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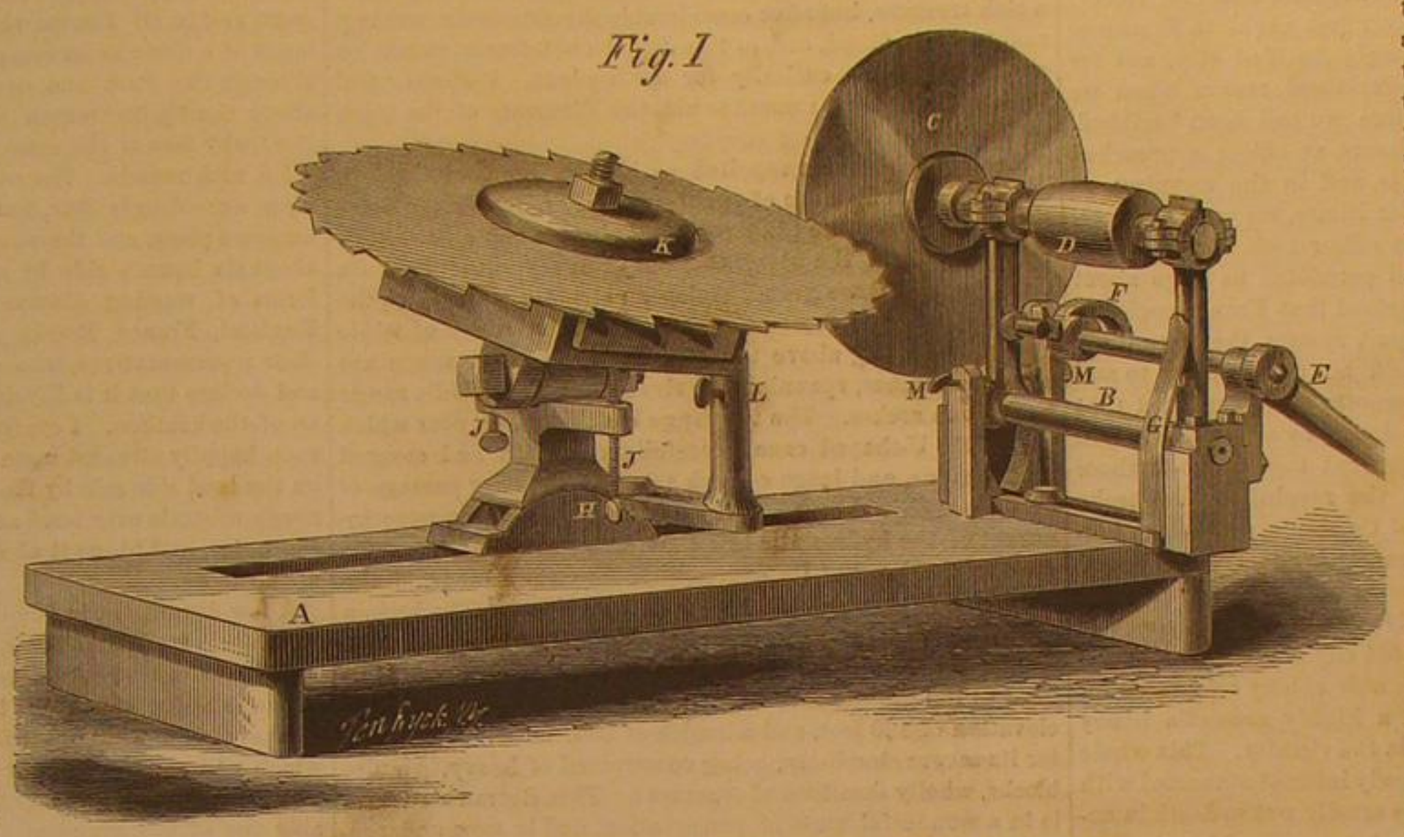
Improvement in Gumming and Sharpening Saws.

One of the difficulties experienced by practical sawyers in the use of their saws is the trouble of keeping them in working order. A large portion—too large—of their time is expended in filing, gumming, or adjusting their saws. A handy, cheap, and portable contrivance for this purpose is certainly a desideratum. The one shown in the engravings contains all these requisites. It may be temporarily affixed to any bench, moved from one place to another, and is adapted to all sizes and styles of saws. The saw, whether circular or straight, can be presented to the gumming wheel at any angle.

Fig. 1 is a perspective view of the machine in position for operation; Fig. 2 shows the method of securing a straight saw to its bed in readiness to be operated upon by the emery wheel. Let A represent a table, or a section of a work bench, with a slot for receiving the standard of the saw support. The standard which holds the gummer or emery wheel and its appliances has a slotted bottom through which and the bench passes one or more bolts by which it is held in position, the slot allowing for lateral adjustment. The uprights, which have the journal boxes on their upper end, are secured to the shaft, B, allowing a swinging or rocking movement to the gummer, C, and its shaft, which is driven by a belt on the pulley, D. The gummer is advanced to the work by the lever, E, on the shaft of which is a cam, F, working against a stud on the inner side of one of the uprights. A spring, G, returns the gummer to place when the pressure on the lever, E, is withdrawn.

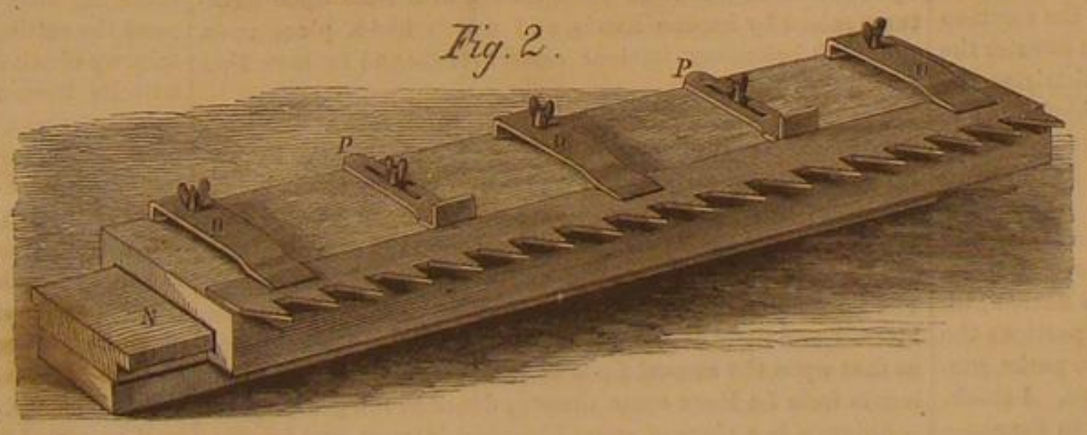
Fig. 1



MARKLAND'S PATENT ADJUSTABLE SAW GUMMER

The foot of the saw support is pivoted or hinged to the base, H, both being held firmly to the bench by a bolt passing through the slot. This allows the saw to be set at an angle to the gummer. The saw is canted in the transverse direction by a joint and bolt, which permits teeth of any angle of edge to be adjusted to the gummer. Two screws, J, hold the bed of the saw in the position desired. The bed itself, is dove-tailed, and a corresponding sliding block fits the recess, and is held by a set screw. The bolt, which, with the flanges, K, hold the saw to the block, is small enough to fit the smallest eye, and larger eyes are fitted by means of properly sized thimbles. The stand, L, supports an adjustable rest to steady the edge of the saw on which the gummer is at work. The amount of forward and backward movement of the gummer frame is governed by thumb screws Fig. 2 is a sliding rest for holding straight saws, its lower portion, N, being formed to fit the same bed as that which the block for holding the circular saw fits. The saw is held by the clamps, O, and adjusted to place by the stops, P. Small fans may be attached to the flanges which secure the gummer to the shaft, one on each side, to keep the teeth of the saw cool while being operated upon. A pan of ice on the bench under the gummer will serve to cool the air before it is taken up by the fans.

Fig. 2.



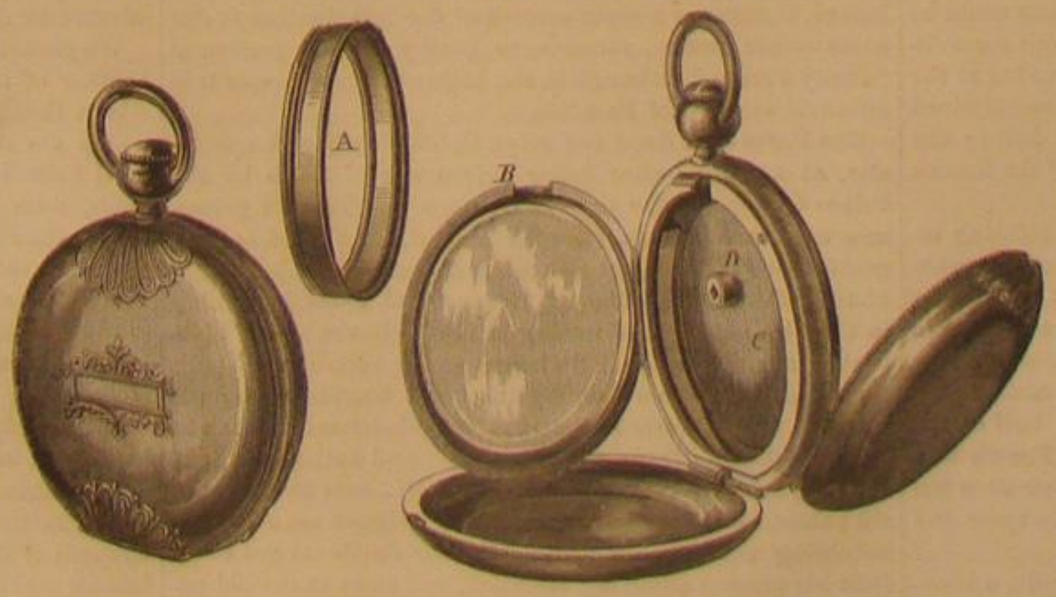
The operation of the machine may be readily understood from the foregoing detailed description and the engravings. It was patented April 2, 1867, by Thomas T. Markland, Jr. The machines will be furnished on application to J. B. Bartlett & Co., 248 South Eighth street, Philadelphia, Pa.; J. B. Bartlett & Sons, 924 Arch street, same city, or W. H. Miles, 117 John street, New York.

Improved Watch Case.

The actual wear of watch movements, apart from the presence of dirt, is very slight. A watch must be kept clean if good results are expected; but it has been found difficult to so construct a watch case that it will not, after being used a short time, admit not only moisture but particles of dust. The patentee of the improved watch case shown in the engravings, however, is confident of having constructed a case which is both dust and water tight; and practical watch makers, including the celebrated American Watch Company of Waltham, Mass., indorse it as a valuable improvement.

As will be seen, it is a capped or hunting case made quite heavy. Inside the center or body portion, on which the back and cover close, fits a ring, A, having a thread cut on one edge of its exterior surface engaging with a corresponding thread on the inside surface of the center, or is secured by studs, pins, or other suitable devices. To this ring the movement is attached, and the bezel, B, containing the crystal, and the cap, C, snap over the edges of the ring, making a perfect case for the movement, in addition to the center, back, and cover, forming the outer case. The cap, C, has a box or tube, D, surrounding the key hole, and embracing the fusee arbor, inside of which tube is placed a packing of soft chamois skin, or other suitable substance, rendering the whole impervious to all foreign substances.

The inventor states that he immersed a watch, inclosed in one of these cases, in water over night without any damage to the movement, and that watches provided with the improved case are eminently fitted for persons employed about engines—stationary, fire, or locomotive—in mines, flour mills, etc. The patent was obtained through the Scientific American Patent Agency, by S. D. Engle. The device is applicable to all styles of watches. Further information relative to the improvement may be obtained by addressing Messrs. Jacot & Brother, No. 9 South Second street, Philadelphia, Pa.



ENGLE'S PATENT AIR TIGHT WATCH CASE.

Dissolving Bones.

The importance of phosphates, such as common bones, as fertilizers, especially in grain culture, could hardly be extolled, and it would be presuming upon the intelligence of our farmers to say more than to recommend their application. There exists, however, some obstacles which yet prevent waste bones, nearly always cheap and within easy reach, from being generally used. The great distances in the far west, and other inconveniences, render their purchase in powder form expensive, and for grinding them at home, or dissolving in acid, there is still less chance.

Professor Ilienhof, in Russia, has, however, lately discovered a method for dissolving them, which must prove highly economical and suitable in unsettled countries, where, owing to the great abundance of forests, wood ashes are cheaply secured—indeed, are almost always ready at hand. This new process of treating bones consists of mixing them with wood ashes and slaked caustic lime, and keeping the mixture constantly moist. As in the preparation of lye for manufacturing soap, the alkaline carbonates in the ashes, such as carbonate of potassa, are by the action of caustic lime converted into free caustic potassa, attacking and quickly dissolving the bones.

The following practical example will illustrate the necessary proceeding. Suppose the wood ashes to contain about 10 per cent carbonate of potassa, and that 4,000 pounds of bones are to be worked up; then we take 4,000 ponnds of ashes, 600 pounds of caustic lime, and 400 to 500 pounds of water. A ditch, some two feet deep, of such width and length as to hold 6,000 pounds of the mixture, is dug, and near it a second ditch, being some 25 per cent larger, and both lined with boards. The lime is then slaked, and, when crumbled to a powder, mingled with the wood ashes; and 2,000 pounds of bones piled up in layers, and covered up with the mass in the smaller ditch; 3,600 pounds of water added, and the whole left to itself. From time to time small quantities of water are added, to keep the mass moist. As soon as it is found that the bones are so far decomposed that when pressed between the fingers they are soft and crumble, the second portion—*i.e.*, the other 2,000 pounds of bones—is brought into the larger ditch, and covered in layers with the first mass, and left to decompose.

After the whole mass has undergone decomposition it is suffered to dry, by removing it; and, lastly, to facilitate its reduction to powder, mixed with 4,000 pounds of dry turf, or some other dry vegetable earth. The mixture is repeatedly stirred about with a shovel and may at once be brought upon the fields. Manure prepared thus will contain about 12 per cent of tribasic phosphate of lime ($3\ CaO,\ PO_5$), 2 per cent of nitrogenous matter. This manure must, from its composition, produce an admirable effect upon grape vines. Liebig, in generally recommending this new fertilizer, thinks an addition of gypsum an improvement for many kinds of fruits.—*Agricultural Report.*

Sheep Wash.

Tobacco juice has long been employed with success as a wash for sheep to keep them clear of vermin. What a pity that the wasted expectorations of tobacco chewers could not in some way be economized. The liquid saved would be more than sufficient to swim all the sheep in the world. Edward B. Booth, of St. Louis, Mo., has lately patented a sheep wash as follows:

"The object of my invention is to produce a liquid com-

pound that will keep the skin of sheep in a healthy condition free them from scab and vermin, and keep the wool clear of vermin.

"I take 100 pounds of tobacco, refuse, stems, etc., and boil it in 50 gallons of water long enough to produce 40 gallons of the extract of tobacco, which will be from one to six hours, according to the degree of heat and strength of the tobacco While the liquid is hot I add to it gradually common pulverized chalk, till effervescence ceases. Then, when this mixture is cool, I add 1 gallon of tersulphide of calcium, prepared in the usual way, and mix thoroughly.

"When the compound is to be applied, one pint must be diluted with one gallon of water, and then the sheep washed with or immersed in it. This is equally efficacious when applied to cattle and other animals."

EDITORIAL CORRESPONDENCE.

Passports in France—The Antiquities of Nimes—Pont du Gard—Avignon—Papal Palaces—Laura's Grave—Hercules and the Ligurians—Marseilles to Nice—A Trip over the Corniche Road—From Geneva to Spezzia—A Magnificent Sight.

SPEZZIA, Jan. 9th, 1868.

On quitting Spain we spent our first night in France at Perpignan, a dull, ancient, strongly fortified city, not far from the frontier. For some unexplained, reason when we alighted from the diligence, where we had been "cribbed, cabined, and confined" for ten hours, an officer approached and civilly asked for our passports, and in the morning, as we were about to take the train for Nimes, we were again requested to produce them; but the officer took our word that we were traveling Americans, and permitted us to go about our business. It should be understood that France professes to have dispensed with the passport system, therefore it appeared to us singular that we could not come and go to and from old Perpignan without passports. We surmised that this excessive vigilance was occasioned by some convention between Spain and France, to prevent the escape of those Spaniards who were concerned in the revolution that broke out last spring in the province of Catalonia, a province bordering this portion of France. Francis Arago, the celebrated astronomer, was born in a small town near to Perpignan, and for many years was a representative in the French Assembly.

Our journey led us through the old city of Narbonne, which boasts of Roman antiquity, but is now chiefly celebrated for its industrious bees, who gather a highly aromatic honey from a disconsolate looking heath in the vicinity. This whole region, however, has a mournful, bloody interest connected with the heretical Albigenses, who were cruelly put to death in answer to the call of the Church of Rome. The historian asserts that 60,000 were massacred, but the inhuman abbot declared in a letter to Innocent III. that he could only slay 20,000. "Kill all," said he; "the Lord will recognize his own." Here the vine is extensively cultivated, and some exquisite qualities of wine are produced, such as the sparkling St. Peray, which is made from the natural juice of a sweet grape, and accounted to be more wholesome than the common sweetened champagne. "The nearer the bone the sweeter the meat." So it is here in these wine producing districts—the rougher the soil the sweeter the wine. Throughout this section there are also numerous unwholesome lagoons of salt water, from which an immense quantity of salt is produced by solar evaporation.

Nimes is one of the oldest and most interesting cities in France, and abounds in remarkable and well preserved Roman remains and antiquities. The old city has narrow, ill-regulated streets or lanes, but in the newer portions the streets are broad avenues. Beside, there are fine parks, gardens and promenades, well shaded and well kept. I think, on the whole, that it is one of the prettiest cities in France—a spot where the weary traveler might comfortably stop to rest for a few days to repair damages, and recruit for a trip towards Italy. There are upwards of a hundred distilleries in Nimes, but the people appear to be sober and industrious. It is not known who founded the Ampitheater, but it is said to be much better preserved externally than the Coliseum at Rome. The building is oval-shaped, seventy feet high, with double row of arcades or galleries, sixty on each story, the lower ones serving as so many entrances to the arena and galleries. It is probable that 20,000 spectators could be accommodated, as there are thirty-two tiers of stone seats rising one above the other. Recent excavations have led to the discovery of a sub-arena, which is supposed to have contained an artificial forest of trees, which were elevated during the time when animals were fought in the presence of the Roman Emperor and on other great occasions.

The guide who conducts visitors through the building assured us that this was the idea which archæologists entertained respecting the sub-arena. It might just as well be that as anything else. A few workmen are kept employed in repairing such portions of the Ampitheater as threaten ruin, and some restorations have been successfully carried out. The arena is now used for very innocent French bull fights, which differ from those in Spain in this, that French bull fights are perfectly bloodless exhibitions, as the law does not permit any wounding of the animal; they simply tease and annoy him.

Here is also to be seen a little Corinthian temple, a beautiful and well preserved specimen of architecture—a miniature of the splendid Church of the Madeleine in Paris. At one time this temple was degraded to the purposes of a horse stable, but it is now used as a museum for antiquities found in the neighborhood, and some pictures, one of which, the master-piece of Delaroche, represents Cromwell lifting the lid of Charles I.'s coffin, and looking at his headless corpse. The well preserved, double-arched Porte of Augustus, which now serves as the entrance to a stable yard, was erected sixteen years before Christ. Within the enclosure of a fine Public Garden are to be seen the Roman baths of Augustus, also the ruins of the Temple of Diana. During the progress of the excavation of the baths, a large Corinthian column, with a finely cut capital, was unearthed, and within the temple there are some splendid pieces of sculpture in marble, statues, and bas reliefs. During the past summer a laborer working about the roots of a rose bush, dug up a curious bas-relief, nicely chiseled, which represents "Old Father Time" discovering truth. In his wanderings about this world of care, Father Time, on one occasion, came across a man having three children, and was naturally curious to know whence they originated. Upon lifting a robe, or veil, he discovered a beautiful female figure concealed beneath its folds, and thus maternity was fully revealed. And thus it is that sooner or later time discovers truth. Upon a hill rising high above the garden, there is a singular tower, dismantled and broken. For what purpose was this high pile of stone erected? Some wise ones say it might have been a light house, but it being fifty miles from the sea, this hypothesis is not a supposable one. Some miserly gardener imagined that it might contain a rich treasure, but after considerable digging and searching, nothing was found, and to this day the old tower stands on on the hill-top, a curiosity for the curious. Perhaps "Old Father Time" may sometime aid the discovery of the truth in this case.

Ancient Nimes was supplied with water brought through an aqueduct a distance of twenty-five miles. A carriage drive of two hours, on the high road to Avignon, and a little turn up the valley of the river Gardon, brings you to "Pont du Gard," one of those grand, cyclopean structures for which the Romans were so famous. It consists in a range of triple arches, one rising above the other. In the lower range are six grand arches, spanning the river bed. The middle range has eleven arches. The top range has thirty-five, over which passes the U-shaped canal, carefully cemented and covered by flat stone, and large enough to admit the easy passage of an ordinary sized man. It is said that the Romans were ignorant of the hydrostatic law that water confined in a tube rises to the level of its source, therefore they incurred the enormous expense of building open aqueducts. The broken remains of this structure are visible for miles from where it crosses the Gardon, and the cement used for the lining is as hard as the granite rock itself. The aqueduct bridge has an elevation of 160 feet, and a length of 886, and is more grand for its severe simplicity, being constructed of heavy, granite blocks, wholly destitute of ornament. This Roman structure is in a wonderful state of preservation, and is now undergoing some repairs for the purpose of once more returning to its original duty of carrying water to Nimes. It has stood in its present solitude for nearly two thousand years, during which time sixty-six generations of living men have come and gone, kingdoms have risen, flourished and been destroyed,—indeed, how many strange thoughts and associations crowd upon the mind when one gazes for the first time upon structures raised by human hands, and which had a place upon the earth before our Saviour came to seek and to save that which was lost.

There are evidences that the river Gardon was at one time six feet at least higher than at present, and that the beautiful valley dotted with towns and villas, which opens below the rocky hights of Pont du Gard, was once wholly submerged; for at the base of the rocks, above the carriage road, are extensive caves worn out by the action of the waters. The jolly hermit who has a comfortable dwelling place for himself and little dog in one of the smaller caves, informed us that upon the annual feast of the Pentecost the pious villagers from La Foux come there to dance in the grand cave.

Avignon is a place of great historical interest, and I amagine that at the right time in the year it might be an agreeable spot to spend a few days, in rummaging about amid the rubbish of old papal palaces and Roman antiquities, which abound in and around the old, weather-beaten city; but we chanced to visit it when the *mistrale* was blowing violently, which chilled all our zeal for the dead past, and compelled us to think more of the present. The *mistrale*, at certain seasons, is the scourge of this section. It blows about three months in the year, and is bitterly cold, drying, and painful. Indeed, it requires a great stretch of the imagination to discover either poetry, romance, or beauty in this portion of "sunny France," although in the brains of some people it is esteemed as a sort of Paradise.

The Popes once lived and reigned, temporally and spiritually, at Avignon, after being driven out of Rome by the Prince Colonna, in the days of Gregory VI. The old palace, now used as a barrack for soldiers, still exists, and is altogether one of the ugliest structures in Europe. It has a long history of luxury, profligacy, tyranny, and blood, beginning in the 14th century and ending in 1791, when scores of innocent men and women fell victims to the infuriated French revolutionists, whose horrid crimes and butcheries are unmatched in the world's history, since Christianity came to bless mankind. Three usurpers of the papal authority, Clement VII., Benedict XIII., and Clement VIII, once occupied the old palace, and the good inhabitants of Avignon are even now indulging the hope that Pius IX. may decide to get away from his present annoying situation, and come to the old papal home. There is a marked difference between the church architecture of Spain and France. The former is grand, impressive, and very magnificent. The latter is usually gloomy, mean, and very unimpressive.

We could not quit Avignon without visiting the grave of Petrarch's Laura, within the enclosure of the old Museum, and over which some sentimental Englishman has placed a rustic marble cross.

The Paris and Mediterranean railway passes through Avignon, and Marseilles is reached in about three hours. Between the two cities the road runs through "Campus Lapideus," a plain of thousands of acres, covered with a mass of round pebbles. This is the spot, according to tradition, where Hercules fought the Ligurians. Having exhausted his arrows, Jupiter sent for his use a shower of stones. Some critic, however, has endeavored to spoil the story by saying that if Jupiter really intended to assist the son of Jove, he could have done so more effectually by showering the stones upon the heads of the Ligurians.

Just before reaching Marseilles, the railway passes through a tunnel three miles long, emerging from which the Mediterranean appears in view. Marseilles is a very enterprising, commercial city, but I must confess a dislike to commercial cities in Europe. They have a rough, business element about them, which shows itself in heavy trucks, carts, and other appliances of an active commerce, which jostles the romance of travel, especially after one has been buried for a time amid the antiquities of Spain, Nimes, and Avignon. Still, I feel bound to say that the city of Marseilles exceeded my preconceived notions. Its newer streets are usually broad and elegant, and in all Europe there is not another city which can boast of a drive to be compared with that along the Prado, through the Park and over the little Corniche, which rises above the Mediterranean and extends for three miles along the rocky face of the coast, until it reaches the noble harbor filled with vessels. The combination is very grand, and the view exceedingly fine, but travelers dislike long stays in a business place, and therefore from this point rush off to Nice, about six hours's ride by rail, where humanity in its varied forms of wasting disease and robust health, congregate. England, France, Russia, and ubiquitous America, all have their representatives, who eat, drink, sleep, dance, and sun, and declare that it is Elysium—though not exactly the heaven of the heathen. I confess that I like Nice. It is a sunny spot, happily situated upon the Mediterranean and sheltered on the land side side by the Alps Maratime, which carries the rough mistrale over head and into the sea, where it often lifts the water, and blows it about the surface like snow dancing upon the ice.

A few days spent in Nice only sharpens the desire to press on towards Italy, and the question arises by what way shall the trip be made? A tolerable steamer enables you to reach Genoa in about nine hours if the weather be good, but to go in that way one misses the famous "Corniche Road," to do which will require the best part of four days; but then it offers great advantages over the trip by sea, as it is unquestionably one of the grandest things to be seen in Europe. We decided in favor of the road, and having bargained with an Italian *Vetturini*, who had just come through from Genoa, we left Nice at noon and soon found ourselves slowly wending our way by zig zags up the sides of the mountains, having always in full view upon one side the snowy peaks of the Maritime Alps, and beneath, unrivalled Nice, with its surrounding olive groves and the Mediterranean stretching beyond the setting sun. Having gained the top of the mountain, we obtained a view of the picturesque village of Turbia, with its Roman ruins perched, like an eagle's nest, upon a ledge of rocks, and, thousands of feet below, upon a sharp promontory, jutting out into the sea, the famous little Principality of Monaco, resembling one of those modeled cities which are often seen in museums.

This miniature spot is a sort of political excresence upon the rocky headlands of France, and is entitled to the position it holds as the smallest independency in Europe. The Prince of Monaco claims his title by a long hereditary line reaching back to the tenth century, and although the town contains but 1,500 souls, the Prince has his grand palace, and is well well protected by fortifications of no mean pretensions. His Highness' chief source of income is derived from a gambling saloon, where fashionable gentlemen can go down twice a day from Nice to try their fortunes at *roulette* and *rouge et noir*, the boat returning as late as eleven o'clock at night, which enables them to make a long and usually very unprofitable day of it. I have heard it remarked that guests stopping at the hotel at Monaco are sometimes, in a polite way, informed that their room is considered better than their company if they do not patronize the games so graciously instituted for their benefit.

We passed our first night on the "Corniche" at Mentone, another of those very pleasant Mediterranean health ports, where invalids put in for balmy air and cheerful sunshine which are denied them in northern latitudes. The whole coast from Nice to Genoa is a succession of bold, rocky headlands, with intervening valleys and very picturesque old towns, the road being often cut in galleries along the side of the solid rock, sometimes running through tunnels under mountains, again across valleys, in full view of the sea, presenting to the traveler a constant and ever varying panorama of grand scenery; and what increases the interest very much, is the truly wonderful piece of railway engineering which was begun some years ago for the purpose of bringing Nice and Genoa nearer together.

The distance is 122 miles, and some idea may be formed of the magnitude of the work when it is known that there are upwards of 150 tunnels already made through the solid rock, besides many miles of causeway along the borders of the sea, protected by revetment walls to prevent washing. Some of the tunnels have caved in, and although millions have already been expended, the work seems to have stopped.

The Corniche road runs through the outskirts of the village of Bordighera, the spot where Ruffini has laid the scene of his story of Dr. Antonio—a most charming tale—which has added very much to the interest of this Riviera Province. Here the palm is extensively cultivated, and since the days of

Sixtus V, Brodighera has had the special privilege of supplying St. Peters, at Rome, with palm leaves to be used in the Church ceremonies before Easter.

The road passes aronnd the walls of the ancient city of Albenga, the streets being too narrow to admit the safe passage of vehicles. The houses of these old towns along the road are usually very high, and the spaces between them, which serve as streets, more resemble deep rifts through a ledge of rocks. It was also curious to see heavy stone arches thrown overhead across the streets, from house to house, having the appearance of so many little foot bridges. But I understand that they were intended as safeguards against earthquakes, which, in former times, were frequent, unwelcome intruders.

Not far from Genoa we passed through the little seaport town of Coggoletto, which claims the honor of having been the birthplace of Christopher Columbus. The house wherein this great event took place, upward of four hundred years ago, is in a block on the main street, three stories high, having a rude fresco of Columbus, and the family shield, with an inscription painted upon its stuccoed front. The lower floor is now used for a very small grocery.

"To what base uses do we come at last!"

We reached Genoa toward evening of the fourth day of our trip, in the midst of a violent snow storm, which reminded us more of rough New England than of "soft, balmy Italy." We were informed that no such storm had occurred for a century. We stopped just long enough in Genoa to confirm what every body is supposed to know that it is a beautifully situated busy commercial city, of narrow streets and fine old palaces, usually magnificently fitted up. From Genoa we hastened on by carriage to the gulf of Spezzia. The trip occupied two days and surpasses the Corniche in beauty and varied scenery. Near to the top of the mountain above Sestri, where the road winds across a high promontory overlooking on either side a wide extent of land and sea, we were favored with one of those magnificent sights which are peculiar to the Mediterranean coast. Upon one hand we had a charming, and extensive view of deep valleys and green mountains, having their steep sides terraced up to form long narrow table lands for cultivation, overhung with the olive, ilex, the mulberry, and the vine, with here and there fine villas, plain stone cottages, and tall white campinales of churches rising gracefully above the foliage. Still higher up the mountains the dwarf pine, the myrtle, and other evergreens, now decked with snow. Upon the other hand, a broad sweep of the Mediterranean with a long stretch of beautifully indented coast, cheerful looking villages, and over the sea on one hand a heavy storm as clearly marked as if composed of so many silken cords suspended from the clouds; on the other hand the rays of sunlight, streaming through broken openings in the clouds, making the water look like a vast mirror of burnished gold, whilst beyond and nearer to the horizon we could discern the skeleton forms of ships appearing like the apparitions of so many goddesses of the sea, and above our heads, capping the summit of a mountain peak, a heavy snow cloud, into which we soon passed when we were enveloped in a heavy snow storm, and thus vanished from our sight a picture which the masters have never transferred to canvas. We are now at a hotel in Spezzia where Garabaldi was recently a prisoner under guard, and in sight of the finest harbor in Italy. S. H.W.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Nitro-Glycerin---Its Dangers and its Advantages.

MESSRS EDITORS:—Permit me to offer a few suggestions in respect to nitro-glycerin since it is an agent so powerful in blasting rock that it is destined in a few years to play an important role in civil engineering; wherever the rock is exceedingly tough and the quantities to be removed are sufficient to permit its manufacture on the ground and pay for intelligent supervision, it will inevitably be largely used. Contractors and miners who study economy or who are under engagements to complete works within a limited period will resort to its use on account of its immense power and consequent economy, in spite of liability to accident. A brief review of some accidents that have been published, and the teachings to be gathered from them may not be out of place.

Discovered by an Italian chemist, A. Sobrero, in 1846, nearly eighteen years elapsed before it attained its present terrible notoriety in the United States; the accident in front of the Wyoming Hotel being the precursor of the slaughter of forty-five persons at Aspinwall, and six persons in the offices of Wells, Fargo & Co., at San Francisco. It is to be regretted that Alfred Nobel, the Swedish engineer, whose name is associated with its introduction to the United States, was not a chemist, since, had this been so, there is very little doubt but the fact of its tendency to decomposition at a temperature of from 110° to 130° Fah. in the presence of organic matter would have been discovered and guarded against, or at least not ignored, with so fearful a loss of human life.

The explosion at Aspinwall was a necessary sequence of shipping nitro-glycerin from a port (Hamburgh) where the temperature was at the time of shipment 55° to 60° Fah., to a tropical climate where the temperature was 110° to 120°, aggravated by the cases being confined in the hold of a steamship, the containing vessels being closed with cork. If the nitro-glycerin had not been thoroughly washed, the chemist will at once recognize in the above description elements certain to culminate in disaster.

The gases disengaged by the surging of the nitro-glycerin against the cork and decomposing it, would permit the nitro-glycerin to escape into the surrounding packing (sawdust). This would generate a new and easily ignited compound, and being mixed up with the undecomposed nitro-glycerin subjected to the rough handling of the stevedore's employés (a thermometer in the hold of the vessel probably would stand at not less than 180° in that climate), the sun pouring down the hatchways added to the radiation from the steam boilers and furnaces, an explosion would certainly occur. The use of it has undoubtedly been retarded by the above accidents, and the public have not been reassured by a vein of bravado which affects to pooh-pooh the possibility of an accident in its use. Your columns contain a statement of thousands of blasts having been performed without accident, of driving over roads with it at a rapid pace, but unfortunately these assertions were so speedily succeeded by an accident destroying eight persons accompanied by a mild censure of the coroner's jury on the person who made them, that less confidence than ever seems to be felt with regard to its use. Meanwhile, at Newcastle-on-Tyne, England, the sheriff and town surveyor with four other persons were hurried into eternity while engaged in burying some cases of this compound in a creep or crevice of an old pit the object being to remove it from the city and thus prevent accident.

The lesson to be derived from these accidents as I conceive for parties proposing to use nitro-glycerin is not to entirely rely upon the statements and assertions of others relative to the properties of the identical specimen they are about to handle, but with sober caution in every case verify for themselves, by experimenting with a few drops at a time the actual quality of the nitro-glycerin they are about operating with, for it differs in purity and liability to explosion.

It will be noticed that the principal accidents that have been published have occurred not to miners in their actual use of it for mining purposes but either in moving, transporting, or liquefying the compound when it had congealed, etc. In one case, however, a miner struck the rock that had been disturbed but not broken up by the blast to ascertain if it was rotten or solid (the nitro-glycerin had been poured into the drill hole without a cartridge); an explosion occurred from the blow on the distributed nitro-glycerin. Another case of a miner who for weeks previous to and at the time of the accident had been habitually drinking, using the magazine to store his bottle of whisky as well as the cans of nitro-glycerin and who, marvellous to relate, concealed his drunken habits from his employer. This case needs no comment; it is obvious a drunkard would be entirely unfit to have charge of a magazine whether containing nitro-glycerin or gunpowder. Instant dismissal of such a man, even if it stops the works, is an imperative duty in justice to his fellow miners.

There is one element of danger in manufacturing nitro-glycerin which will be overlooked by the tyro, viz., impurity of the acids used. It involves considerable care and skill to prepare concentrated nitric acid free from nitrous fumes, and if free when prepared, still exposure for a few minutes to the sun's rays, or any organic matter dropped in, causes decomposition; now if such acid be used, the washing (after the nitro-glycerin is produced) is so tedious, it must be continued so persistently, that few employés will give the labor requisite to ensure its thorough removal. Impure nitro-glycerin is the consequence, and, like a slow fuse, it is only a question of time how long it will take to reach the point of explosion. Manufactured where it is to be used, and used as soon after it is made as may be conveniently possible, avoids, however, this element of danger—less washing is then possible. Pure nitro-glycerin is colorless; a yellow tint indicates impurity, either of dentoxide azote, or iron contamination, caused by using iron vessels in the course of manufacture.

It may be purified by dissolving (very gradually) and at a low temperature not exceeding 50° Fah., in sulphuric acid and separating by the gradual addition of nitric acid always maintaining the temperature below 50° Fah., then pouring the mixed acids and nitro-glycerin in a fine stream, into at least five times their volume of cold water and thoroughly washing with distilled water the precipitated nitro-glycerin. The water used for washing should have its atmospheric air removed by boiling and then be allowed to cool. Condensed steam will answer. Printed assurances have been circulated that nitro-glycerin may be safely exposed to a temperature of 212°, that it may be stored for an indefinite time, without loss in weight or deterioration in quality; that it is insoluble in water, and that it is a fixed oil not subject to evaporation. In a limited sense, these assertions are true of a chemically pure nitro-glycerin; thus, under certain conditions, say at a temperature of from 50° to 60° Fah., pure nitro-glycerin entirely free from deutoxide azote and from organic matter may be stored for an indefinite time without deterioration. It is not vaporizable at ordinary temperatures but dropped on to a hot surface of soapstone it does evaporate and it is (sparingly) soluble in water.

But if commercial nitro-glycerin, as imported, be heated repeatedly in bulk from 110° to 130°, and then stored at 120° or thereabouts, an explosion will follow; the authority for this assertion is Prof. Abel, Supt. Laboratory, Woolwich Arsenal. An impression exists that in the congealed state it is more easily exploded than in the liquid form. I think otherwise. Fragments, the size of a bean, laid on a cold face and struck repeatedly with a cold steel hammer (temperature 28°) could not be exploded. Cartridges, 14 inches by 1¼ in diameter filled with nitro-glycerin and exposed to cold so as to solidify their contents were armed with a charge of powder a percussion cap containing 3 grains fulminating mercury (sporting caps only contain half-grain charges) and a fuse, were placed on ice and the fuse fired; the cap and powder exploded, the cap being driven four or five inches down into the solidified nitro-glycerin, the tin cartridge was split open, and the cylinder of frozen nitro-glycerin driven through the tin bottom of the cartridge. When a cartridge of liquid nitro-glycerin armed in a manner similar to the preceding was fired, explosion took place, firing at the same time the congealed nitro-glycerin that had missed exploding.

The conclusions I arrive at from the above observations are: 1. That nitro-glycerin will be largely used, owing to its great economy in mining, especially in very tough rock. 2. That the temptations to secure a profit regardless of a due sense of responsibility will tempt manufacturers to offer an impure article and unless this be carefully watched in magazine or speedily used great accidents will be apt to occur. 3. The miner should see that his nitro-glycerin is colorless and inodorous, if he stores it away; if it has a yellow tinge, emits bubbles, or gives off gases, or if on opening a can there is any indication of pressure and if on inhaling the air in the can there is a disagreeable or suffocating sensation in the trachea such nitro-glycerin is dangerous to store and should be used immediately or purified as previously directed. 4. That general statements relative to nitro-glycerin cannot be entirely trusted, for the reason that the writer may be describing either a pure, a comparatively pure, or an impure article, and remarks applicable to the pure article do not hold good as applied to a partially decomposed or decomposing nitro-glycerin.

GEO. M. MOWBRAY, West Shaft, Hoosac Tunnel.
North Adams, Mass.

Rotary Yokes and Bells.

MESSRS. EDITORS:—The practice of rotating bells for alleged security against breakage, by the use of any of the so-styled rotary yokes, in order to have the clapper strike on spots that may be changed and multiplied, until the entire inner circle of the sound bow-ring or a succession of spots in it is hammer-hardened and expanded, has no warrant in science or practical mechanics. All the particles adjacent to the hammer-hardened inner circle or succession of spots thus produced are subjected to a forced strain that impedes free vibration and weakens cohesion. Every considerable change of temperature, and all vibration producing sound from the bell increases this strain; sometimes both causes co-operate, and then as the disturbance of the particles is always greatest at the greatest diameter of the bell where the hammer-hardened spots or surfaces are made, and the forced strain exists, the danger of breakage is enhanced. It is well known that genuine bell metal composition in the form of a bell preserves the property of elasticity to that extent that the arrangement of the particles undergo no permanent change by any amount of vibration in ringing, only at the clapper spots. It is also known that bells have been in continuous use without breakage for a period as long as seven centuries with the clapper striking only on the two opposite spots. In all such cases, the clapper first wears a slight depression that is a counterpart of its form, at the spot where it strikes; the clapper and the spot conform to each other so completely after a time as to avoid all appearance of further wear. The spot is thus better suited to receive the impact of the clapper stroke and initiate the vibration which from thence pervades the whole mass of the bell without encountering condensed portions which would impede vibration by the partial immobility of the packed spots as will always be the case where there is a ring or a succession of spots hammer-hardened. A discussion of this question by a late commission at the Parlimentary Buildings in England tending adversely to the supposed benefits in the practice of swivelling bells in rotary yokes; and the collection of a number of facts and a number of broken bells that had actually been rotated, prompt these remarks.

J. C. M.

Cincinnati, Ohio.

Length of the Day---How to Make Plaster of Paris Harder.

MESSRS. EDITORS:—It has occurred to me that neither in the articles in your paper on "The Day Line" nor elsewhere have I seen the fact mentioned that the entire length of each day is 48 instead of 24 hours as always taught. Of course I mean its duration on the earth; not at any one place. I mention it because to all to whom I have spoken of it, it was a new idea, and it may be so to a great many others. I presume it is not necessary for me to explain how this is; as it will be evident on examination to those who have not before thought of it.

I also thought it might be worth while to say in relation to the question asked by "C. H. G., of Tenn.," No. 5, current volume, that I have experimented with plaster of Paris in the way of which he speaks, and, with one exception, have found all admixtures to impair the hardness of the plaster. The exception is iron filings. When these are mixed with plaster they rapidly oxidize, and the coherent mass of oxide of iron formed, adds its own strength to that of the plaster, making a very firm mass, which has also the advantage of strongly uniting itself to surfaces of iron. I have not observed what proportion of the filings is best, but suppose they should form about one fifth the whole weight. F. BOWLY.

Winchester, Va.

Remedy for Smoky Chimneys.

MESSRS. EDITORS:—May I communicate the result of my observation and reflection on some kinds of smoking chimneys, or such as have an imperfect draft? If a chimney is built near a wall or any other obstruction to the passage of the wind when it is blowing from the side on which the chimney is erected, the compression of the air in the vicinity of the wall is such that it will seek every crevice, stove-pipe and chimney through which to escape, thus producing a draft the wrong way. Remedy: Raise the vent of the chimney above the region of compressed air; or move it back or to one side, out of it. G. R. H.

Centralia, Mo.

Heating Cars---A System of Telegraphic Signals.

MESSRS. EDITORS:—In your issue of Jan. 25th, a correspondent, referring to the *Angola* disaster, asks, "Would the flood of scalding water from the broken pipes have been any more merciful?" etc. He evidently has but crude notions of what is requisite in the application of water for warming cars. No huge tanks of boiling water, as may have been in his fancy, are required for this purpose.

To most comfortably warm every passenger in an ordinary railroad car requires but about a dozen gallons of *warm* (not *scalding*) water, circulating through a single pipe, of one and a half inches diameter, running along the sides of the car, and under each seat, so as to be in easy contact with the feet of every passenger.

This pipe being of very strong wrought iron, and firmly fastened, might be bent; but could hardly be broken by any railroad accident. Even were it to break, and the water "scalding," so small a quantity distributed over the entire floor space of the car could not possibly do any very serious injury.

A dull coal fire, strongly inclosed within a well-secured stove in one corner of the car, or under it, warms the water. In case of a "smash up," the probabilities are that the water, if let out, would protect the passengers by extinguishing the fire, rather than otherwise.

The above brief description is that of my arrangement now in use in cars running between New York and New Haven, and to Boston. I would add, that one of the indispensable requisites in this system is to have the circulating water prepa red with salt, so that it cannot freeze when the fire goes out. No safer or "better plan" can be devised.

New York city. W. C. BAKER.

[Another correspondent recommends a stove made of boiler iron, with the openings guarded by dampers and doors to prevent the escape of fire in whatever position the stove may be placed by the overturning of the car. He sends a diagram of a safety stove, which appears to be well designed for the purpose.

For safety from collisions, a correspondent advises that every train, upon arriving at a depot, should be signalled to the next station that it will pass, and not be allowed to leave until an answer is returned, stating that the track is clear; and when again started, the signal of "started" should be again sent forward, so that the train may be expected, and the track kept clear; and in no case should a train be allowed to pass a station, and follow upon the track of a preceding one, until the other shall have reached the next station, and the proper signal have been returned. The same plan should also be adopted with the through express and freight trains passing depots without stopping, so that the ordinary signals now in use may be regulated by these telegraphic messages, which could be modified by using the simple signals of "In" and "Out." When the train has arrived, the message "In" should be used, and when the train has started, "Out" should be employed; and in the event of allowing a train to go past a station at which there may be a train standing, or switched, the signal of "Caution" might be added to the list, and the train would then proceed slowly; also, in the case of an accident between the stations, the very non-arrival of the train in due time, after being signalled as having left the preceding station, would cause an immediate inquiry, and would prevent the following train from running indiscriminately upon it, which is only too often the case.

Tar and Resin Compounds.

Compositions having tar and resin for the basis are almost endless, and so are the patents for them. Almost any simple mixture of these substances, which any one may make, will possess excellent qualities. A recent patent, by Louis Harmyer, of Cincinnati, O., contains the following:—

"This composition is composed of tar, resin, sulphuric acid, copperas, salt, alum, lime, and carbon iron. These articles I compound in the following manner: Take one barrel of tar and boil it for half an hour; then take 10 lbs. pulverized resin, mix with the tar, and boil until the resin is dissolved: then mix carefully with the tar and resin 2½ lbs. of sulphuric acid; then add and mix 10 lbs. of pulverized copperas, 6 lbs salt, 6 lbs. pulverized alum, 60 lbs. lime, and 2 lbs. carbon iron, and the composition is complete.

"This composition is of value for the preservation of wood, metal, canvas, leather, paper, etc., and mixed with another composition, hereinafter described, may be used as a pavement for streets and walks.

"Blocks or pieces of wood, or wooden structures, are benefitted by the use of this composition. The blocks should be saturated with hot composition. Where that cannot well be done, the composition may be put upon blocks, and upon structures, warm, with a brush. On metal, it should be put on in a warm day, or better, in a warm room, with a brush. Canvas may be soaked in it for a few minutes, then rolled and dried. Leather may be painted with it warm. Better to soak it, say for fifteen minutes in warm composition, then rolled and dried in a warm room, and rubbed with rags. Paper and pasteboards for roofing, or for many other purposes, should be saturated with hot composition, and then rolled through rollers. Brick and stone may be soaked in hot composition, or the hot composition may be put on with a brush, etc.

"This composition makes wood water proof and air tight. On metal roofing it is proof against the corroding effects of rain and atmospheric changes. It renders canvas water proof. So also of leather, paper, and pasteboard, and for roofing with paper, is superior to any composition in use.

"For a pavement the composition should be made hot. Then to one barrel of composition add one and a half barrel of pulverized resin, one and a half barrel of lime, and dry fine gravel enough to make it nearly a dry substance. Then put it down hot, and put marble dust upon it.

"To make sealing wax, take one compound of composition, make it hot, and add two pounds of pulverized resin and half a pound of pulverized chalk."

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., FRS.

Lecture III.

In the last lecture I showed you the change which takes place in water when it is gradually cooled; and I showed you in a very striking manner that water when it freezes and becomes ice, expands, and that the force of the expansion is so great as to burst the bombshell which was placed before you in the last lecture. Now follow me for a moment, please. Conceive water at the ordinary temperature; conceive it growing gradually colder and colder. Like almost all other bodies it becomes smaller and smaller; it shrinks as it becomes colder; but at a certain point, and some time before it turns into ice, it leaves off contracting. Suppose the water to go down from a temperature of 60°; it continues contracting until it reaches the temperature of 39° Fahr., or 4° Centigrade; and then the water instantly ceases to contract, and 7° F. before it becomes solid it begins to expand as it becomes colder. What is the consequence of this expansion? The water from 39° Fahr. downwards becomes lighter, and it swims like oil over the surface of the water underneath, and there it is frozen; and when it freezes, when it passes from the liquid state to the solid state, a sudden and very great expansion occurs, so that eight volumes of water weigh about as much as nine volumes of ice, the ice being the lighter of the two, and therefore swimming upon the water.

I must ask you now to accompany me for a moment to some of the things that occur in nature in connection with this subject of heat. You know that at certain parts of the earth's surface the heat is very much more powerful than it is here in England; and you know that the reason for this is that at certain parts of the earth's surface the sun is overhead, and its rays come vertically downwards, and thus heat very much the surface of the earth directly underneath the sun. In the region of what is called the Equator we know that the sun is directly above the heads of the people living there, and at certain distances each side of it. Now, imagine this sun pouring down its heat through the atmosphere upon the sea. The surface of the sea is thereby warmed, a quantity of vapor is produced, and that vapor ascends with the air into the higher regions. When the surface of the earth at the Equator is heated, the air also at that point becomes heated, and rises, as the air of this room rose from the surface of that heated spatula, in the last lecture. When the air at the Equator is heated by the sun, part of it goes toward the North Pole and part of it toward the South Pole, while underneath air rushes in from the other directions to supply the place of the air which goes to the north and south. If you could see the air you would see it going one way and coming back another. A continuous circulation is thus going on, and the winds that are produced in this way have a particular name given them. They are called the "trade winds." The current above is called the "upper trade wind," and the current beneath is called the "lower trade wind." Now, as I have said, when the sun's rays act upon the ocean they convert its water into vapor, and this vapor is carried up into the air. What is the consequence? I want to show you one or two facts that will enable you to understand what must occur.

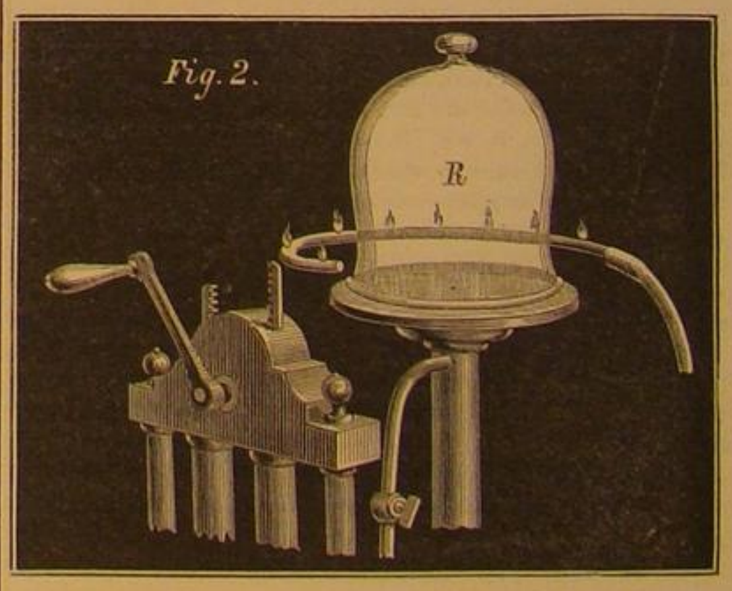
The first fact that I wish to show you is, that if we compress air suddenly we develope heat; and I do this by means of the syringe that I have here. This is a small (Fig. 1) glass tube bored very carefully, and furnished with a piston that fits air tight into that glass tube; so that if I squeeze this piston down I compress the air underneath it. Now, here I have a piece of German tinder, which I place in a little cavity made at the bottom of the piston; and I think I shall be able to ignite that German tinder by forcing down the piston and thus compressing the air. [The tinder was ignited as described.] Now, what we have done here is, indeed, nothing more than simply throwing the atoms (as we have agreed to call them) of the air into this intense state of vibration which we call heat. On the other hand, if we take a body having a certain amount of heat, and, instead of compressing the air, allow it to expand, then the expansion of the air produces cold. I will show you one effect of this expansion of air. I have here condensed in this vessel, forced in by a kind of syringe, a great deal more air than the vessel would contain naturally; and if I were simply to turn this cock, and allow the air to issue from the vessel against an air thermometer, I should produce an effect which would, perhaps, be visible to my young friends immediately before me. If cold is produced in this way the column will rise a little. I will now turn this air out against the thermometer. The column has risen a little, which proves that the air which has come out of this vessel, and become expanded, has become chilled.

Fig. 1.

A great man who used to lecture in this room many years ago, Sir Humphrey Davy, described a machine which he saw at Schemnitz in Hungary, formed so as to allow a very strong current of compressed air to issue from it, and the amount of cold produced by the expansion of the air was such as to cause the vapor of the atmosphere to condense and congeal, and form icicles. Now I want you to remember that when air is condensed in the way I have described heat is developed, and that when an expansion of the air takes place an opposite effect is produced. Mr. Cottrell has here arranged a little experiment, but as I do not know whether it will be visible or not to you all, I will tell you what it is. This glass receiver contains air, and within it is a small elastic balloon, which also contains air. The air which the balloon has within it has a certain amount of heat, and in virtue of that heat it has a certain power of squeezing out the sides of the balloon. If we now pump the air out of the outer vessel, and so remove the air from the outside of the balloon, we take away the force which counteracts the force inside this balloon. It will then expand and almost fill the entire vessel. [The air was then exhausted by means of an air pump.] You see the balloon becomes larger and larger. You see it growing visibly before you, and the air within this balloon at the present time is being chilled because of its expansion. The assistant will go on pumping out the air from the glass receiver, and after a time the balloon will almost fill the receiver. It thus goes on swelling and swelling, the air within it expanding, and this air, by the act of expansion, becomes chilled. We will now allow the air to enter by turning this cock, and then the balloon will shrink to its first dimensions. See how small it becomes, because we get a pressure on the outside of the balloon, squeezing it inwards, until now it is finally reduced to the same size that it had at the commencement. Mr. Cottrell will now remove that balloon altogether, as I want to show you what takes place within that receiver when the air is thus taken out of it. I want to show you the effect of the chilling produced by the rarefaction or expansion of the air in nature. But first I will tell you the effect produced on a body of air rising, we will say, from the surface of the sea to a certain hight above it. We will take a definite hight, such as we often find in the Alps—11,000 feet, the hight of one of the higher Alpine passes. Conceive, then, a body of air rushing up the mountain, and going to the top of that pass. In climbing up this 11,000 feet the air gets into a place where it is not so much pressed upon as it was below. A portion of the atmosphere has been removed from above it, and the consequence is that the rising air expands, and the expansion is followed by a lowering of its temperature. The air becomes colder, and if it had in it as much moisture as it could hold, it would, in rising 11,000 feet, fall very nearly 50° Fahrenheit in temperature.

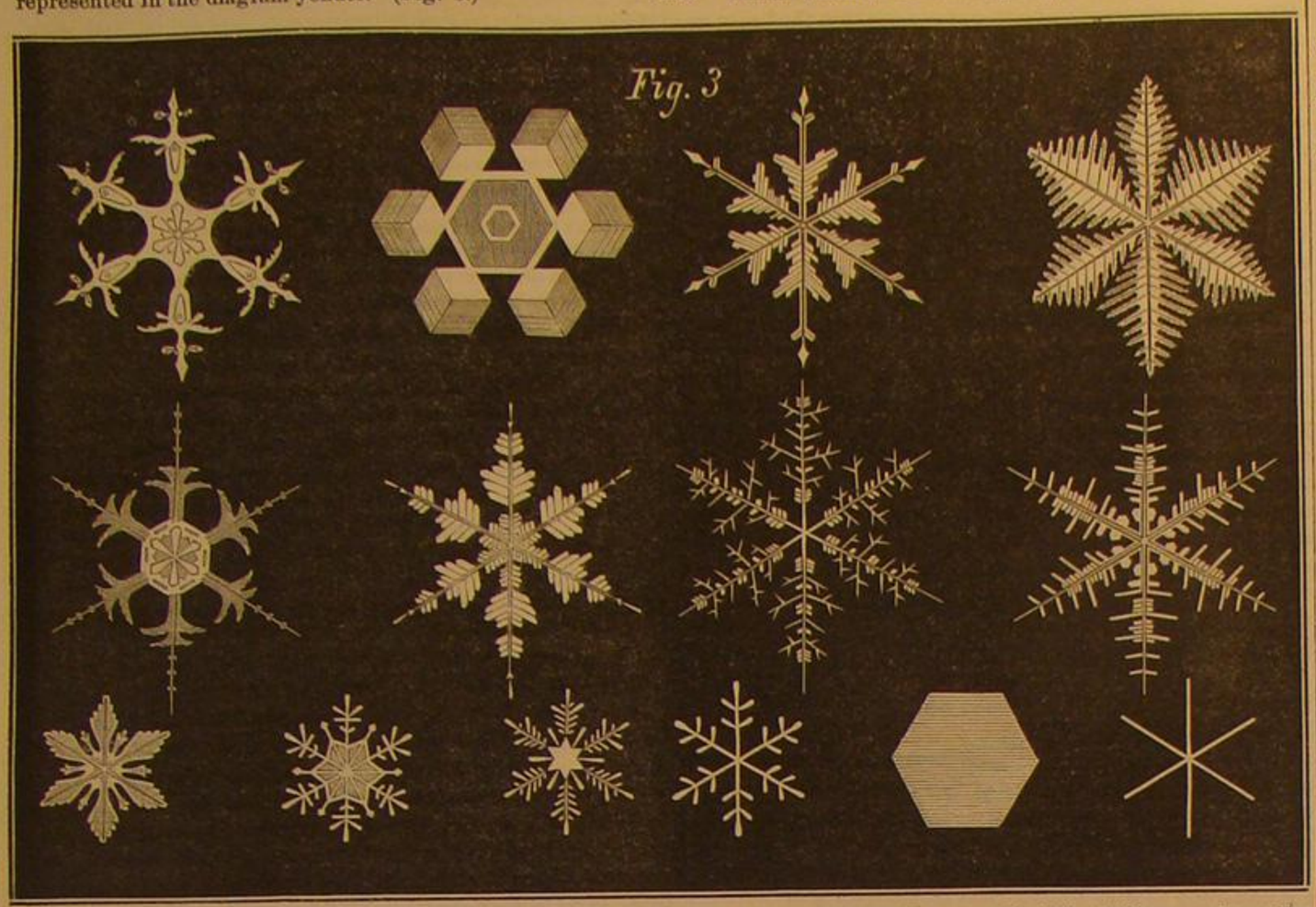
Now, you must remember that in order to preserve the vapor of this room in an invisible state, a certain temperature is necessary. If you could at this moment introduce into this room the temperature of the polar regions, what would you obtain? First, the air of the room would thicken so as to form a fog, and then that air would be chilled and fall as snow. Even in London ball-rooms this may sometimes be observed. When the windows have been opened in the intervals of the dances, the air has immediately become cooled, and a condensation of the vapor has taken place sufficient to make the atmosphere dim. Now imagine air charged with this invisible vapor being carried up one of these high Alpine passes. If in this way it gets its temperature reduced to 32°, the air can no longer hold its vapor, that vapor then falls as snow, and that snow is deposited on the tops of the mountains.

I want now to show you how clouds are formed by the condensation of vapor. Here we have the receiver of our air-pump, enclosing a quantity of air which is charged with invisible aqueous vapor. Mr. Chapman will now place a lamp behind this glass receiver. I will send a beam of light through the receiver, and let it fall on the screen. At first you will not see any appearance of anything inside the receiver. I will then ask Mr. Cottrell to work the air-pump, and exhaust some of the air, and thus cause the remaining air to expand. This will reduce its temperature, and then you will see that the vapor within the receiver will become a fog. You now see no sign of anything within the receiver; but we will now exhaust the air. [The air-pump was then put in action, and a condensation of the vapor became immediately manifest.]



You see a cloud has now formed in the receiver, and when the air is allowed to reënter it causes the cloud to go entirely away, although the vapor itself is still there. We will work the pump again, and you will see that the cloud is again formed, and will be again illuminated by the light from the lamp. There it is. That is a true cloud which is formed in this way from the air of the room, and it is in this way that clouds are formed in the atmosphere by the expansion and consequent cooling of the air which rises from the surface of the sea.

These clouds may fall as rain, but as I have said, they may also fall as snow. I suppose that snow is such a familiar thing to every boy and girl here present, that it may seem to be hardly worth thinking about; but still this substance is one of the most wonderful and beautiful things in the whole world; and when snow is formed in a very still atmosphere, as I have often had the pleasure of seeing it formed in the Alps, it takes the form of those beautiful figures which are represented in the diagram yonder. (Fig. 3.)



It forms as small, six-rayed stars. This is the form of the snow which goes on loading the Alpine mountains year after year; and when we look at these mountains, and at the valleys connected with them, we find that the most wonderful series of appearances presents itself. On very closely observing the snow upon the Alpine slopes, we find that it is in a state of motion. We find that the snow has been incessantly moving down the Alpine slopes into the valleys; and hence we have the valleys filled with rivers of ice. On standing for the first time beside one of these rivers of ice, you would imagine that it was perfectly motionless, and that a body so rigid as ice could not move at all; but when you make proper observations, you find that the ice is perpetually moving down, and thus we have these glaciers of the Alps. I have no doubt that every boy here will one day visit those glaciers for himself. I have here a sketch of one of the most famous of those glaciers. It is called the "Mer de Glace," and is situated near Chamounix. This Mer de Glace has its great feeders from the snows that fall upon Mont Blanc and the series of mountains which are rudely sketched in this diagram. Here is a great cascade where the snow, after being half consolidated—squeezed together so as to form ice—actually moves down, forming a cascade of ice which comes along this valley. Here is another basin where the snows collect, and where its particles are squeezed into ice, and you have this ice also always in a state of motion.

Now let us look at the lines which I have drawn on the diagram. The mountains beside the glaciers are always sending down stones and dirt, and consequently you always have lines of dirt carried down; and you see that where two glaciers have their sides turning and uniting as here shown, they form a line along the middle of the trunk of the glacier. Now these lines which I have mentioned are called *moraines*. Those at the side are called *lateral moraines*, and those in the middle are called *medial moraines*. We have in the Mer de Glace these three moraines. If we examine this glacier we find that notwithstanding the rigidity of ice it moves down like a river. Eminent men have worked at this subject; Saussure worked at it a little, not much, and was followed by Bordier, who observed that ice behaved almost like a viscous body. He was the first to propound the fact that ice was of this character. He was followed by Rendu, who also took up the idea that ice behaved like a viscous body, such as honey, treacle, or tar, or paste. Then he was followed by Mr. Agassiz, and another, and they determined the velocity with which this ice falls. Then came Principal Forbes, an eminent Scotchman, and his measurements pushed the question far beyond its former stage. And then came Mr. Huxley and myself; and we pushed the matter a little forward; and afterwards I did a little on my own account in reference to this question. It is in this way that scientific knowledge is accumulated. It goes rolling on and becoming bigger like a snow-ball, and thus it is that science grows and has grown to what it is at the present day.

A Transcript from Old Records.

From "Morse's Gazetteer," published in 1797, we take the following relating to New York city:

"The city was incorporated in 1696. It is two miles in length and one mile in breadth. Its population in 1756 was 11,000; in 1771, 22,000; in 1786, 24,000; in 1796, 70,000.

"From the gallery in front of Federal Hall, at the head of Broad street, George Washington took the oath of office as President of the United States, April 30, 1789.

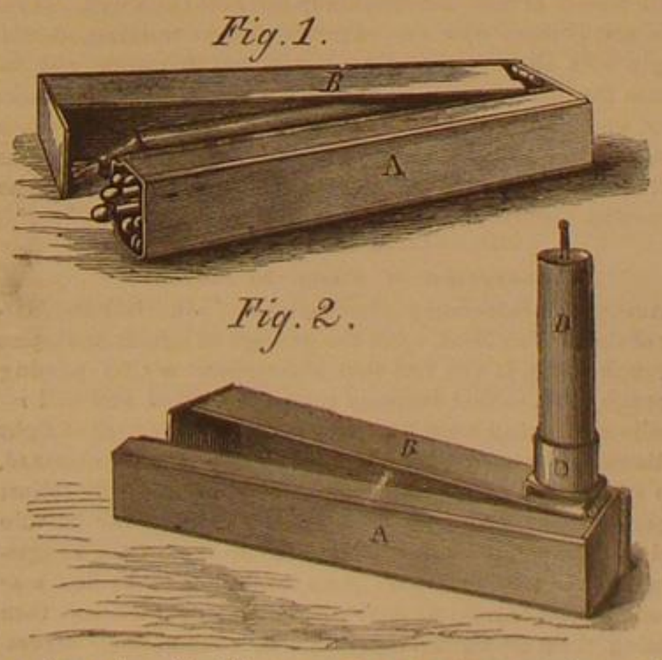
"The supply of water is insufficient, and many of the inhabitants are provided from a well at the head of Queen street, from which the quantity of 110 hogsheads, or 14,400 gallons is daily drawn, and on some hot days the amount of 216 hogsheads. The well is but 20 feet in depth, and holds but three feet of water, which is sold at three pence per hogshead."

From the same work, under the head of "Mingo Town," Pa.: "In this vicinity are some springs which yield 'Petrel,' a bituminous fluid." [The "coal oil" which so universally dispels the darkness of 1868.—ED. SC. AM.]

And from the same work, under the head of "Territory"—relating to the Northwest Territory of the United States—is taken the following prediction, made eleven years previously to the passage of Robert Fulton up the Hudson river in a steamboat: "It is probable that steamboats will be found to do infinite service in all our extensive river navigation."

WHIPPLE'S COMBINED TAPER HOLDER AND MATCH SAFE.

The object of this invention is to furnish a ready means of providing a light on occasions when an ordinary lamp might not be accessible or convenient to carry about. For this purpose the little device shown in the engravings is admirably adapted, being neat, handy, and so small as to be readily carried in the vest pocket. Larger sizes for ordinary candles



are also made. It will prove of great advantage to parties camping out, to mechanics at work in dark places, hunters, frontier's men, and convenient for Christmas tapers. It was patented in the United States, May 28, 1867, by John A. Whipple, 297 Washington street, Boston, Mass. It is also the subject of several foreign patents.

The case proper is in two parts, hinged, and formed of sheet metal. One compartment, A, is the match receptacle; and the other, B, a case or box for its reception. Hinged to the end of the match safe is a socket, C, for holding an ordinary candle or a miniature candle, or taper, D. When closed the contrivance is simply a rectangular box, being, for the small size, about three quarters of an inch square by three-and-a-half inches long. When opened the taper and its socket stands on one end of the case, and the case is a handle and standard for the light.

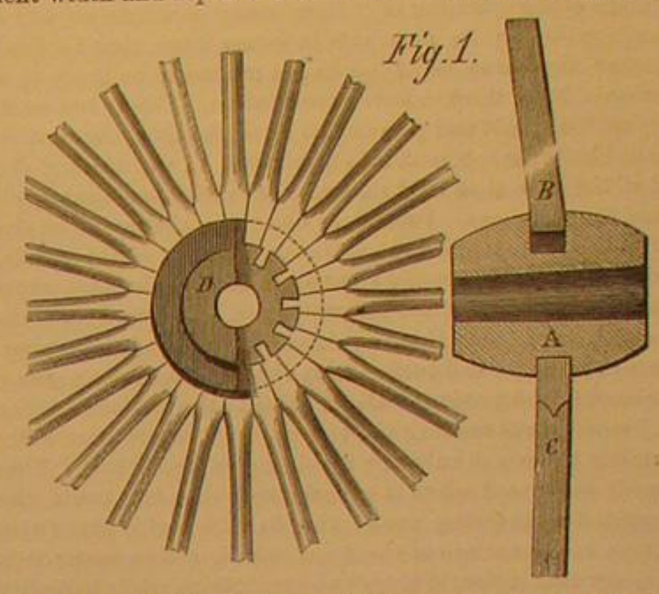
The foregoing is sufficient to give the reader a correct idea of this eminently handy and useful device. All orders and other communications should be addressed to the patentee, as above.

ANY subscriber who fails to get his paper regularly or has not received all the numbers of this volume is desired to inform the publishers by mail; missing numbers will be supplied.

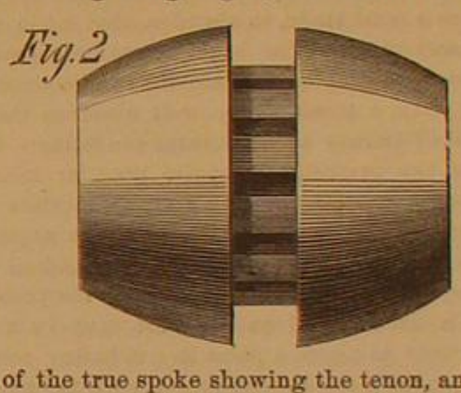
SAWYER'S PATENT CARRIAGE WHEEL.

One great difficulty experienced by carriage makers in constructing a strong and elegant wheel is the necessity of cutting away in mortises so large a proportion of the hub as to greatly weaken this important and central part. The design of the improvement shown in the engraving is to retain the largest number of spokes in a wheel, while the hub shall not be weakened by cutting away the most of its interior in mortising.

In this invention only every alternate spoke is mortised, the others, or supplementary spokes, acting as keys or wedges, yet being firmly held in place by their contact with the other spokes, and with the shoulders or rims on the hub. The hub has a circumferential groove—Fig. 2—turned in it of sufficient width and depth to receive the ends of the supplemental spokes. At the bottom of this groove the mortises for the true spokes are cut, which are seated in the usual manner, they, with the auxiliary spokes, making a solid continuation of the wheel hub, the whole being thus securely locked and fastened.



A, in the engraving, Fig. 1, is a section of the hub. B, a



section of the true spoke showing the tenon, and C, the supplementary spoke, seated in the circumferential recess. The figure marked D, shows the wheel as constructed, the dotted lines on one side denoting the periphery of the hub.

Instead of cutting a score or recess in the hub, it may be made quite small, and two strong bands or flanges of iron or other metal may be shrunk on, or otherwise secured to the hub, their inner surfaces forming the recess or groove which will secure the spokes firmly in place. By means of these bands, wheels already in use may be strengthened by the introduction of supplementary spokes, without diminishing the strength of the hub by increasing the number of mortises. This device applies to wheels, the hubs, spokes, and fellies of which may be made of metal, as well as those which are composed of wood.

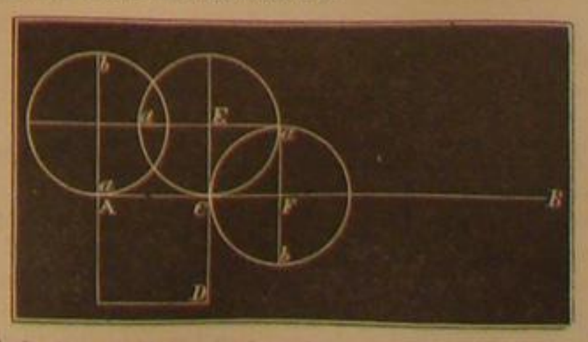
Practical wheelwrights, and others, will readily see the advantages of this mode of constructing wheels. It was patented through the Scientific American Patent Agency, Oct. 22, 1867, by W. T. Sawyer, Whistler, Mobile Co., Ala., whom address for further information.

THE MOVABLE WHEEL QUESTION.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?" [Original question.]

We are in continued receipt of many communications upon the subject, but are obliged this week to curtail our selections. We shall return to the subject next week.

MESSRS EDITORS:—You say that a wheel in revolving around a fixed wheel of the same size makes but one revolution on its axis. You say that L. M., by the diagram given, proves himself wrong. I beg leave to disagree with you, and think the following sketch will make it appear that the wheel does make two revolutions:



If the line, A B, is equal to the circumference of the wheel in revolving from A to B, the wheel will make one revolution, but if A B be bent into a square then the wheel will make two revolutions in passing round it.

Suppose the wheel starts at A, in going from A to C, one-fourth of the distance, A B, the wheel would make one-fourth of a revolution; now before the wheel can advance on the line

C D, the point at C must remain stationary while the center, E, moves round to the point, F, making another quarter of a revolution. One half a revolution is made on one side of the square, or rather one side and at one angle. If the square be changed into a polygon of an infinite number of sides, or a circle, the case will not be changed. A. C. SEKELL.

Boston, Mass.

As the rolling wheel, in making one revolution upon its own axis, moves over a distance equal to its circumference, which is designated A B by the above correspondent, the distance traversed by the wheel in making a revolution upon its own axis will be the same whether the path traversed be curved or rectilinear. If the wheel made two revolutions upon its axis, the distance traversed by it would be twice A B.

MESSRS. EDITORS:—Allow me to give my theory of the solution of the question of "How many revolutions will a wheel make on its own axis in going once round a fixed wheel of the same size?" I do not profess to be much of a mechanic but I think I have the solution. I took two ordinary cotton spools and put a shaft through one of them, then marked both the spools off into quadrants. I also marked the end of the axis, then held the axis firm and rolled that spool round the other one. I found, by observing the marks on the end of the axis and also the marks on the face of the spools, that there were *apparently* two revolutions on the axis, while there was only one on the circumference, and then by a little consideration I found that the axis itself had made one revolution in an opposite direction from the spool, because in going all round it had presented all its sides to the surface of the fixed wheel, thus making the two *apparent* revolutions while in reality there was only one revolution of the wheel. This is easily undertood when it is considered that the circle the axis describes in going round the fixed wheel is just twice as large as the surface of the fixed wheel, consequently it is necessary that it should show two revolutions while in reality making only one. J. B.

Philadelphia, Pa.

Advice to Young Mechanics.

In referring to the growing inclination on the part of young men, after they have served long and hard apprenticeships to acquire a good trade, to abandon that mode of making a living and to enter the legal or medical profession, where it is supposed greater emoluments can be secured and larger honors won, a cotemporary well observes that nineteen cases out of twenty such ventures are failnres, for two reasons. First, the professions require peculiar talent and the most thorough education. As a rule, apprentices to the trades have neither the time nor the means to acquire this education. Hence, when a mechanic at the end of his apprenticeship aspires to and enters any one of the professions he does so at a great disadvantage. He may be a fluent speaker, know how to argue a point in a debating society or harangue a crowd at a ward meeting, but such talents do not fit him for the legal profession. He may know how to extract a splinter from his own hand, how to make a salve, how to mix a powder or administer a pill, but all this, while it might qualify him as a good nurse, does not fit him for the medical profession. The fact is, the young men who abandon their trades are tempted to do so by a feeling of false pride, erroneously imagining there is no honor to be secured in a pursuit of the mechanical arts. History proves the fallacy of such suppositions.

The brightest names which now adorn the annals of all countries are of the best mechanics who have blessed mankind with the productions of their genius. All that is beauiful and grand is the result of improvement in mechanics. The pendulum, the main-spring, the barometer, thermometer, printing press, steam engine, locomotive, sewing machine, telescope—all, all are the result of mechanics' arts, making those famous who produced them, and the people great who adopted them.

A good mechanic who becomes a pettifogger or quack, merely because he is too proud to work at his trade, is, indeed, a pitiful object. A man of the right mental balance, who has proper mental form, with the necessary independence, will win as much honor and as fair a living in the trades as in the professions; indeed an indifferent lawyer or doctor lacking briefs or patients, is always a miserable being, a bad example in the community. Let our young mechanics, then, become ambitious in their own peculiar vocations. If they dignify their trades by becoming proficient therein, the trades will dignify them with the highest honors. If mechanics pursue their business with a purpose to self-improvement therein, and not merely to hammer and file and saw, but to improve the art, to develope something new therein, the mind will be strengthened as the arm becomes muscular, and the heart of the mechanic will be made to swell with as true a pride as ever glowed beneath the doublet of a prince. Will the young mechanic think of these truths?

Walking and its Uses.

Dr. A. L. Wood, in the *Herald of Health*, gives the following sensible advice on walking.

Exercise is absolutely indispensable to the physical well-being of man, and walking is one of the most useful of the various modes of exercise. As a people we ride too much and walk too little. If we are in the country, and have a mile or two to go, we wait—perhaps long enough to walk the entire distance—for a horse to be got ready, and then sit lazily in our seats while this noble animal rapidly carries us to our destination. If we are in the city, and have a few blocks to go, we get into an omnibus or a horse car and sit our journey out, just as though we were not created with legs the same as horses are. The nation's legs are rapidly diminishing in size for the want of exercise, hence the demand for false calves and for easier modes of locomotion is on the increase; so, also, is dyspepsia, liver complaint, general debility, and other physical derangements, which result, in great part at least, from a lack of muscular action.

The special advantages of walking, as an exercise, are many. Perhaps the most important is that it takes us out of doors, and keeps us there in the pure air and the bright sunshine. The exercise, which is gentle and prolonged, increases not only the frequency but the fulness of respiration, thus bringing a much larger quantity of oxygen into the lungs and through them, to the blood, thereby giving the finishing touch to the process of digestion and vitalizing "the red current of life." Another advantage to respiration is this: when a person is sitting or standing still, the exhaled air from the lungs, which is unfit to be breathed again, fills the space about the face, and a portion of it is taken into the lungs at the next breath; especially is this the case if the head is bent forward; but when a person is walking and expels the air from his lungs, his head is carried past the expired air before he draws in another breath, and thus he gets a supply of pure air, with its full proportion of oxygen, at every inspiration, and thus is the vigor and vivacity which results from exercise in the open air partially accounted for. Walking is very beneficial to the digestive organs, by the gentle yet constant motion which it imparts to them, and which is essential to their long-continued, healthful action. It brings into action and properly develops more muscles than any other one mode of exercise. It tends to equalize the circulation of the blood. Pedestrians, rope-dancers, and those who exercise their legs a great deal are not troubled with that almost universal complaint—cold feet. The simple reason is that exercise calls the blood to the parts exercised, and the blood feeds and warms.

One great objection to walking is that it takes so much time. True, it takes some time; more, as a general thing, than it does to ride; but so does the accomplishment of any thing desirable; and is not good health desirable? In the end, however, it results in the saving of time, by preserving the health and increasing the vigor of all the physical and mental functions. In no way is there so much time wasted, to say nothing of vitality, as in being sick, and yet people are unwilling to give a little time to keeping well.

To obtain the greatest amount of good from walking, it must, like every thing else, be done right. In the first place, it is always best to have some definite object in view when going out to walk, some particular place or object of interest to see, some purpose to accomplish, or some friend to visit, and not walk merely for the purpose of walking, if any other object can be attained at the same time. But better walk without any other object than not walk at all. The position of the body while walking is of great importance. The body should incline slightly forward from the hips, if walking slowly, and the inclination should increase according to the rapidity of the walk. The head should be kept on a line with the body, the shoulders and hips held back, and the chest unimpeded in its action by tight clothing or otherwise. The arms should be allowed to swing freely at the side. The respiration should be carried on entirely through the nostrils, and not through the mouth. In commencing a long walk, walk slowly at first, and gradually increase the speed. Invalids, and persons who are unaccustomed to walking, should begin with short walks, being careful not to overdo, and increase the distance as their strength and endurance increase. Any one who will practise this precept—never ride when you can just as well walk—will not only be more vigorous and healthy, but will accomplish far more than he or she otherwise would.

Absorption of Gases by Solids.

Among the interesting observations of Mr. Graham, Master of the British Mint, upon the passage of liquids and gases through solids, is the fact that atmospheric air, by passing through india-rubber, becomes super-oxigenated, and will rekindle smoldering wood like pure oxygen. Any kind of light india-rubber receiver, in which a vacuum may be obtained, the size being sustained by mechanical means, will collect super-oxigenated air; the better if the india-rubber be thin and the temperature high. Mr. Graham makes the suggestion that the solid films pass gases through them by first condensing them to a liquid form within the substance, and then passing them off on the other side by evaporation. Hydrogen pases through red-hot platinum, while oxygen and nitrogen do not, or not in appreciable qualities; hence their compounds with hydrogen are readily dialyzed by this method. The passage of carbonic acid, chlorine, hydro-chloric acid, vapor of water, ammonia, coal gas, and hydro-sulphuric acid, is also inappreciable, while the hydrogen, in compounds containing it, passes. One volume of red hot platinum absorbed 0·207 volume of hydrogen, retained in while cold, and gave it off on reheating. One volume of palladium absorbed 643 volumes of hydrogen, sensibly increasing its weight, and when heated afterward, gave off the most of it in a continuous stream. On the other hand, osmium-iridium does not absorb hydrogen, and copper absorbs it very slightly. Gold absorbs hydrogen and nitrogen slightly. Silver absorbs 0·289 of its volume of hydrogen, and then presents a beautifully frosted appearance. Oxygen is taken up in the proportion of 0·745. Red-hot iron and steel pass hydrogen as readily as platinum does.

Notice to Correspondents.

In consequence of a derangement of water pipes our editorial rooms were flooded a few days ago and a large quantity of correspondence and MSS. destroyed. Correspondents who fail to receive a response to their communications will please write again.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

LOOSE PULLEYS, GEAR WHEELS, ETC.—George M. Morris and John McCreary, Cohoes, N. Y.—This invention relates to a new manner of forming the recesses, channels, or grooves in the hubs of loose pulleys, gear or other wheels, or in the bushings fitted into their hubs.

BRUSH.—William W. Clark, New York city.—This invention consists in so forming brushes used for painting, varnishing, and other purposes, that the bristles which form the brush are rendered more elastic and the brush more durable than when they are put together in the ordinary manner.

SAW HOOD.—C. D. Blakeslee, Grand Rapids, Mich.—This invention relates to an improved saw hood and consists of an adju table guard on which the hood is hung of peculiar form protecting every part of the saw except where the lumber is fed to the saw.

CONSTRUCTING MOLASSES CUPS.—Griffen B. Halsted, New York city.—This invention consists in constructing the cup of tinned iron plates swaged or struck up in two vertical equal parts or halves, the edges of the swaged parts being trimmed and then united together by soldering. The feet, knob, lid, and handle, being afterward applied or attached.

PAWL AND RATCHET ATTACHMENT FOR THE NUTS OF SCREW BOLTS.—D. Elliot and E. Seely, New York city.—This invention relates to a pawl and ratchet attachment for the nuts of screw bolts whereby the nuts are prevented from casually loosening or becoming unscrewed. The invention consists in a novel manner of constructing the pawl on the washer of the bolt and in forming the ratchet on the nut, whereby a very economical device for the purpose specified is obtained.

NAIL PLATE FEEDER.—Cyrus D. Hunt, Fair Haven, Mass.—This invention relates to a new and useful improvement in feeding apparatus for turning or reversing and feeding nail plates in a nail-cutting machine automatically.

BRACE FOR CARRIAGE HOODS.—Moses Powe, Belvedere, N. J.—This invention relates to the joint of the brace of carriage tops or hoods and consists of a rigid metallic sheath lapping on three sides of the joint when the hood is raised.

HAND TRUCK.—Wm. May, Binghamton, N. Y.—This invention relates to a hand truck which is so arranged that it can easily take hold of boxes, packages, etc., and that it can be readily handled.

PISTOL AIM HOLDER.—Fisher A. Spofford and Mathew G. Raffington, Columbus, Ohio.—This invention relates to a device for holding the aim during shooting practice with toy guns and pistols and for retaining the same when it has been hit, also for retaining the balls or marbles ejected from the guns or pistols.

MACHINE FOR FORMING SHEET-METAL MOLDINGS.—Valentine Fischer, New York city.—This invention relates to a new machine for pressing moldings for cornices, etc., from galvanized or other sheet metal and consists in so arranging the machine that but two kinds of dies for all kinds of smooth moldings that may have to be formed are needed, viz., rounded and square dies. Of the latter but one set is required for making all sorts of angles while of the rounded dies as many sets must be provided as there are different-sized curves to be represented in the moldings.

SKATE.—Alfred Woodham, New York city.—The present invention relates to the fastening of skates to the boot or shoe sole, and to that class of fastenings which sieze the boot or shoe sole upon its sides and heel; the invention consisting in a novel arrangement of such side clamps upon the foot rest of the skate and in their connection together at corresponding points upon each side of the skate whereby a fastening is produced of most simple form and in its construction practical and not liable to become disarranged or to break from use and wear.

SLIDING PEN HOLDER.—C. M. H. Warren, Brooklyn, N. Y.—This invention relates to a pen holder of that class in which the pen is allowed to slide so that its point may be protected in case of the dropping of the pen and holder upon the floor. The object of the invention is to obtain a very simple, economical and portable pen holder which will answer equally as well as the expensive telescopic holders now in very general use.

BUTTER WORKER.—Henry Garrett, Richmond, Mo.—This invention relates to a machine for working butter depriving it of butter-milk after, taking it from the churn. The object of the invention is to obtain a simple and efficient device for the purpose and one which may be manipulated with the greatest facility.

CHERRY STONER.—Rufus Wright, Brooklyn, N. Y.—This invention relates to a machine for depriving cherries of their pits or stones, and it consists of a peculiar construction and arrangement of parts whereby the work may be done with great rapidity and in a perfect manner.

CARBURETTING MACHINE.—Iva Prichard, Terra Haute, Ind.—This invention is a simple and economical machine for the manufacture of illuminating gas from the volatile hydro-carbons.

PILE OINTMENT.—L. H. Mosely, Franklin, Tenn.—This invention is a compound which when properly applied works a speedy and infallible cure of the disease known as the piles.

RAILWAY SWITCH.—Joseph C. McCarty, Grafton, W. Va.—The object of this invention is to construct a switch by which the use of frogs can be avoided, and the cars be made to run always on a smooth continuous track, and thereby to render the motion of the cars easier, and to save the wheels from wear.

CORN PLOW AND CULTIVATOR.—Isaiah B. Arthur, Sidonsburgh, Pa.—This cultivator is made with three handles, by which it can be more easily held and regulated. In connection with them, it has a new form of guards to protect the young corn from injury, and a new device for adjusting the instrument in width.

TOBACCO PIPE.—James Cook, West Groton, Mass.—This invention consists in placing and securing so as to be detachable at pleasure, within the bowl of the pipe, a cup or receptacle for the tobacco, that at its lower end is provided with a series of apertures for forming a communication between it and the stem, and with a space or chamber left around and between it and the interior of the bowl, whereby the stem cannot become clogged, and the smoke before passing to the mouth is cooled, as well as the tobacco kept dry and free from nicotine, as it is extracted by the smoking of the pipe.

GAS TORCH.—Wm. A. Lawton, New York city.—This invention relates to a method of constructing torches for the lighting of gas, whereby the alcohol or other fluid burned for that purpose is more economically expended.

VALVE.—Edward A. Rock, Ludlow, Vt.—This invention consists in arranging an open ring valve on the valve stem, which, when the valve is closed, shall be expanded by a stationary wedge in the valve seat.

TUNNEL EXCAVATOR.—Theodore A. Fisher and Anson F. Fisher.—This invention relates to a novel and useful method of constructing tunnels under water, and consists of an apparatus for boring and excavating the earth in the bottom of rivers, lakes, and other large bodies of water.

EYE GLASS.—J. K. McDonald, Newark, N. J.—This invention consists in the employment of soft rubber tubing for nose pieces, together with features of improvement.

BOOT ATTACHMENT.—Marvel M. Follett, Westboro, Mass.—This invention relates to a new and improved method of attaching the boot to the bodies of carriages, whereby they are rolled or wound up with more ease, and so as to occupy smaller space.

FILLING STEAM BOILERS.—E. Ferguson, Newbern, N. C.—This invention consists in attaching to the boiler a water supply pipe, which is provided with a suitable check valve, wherewith the boiler may be filled with water by the vacuum produced therein by the condensation of steam.

HARVESTER.—S. O. Bartow, Bethel, Conn.—This invention relates to a grain and grass harvester, and consists in an improved sickle-driving mechanism and an arrangement of the frame of the machine and gearing, whereby a very rapid motion of the sickle is obtained, and a clean, smooth cut of the same is obtained, with a moderate expenditure of power.

BALE TIE.—Joseph Bragg Dunn, Petersburg, Va.—This invention has for its object to furnish an improved bale tie, simple in construction, which will hold the hoop securely, which may be easily applied, and which can be manufactured at small expense and without waste of material.

CORN PLANTER.—N. G. Hughes, Waynesburg, Pa.—This invention has for its object to furnish an improved corn planter, by means of which the ground may be marked and the seed dropped and covered at the same time and by the same operation.

SNAP HOOK.—John McKibben, Lima, Ohio.—This invention relates to an improved spring snap hook, the advantages of which are that while it secures all the advantages of other rein and spring snaps now in use, it is greatly reduced in size. By the position of the spring it acts as a guard snap, and as the spring is almost concealed within the hook, it is protected by the jaws that hold the lip on which it acts. It is also very compact, thus securing greater strength, so there is less purchase bearing upon it from its curtailed length of body and spring, also rendering it lighter, neater, and better, and more convenient.

VISE.—Samuel S. Barnaby, Macon, Ga.—The object of this invention is to produce a vise which will be of such a construction as to obviate the great inconvenience and loss of time now unavoidable with the use of all vises heretofore invented.

MACHINE FOR RAISING HEAVY WEIGHTS.—S. E. Tuttle, Genoa, Nevada.—This invention has for its object to furnish an improved machine by means of which heavy weights may be raised with a comparatively small outlay of power.

ROTARY STEAM ENGINE.—Chester B. Turner, Grand Rapids, Mich.—This invention consists in the arrangement of wings or valves on the piston core, or center, and in so forming the parts of the engine that the steam can be cut off at any part of the stroke, or at any desired point.

HORSE RAKE.—Oliver E. Randall, Lewiston, Maine.—This invention consists in the application of a separate and independent spring to each tooth bar, and in a peculiar lifting arrangement whereby the rake teeth, as hitherto, are allowed to conform to the inequalities of surface over which they may pass, and the rake at the same time allowed to gather up and retain a large quantity of hay or grain before being discharged.

PORTABLE SAWING MACHINE.—G. W. Bell, Rising Sun, Ind.—This invention has for its object to furnish a simple, cheap, and portable machine, by means of which timber for shingles, staves, fire-wood, etc., may be sawn in the woods without its being necessary to incur the expense and labor of transporting the logs to a machine, as is now the case.

STREET AND STATION INDICATOR FOR RAILROAD CARS.—Anthony Pirz, and Manuel Pirz, East New York, N. Y.—This invention relates to a new and improved street and station indicator for railroad cars, and of that class in which the names of the streets or stations are on a belt or band which is moved at certain proper intervals, after each street or station is passed, in order to exhibit to the passengers the name of the preceding street or station.

FLOUR SAFE AND SIFTER.—F. A. Hoyt, Hanover, Mis.—This invention relates to an article of household use, and consists of a sifter operated by a crank and gearing, the said sifter located over a drawer covering the flour receptacle beneath.

DITCHING MACHINE.—A. A. Taselier, Algiers, La.—This invention relates to an improved machine for excavating ditches or canals, and consists of a carriage mounted on wheels, to be worked and propelled on temporary movable rails, by a steam engine, and supporting drums for carrying an endless belt or chain to which are affixed excavating buckets.

CALCULATING AND REGISTERING MACHINE.—Thomas T. Strode, Mortonville, Pa.—This invention relates to an improved calculating and registering machine, being a simplification of the calculating machines heretofore invented.

COMBINED FLOUR SIFTER AND SCOOP.—G. W. & C. L. Sherman, Seymour, Conn.—This invention of an improved article of domestic utility relates to a flour sifter and scoop.

MACHINE FOR EMBOSSING WINDOW SHADES.—R. K. Slaughter, and J. O. Hundt, New York city.—This invention relates to a new machine for embossing window shades of all sizes with ornamental borders, corner or central pieces, and consists chiefly in the use of a sliding carriage, which is covered with a plate of rubber or other elastic surface, and which is provided with adjustable guide bars for guiding the rollers, by which the ornamental borders are produced, and for holding the shade to be embossed on the table.

HAY PRESS.—George W. D. Culp, East Enterprise, Ind.—This invention relates to an improved beater press, which is so arranged that the motion of follower can be reversed whenever desired, without reversing the motion of the horses; and that, furthermore, the beater or the follower, or both, can be thrown out of gear whenever desired, without stopping the horses, and in which an automatic self-opening and closing feed door is arranged in such a manner that when the beater ascends it will be closed, while it will open as soon as the beater is down.

SPINNING WHEEL.—S. W. Clark, Seneca, Wis.—The nature of this invention consists in a novel and useful modification of the ordinary domestic spinning wheel, enabling the operator to sit while spinning, and thus avoid the labor of walking to and from the head of the wheel.

WALKING VEHICLE.—R. C. Vernol, New York city.—This invention relates to a new manner of operating vehicles, and consists in the use of legs, to which a motion is imparted imitating as near as possible the motion of the human extremities. At least two legs or bars are arranged on each side of the platform of the wagon, or vehicle, and are secured to and suspended from a horizontal axle, which has its bearings on the platform. On the shaft are two circular eccentric cams, to which the legs are secured, the cams projecting equally far from opposite sides of the shaft. An alternate up and down motion is thus imparted to the two legs on each side of the platform.

BRICK MACHINE.—Ephraim R. Greene, and Henry D. Phillips, Trenton, N. J.—This invention relates to a machine for pressing and molding brick, and it consists in a novel manner of operating the plungers, by which the clay is forced into the molds, and in a novel manner of operating the molds, feeding them underneath the press boxes.

CORN GATHERER.—James Mains, Olena, Ill.—This invention has for its object to furnish an improved machine for gathering the corn, simple and inexpensive, in construction and effective in operation.

HORSE HAY FORK.—L. S. Mason, Middlefield Centre, N. Y.—This invention relates to a harpoon hay fork, which is provided with tines projecting from the sides of the shank, so that the hay, straw or grain will be prevented from slipping on the shank.

PORTABLE HAY AND GRAIN ROOF.—John J. Naylon, Brighton, Mich.—This invention has for its object to furnish a simple and convenient portable roof for covering hay and grain stacks, and for other purposes.

GRINDING MILLS.—John Snyder, Hart's Mills, Ind.—This invention has for its object to furnish an improved manner of hanging the upper mill-stone or runner, so as to insure freedom of motion and the proper and effective action of the runner and spindle, and at the same time to facilitate the tramming of the spindle.

WAGON HUB REAMER.—J. W. Emerson, Rochester, Minn.—This invention has for its object to furnish an improved machine by means of which wagon and other hubs may be reamed out quickly and accurately, so as to be ready to at once receive the cast-iron box.

DRYING AND VENTILATING APPARATUS.—Jarvis Royal, Rochelle, Ill.—This invention has for its object to furnish an improved means for drying and ventilating damp grain fish, and other things, stored in bins, holds of vessels and other places.

ANIMAL TRAPS.—Joel Manchester, New York City.—This invention has for its object to furnish a simple, cheap, and effective trap, by means of which animals may be killed and thrown from the trap, the trap setting itself for the next animal.

WOOD SAWING MACHINES.—Isaac B. Jones, Xenia, Ohio.—This invention relates to improvements in machines for sawing wood, whereby great strength, firmness, simplicity and efficiency of operation are secured.

BED BOTTOMS.—S. L. Southard, Rock Island, Ill.—This invention relates to an improvement in bed bottoms, and consists in an arrangement of compound special springs attached to the under side of the bed bottom and resting upon cross pieces set in the bedstead.

SEEDER.—Olney Fry, Jr., Albany, Oregon.—This invention has for its object to furnish a simple, cheap and effective machine for sowing grain broadcast, which shall sow the grain evenly and cover it at a uniform depth, thereby decreasing the labor and time required for putting in the grain, and at the same time increasing the yield.

PORTABLE PISTOL GALLERY.—F. A. Spofford & M. G. Rathgton, Columbus, Ohio.—This invention relates to a device for supporting the aim and for retaining the balls, marbles, or other articles thrown at the aim, during target exercise with toy guns.

SECURING THE OUTER SOLE OR PATTERN AND THE HEEL TO BOOTS AND SHOES.—L. A. Favre, Paris, France.—This invention consists in securing to the underside of the inner sole, whether it is sewed or nailed to the vamp, a metallic plate, which is provided with small perforations or slots, and in securing said plate, either by nails, rivets, screws, or other suitable means thereon. The outer sole or pattern, which is to be connected to the sole and to complete the shoe, is provided with a set of projecting screws or tenons on its upper face, said screws or tenons being intended to fit into corresponding slots in the plate.

FASTENING BOILER TUBES.—James U. Adams, Richfield, Mich.—This invention relates to a mode of fastening tubes in steam boilers, and consists in attaching a thimble or ferrule having external and internal threads cut on it which screws engage with the internal threads upon the end of the boiler tube and with the external threads upon the boiler plate.

PORTABLE FENCE.—H. A. Stewart, Minneapolis, Minn.—This invention has for its object to furnish an improved portable fence, simple and cheap in construction, durable, easily taken down, set up, or transported from place to place, and which, when not in use, can be packed for storage in a very small space.

ELEVATING DEVICE FOR LOADING HAY, ETC.—Ezra N. Curtice, Spring Water, N. Y.—This invention relates to a new and useful device for making hay loaders, elevators, &c., and consists in applying rubber friction rollers to the front wheels, in such manner that they shall rotate one or more drums placed on the shafts of the friction rollers, and wind a rope for elevating hay, &c., as may be required.

BOILER FOR HEATING WATER.—John Ellis, White Plains, N. Y.—This invention relates to a boiler for heating water for buildings, green houses, and other similar purposes, and consists in arranging a series of horizontal pipes between two hollow heads, in such a manner that the water will flow at least twice through the tubes, so as to be very completely heated.

SAP SPOUT.—R. F. Livermore, Starksboro, Vt.—This invention consists of a metallic sap spout of such a form that many important advantages are secured over the common wooden spout as heretofore used.

CARPET HOLDER.—F. Smith, Alexandersville, Ohio.—This invention relates to a device for holding carpets upon the floors, whereby the same are more firmly held against the mop board and more easily at any time moved.

PUMP ROD.—H. F. Purmort, Saginaw City, Mich.—This invention relates to pump and drill poles or rods, and consists in a novel manner of jointing together the several sections composing the same, whereby rivets are dispensed with, consequently obviating not only all injury to the interior of the pump now resulting from the breaking and falling of rivets into the same, but also the frequent drawing up of the pump tube from the well to remove the rivets.

SAFETY HOOK.—E. F. Brundage, Virginia City, Nevada.—This invention relates to a safety hook for watch and locket chains, bridle reins, trace chains, etc. The object of the invention is to obtain a simple and efficient hook of the kind specified, and one which will admit of the jointed portion of the hook being readily opened and closed and also readily secured in a closed state.

STREET LAMP LIGHTER.—Albert Assman.—Rahway, N. J.—This invention relates to a device for lighting lanterns in streets, public buildings, railroad depots, or wherever a large number of lights are arranged too high to be reached without the use of a ladder or long lighter. The invention consists in attaching the lamp or light to the upper end of a pole of suitable length, and in arranging the pole and lamp within a tubular inclosure.

HOOKS FOR HOLD BACK STRAPS.—N. W. Robinson, Norwich, N. Y.—This invention relates to an improvement in hooks for hold back straps of harnesses, which improvement consists in a novel combination of a post with the hook, whereby the unfastening or detachment of the strap therefrom, by accident or otherwise, except so desired, is rendered impossible, while at the same time the unhitching of the strap, if desired, can be accomplished with the utmost ease and dispatch.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

W. M., of Canada, asks how he can lengthen boiler tubes three-eighths of an inch. They are 7 feet, 8½ inches long by 3½ inches diameter and were cut too short by three-eighths of an inch. We think they might easily be lengthened by heating, two feet or so between the ends and then stretching them in an ordinary horizontal screw press. Or, they may be slightly drawn by means of a die which may be made in halves, one half to be forced upon the other by a screw.

G. & P., of Ky., ask how to bronze or lacquer the handles of steel instruments. We have often answered similar questions and should, in justice to ourselves, refer this correspondent to back numbers of our paper; but, as we have frequent inquiries on this subject we will repeat what we have several times said before. An ordinary coating of a coppery color can be deposited on polished iron or steel by immersing the article in a solution of sulphate of copper (blue vitriol), the mineral being dissolved in water. But if a more brilliant bronze is required it can be produced by simply painting the article with a sizing and sprinkling it with bronze powder. Coating iron or steel with bronze can be done only by a deposition of the copper or brass on the surface of the iron by the galvanic battery. It is difficult and costly.

In reply to a correspondent who asked how to harden plaster of Paris casts, X says: A little glue dissolved in the water with which plaster is mixed will harden it to almost any degree. Experiment will soon determine the proper quantity for the degree required.

N. C. L., of N. Y., asks if it is not time for "C," of Troy, N. Y., to explain, as promised, his system of cypher published in No. 18, Vol. XVII. He says: "I, for one, have worried enough over it."

J. L. B., of Iowa, says he has a well 45 feet deep, surface of water generally within 20 feet of the ground, never more than 25 feet. From well to house 100 feet with rise of 12 feet. He wishes to use wind power for pumping so as to supply a reservoir at the house at all times, but there are tall trees near the well which would interfere. He asks if he can locate the windmill near the house and what sort of pump he shall use. There are plenty of good pumps in the market intended for lifting and forcing. The proper location for a pump in this case would be at the well so that it could lift 25 feet and force 12 feet higher through 100 feet of pipe. Of course, the windmill and pump should be located together. If the pump and power should be located at the house it would we think be found difficult, even with an air chamber, to obtain a supply from an ordinary lifting or suction pump. Any sensible pump maker or dealer can overcome your difficulty on a personal inspection of the premises.

G. W. E., of Wis., asks us to give him the rule for calculating horse-power of non-condensing engine. John Bourne states it briefly thus: "Multiply the square of the cylinder's diameter in inches by the cube root of the length of stroke in feet, and divide the product by 47. This is the nominal horse-power." We prefer to state it thus: "Multiply number of feet traveled by the piston per minute by the pressure of steam on the piston and divide by 33,000." We choose that you apply the above to the data you send rather than have us tell you the power of your ten-inch cylinder engine.

J. F. L., of Ohio.—Henry Carey Baird, 406 Walnut street, Philadelphia, Pa., will probably furnish you with a manual on sugar refining from which you will obtain more information than it is possible to crowd into our columns.

G. H. W., of N. Y.—"How many feet of grate surface will be required for a boiler nine feet, six inches long with thirty two-inch tubes?" The rule is to allow one square foot of grate surface to twenty inches fine surface. See No. 9, Vol. XVII SCIENTIFIC AMERICAN for the proper method of setting boiler. It has saved our readers already many hundreds of dollars.

F. M. D., of Va., asks "what is the best mixture to temper (harden) files in?" Files are not generally "tempered" they are left of full hardness. There is no "mixture" equal to clean cold water for file hardening. Before they are heated for hardening the teeth are coated with strong brine thickened with beer grounds, yeast, or bean flour and allowed to dry. This makes a protecting flux for preventing the teeth from burning.

G. G. B., of Conn., inquires "whether yellow pine or cypress is to be preferred for frame and trestle work for water wheel where the timber will be exposed to water and steam." The cypress in use in this country is not the true cypress of which we read in sacred and profane history. It is a deciduous tree whose value for timber exposed to constant moisture we do not fully understand. The yellow pine is very long lived under the circumstances mentioned.

G. W. R., of Pa.—"Can you tell me the ingredients of a good marking ink that will not evaporate and will resist the action of rain, etc.? I want something better than the mixture of lamp black and turpentine now used." We have used successfully shellac varnish thin, with lamp black stirred in. It will evaporate but will stand water. The evaporation, however, is necessary if you want the marking ink to dry rapidly.

E. B. R., of Mass.—"Can you inform me of the best method of conveying power a distance of one hundred feet, whether by a leather or other flat belt or a rope running over a wheel with a V-groove?" The latter method we put in practice nearly twenty years ago, the distance between points being over two hundred feet. It was speedily rejected for the ordinary belt and pulleys. We know of nothing better than flat belts or a continuous shaft. The rope is unreliable and annoying.

J. S., of Pa.—The essential oils of wintergreen, mint, spruce, hemlock, etc., are procured by steam distillation of the leaves, buds, blossoms, or roots of the plants. For processes and full details we refer you to the "Art of Perfumery" by Piesse, published by Lindsay & Blakiston, Philadelphia, Pa., or to "Perfumery: Its Manufacture and Uses," by Campbell Morfit, published by H. C. Baird, 406 Walnut street, Philadelphia, Pa.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Inventors and Patentees wishing to get small, light articles manufactured for them in German Silver or Brass, address Schofield Brothers, Plainville, Mass.

$300 will buy a Patent of A. Grushus, St. Paul, Minn.

Agents wanted everywhere—enormous profits. Sample doz. $1 50. Retail for $3 each. Thomas Powell, Milroy, Ind.

Scale removed from Boilers by Winans' Powder (11 Wall st., N. Y.), 12 years' use proves it reliable an uninjurious.

For Steam and Gas Fitters Tools, Machines for Hand or Power to Screw and Cut-off Gas pipe; stocks, dies, pipe, vises, Peace's adjustable pipe tongs, address Camden Tool and Tube Works Co., Camden, N. J.

Address J. S. Elliott, East Boston, Mass., for best machinery for making lime and sand building blocks.

Good 2d-hand engines, all sizes & styles. A. Logan, Tideoute, Pa.

Persons having the best barrel and bucket machinery send circulars to D. C. Baggerly, Luray, Page Co., Va.

Manufacturers of potato diggers send circulars to H. C. Oathout, Luana, Iowa.

Inventions made for those desiring them, or aid lent to perfect others. Address A. E. Watkins, 114 Fulton st.

Hamilton's self-oiler for shafting uses one half-pint of poor oil for two-inch bearing in three months. Has been in constant use two years, and fast coming into use. Rights for sale by A. G. Stevens, Manchester, N. H.

J. N. Proctor, of Albion, Orleans county, N. Y., wants the address of inventors and Manufacturers of Brick Machines with descriptive circular and mode and operations for burning Brick.

W. C. Stripe, Keokuk, Iowa, wishes to obtain a mill capable of grinding fifteen barrels of lime per day.

Manufacturers of Wood-working Machinery send Catalogue and prices to Wm. Z. Hallam, Denver, Colorado Ter.

EXTENSION NOTICES.

Mahlon Loomis, of Washington, D. C., having petitioned for the extension of a patent granted to him the 3d day of May, 1854, for an improvement in plates for artificial teeth, for seven years from the expiration of said patent, which takes place on the 2d day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of April next.

Philander Shaw, of Boston, Mass., having petitioned for the extension of a patent granted to him the 21 day of May, 1854, and reissued the 17th day of July, 1860, for an improvement in air engines, for seven years from the expiration of said patent, which takes place on the 2d day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of April next.

Conrad Liebrich, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 2d day of May, 1854, for an improvement in trunk lock hasps, for seven years from the expiration of said patent, which takes place on the 2d day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of April next.

E. G. Allen, of Boston, Mass., having petitioned for the extension of a patent granted to him the 27th day of October, 1857, for an improvement in steam pressure gages, for seven years from the expiraton of said patent, which takes place on the 27th day of October, 1871, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

E. G. Allen, of Boston, Mass., having petitioned for the extension of a patent granted to him the 22d day of November, 1859, for an improvement in combination steam gage, for seven years from the expiration of said patent, which takes place on the 23d day of November, 1873, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

Improvement in Horse Hay Rakes.

After an examination of the machine represented in the engravings accompanying this description, practical farmers will notice its simplicity of construction, its ease of operation, lightness, compactness, and efficiency. The driver has both hands at liberty, to be used in guiding the horse; the work to be done and the work already done is straight before him, and a touch of his foot on a pedal lever will discharge the windrow of hay and return the rake teeth to position instantly.

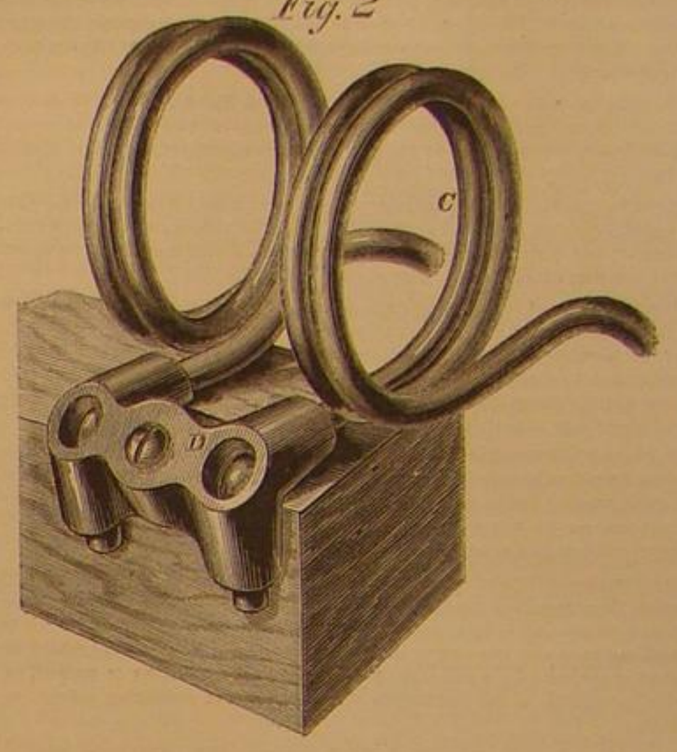
The general appearance and construction of the machine will be understood by reference to Fig. 1, and the peculiar method of securing the teeth to the rake head by Fig. 2. The driver's seat is placed at the extreme rear of the implement, it being capable of being raised or lowered on the spring-board which sustains it, to accommodate any length of leg, by means of a bolt, traversing a slot in the support, and a lever nut. In front of the driver is a bell crank with a projection, A, for his foot, the crank, or lever, having a hook engaging with the delivery shaft to throw the pinion on that shaft in gear with the cog wheel, B, secured to the hub of one of the driving wheels. When the bell crank is not pressed down by the foot a spiral spring underneath the shaft and attached to the lever, keeps the pinion from meshing with the main gear wheel. The end of the counter shaft, carrying the pinion, opposite from the driving wheel, has a crank which connects by a rod with an arm on the rake head by which the head may be partially rotated and the teeth elevated or depressed. While the rake is gathering the hay the pinion is disengaged from the gear wheel; soon, however, as the teeth are filled the driver touches the pedal, engaging the pinion with the larger gear, and the crank on the pinion shaft actuates the rake head and the teeth. The rake is held in position, whether elevated from the ground for driving over common roads, or depressed to perform its work, by means of a hollow cam on the inside of the pinion and revolving with it. This cam has two depressions, one opposite the other, in which a fixed horizontal catch or bar engages to hold the pinion shaft firmly in the position desired. The driver has only to press his foot on the pedal to disengage the catch when the pinion shaft will make only half a revolution, being stopped by the action of the catch engaging with the depressions on the cam. This action of the rake head, cam, etc.; can be secured by the driver whether the machine is running forward or backward. The devices for securing the delivery action of the rake head are very simple, the mechanical arrangements being few in number and not liable to derangement. A bar secured to the rear of the rake head has a number of horizontally projecting fingers between the rake teeth to prevent the hay from being crowded up beyond a certain point.

Fig. 2 shows a simple device for securing the rake teeth to the head. The teeth are of round steel, coiled as at C, to form a spring, the ends being bent and held in recesses in the casting, D, which contains two teeth the whole being secured by a single screw or bolt. The rake head is sustained in boxes which allow of its adaptation to unevenness of the surface of the ground. It is evident that the horse, and not the driver, does the work, the draft of the machine holding the teeth to their work. The rake will always conform to the surface of the ground independent of the wheels. The draft of the horse is directly in front of the work so there is no lateral or side pull. The grass is gathered before the wheels can press it into the ground as the rake is in front of the wheels. The ease of operation of this machine is illustrated by the following statement from the inventor; "A son of Mr. James Taylor of Sutton, Mass., only seven years old raked one hundred tuns of hay in one season—1863—with this machine, and has repeated the work for the four years succeeding." Several patents have been issued on this rake, and an application on other improvements is pending before the Patent Office.

All communications relative to this implement should be addressed to J. C. Stoddard, Worcester, Mass.

Fig. 1.

Fig. 2



STODDARD'S SELF-OPERATING HORSE HAY RAKE.

Defenses Against Hurricanes.

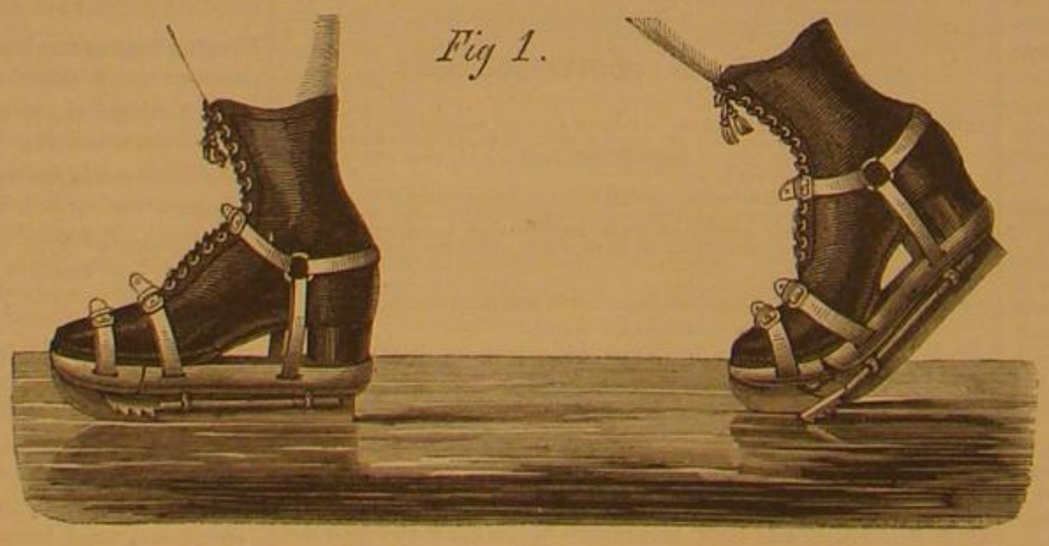
In the London *Mechanics' Magazine* of January 10th we notice a correspondent's plan for the protection of buildings, plantations, etc., from the effects of hurricanes, intended for the West India islands, where during the past few months great devastations have been done by the forces of nature. The idea is to build the houses, whether dwellings or otherwise, like that of the "old woman who lived under a hill," partially subterranean, and then to erect pyramidal structures of iron "in combination with wooden beams, wire ropes, chains, etc.," to break the force of the gale, etc., etc.

Now, we would suggest to this correspondent to give the public, and especially the miserable inhabitants of the torrid zone, some idea of protection against earthquakes. Cannot he show how buildings may be erected on rollers or balls so that their foundations may be moved without displacing the walls?

Improvement in the Construction of Skates.

Since the skating mania has spread over the country, all classes, young and old, have endeavored to avail themselves of this health-giving amusement. Among the chief difficulties that grown persons have to encounter are weak ankles and cold feet; in fact, skating, in place of being an amusement, soon becomes a labor to them.

Fig 1.



BROWNLEE'S PATENT ICE AND PARLOR FLEXIBLE SKATES.

Th jointed or flexible skate is intended to remove these difficulties. With this article any person that can walk can skate; he has no new motions to make with his feet or legs; all he has to do is to start off as if walking, and his feet are not bound up like club feet, and he uses the same muscles and motions as walking, his feet not becoming cold nor his muscles soon tired. Ladies can put on these skates at home, screw up the claws, (unless there is ice in the road), and walk to the skating pond or rink. These skates being propelled by claws, which take hold of the ice as the foot is bent, there is no necessity for fluted or sharp edges to cut up the ice or retard the skater and turn his amusement into work. By having the claws shod with rubber, this improvement can be applied to roller or parlor skates. Any good mechanic can see how to apply this improvement to old skates without much expense. A patent for this improvement has been issued to Geo. Brownlee through the Scientific American Patent Agency, Dec. 24, 1867. Any information desired in regard to the sale of rights will be given by addressing G. & C. Brownlee, proprietors, at Princeton, Ind.

The description may be very brief as the engravings sufficiently exhibit the peculiarities of the device. Fig. 1 represents the skate in use on the ice, one foot receiving the weight of the body, and the other being in the act of beginning a forward movement. Fig. 2 presents a bottom view of the skate, showing the runner—the edge of which is round like that of a sled or cutter—and of the attachments on its side intended to grasp and adhere to the ice for the purpose of propulsion. A shows a single lever claw, intended for low irons, adjusted merely by a screw on its rear end, and held in place by guides. B is a double lever claw, the back end of the long lever pivoted and the claw end controlled in its action by a short screw lever, having a nut on it seated in a recess between the two hinged parts of the skate, and acting as a fulcrum for the short lever, which by means of a sliding yoke or clasp, and the nut, can govern the hight of the claw and its motion.

Fig. 2

Curculio Arrester.

General William H. Noble, of Bridgeport, Conn., has lately patented an apparatus for preventing the curculio from ascending fruit trees. He says:

"This invention is designed to prevent the ascent of or to drive the curculio from fruit trees, vines, etc. It needs not that I should say anything to show the importance of preventing the attacks of this insect upon fruit trees; this is too well known to all experienced in horticulture, and many devices have been practiced to destroy the insect, or prevent its devastations. It has been found, by practice, that a slight jar upon the tree or vine causes the curculio to let go its hold and fall to the ground. It is well known to horticulturists that the curculio is very timid, and to this weakness I attribute the effect of the slight jar upon the tree, as the jar requires to be only so heavy as will simply give the slightest shock, and scarcely perceptible to the person, to cause the insect to fall to the ground.

"My invention consists in the arrangement of an automatic hammer, in such relative position to the tree or vine which it is designed to protect, that the hammer may so strike the tree or vine, or rods, or frame, attached thereto, as to give the slight shock required.

"A hammer is arranged in connection with a clock work, so that the hammer is caused to vibrate as often as may be expedient, and should give from ten to fifteen blows per minute, and this is arranged in such relative position to a frame that the hammer may strike on the frame. A clock work set in motion, by winding or otherwise, causes the hammer to strike the frame, and, through the blows constantly given, a jarring effect on the tree is constantly kept up, and when so continued, the curculio will not ascend, or, if ascending, will drop to the ground, where it may be destroyed in any convenient manner.

"For vines, a single apparatus may be sufficient for a long frame, but for trees, one apparatus should be attached directly to the tree, and I prefer that it be so attached at some little distance above the roots; or several trees may be attached to rods, so that a single apparatus may answer the purpose for many trees."

GOLD filings are saved only because the metal is deemed precious; but iron filings are of real value, mechanical and medicinal, but are frequently foolishly thrown away.—*Verb. sap., etc.*

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VOL. XVIII., No. 8....[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, SATURDAY, FEBRUARY 22, 1868.

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CONCERNING STREET CARS.

Certain London capitalists, whom we might almost designate philanthropists, having at heart a desire for benefiting the masses, and at the same time being wise enough to foresee in the project a paying investment, are endeavoring to introduce our popular democratic and American institution, horse cars, into the English metropolis. For two successive sessions have these individuals petitioned Parliament for powers to carry their project into effect, but without having their prayer answered. Yet with a commendable pertinacity again have they published, according to law, the prescribed notices of their intention to once more apply for a bill, in the session of 1868. There is a certain proverb which assures success for the third trial, and if there is any trace of truth in this popular notion, the petitioners will this time come off triumphant.

If tested by the greatest amount of service rendered to the largest number of the community, the street cars in this country may be regarded as one of the greatest among public benefits, their general use upon the principal thoroughfares of all our large cities affording proof sufficient that they fill a wide-spread public demand. But these railways, it must be admitted, are not without their disadvantages, the presence of the "permanent way," as the English style it, proving a constant and considerable impediment to general traffic. It is needless to expatiate on the difficulty which ordinary vehicles experience in crossing and recrossing the tracks, our only purpose now being to give some suggestions relative to obviating this really serious annoyance. If rails could be entirely dispensed with except when actually in use, a great desideratum would be attained, but up to this time cars which are constructed to lay and take up their own tracks, of which there are many styles, all theoretically perfect and working well as models simply, have signally failed in actual practice. If then we must tolerate the iron rails in our streets, what form is least objectionable?

The London company before referred to propose to lay down a crescent rail which will be on a level with the street both on its outer side and between the rails, the only break in the surface being a groove on the inner side of the rail for the flange on the car wheels, such groove being too narrow to take in the tire of any ordinary street vehicle. By employing this rail, the company contend that the level of the street will not be broken nor the passage in any direction by ordinary carts and carriages obstructed, the whole width of the road being preserved for continued public use. Such a rail could never be used in this country for the groove would be continually choked up, in summer with dust and street waste, in winter by the more formidable snow and ice, and it seems hardly possible that the track would prove a success in England.

In our last issue we gave, on the authority of a newspaper correspondent, a short notice of the style of track adopted in the streets of Paris. The rails are simple metal plates spiked down, while the wheels running on them are without flanges. The cars are made to keep on the plates by means of a fifth wheel, which has a flange but half an inch thick, a mere disk, running in a grooved central rail, laid for the purpose. This extra wheel, being attached to the car by a lever, is to be raised at will and the car run off the track, a feature of the plan, we may remark, whose desirability is not so apparent, a short turnout being a preferable method of allowing cars to be run in both directions with but one track. The Paris plan, however, certainly embodies several and important advantages. Ordinary vehicles can in no way be inconvenienced, but on the other hand the permanent way may be of positive service. The same objection, however, can be urged against the central as well as all other grooved rails.

Now a simple modification of this Parisian idea, it seems to us, would furnish a track, if not perfect, yet a decided improvement upon any plan that has ever fallen under our notice. Let two extra wheels be provided, one at the front, the other at the rear of the car, both running on a central rail. The latter is merely a continuous iron bar slightly raised above the street level, the wheels themselves being grooved or made with double flanges. The advantages of such a method are too apparent to need particular mention, and if our street railways were laid out accordingly, the objections now existing, and which prevent the laying of tracks in some thoroughfares, we are confident would no longer exist.

GATHERING, DISTRIBUTION, AND UTILIZATION OF SEWERAGE.

The usual method employed in our cities of discharging the accumulations gathered at our water closets directly into street sewers, is not only wasteful but more or less injurious to health, the exhalations from fermentation and decomposition finding their way back to our dwellings and tainting the atmosphere we breathe, notwithstanding the precautions taken by means of gas traps and other similar contrivances.

The same objection will apply to the attempt to carry off the excretæ by a flow of water; the solid and liquid portions will be removed, while the gaseous components pass back, by their ascencive force, to the rooms.

Another system has been devised by Capt. Chas. T. Liernur, of London, from whom we have received a description with diagrams, which latter, however, we do not think are necessary to arrive at a correct notion of the nature of the invention. It is in use at the Hague, the capital of Holland, and has proved highly efficient. The plan is to connect the pipes leading from the rooms to air-tight reservoirs of boiler iron situated under the street crossings and of capacity sufficient to receive all the excrements which may accumulate during one, two or more days, as desired. These pipes are at least five inches in diameter and are provided with valves which may be operated from the sidewalk. The pipes are, of course, air-tight. Tho privies have each a pipe leading to the delivery pipe, and in case of one water closet being above the other, drooping lips inside the pipe compel the filth to follow the middle of the pipe, so that there may be no adhesion of the matter to its sides. From this delivery pipe one is carried up above the roof of the building acting as a chimney to carry off the effluvia to the upper atmosphere. The receiving pipe has a short upward curve just before it reaches the street reservoir, which receives the excrementitious matter until it is ready to be taken away.

Every night, or as often as may be necessary, a movable air pump driven by steam is brought to one of the reservoirs, a flexible hose is placed over the reservoir and connected by a coupling, when the air is pumped from the tank, the sidewalk valves being shut, and the contents of the pipe and tank are emptied by atmospheric pressure, or suction, into a movable tank accompanying the steam engine and pump. As soon as the vacuum has reached the proper point, indicated by a gage, the valve communication between pipe and tank being opened, the filth rushes into the tank, the air pump being kept in operation during the process, and thus aiding in effectually cleaning the pipes even to their upward openings, and compelling even the gases to accompany or follow the solid constituents. After being collected, the contents of the tanks are carried to some point outside the town where they are barreled and sent to the country. Capt. Lienur's plan comprehends, also, the method of application of the manure to lands, a subject which we reserve for another notice.

PROCESS OF SUGAR MAKING IN MAURITIUS.

There is no department of manufacturing industry in which more progress has been made during the last ten years than in the production of sugar. It is equally true that there is none in which so much remains to be done. The extraction of white sugar direct from the juice of the cane and beet, without refining, is now an accomplished fact. At the great Exposition in Paris, beautiful specimens from three estates in Mauritius were exhibited and took gold medals. Our Paris correspondent took pains to obtain specimens, which may be seen by application at our office, and every person interested in the subject of sugar will do well to call and examine these beautiful samples, produced without the use of a particle of bone black, and without the addition of any injurious chemical substance.

M. Poulin, one of the three enterprizing planters who received the gold medal as before stated, gives the following simple statement of the process employed:—

"The canes are crushed in very powerful steam mills, the cylinders of which turn extremely slowly, so as to squeeze out all the juice. The juice is received in troughs and a certain quantity of sulphite of soda (neutral and anhydrous, *i. e.* without water) is added to it. After this first operation, the object of which is to prevent the juice from fermenting in the defecating troughs, it is saturated with lime (the quantity varying according to the quality of the juice), and it is then drawn off into an apparatus called an '*appareil à triple effet*,' which is a set of vacuum pans three in number. It is then boiled at a very low temperature in these vacuum pans. When the sirup is concentrated to the granulating point, it is left to cool. When cold it is put into a turbine or centrifugal, which is made to perform 700 revolutions per minute. The sugar is 'clairced,' or clarified, by having thrown upon it a 'claircе,' *i. e.* a sirup, which is ladled out of a jar or tub and thrown upon the revolving mass of sugar by a workman.

"The claircе is simply a sirup of sugar, or molasses, into which has been previously introduced a certain quantity of water, so as to reduce the sirup to a density of 35 degrees (Baumè's aerometer, called also a *pèse syrop*). As the workman pours in the claircе the sugar becomes white, and when the cleansing process is thus accomplished a jet of dry steam is let into the turbine. This jet is sent directly into the center of the turbine.

"A jar or tub for the clairсing or clarifying sirup is attached to each turbine and bears a fixed proportion to its capacity. The workman pours this sirup upon the revolving sugar with a large iron ladle, about three-fourths pint; so that the contents of the turbine are clarified by a single jet of the sirup, and in from three to four minutes. The sirup usually employed in turbining the sugar is obtained from that part of it which flows from the turbine.

"In Mauritius the sirups from the turbine are usually reboiled a second and third time, so as to extract from them every particle of crystallizable sugar. The residuum of the third boiling is generally sent to the distillery and used for making rum.

"By means of this process canes cut in the morning may furnish sugar perfectly ready for packing and shipping by evening of the same day. But for the full practical understanding of all the niceties of the process, a visit to the Mauritius might be useful, for much depends on practice. For instance, the success of the clairсing in the turbine depends in a great degree on the skill of the workman in charge of the ladle; and this skill is the result of practice and observation. So also in regard to the jet of steam sent into the turbine, and *which must be dry, i. e.*, heated to a degree where it ceases to be moist, as moist steam would cause the sugar to melt in the turbine, instead of drying, as happened in the beginning in Mauritius, where the planters began by using condensed steam, which is very bad.

"The very large and splendid crystals shown in some of the samples are easily obtained; but they cost more and are inconveniently slow in melting. Those samples in the Exposition were made simply to show what can be done; but they would be unsuitable for general use, as they would take a good half hour to melt in water.

"Let any one desirous of ascertaining the relative qualities of European-made and Mauritian-made sugars, dissolve the latter in a glass of water and observe its delightful perfume. But in order to have this fine odor, the sugar must not have undergone fermentation, nor have been subjected to refining by bone black. All the Mauritian sugars made by this process have this perfume, and all are, strictly speaking, raw sugars, *i. e.*, they are purified by a mode of fabrication from the juice, which is not refining, and which makes no change in their natural savor.

"The Mauritian sugars are only admitted into France under the specification of "assimilated sugars," in order that they may be made to pay the same duties as "refined sugars." The scale of duties levied here and in England on Mauritian sugars practically excludes them from both markets. This exclusion is kept up simply in the interest of the refiners of both countries. The Mauritian sugars are mainly consumed by India and Australia, which admit them free.

"The flavor of anything made with these Mauritian sugars is said to be superior to that of things made with refined sugar. Preserves made with it are said to keep much longer, and it is considered much more wholesome."

We hope that our Louisiana sugar planters, and the enterprizing men who are preparing to introduce the manufacture of beet sugar into our country, will give these remarkable results of modern science an enlightened consideration.

IRON PUDDLING BY MACHINERY.

A correspondent writing from St. Johns, New Brunswick, on the above subject, says that as a general thing puddlers discourage all attempts to introduce machinery as an aid to the arduous and exhaustive labor to which they are now subjected. But, nevertheless, a number of attempts have been made to that end. "As far back as 1836, a patent was granted to Dr. Charles Schafhæutl of Dudley, England, for an 'improved apparatus to impart a compound motion longitudinally and transversely to the puddling tool.'" This invention was found to be imperfect, but no doubt has started numerous later inventions for the same purpose, among which I may mention Bennett's, Griffith's, Harrison's, and others, all secured in England during the last six years. Bennett's machine is placed on the top of the furnace, a lever through which the motion is imparted to the tool hangs down in front of the fire door. The power is taken from the engine by a long connecting rod, which moves backward and forward, sliding at the same time the lever which holds the tool around a quadrant to impart the side motion. It is rather a difficult matter to describe the machine without drawings, but probably the explanation I have given may enable some to catch at the idea I have endeavored to convey. Mr. Griffith's machine is, I believe, on the same principle. Mr. Harrison has placed a small cylinder, either for steam or water pressure, over the furnace, to furnish the movements for his machine. When started, it works the rubble backward and forward, and around the bottom of the furnace, but whether it is an improvement on the other two patents I have no means of knowing. Bennett's machine is now in operation at his works, and answers a good purpose,—so I heard from a workman last spring. I saw in the Iron Master's Association book of the United States, that Mr. Grove, of Montour Rolling Mills in the State of Pennsylvania, had introduced machine puddling in his works. Perhaps he would be willing to give some information on the subject.

In 1863, a patent was granted to Messrs. Walker & Warren of Wolverhampton, for a rotary puddling furnace. This patent was purchased and experimented upon by the Dowlais

Iron Company, under Mr. Menelaus (who wrote a paper on machine puddling, to be read before the Institution of Mechanical Engineers, of Birmingham). As this company erected several of these furnaces, with a capacity of sixty tuns a week each, it must have been considered a success, although I have never heard of its being adopted elsewhere. This patent furnace requires no assistance to puddle the iron. The iron is run in melted, the machine set in motion, and the charge boiled or balled, ready for the hammer or squeezers, without further assistance. The body of the furnace is a cylinder lined with probably something the same as the Bessemer retorts, and made to hold about five cwt. of iron. It is hung on large journals at each end of the cylinder. Through these journals the flame passes from the stationary grate to the stack. The operation of the machine keeps the fluid iron constantly in motion, and prevents it from adhering to the inside of the cylinder; and as it comes to "nature," it gets gradually rolled into a ball the shape of the inside of the furnace. The iron made by this furnace was said to be of a more uniform quality than could be made by hand or by the assistance of other machines. A bloom and specimens of finished iron made of it were exhibited at the same time Mr. Menelaus read his paper on machine puddling in Birmingham.

The Rusting of Iron.

Perfectly pure water will not rust iron until it is heated to redness, when the contact with the metal instantly forms a red-heat crust. If iron again be left for a very long time in water, a yellow envelope of hydrated peroxide will be formed. Water charged with atmospheric air will not rust iron, but oxidation will take place as soon as the air has constant access. According to Martell's and Hall's experiments, the rusty envelope is to be attributed to the presence of carbonic acid in the air, where, in its normal condition, it exists on an average of 4 in 10,000 volumes. Water charged with carbonic acid oxidizes iron with rapidity under visible evolution of hydrogen, the process being expressed by the following formula:

$$3HO+Fe+CO_2=Fe_2O_3\,CO_2+3H.$$

The temperature at which steam is decomposed by iron is at a red heat, but at the white heat the oxide loses partly its oxgen and forms the double combination of peroxide and protoxide, having the formula of magnetic iron.

The French chemist Gay Lussac holds that iron cannot be oxidized higher than 37·8 parts of oxygen to 100 parts of iron, answering very nearly to the above-mentioned double combination.

Water oxydizes iron more rapidly when it receives small quantities of mineral acids, while on the other hand an alkali or caustic lime destroys the oxidizing faculty of water, a fact which is easily explained when we consider what strong affinity carbonic acid has for those bases. We are indebted to Fayen for the determination of the limits of this veto power which alkalies possess over the oxidation of iron in water. He ascertained that a saturated solution of potassa lye diluted with from 1,000 to 2,000 parts of water could still protect iron, but not when diluted with from 3,000 to 4,000 parts. Saturated lime water, when diluted three times, protected iron, but not when diluted four times. Saturated carbonate of soda, diluted with from fifty to fifty-four volumes, protected iron, but not so when diluted with even fifty-nine volumes. The finest cast steel was protected perfectly by even less potash.

Iron is perfectly oxidized by being often sprinkled with pure water, and then on being exposed to red heat loses 1·74 per cent of water, having in fact been a hydrated peroxide with a formula, Fe_2O_3, HO. Moist air rusts the iron yellow, and Bergmann considers the rust to be a compound of 76 Fe_2O_3 and 24 CO_2; Hausmann, of peroxide and water—but it is, as Thompson and Karsten have shown, a true hydrated basic carbonate of peroxide.

Rust is porus, and like all porous bodies, absorbs gases. White pig metal scarcely oxidizes; gray iron with more facility, bar iron still easier, especially when red hot. Cold, short iron rusts least and slowest. Polish is the best preventive of rust, particularly when the article is kept in dry air. There are many recipes given of compositions designed to prevent oxidizing, but a coat consisting of common resin melted with a little gallipot oil and spirits of turpentine is generally considered to be the best. Bleaching also, in a slow fire, is a protective against rust, and this is constantly used for nails and tacks.

Improved Artificial Leather Belting.

Patented by Stephen M. Allen, Woburn, Mass.

I take ordinary scrap leather, though preferring the skivings or shavings of the cuticle, from tanneries, shoemakers' or curriers' shops, and soak and wash the same before or during the process of pulping, sometimes with pure cold or warm water, and sometimes using alkalies, or any other property which will separate the tannin from the scraps of leather, so that when pulped and dried the fiber will adhere strongly together, and be less likely to absorb moisture. I then prepare the untanned scraps of hides, sometimes in lime solutions, or solutions of salts, so as to remove the stiffness when dry, without destroying either the fiber itself or the adhesive properties of the glue or gelatine in the same. When the fiber is thus prepared, the tanned and untanned fiber will readily unite in combination, and will also unite with vegetable fiber, either with or without other gelatinous or resinous substances while pulping. I sometimes add to the combination of fibrous substances, when the same is being pulped, a proper quantity of bullock's or animal blood, which, with the previous preparation of the animal fiber, as before described, will make nearly a water proof sheet of artificial leather, and the same will not be susceptible of absorbing moisture, so as to cause a belt to contract or expand, either under the influence of heat or a humid atmosphere. When properly pulped, the same may be run off on an ordinary paper machine, or between rollers, and doubled to a proper thickness, and may be used either with or without further preparation, by printing, japanning, stitching, or water-proof applications. I usually subject the belting to a high temperature of heat, to set the gluten and other resinous properties, and sometimes vulcanize the same, though for ordinary use it is not necessary.

Bromo-Iodized Rubber.

The following process of treating rubber and other gums without the use of sulphur has lately been patented by J. B. Newbrough and E. Fagan, New York city: By adding to iodine one half its weight of bromine proto-bromine of iodine is formed, and this, when combined with rubber, or equivalent gum, will produce a composition which will harden on being subjected for about an hour to a heat of 250° Fah. Owing to the volatile properties of proto-bromide of iodine, it cannot be applied without difficulty to practical purposes. To obviate this difficulty, we treat both the bromine and iodine, prior to combining the same, with oil of turpentine, or similar oil, which has previously been mixed with about one fourth its weight of sulphuric acid, to prevent the formation of an explosive composition.

The pasty mixture, produced as above described, is combined with caoutchouc, or eqvivalent gum, in the proportion of about three ounces of the paste to a pound of gum, the proportion of gum being increased if a more elastic product is desired. After the gum and paste are thoroughly incorporated, the composition may be hardened by subjecting it to a dry heat (of from 200° to 320° Fah.), for from ten minutes to one hour and a half, the time being lengthened to increase the toughness of the product.

The product thus obtained may be applied to many useful and ornamental purposes, and any desired color may be imparted to the material by combining with the composition, before it is hardened, any suitable mineral or earthy coloring matter.

Manufacture of Carpets and other Fabrics from Jute, Flax, etc.

Thomas Crossley, of Bridgeport, Conn., has obtained a patent as above, the process being as follows:

"The cloth, after being woven from the raw jute, flax, or cotton, is immersed in a bath of water, at, say, from 90° to 120° Fahrenheit, in which has been mixed a certain portion of either wheat or corn bran, and sub or bicarbonate of soda. After remaining in this bath for a length of time sufficient to thoroughly dissolve the tannin in the jute or cotton, or the gluten or gum in the flax, I then remove the cloth and wash it thoroughly in clean water, and I afterwards immerse it in a bath of cold water, mixed with a solution of crystallized tin and muriatic acid, or strong muriate of tin, with twenty per cent of sulphuric acid, at a strength of from one to two degrees Twaddell. After impregnating the cloth with this bath, it should be again washed in clean water, and then submitted to a bath of weak solution of chloride of lime, after which the cloth is so washed clean and dried, and it is then ready for printing or dyeing.

"By these means I am enabled to produce a carpet or other fabric, dyed or colored in any colors or design, by the process of dyeing or printing, without weakening or injuring the strength of the fibers, and at the same time to produce a carpet or other fabric, having all the richness and style of woolen or worsted goods, with equally durable colors, but at much less cost."*

Recutting Files with Acids.

There are many recipes for converting old files into new by means of acids, and among the latest is that recently patented as follows, by Albert I. Ferguson, of Sharon, Pa.:

"The files must be thoroughly cleansed in warm water containing a small quantity of potash, which readily removes any grease or dirt from them. After the files are thus cleansed, they must be washed with warm water and dried by artificial heat. Next, place one pint of warm water into a wooden vessel, and put into it as many files as the water will cover. Then add two ounces of blue vitriol, finely pulverized, and two ounces of borax, well mixed, taking care to turn the files over, so that each may come in contact with the mixture. To the above mixture now add seven ounces of sulphuric acid and one fourth of an ounce of cider vinegar, which will cause the files to assume a red appearance at first, but they will, in a short time, resume their natural color. Then they must be removed, washed in cold water, and then dried by artificial heat. When dry, they must be sponged with olive oil, wrapped in porous paper, and laid aside for use."

Improvement in Combs.

Elias Brown, of Wappinger's Falls, N. Y., has lately received a patent for a valuable improvement as above, which is coming into extensive use. The combs are stamped by a peculiar machine out of sheet steel, the mechanism being of such a nature as to leave the teeth of the comb rounded and smooth. The combs are then tempered and afterwards ornamented with an enamel which gives them a very soft and beautiful appearance. In weight they are about the same as rubber, over which they have several important advantages, such as freedom from odor, greater elasticity, cheapness, and durability. The agents are Noyes, Wilson & White, 98 Franklin street, New York. Mr. Brown's large factory for the manufacture of these new combs was lately burned down at Wappinger's Falls. But he is rebuilding with characteristic energy, and will soon be in full operation again. He is the first, we believe, to make a really superior comb from steel.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 4, 1868.

Reported Officially for the Scientific American.

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73,942.—COOKING STOVE.—Federal C. Adams and Joseph Peckover, Cincinnati, Ohio.

We claim, 1st, The horizontal concentrating plate, A, stationary or movable, and with or without fuel doors, substantially as and for the purposes described.

2d, The flap or guard plate, B, whether stationary or movable, substantially as and for the purposes described.

3d, The spaces between the fire back and sides and the front oven and side plates in combination with the plate, A, substantially as described.

4th, The chamber above the top oven plate and below the top flue formed by plates, C and C', substantially as and for the purpose described.

5th, The hollow or double fire-back, Q, substantially as described.

6th, The air chamber under the grate and ash pot formed by the false bottom, I, substantially as described.

7th, The chamber between the front oven plate and fire-back in combination with the open-grate frame and plate, A.

8th, The hollow side plates, S S', substantially as described.

9th, The register, R, in combination with the fire-back and front oven plate, substantially as described.

10th, The register, N, in combination with the open-grate frame, substantially as described.

11th, The sliding lid, A a, in combination with a cooking stove, substantially as described.

12th, The rolling hearth plate, D d, operating substantially as described.

13th, The hearth plates, E e, sliding laterally under the bottom plate, substantially as described.

73,943.—PRINTING PRESS.—Edwin Allen, Norwich, Conn., assignor to the Allen Manufacturing Company.

I claim the rotary press herein described having one of its driving wheels, F1, provided with one or more adjustable segments or racks, F2, substantially as and for the purpose set forth.

73,944.—VISE.—Samuel S. Barnaby, Macon, Ga. Antedated November 23, 1867.

I claim, 1st, The combination of the sliding bar, H, ratchet-jaw shank or bar, E, and pawl, M, when arranged together substantially in the manner and so as to operate as and for the purpose described.

2d, The combination with the eccentric V and sliding sleeve, S, of the pawl, M, arranged together and connected with the jaw shank or bar, E, substantially as and for the purpose set forth.

3d, An improved vise constructed and arranged in its several parts substantially as described and so as to be operated as specified.

73,945.—CULTIVATOR.—F. M. Barrier, Stevenson, Ala.

I claim the construction, arrangement, and combination of the central beam, A, with its shovel or plow, the side beams, C C', with their shovels or plows, the U or arched-shaped brackets, E E, and braces, a a, all as and for the purpose described.

73,946.—INKSTAND.—James Barwick, Silvertown, North Woolwich, England.

I claim, 1st, The combination with an ink reservoir and cup of a valve for holding and discharging the ink which the cup may contain said valve being arranged within the reservoir so as to close against the bottom or under side of the cup, substantially as herein shown and described.

2d, The combination with the ink reservoir, dipping cup and valve, arranged as above described of a valve rod passing centrally or axially through the said cup, substantially as and for the purposes set forth.

3d, The combination with the ink reservoir, cup and valve of a hollow valve-operating stem extending from within and near the bottom of the reservoir up through and above the bottom of the ink cup, substantially as and for the purposes shown and described.

4th, The combination with the ink reservoir, dipping cup and valve of a rubber sleeve or other device for holding the valve against its seat with a yielding pressure, substantially in the manner herein shown and specified.

5th, In an inkstand organized substantially as herein shown and described providing the valve stem, when hollow, with discharge openings within the capacity of the ink cup and above the intended level of the ink held in the same, substantially as and for the purposes shown and specified.

6th, The combination with the closed ink reservoir, the elastic bulb, or equivalent device for compressing the air within the same and the ink cup, of a tube or conduit opening from the reservoir into the cup at a point above the bottom of the latter and a valve for holding and discharging the ink contained within the cup, substantially as and for the purposes shown and specified.

73,947.—DRAWING CLAMP.—Jules Bouniol, Philadelphia, Pa.

I claim the wire and tube drawing device consisting of the frame, A B, with rollers, C D, which have cams or jaws, g h, cog wheels, H I, double joint or hinge, E F, and hook, G, substantially as and for the purposes described.

73,948.—PHOTOGRAPHIC PRINTING APPARATUS.—Edwin Brown, Roxbury, and Edwin W. Brown, assignors to Edwin W. Brown, Boston, Mass.

We claim, 1st, So connecting a frame suitable for sketching photographic prints to and with any proper operating mechanism that such frame will be moved over and across the picture as it is being printed, substantially as and for the purpose described.

2d, Also the rod, F, carrying the sketching frame and guide, M, or their respective equivalents, in combination with each other and when so arranged together and with reference to the operating mechanism as to impart to the frame the movement requisite for sketching, substantially as described.

73,949.—STATEROOM FOR RAILROAD CARS.—William Brown, Duncannon, Pa.

I claim the combination of the hinged doors, c, with the passage way or entry, C, so that the latter may be inclosed and made to form a portion of the staterooms when desired, substantially as described.

73,950.—CAR BRAKE.—John A. Campbell (assignor to himself and David Sharp), South Boston, Mass.

I claim the combination as well as the arrangement of the two screws, e f, of the transom-bolt, C, with such bolt, the bars, a c, and the two series of brakes applied to such bars and the wheels or to the same and the platform, A, substantially as described.

And in combination therewith the hand wheel shaft, m, its gear, l, and chain or belt, k, and the gear, i, on the transom-bolt, C, the whole being arranged substantially in manner and so as to operate as described.

73,951.—STEERING APPARATUS.—James L. Cathcart, Georgetown, D. C.

I claim the jointed propeller so arranged in connection with the rudder a to be capable of lateral motion for steering purposes in unison with the rudder by power transmitted through the latter and of being disconnected therefrom and secured in its normal position, substantially as herein described.

73,952.—HORSE RAKE.—Abner Chapman, Delta, N. Y.

I claim a grain head applied to the arms of a revolving horse rake, marked B, in the manner and for the purpose herein set forth.

73,953.—CASE FOR TOOTH PASTE.—George F. J. Colburn, Newark, N. J.

I claim the case, D, to be used in combination with the tube, B, and with or without the sack, A, and the application of the whole, as and for the purpose specified.

73,954.—LIFTING JACK.—John Coulter, Sen., Xenia, Ohio. Antedated January 31, 1868.

I claim the combination and arrangement of the standards, C C, horizontal sliding bar, B, vertical bars, d d, windlass, E, with its toothed wheels, F F, and ratchet lever, G, toothed wheel, I, and pawl, H, constructed substantially as shown and described

73,955.—SHUTTLE FOR LOOMS.—E. Cross, Southbridge, Mass.

I claim the combination with the tip and wood of the shuttle of an interposed shield, C, arranged with relation to the tip and the shuttle wood, substantially as and for the purposes set forth.

73,956.—PEN WIPER.—Samuel Darling, Bangor, Me.

I claim, 1st, A pen-cleaning apparatus so constructed as that the pen may be first dipped in water and then be cleaned against a brush hung free to revolve, substantially as set forth.

2d, The combination with a water cup or vessel of a circular brush free to revolve therein, as and for the purpose described.

3d, The combination with such a cup of a revolvable brush set at an angle with the cup, substantially as and for the purpose described.

4th, The removable cover having secured thereon one of the bearings or centers for the brush.

5th, The combination with a pen washer of a wiping reel, as and for the purposes described.

6th, A pen cleaner having a brush, circular or otherwise, to be used wet or dry, in combination with a wiper made of wash leather, cloth, or their equivalents, for the purpose herein set forth.

73,957.—GAS HEATER.—Samuel Darling, Bangor, Me.

I claim the combination with the tube of a "gas heater" of flame-confining guides, substantially as described.

73,958.—SAFETY HARNESS HOOK.—J. L. Dickinson, Dubuque, Iowa.

I claim a safety harness hook for liberating horses from carriages, constructed and operating substantially as herein shown and described.

73,959.—RAILWAY FROG.—J. Hall Dow and Daniel J. Riker, Chicago, Ill.

We claim, 1st, The chair, C, constructed substantially as and for the purpose specified.

2d, The point, g, having its upper and lower edges bevelled in combination with the chair, C, constructed substantially as and for the purposes specified.

3d, The wings, e f, when provided with the two bevelled edges in combination with the point, g, and chair, C, all constructed and arranged substantially as and for the purposes specified.

73,960.—EGG-PRESERVING FRAME.—Christopher A. Erskine, Palermo Centre, Me.

I claim the said egg supporting frame substantially as described as made not only with its trays provided with ledges at their ends and without any at their sides but as having the tie bars arranged with respect to such trays in manner and so as to operate as and for the purposes as set forth.

73,961.—STRAW CUTTER.—William H. Evans and William H. Wainwright, Indianapolis, Ind.

We claim, 1st, The combination of the eccentric shaft, I, pawls, L and M, ratchet wheels, O and O', rollers, D and D', and the adjustable eccentric, R, constructed and arranged substantially as set forth.

2d, The combination of the boxes, B and B1, and plates, B2, constructed as described.

3d, In combination with the boxes, B and B1, and knife, E, the cutting bar, C, adjustably attached by eccentric bolts, substantially as described.

73,962.—LOOM INDICATOR.—Alfred Fellows, Thos. B. Harrison, and Hugh Dyer, Maquoketa, Iowa.

We claim, 1st, The cylinder, C, pin, D, and shaft, B, and spur, E, constructed, arranged, and operating as and for the purpose described.

2d, The combination of the bevel wheels, G and F, arbor, H, the ratchets, O and N, with their hollow arbors, dial, K, and hands, P and L, arranged and operating as described.

3d, The combination of the rod, Z, lever, A'', spring, B'', lever, W, pawl, Y, and ratchet wheel, O, arranged and operating as described.

4th, The shaft, E'', button, F'', and pinion, D'', arranged and operating as above described.

5th, Operating the lever, W, by means of a flexible cord attached to the lay or batten of the loom, as described.

6th, The measuring device, constructed as described, in combination with the clamp and screw, H''.

7th, The combination of the wheel, G, pin, R, lever, S, spring, U, pawl, T, and ratchet wheel, N, arranged and operating as described.

73,963.—NUMBERING MACHINE.—Walter H. Forbush, Buffalo, N. Y.

I claim, 1st, A registering pawl, G, striking radially, or nearly so, into the external registering notches, D, of the disks, after each movement thereof, thereby bringing said disks into strict alignment.

2d, The system of steps, c3, on the registering pawl, G, working in combination with the steps of the changing pawl, E, substantially as set forth.

3d, The mechanism consisting of the cam, I, arm, H, and fixed plate, J2, or the equivalent thereof, for giving the in, down, out, and up movement to the changing pawl, E, as and for the purpose set forth.

73,964.—CAR COUPLING.—John Fortier, Fairport, N. Y.

I claim the combination of the spring, E, with the inclosing slide, D, and case, f, arranged in such a manner that the spring acts by the tension of its main body and compression of its parts, k k, simultaneously to resist the thrust of the coupling link, substantially as set forth.

73,965.—MANUFACTURE OF ARTIFICIAL STONE, STUCCO, CEMENT, ETC.—Geo. A. Frear, Chicago, Ill.

I claim the use of an aqueous solution of shellac in the production of artificial stones, cements, stucco, etc., for useful and ornamental purposes.

73,966.—TOY GUN.—Russel Frisbie (assignor to J. E. Stevens & Co.), Cromwell, Conn.

I claim the spring, E, with the clutch hub, D, rod, F, pebble socket, J, trigger, B, substantially as and for the purpose described.

73,967.—WETTING OR WIPING INSTRUMENT FOR SLATES, etc.—Wm. T. Fry (assignor to G. H. Jones and H. C. Berlin), New York city. Antedated Jan. 23, 1868.

I claim a vessel, A, having openings in the end, through which pass fibrous strands, d, in combination with a sponge, G, with which the strands are in contact, the whole being arranged substantially as specified.

73,968.—WETTING OR WIPING INSTRUMENT FOR SLATES, etc.—W. T. Fry (assignor to G. H. Jones and H. C. Berlin), New York city. Antedated Jan. 24, 1868.

I claim, 1st, An instrument consisting of a casing for containing water, one end of the casing being provided with a sponge, or its equivalent, communicating with the water, and the other end with a sponge to which the water cannot gain access, the whole being constructed substantially as and for the purpose herein set forth.

2d, The enlargement, c c, at opposite ends of the case, for the purpose specified.

73,969.—PUMP PISTON.—S. P. Gilbert, Racine, Wis.

I claim the ring, I, holding the packing, E, and forming a valve for the ports D, all substantially as and for the purpose set forth.

73,970.—APPARATUS FOR TURNING THE LEAVES OF MUSIC.—Thos. Goodrum (assignor to Wm. E Green and Charles W. H. Day), Providence, R. I.

I claim the ratchet plate, F, hinged to and operated by the spindle, C, and lever, I, in combination with the fingers, for turning over the leaves of music books, substantially as shown and described.

73,971.—HORSESHOE.—Wm. T. Harmar, New York city.

I claim the steel toe cork or sharp, attachable to any smooth horseshoe by means of a clip, or flexible metal straps; also, an iron, or other metal, snow plate, attachable to the shoe by means of the clip and hole and leather loop and strap.

73,972.—SEEDING CULTIVATOR.—M. Hayden, Detroit, Mich.

I claim, 1st, The springs, L, when arranged and operating substantially as and for the purposes set forth.

2d, The arrangement of the treadle or vibrating lever, W, the arm, V, and rod, X, provided with the adjustable screws and nuts, the pins, Y, and the ears, Z, for the purpose described.

3d, The covering shovels, G, provided with a proper spring, when operating substantially as and for the purposes specified.

4th, The combination and arrangement of a seeding cultivator, combining the above recited parts, with the frame, A, the wheels, B, the bars of the frame, C, the bar behind the rear bar, C, the hollow standards, E, hung upon the bars, D, the shovels, F, and covering shovels, G, the hinged joints, H, the braces, I, clasps, J, the adjusting slotted plates and bolts, K, the slotted projections, M, the bolts, P, the lever, Q, the arm, R, the quadrant, S, the pitman arm, T, the rocking bar, U, the vibrating lever or treadle, W, with its attachments, the gear wheel, 2, the pinions, 3 and 4, and lever, 5, and the shaft, 6, when constructed and operating substantially as herein set forth.

73,973.—SEEDING MACHINE.—M. Hayden, Detroit, Mich.

I claim, 1st, The construction of a seeding machine provided with the shaft B, the grooved cylinder, E, the collar, P, provided with the gage prongs, F, and the sleeve, D, when constructed and operating substantially as herein before described.

2d, The quadrant, H, the lever, I, the segment rack, J, and the plate, L, when attached and operating substantially as and for the purposes set forth.

3d, The combination of all the foregoing described parts, in conjunction with the hopper or seed box, A, when constructed and operating substantially as and for the purpose specified.

73,974.—DENTISTS' FLASK.—G. E. Hayes (assignor to Buffalo Dental Manufacturing Co.), Buffalo, N. Y.

I claim, 1st, The process, substantially as herein described, of filling vulcanizing flasks, or the molds contained therein, by constructing the flask with a side opening, a, and forming a cavity, b, in the mold by a plunger, E, combined or connected in a direct manner with said flask, and after having first packed the mold proper, also, the cavity, b, communicating therewith, with rubber and closing the flask, projecting the plunger through the cavity in the flask to press upon the rubber, substantially as specified.

2d, The molds, C and D, provided with an enlarged cavity, b, in communication with a side opening, a, made in the flask for reception of a portion of the requisite amount of rubber necessary to fill the mold, essentially as herein set forth.

3d, The combination, with a vulcanizing flask having a side opening, a, in it, of a plunger, E, for operation therein, substantially as specified.

73,975.—DRAWER.—Henry Heath (assignor to H. G. Fish, T. R. Clark, and T. J. Flagg), New York city.

I claim the combination of the pointed waistband of the drawers with a full leg, having triangular portions removed from its upper end, so as to obtain the requisite fullness at the hips and waist without the necessity of gathers.

Also, the combination of the ankle band of the drawers with a full leg, having a triangular portion removed from its lower end, so that the requisite fullness of the legs is secured without a surplus of material in the vicinity of the ankle.

Also, the combination of the pointed waistband of the drawers, ankle band and full leg having triangular portions removed at both ends, substantially as set forth.

73,976.—POSTAL SCALE.—Marcus L. M. Hussey, New York city.

I claim, 1st, The revolving dial, 1, upon which are inscribed mail routes and postal rates, substantially as described and for the purposes specified.

2d, The combination of the revolving dial, 1, upon which are inscribed postal rates and mail routes, with the spring, or other equivalent weighing balance, substantially as and for the purpose described.

3d, The combination of the dial, 1, or a segment thereof, with the adjustable indicator, o, when constructed substantially as described.

4th, The vertical indicator, when used in connection with a revolving dial, or a segment thereof, for the purposes specified.

5th, The vertical indicator, in connection with a spiral spring balance, for the purposes specified.

73,977.—COLLAR BLOCK.—John Jacobs, Oneida, Ill. Antedated Jan. 24, 1868.

I claim, 1st, The use of the right-and-left screw shaft, K, provided with the nuts, o o, and arms or rods, J J, for expanding or contracting the parts, B B, substantially as herein set forth.

2d, The arrangement of the shaft, H, pinions or gear wheels, I and T, and shaft, K, for expanding and contracting the former, and at the same time moving the platform, C, substantially as specified.

3d, The arrangement of the pincers, E, upon the platform, C, and with the arms, e e, links m' m, and the lever, d, as and for the purpose set forth.

73,978.—WASHING MACHINE.—Martin V. Jennings, Centralia, Mo.

I claim the combination, in a washing machine, of the corrugated washboard, e e' e'', etc., with an adjustable dasher, w, when the same are arranged constructed and operated substantially as shown and specified.

73,979.—CORN CULTIVATOR.—N. S. Johnson, Maquoketa, Iowa, Antedated Feb. 1, 1868.

I claim, 1st, The combination of the two axle bars, B B, and the four upright standards, A A A A, and cross beam, S, and bolts, E.

2d, The combination of the seat board and seat level, I, with the levers, L L, shovel beams, D D, and the movable pivot or standard, C, substantially as and for the purpose herein specified.

73,980.—COMPOUND FOR DESTROYING BURRS IN WOOL.—W. H. Jubb, Norwalk, Conn.

I claim the use and combination of the ingredients, as herein described, for destroying the burrs in wool and bleaching the wool, substantially as and for the purpose set forth.

73,981.—FLOUR BOLT.—E. H. Kellogg, Mukwonago, Wis.

I claim, 1st, Attaching the bolting cloth, one edge to the outside and the other to the inside of the ribs of each square of a bolting reel, as described.

2d, Inclines, H, in combination with arms, E, and ribs, F, of a bolting reel, substantially as and for the purposes described.

73,982.—WASHING MACHINE.—Dan'l Lampson, Lyons, Iowa.

I claim the hollow cylinder, B, encased with ends and slats, as above set forth.

2d, The combination and arrangement of the hollow cylinder, B, the slats, d, the corrugated trough bottom, when constructed, arranged, and operating substantially as and for the purposes set forth.

73,983.—MODE OF FORMING PLOW LAYS.—John Lane, Chicago, Ill.

I claim the method herein described of making plow lays, that is to say, by first reducing by means of rolls a slab of steel along its center, from end to end, to the shape described, then slitting said slab along the line of its greatest depression, and afterwards cutting the same crosswise, in suitable lengths for plow lays, as set forth.

73,984.—CAR COUPLING.—Sam'l D. Lecompte, Leavenworth County, Kansas.

I claim the combination of the pivoted swinging bar, d, and the spring, e, hinged at f, in connection with the double slotted boltholder, B, and shank-headed bolt, O, when constructed and arranged substantially as and for the purpose described.

73,985.—WOOD TURNING LATHE.—Geo. Lewis, Westfield, O.

I claim the combination of the reciprocating vibrating carriage, R, cutter head, W', cross piece, U, standards, X C, spring, A', adjustable arms, Y D', lever, F, and weights, Z E, all constructed, combined and arranged in relation to the pattern, Q, and spoke, P, and operating in the manner and for the purpose substantially as set forth.

73,986.—CARPET STRETCHER.—C. S. McRobert, Plymouth, Mich.

I claim, 1st, The rack, I, and hooked sliding pawl, J, in connection with levers, C and A, when constructed and operating substantially as and for the purposes set forth.

2d, The combination of the above named parts with the crotchet lever, A, provided with the transverse bar, B, the levers, C and D, provided with transverse bars, E and F, and teeth, as hereinbefore described, and the adjusting pins, G and H, when arranged substantially as and for the purposes herein described.

73,987.—WINDOW BLIND FASTENING.—George B. Melcher (assignor through mesne assignments to John Kinsman), Salem, Mass.

I claim the aforesaid rotary slide button, as made with a slot, B, projection, g, notch, d, and convex face, c c, substantially as described.

73,988.—CORN AND COTTON CULTIVATOR.—James W. Milroy, Galveston, Ind.

I claim the movable arms, D D, toggle jointed lever, E, beam, C, notched lever, F, rod, G, key, g, circular frame, A, and self-adjusting hoe shovels, B B B B B, the whole as constructed and arranged substantially in the manner and for the purpose set forth.

73,989.—FRUIT PICKER.—Oel B. Moore, Walled Lake, Mich.

I claim 1st, The form of the instrument.

2d, The application of the loops A and B.

73,990.—STOVE DRUM.—M. S. Morgan (assignor to himself and George C. Coffee), Clintonville, Ill.

I claim rotating case, A, in combination with soot box, L, scrapers, H and H'', substantially as and for the purpose described.

73,991.—ARTIFICIAL LEATHER.—Louis Montier, N. Y. city.

I claim, 1st, The process herein shown and described of combining the refuse shavings of leather to make artificial leather.

2d, Water proof artificial leather, when made and coated, substantially in the manner and with the ingredients herein described and set forth.

73,992.—CARRIAGE JACK.—Calvin H. Paine (assignor to himself and George S. Thompson), Providence, R. I.

I claim the arrangement and combination of the lever, D, and toggle, E, with the slide bar, C, and the base board, B, applied to the standard, A, substantially as specified.

Also, The pin, g, as made with the brace or arm, m, extended from it as set forth.

73,993.—LET-OFF AND TAKE-UP FOR LOOMS.—John Pender, Worcester, Mass.

I claim, in combination with the yarn and cloth beams, or either of them, and with the mechanism by which the intermittent rotative movement of the yarn or cloth beam is directly produced, the lever or levers, i, pawl or pawls, u, and arm or arms, v x, arranged to operate substantially as set forth.

73,994.—APPARATUS FOR SEPARATING SOAP BARS.—Harvey Phelps and Alvah Phelps, Albany, N. Y.

We claim the application to soap cutting apparatus of a carriage, E, having an accelerated motion with relation to the slab feed, D, for the purpose set forth.

73,995.—CALCULATING MACHINE.—A. C. Pierson, Rahway, N. J.

I claim, in combination with the table, N, or its equivalent, having the interest or other calculations for given amounts entered as represented, the parallel bar, B, with or without the adjustable movable pieces, c, or their equivalents, adapted to operate in connection with the numbers in the table, N, or its equivalent, substantially in the manner and for the purpose herein set forth.

2d, In combination with the above, carrying on the parallel bar, B, the line of figures or other marks, P, indicating the amounts for which the interest or other calculations is to be computed at the several points, substantially in the manner and so as to realize the advantages herein set forth.

3d, In combination with the column of days, the belts or moving columns, G and H, carrying the dates in a reverse order, so as to allow the length of time to be ascertained from a given day, reckoning either forward or backward, substantially as and for the purpose herein set forth.

4th, The belts or sliding columns, G and H, having the dates in reverse order, as shown, in combination with the interest table, n, as and for the purpose herein specified.

73,996.—WASHING MACHINE.—J. F. Pond, Cleveland, Ohio.

I claim, 1st, The application of friction guide pieces, i, attached to the edge of the endless apron or belt, to prevent the apron from turning under or over, and getting out of place, as and for the purpose specified.

2d, The adjustable slides, b b, attached to the upright pieces, B B, by means of bolts or screws, as and for the purpose specified.

73,997.—BED BOTTOM.—James Potter, Portland, Me.

I claim, 1st, The spring as shown at b, in connection with the recesses, m' m', in the slats, b', as and for the purposes set forth.

2d, The spring joints, a, in the slat, B, as and for the described purposes.

3d, In combination with a bed slat, removable by means of the spring, b, the arrangement of pivots, t, and hinges, s, as and for the purposes described.

73,998.—LIME KILN.—Wm. W. Potts, Bridgeport, Pa.

I claim, 1st, Arching over the upper end of the kiln, A B, substantially as described, and covering the feed hole, a', left thereby, by means of a removable cover, a'', provided with the small vent hole, a''', substantially as and for the purpose described and set forth.

2d, The combination of the furnaces, C, and the channels, D and E, when the same are constructed and arranged in the relation to each other and to the kiln, A B, as described and set forth, for the purposes specified.

3d, Forcing the currents of air up through the lower part of the kiln, and onward therein, by means of the channel, F, substantially as and for the purposes described.

73,999.—DOOR SPRING.—L. C. Prindle, Chicago, Ill.

I claim a door and gate spring, cut in the form shown, and coiled so as to have projections, F and G, in combination with plates, E H, substantially as and for the purposes herein specified.

74,000.—BRICK MACHINE.—L. E. Ransom, Trenton, Mich.

I claim the construction of the apparatus as hereinbefore described, combining the frame, A, the rollers, B and C, the crank, D, the gears, E and F, the sides or shields, G, the sloping shelf, H, the scraper, I, the wheels, J, and the knife, K, with the stand, L, all arranged and operating substantially as and for the purposes herein described.

74,001.—PROCESS OF GENERATING GASES AND IN THE APPLICATION OF THE SAME.—John T. Rich, Philadelphia, Pa. Antedated Jan. 23, 1868.

I claim, 1st, The process of generating and procuring the partial decomposition of atmospheric air by the action of wet steam in contact with mesallic or other hard substances, for the purposes set forth.

2d, The process, substantially as described, of saturating atmospheric air, and the subsequent application of the same to the purposes of chemical distillation, or mixed with carbon or hydrocarbon vapors to heating or illuminating purposes.

3d, The process of generating and preserving oxygen gas by the action upon a current of atmospheric air or electricity, evolved by a jet of wet steam, and the consequent separation of the steam and nitric acid from the oxygen thus set free, substantially as set forth.

4th, The mode of manufacturing, illuminating and heating gases by mingling hydrocarbon gases or vapor with oxygen gases, generated substantially in the manner set forth.

5th, The mode of manufacturing mingled oxygen gases for use in the desulphurization of ores, etc., substantially as set forth.

74,002.—DEVICE TO PREVENT HOGS FROM ROOTING.—L. L. Rinehart and P. Phillips, Evansburg, Ohio.

We claim the strip, A, with arms, a a, belt, B, spring, C, pin, c', arms, d, and roller, D, when combined and arranged substantially as described.

74,003.—CENTER BOARD FOR VESSELS.—Duncan Robertson, Detroit, Mich. Antedated Dec. 12, 1867.

I claim the combination and arrangement of the iron center board, A, the journals, C C, the eyebolts, a a, the ropes or chains, D D H H, the hollow stanchions, E E I I, and the stops, G G, arranged substantially as described, for the purpose designed.

74,004.—CULTIVATOR TEETH.—Luman Rogers, Pittsburg, Pa. Antedate 1 Jan. 23, 1868.

I claim, 1st, The rib, b, on the back of cultivator teeth, or of blades for shovel plows, for the purpose of adding strength to the blade, or of forming a means for attaching it to its standard or frame.

2d, Attaching cultivator teeth or blades of shovel plows by means of a bolt inserted into a rib or projection on the back of the tooth, which fits into a recess or groove in the standard or frame, substantially as and for the purposes described.

74,005.—COTTON PLOW AND CULTIVATOR.—Andrew Runstetler and Albert Windeck, Peoria, Ill.

We claim the construction, combination and arrangement of the frame pieces, A B C, the iron gage pieces, D E F, hook and ring, and removable shovel, M, attached to the beam or piece, B, all as shown and for the purposes described.

74,006.—COTTON SCRAPER AND CUTTER.—Andrew Runstetler and Albert Windeck, Peoria, Ill.

We claim, 1st, The mode, substantially as set forth, of adjusting the scrapers, c c, by means of curved irons, h h, connected with the regulator, I.

2d, The combination of a driver's seat, the levers, M and L, for controlling the action of the revolving hoes, H H, and the regulator, I, for controlling the scrapers, substantially as set forth.

74,007.—TREADLE FOR PROPELLING SEWING MACHINES.—Benj. Rotter and Hixson Hunt, New Lexington, Ohio.

We claim the construction of the top of a sewing machine stand, with a fulcrum, G, and balance lever, F, in combination with the treadles, A and C, bar B, crank D, and rods E E, substantially in the manner and for the purpose as herein set forth.

74,008.—SAFETY POCKET.—Cyrus Sanborn, Chichester, N.H.

I claim the said improved safety pocket, consisting of the case, A, secured to the apparel, into which the case, C, is arranged to slide and fasten, substantially as herein set forth.

74,009.—CARRIAGE SPRING.—J. D. Sarven, Columbia, Tenn.

I claim the combination of the steel springs, D, rubber springs, E, and curved plates, C (having flanges or ears formed upon their side edges), with each other, and with the springs and body of the vehicle, substahtially as herein shown and described, and for the purpose set forth.

74,010.—CARRIAGE SPRING.—J. D. Sarven, Columbia, Tenn.

I claim the combination of the metallic plate or cap, B, having flanges, b', upon its sides and outer end, and the rubber spring or angular block, C, with the end of the wooden spring, A, substantially as herein shown and described and for the purpose set forth.

74,011.—ELASTIC BEARINGS FOR BODY-SUPPORTING IRONS FOR CARRIAGES.—James D. Sarven, Columbia, Tenn.

I claim the method of fastening the iron head, D, in the box, B, as above described, by means of vertical grooves, e e, in the side of the head, in connection with vertical projections in the box, or by means of a vertical bolt, G, passing through the center of the box, substantially as and for the purpose specified.

74,012.—ELASTIC BEARING FOR THE BODY SUPPORTING IRONS FOR CARRIAGES.—James D. Sarven, Columbia, Tenn.

I claim, 1st, The supporting iron, D, having the neck, d, and the head, D', as and for the purpose specified.

2d, The combination of the springs, A A, one or both, cushions, I F, and cross-bars, B, substantially as and for the purpose described.

3d, The combination and arrangement of the box, E, with the enclosed cushions, I F, substantially as and for the purpose specified.

74,013.—SHUTTLE FOR LOOMS.—Levi Scofield, Farmington, Wisconsin.

I claim constructing a shuttle for weaving cloth, with the orifices, d and e, substantially as and for the purpose described.

74,014.—BOOK BINDING.—Henry M. Shute, Waukegan, Ill., assignor to George W. Emerson.

I claim the wire, C, figs., 1, 2 and 3, in combination with the flattened wires, e, figs., 1 and 2, one or more, or their equivalent, substantially as and for the purpose set forth.

74,015.—LETTER BOX.—John W. Smith and Jas. D. Smith, Washington, D. C.

We claim the arrangement of the cylinder, C, coiled spring, D, pulley, E, chain, F, and cover, G, with the trough, B, when constructed on the top of the lid or cover, A, substantially in the manner and for the purpose as herein set forth.

74,016.—HARVESTER.—Jno. W. Thompson, (assignor to Elvira A. Thompson,) Greenfield, Mass.

I claim, 1st, The combination of the shipper, consisting of the sleeve, G, having the hand wheel, d, and threads upon it, with the frame, A A, arranged so as to slide upon the carriage axle, substantially in the manner and for the purpose shown.

2d, The pawl having the cup, q, with spring, u, and nut, t, arranged and constructed substantially as shown.

3d, The cutter bar frame, E, consisting of the pieces, f and g, with cross strips, 1, 2, 3, &c., formed as shown.

4th, The arrangement of the gear wheels, a and J, upon the bar, C, so that the pressure upon the latter is equalized, substantially as shown.

5th, The peculiarly shaped cutter, having the projections, k k k, &c., in combination with the cutter bar, consisting of the two plates, P and R, and adjusted by the nuts, m m, &c., substantially as and for the purpose described.

74,017.—CONSTRUCTION OF FENCE.—Asahel Todd, Jr., Pultneyville, N. Y., assignor to himself, A. F. Sheldon, John S. Todd, T. S. Ledyard and L. S. Cuyler.

I claim, 1st, The herein described method of attaching and detatching the pickets from the wires by means of the clasp, K, fig. 7, or their substantial equivalents, in the manner specified.

2d, The clasp, K or L, or equivalent, in combination with the wires, C C', posts, A, pickets, N, and brace wire, M.

3d, The metallic bracket, D, cap, E, in combination with the posts, A, wires, C C', brace wire, M, and pickets, N.

4th, The brace wire, M, in combination with the posts, A, wires, C C', bracket, D, cap, E, and clasp, K.

5th, The temporary post, A', in combination with the wires, C C', brace wire, M, bracket, D, cap, E, clasp, K, substantially as and for the purposes set forth.

74,018.—CONSTRUCTION OF FENCE.—Asahel Todd, Jr., Pultneyville, N. Y., assignor to himself, A. F. Sheldon, J. S. Todd, T. S. Ledyard, and L. S. Cuyler.

I claim, 1st, The jointed double acting lever, D.

2d, The detachable indexes, K and H H', in combination with the double-acting lever, D, and guide, I.

3d, The detachable guide, I, in combination with the lever, D, and indexes, K and H H', substantially as and for the purposes set forth.

74,019.—CASTER.—Alexander C. Twining, New Haven, Conn. Antedated January 8, 1868.

I claim the spring catch attached to the carriage, as described, in combination with the groove or slot around the interior of the socket, and substantially as described and for the purposes set forth.

74,020.—LANTERN GLOBE.—William Westlake, Brooklyn, N. Y.

I claim a lantern globe, made of or finished into a single piece, having one portion colored and a part clear, substantially as specified.

74,021.—MACHINE FOR SEPARATING LIQUIDS FROM PAINTS AND OTHER SOLID SUBSTANCES.—David M. Weston, Boston, Mass.

I claim the revolving cylinder, F, without openings or perforations in the circumference, substantially as described.

Also, the cylinder, F, in combination with the passages or outlets, or their equivalents, at A, in the hub and bottom, substantially as described.

Also, the breakwater, E, or its equivalent, in combination with the cylinder, F, substantially as described.

74,022.—LETTER GAME.—James E. Wheat, Rochester, N. Y.

I claim the application of letters or figures to a series of stakes or pins, to be arranged suostantially as herein shown and described, for the purpose of constituting a parlor or a yard play or game, as set forth.

74,023.—HORSE RAKE.—John R. Whittemore, Chicopee Falls, Mass.

I claim the device for operating the teeth of the rake, consisting of the double armed lever, E, fulcrumed at L, and connected to the arm, K, by means of the link, I, hinged at its elbow at H, the parts being arranged substantially as herein shown, and for the purposes set forth.

74,024.—COMBINED PLOW AND HARROW.—Philander Wonsey, Ogden, N. Y.

I claim the combination of the harrow, scraper, and plow, and the manner in which they are attached and detached.

74,025.—VISE.—Linus Yale, Jr., Shelburne Falls, Mass.

I claim, as of my own invention, the combination of a spring with the jaws, nut, and screw of a vise, substantially in the manner and operating as specified.

74,026.—BRUSH STOCK AND HANDLE.—Albert A. Young, (assignor to himself and George T. Dalton,) Boston, Mass, Antedated January 16, 1868.

I claim, 1st, The combination and arrangement of the circular plate, D, with the plate of the handle, F, whereby the handle is placed at right angles, and also diagonally to the body of the brush, substantially in the manner and for the purpose above set forth.

2d, Also, the combination and arrangement of the hinge, F, with its swiveling abutment, b, the turning screw, c, and the spring bolt, G, whereby the handle is raised and secured perpendicular to the body of the brush, substantially in the manner and for the purpose above set forth.

3d, Also, the combination and arrangement of the brush handle, B, with the other parts of the brush, whereby the handle may be used in a diagonal, reversible, and perpendicular position, and also at right angles with respect to the body of the brush, substantially in the manner and for the purpose above set forth.

74,027.—BRUSH STOCK AND HANDLE.—Albert A. Young, (assignor to himself and George T. Dalton,) Boston, Mass. Antedated January 16, 1868.

I claim the combination and arrangement of the body of the brush with respect to the cap, B, the handle, C, the screw, D, the groove, a and the pin, b, whereby the handle, C, may be extended at either end of the brush, the several parts being constructed and arranged with respect to each other, substantially in the manner and for the purpose set forth.

74,028.—BOILER TUBE FERRULE.—James U. Adams, Richfield, Mich.

I claim the combination of the ferrule, c, with the tube, A, and plate, a, substantially as herein described.

74,029.—MODE OF SECURING BOX METAL IN CARRIAGE HUBS.—Augustus H. Ahlborn, Lawrenceville, Pa.

I claim tinning the interior of carriage boxes prior to lining them with a metallic alloy, so that said metallic alloy will adhere to the box and become part of the same, substantially as herein described and for the purpose set forth.

74,030.—BRICK MACHINE.—John Armstrong, St. Louis, Mo.

I claim, 1st, The hopper, R'', in combination with the plunger, S, for feeding the machine, when constructed and arranged to operate substantially as herein described and set forth.

2d, Providing the plungers, H I, and die box, J, with hollow chambers, so that the brick or other materials that are being moulded may be surrounded on all sides with heated surfaces, substantially as shown and described.

3d, The follower, N', in combination with the vertically moving table, N, for delivering the brick on to the discharging carrier belt, Q, when constructed and arranged to operate substantially as herein described, and set forth.

4th, Imparting to the discharging carrier belt, Q, an intermittent motion, by the means substantially as herein described.

5th, The plungers, H and I, provided with the projections, G G', and F F', in combination with the cams, d e, and the cams, a b c, for imparting to them a reciprocating longitudinal motion, when constructed and arranged to operate substantially as herein described.

6th, The shaft, O, provided with the spiral spring, o', in combination with

the lever, p, and hook, q, when constructed and arranged to operate substantially as described.

74,031.—CULTIVATOR.—Henry B. Arnoldt and John Grimm, St. Louis, Mo.

We claim, 1st, The weed cutter, C, when combined with a cultivator, A B, as and for the purpose herein shown and described.

2d, Also, the movable arm, A1, when combined with the plow beam, A, as described, and for the purpose set forth.

3d, Also, the plow handles, A3, and the curved rack, A4, for the purposes herein set forth and described.

74,032.—CORN PLOW AND CULTIVATOR.—Isaiah B. Arthur, Sidonsburgh, Pa.

I claim, 1st, The combination of the fixed central handle, E, with the shifting adjustable handle, E', when used in a corn plow and cultivator, substantially as and for the purpose specified.

2d, Also, the wire guard, C, when constructed in the form shown, hinged at its rear end, and allowed to rise and fall at its forward end, and, when held in position by rods, c' c' at its forward end, preventing the two guards from changing their parallel position to each other substantially in the manner and for the purposes set forth.

3d, Also, the corrugated plates, e e, when used in combination with the side beams, A2 A3, having corrugated ends, substantially as and for the purposes indicated.

74,033.—LAMP LIGHTER.—Albert Assman, Rahway, N. J.

I claim the pole, A, light, B, and tube, C, when arranged as described, in combination with the wrenches or brackets, f, all made and operating substantially as and for the purpose herein shown and described.

74,034.—GATE.—Jearum Atkins, Mokena, Ill.

I claim a gate, constructed as described, having the pivoted braces, R S, post, A, and guide bars, D G, and post, E, all arranged and operating as specified.

74,035.—COMBINED HARROW AND STONE REMOVER.—Ezra Babcock, Scott, N. Y.

I claim, 1st, The cylinder, E, provided with rows of hooked teeth, and arranged with the bed pieces, C, as and for the purpose set forth.

2d, The combination of the cylinder, E, with the body, A, said body being provided with a movable bottom and the rack, L, as and for the purpose specified.

3d, The windlass, D, when arranged with the body, A, and cylinder, E, as and for the purpose set forth.

74,036.—HARVESTER.—S. O. Bartow, Bethel, Conn.

I claim, 1st, The construction and arrangement of the pendent bar, k, pivoted arm, i, finger bar, L, pitman, A', right angular lever, M, and chain, l, all operating as described for the purpose specified.

2d, The arrangement of the gear wheel, p, upon the shaft of the wheels, B, sliding pinion, G, upon shaft, H, bearing the cam wheel, I, lever, J, having its fulcrum in the pendent, f, upon the side of the shaft, A, pitman A' finger bar, L, pivoted arm, l, pendent bar, k, right angular lever, M, and chain, l, all operating as herein shown and described.

74,037.—RAILWAY JOINT.—Lewis Behymer, Indianapolis, Ind.

I claim the coupling, A, with re-entrant angular excavations, D, and swells F, which fit and embrace the wedge-formed ends and the hollow of the rail, the same being secured by bolts, I, which traverse said coupling, and the slots, H, in the rails, substantially as set forth.

74,038.—SEWING-MACHINE.—G. W. Bell, Rising Sun, Ind.

I claim, 1st, The construction and arrangement of the eccentric wheel, F, balance wheel, G, pendulum frame, N, supporting frame, I, jointed dog, I, shaft, D, and brace or connecting bars, K and M, as herein described, for the purpose specified.

2d, The sliding bearings, S, constructed as described, fitting upon the square shaft, D, and turning freely in the box upon the upright, T, said box adjusted upon the upright by means of the sliding sleeve and set screw, as herein shown and described.

3d, The combination of one or more adjustable supports, T, with the sliding bearings, S, and shaft, D, constructed and operating substantially as herein shown and described and for the purpose specified.

74,039.—STEAM ENGINE.—E. H. Bellows, Worcester, Mass.

I claim, 1st, The arrangement of the valve rods, D D and E E, in the chamber, M, and in relation to each other, substantially as and for the purposes set forth.

2d, The combination, with the valve rods, D D, and E E, of the shaft, H, spindle, I, and cams, G and L, substantially and for the purposes set forth.

74,040.—LIFTING JACK.—James W. Bemis, Fall river, Mass.

I claim, 1st, The arrangement, as described, of the levers, L, and L L, L L, together with standard, A B, A B.

2d, Also, the combination of the levers, L, and L L, L L, together with their supporting frame, by which the power to raise the axle is obtained, substantially as described and set forth as above.

74,041.—WATCH.—B. D. Bingham, Boston, Mass.

I claim, in combination with peripheral rings of watches, spurs or projections for holding them in place, substantially as described.

Also, making such rings of a width equal to, or but slightly exceeding the space between the inner surfaces of the two main plates of a watch, and so as not to cover the larger portion of the thickness of the back plate, for the reason set forth.

74,042.—CIRCULAR SAWING MACHINE.—C. D. Blakeslee (assignor to himself and Elias Skinner), Grand Rapids, Mich.

I claim the saw-hood constructed as described, consisting of the adjustable curved guards, C, the curved hood, D, secured to the guard, C, by the bolt, d, and notch, c, and the notched vertical guard, F, adjusted upon the hood by the set-screw, f, and slotted part, E, as herein described, for the purpose specified.

74,043.—SAFETY HOOK.—E. F. Brundage, Virginia city, Nevada, assignor to himself, William T. Eaves, and William Eaves.

I claim the collar, C, fitted on the swivel stem, B, and provided with notches or recesses, i k, in its under side, in combination with the hinged part, c, of the hook, and the projection, j, on the upper part, b, thereof, all arranged substantially as and for the purpose set forth.

74,044.—CULTIVATOR.—John Burnham (assignor to himself and David L. Hough), La Salle, Ill.

I claim, 1st, In combination with the elevated axle-tree, A2, hounds, B, pivoted draft pole, and C, lever, C', having a movable fulcrum, the pivoted beam, D, having the plow beams secured to its extremities, or to pendants applied thereto, said beam being connected, by means of a chain, to the draft pole, substantially as described.

2d, In combination with a pivoted beam, D, arranged and operated as described, and provided with pendants upon its ends, the plates, d' d', having the plow beams attached to them, substantially as described.

3d, The flexible draft connection, h, secured to swinging pendants, G G, at its ends, and passed around the axle-tree, A2, longitudinally, substantially as described.

4th, The removable driver's seat, H, applied to the carriage, and supported thereon, substantially as described, in combination with levers, P, suspension chains, j, beams, E, and pivoted cross beam, D, substantially as described.

5th, The attachment of the plow blades or shovels, J, to their standards, by means of loops, m, and clamping eye or hooked bolts, n', substantially as described.

74,045.—STEAM HEATING APPARATUS.—James Chambers, Boston, Mass. Antedated Jan. 31, 1868.

I claim the combination of the boiler, A, the gas burner, D, its conduit, f, and cock, g, the safety-valve, B, the lever, a, thereof, the chain, l, and the arm, h, and its weight, o, or their equivalents.

Also, the combination of the same and the coil, C, and the damper, d, and its bent arm, e, and the chain, p, connecting such arm with the safety valve lever.

Also, the combination of the circulation or induction and eduction pipes, b c, with the boiler, the gas conduit and burner, the safety-valve, the lever chain, and weighted arm, connecting the safety-valve and gas cock key, as set forth.

Also, the combination of the gas burner and its conduit with an extension, q, of the conduit beyond the burner, and with a screw cap or thimble, m', screwed upon such extension as set forth, such being to enable atmospheric air to be supplied to the gas conduit, as circumstances may require, when such gas conduit and its burner are combined with a boiler, as set forth.

74,046.—STEAM ENGINE.—William T. Chamberlain, Norwich, Conn., assignor to himself and Charles W. Chamberlain, Boston, Mass.

I claim the improved engine, as described, viz., as made with the cylinder, A, the partition, B, the two pistons, D E, the rod, C, the induction ports, e f, and eduction ports, g h, arranged in manner substantially as specified.

Also, the combination of the movable partition, B, its packing and clamp screws, or the equivalents of the latter, with the cylinder, A, provided with induction and eduction ports, and two pistons, D E, arranged so as to operate as described.

74,047.—HAND SPINNING WHEEL.—S. W. Clark (assignor to himself, N. A. Wright, and W. A. Terry), Prairie du Chien, Wis.

I claim the curved rod, r, with the adjustable weight, r', attached to the radial arm, D, the segmental groove, m, cord, m', pulley, l, and treadle, q, in combination with the spinning wheel, C, and the spindle d, placed on the upper end of the arm, D, the whole being arranged and operated substantially as and for the purpose herein described.

74,048.—BRUSH.—William W. Clark, New York city.

I claim a brush, as a new article of manufacture, when constructed as described, with an interliner, a, as and for the purpose specified.

74,049.—LAMP.—Michael Henry Collins, Chelsea, Mass.

I claim the combination of the auxiliary supporter, S, or its equivalent, with the chimney rest and the chimney-holding friction cone or air deflector arranged as described, and so connected as to be capable of being slipped together, and with the chimney, on and off the wick tube, and away from the supporter, for the purpose of enabling access to be had to the wick for trimming it, as occasion may require.

74,050.—TOBACCO PIPE.—James Cook, West Groton, Mass.

I claim the chamber, D, formed around the sides of the bowl, C, by suspending the latter in the screw cap of the bowl, A, as and for the purpose specified.

74,051.—HEATING FURNACE.—Nathaniel E. Cornwall, New York city.

I claim, 1st, The radiator, consisting of the base, a, with pipes, c c c c, and the chamber, b, or chambers, b and d, substantially as described, and for the purposes set forth.

2d, The crescent check damper and the crescent close damper, constructed substantially as described, and arranged so as to operate in the manner and for the purposes shown.

3d, The fire pot, constructed in two parts, with a self-adjusting grate in each part, and a movable partition, substantially as described, and so arranged with separate radiators in separate compartments of the hot-air chamber of a furnace, and separate systems of hot air pipes and distributing registers, as to convey all the heat from both parts of the fire pot to one system of registers, or to distribute the heat from one part of the fire pot to every system of registers, at pleasure.

74,052.—WASHING MACHINE.—E. Hall Covel (assignor to Home Manufacturing Company), New York city.

I claim, 1st, The annular bands, b and c, with or without the ears, a1 and b', so constructed and arranged as not only to hold together the upper and lower ends of the staves, but also to cover a greater or less portion of the upper and lower surfaces of such ends, substantially as herein set forth.

2d, The detachable pin or stud, a2, in combination with the tubular sleeve, g, carrying the radial fins or ribs, and the circumferential groove, f, of the standard, e, substantially as and for the purpose specified.

3d, The ogee-shaped fins, i, on the disk, h, arranged to rotate within the tub, A, substantially as and for the purpose specified.

4th, The combination of the spring-catch, k*, and spurs, k', with the pivoted bar, k, carrying the crank shaft, n', and bevelled pinions, m n, substantially as and for the purpose specified.

5th, The clutch, m'', a*, arranged to connect the sleeve, g, with the gearing upon the bar, k, substantially as herein set forth.

6th, The washing machine, constructed and operating substantially as herein shown and described.

74,053.—THREE HORSE EQUALIZER.—Giles Cramton, Marshall, Mich.

I claim the arrangement and combination of the pulley, D, coupling tongue, B, pin, P, hollow disk casing, A, and hitching chain or chains, G, with the whiffletree, E, and double-tree, F, of a three-horse team, substantially as and for the purpose herein described.

74,054.—HAY PRESS.—G. W. D. Culp, East Enterprise, Ind.

I claim, 1st, The shaft, C, when provided with a loose gear wheel, g, and with a sliding clutch, k, in combination with the capstan, G, all made and operating so that the shaft can be revolved with or without the capstan, as may be desired.

2d, The disk, d, on the shaft, C, for operating the beater, in combination with the capstan, G, and cogs, g h, and i, for operating the follower, all made as set forth.

3d, The catch, m, on the sweep, k, in combination with the arm, L, on the capstan, G, all made and operating substantially as herein shown and described.

4th, The device for automatically opening the feed door, M, by the downward motion of the beater, consisting of the elbow, P, catches, O, and weight r, all made and operating substantially as herein shown and described.

5th, The device for automatically closing the feed door by the upward motion of the beater, consisting of the lever, N, weighted cord, g, and catches, O, all made and operating substantially as herein shown and described.

74,055.—HAY LOADER.—Ezra N. Curtice, Spring Water, N. Y.

I claim the construction and arrangement of the shafts, b b, having drums, h, and hung to the pivoted pendant, a, and provided with the flanged elastic friction rollers, c c, operating against the hind wagon wheels, B, by means of the curved rods, and lever, e, as herein described for the purpose specified.

74,056.—PROCESS OF TREATING WOOD FOR COVERING WALLS, ETC.—Abbot R. Davis, Cambridge, Mass.

I claim the employment of glycerin for saturating thin sheets or laminæ of wood, to be used as a wall covering or for other purposes, substantially as described.

74,057.—LID FOR TEA-KETTLE.—Isaac De Haven, Allegheny city, Pa.

I claim a lid provided with a hinged joint, and pivoted to the body of a tea kettle or other vessel, substantially as herein described, and for the purpose set forth.

74,058.—VELOCIPEDE.—Louis Derozier (assignor to himself and George Schaffer), New York city.

I claim, 1st, Providing a velocipede with a rear axle, which consists of two sections, C C', each turning independent of the other, substantially as and for the purpose herein shown and described.

2d, Providing the bearings for the axles, C C', and F, or either, directly in the springs, B and K, substantially as and for the purpose herein shown and described.

3d, The crank axles, C C', and wheels, D, when arranged as described, in combination with the springs B, in which the bearings for the said axles are provided.

4th, The above, in combination with the front axle, F, wheels, f, and king bolt, H, having a crank, all made and operating substantially as and for the purpose herein shown and described.

74,059.—COTTON BALE TIE.—Jos. B. Dunn, Petersburg, Va.

I claim the improved bale tie, A, formed with a slot, B, at one end, and a lateral slit or open slot at the other end, said open slit or slot having a shoulder, a1, at its outer end, and having its inner side struck or bent downward, forming a curved lip, a2, substantially as herein shown and described and for the purpose set forth.

74,060.—WASHER FOR LOCK NUT.—D. Elliot and E. Seely, New York city.

We claim the washer, C, constructed as described, provided with the concentric pawl D, cut from it and adapted to fit into the ratchet teeth, t, formed in the chamber of the nut, E, to prevent the said nut from turning off the bolt, B, as herein shown and described.

74,061.—BOILER FOR HEATING WATER.—John Ellis, White Plains, N. Y.

I claim the boiler for heating water consisting of the two hollow heads connected by the tubes, and having no metallic sides of walls, the gate bars being also tubular, said heads subdivided into compartments, so that the water shall circulate freely through the boiler, as herein described, for the purpose specified.

74,062.—MACHINE FOR BORING WATER HUBS.—J. W. Emerson, Rochester, Minn.

I claim the small shaft, L, in combination with the shaft, J, handle, j, gear wheel, S, circular plate, K, stop, T, gear wheels, N O, an cutter, R, substantially as described, for the purpose specified.

74,063.—MANUFACTURE OF ILLUMINATING GAS.—John J. Ensley, New York city, assignor to Thos. D. Ledyard, Toronto, Canada. Antedated Jan. 27, 1868.

I claim making a compound gas by the mixture with common coal gas, of gas made from bones, or other animal matter, and from wood, or equivalent vegetable matter, either separately or combined, for the purposes herein specified.

74,064.—HORSE HAY FORK.—Henry A. Estes (assignor to himself and George Smith), Jersey City, N. J. Antedated Jan. 31, 1868.

I claim, 1st, The toggle bars and central operating rod, in combination with the tubular stock and the two laterally moving lifting spurs, substantially as and for the purpose herein set forth.

2d, The arrangement of the guards, e, with reference to the lever, B, and the upper end of the tubular stock, A, substantially as and for the purpose herein set forth.

3d, The laterally moving spurs, E, toggle bars, D, and central rod, c, arranged in relation with the tubular stock, A, lever, B, and guard, e, substantially as and for the purpose herein set forth.

74,065.—APIARY.—William Faulkner, Vevay, Ind.

I claim, 1st, The provision in an apiary of the sunk hatchway, G, pit, A, and flue, N, together with suitable registers, or their equivalents, substantially as and for the purpose herein set forth.

2d, In combination with the elements of claim 1st, the insulating walls, K, and ceilings, L, as and for the purpose explained.

3d, An apiary supported on posts, which rest in cups, D, in connection with a pit or depression in the ground, and a hatchway, as represented.

74,066.—SOLING SHOES.—L. A. Favre, Geneva, Switzerland.

I claim the metallic plate, rigidly secured to the inner sole b, and provided with slots, f, adapted to receive and retain projections, g, on the outer sole, e, as and for the purpose set forth.

74,067.—INJECTOR FOR STEAM GENERATORS.—E. Ferguson (assignor to Isaac H. Ferguson and Mitchell, Allen & Co.), Newbern, N.C.

I claim the arrangement of the supply pipe, B, cock, D, and pipe, C, with the boiler, A, whereby, with a vacuum in the boiler, and consequent atmospheric pressure, the water is injected to the boiler, substantially as herein shown and described.

74,068.—MACHINE FOR FORMING SHEET METAL MOLDINGS.—Valentine Fischer, New York city.

I claim, 1st, The machine having the rounded and square dies arranged as described, whereby all kinds of smooth moldings can be formed, as herein shown and set forth.

2d, The standard, D, when provided with one concave side, as shown.

3d, So arranging the dies, E and F, that the latter can be placed upon the former without any other fastening, as described.

4th, Arranging the female die, G, above the male die, E or F, for the purpose of keeping the female die clear, as set forth.

5th, The device for operating the movable die, said device consisting of the toggle levers, J L, in combination with the pendant bar, H, and central bar, K, so that by moving the latter horizontally the die will be moved up and down, as set forth.

6th, The manner herein shown and described of operating the bar, K, by means of the screw, N, and the nut pinion, O, all made as set forth.

7th, A machine for forming sheet-metal moldings, when the same are made and operating substantially as herein shown and described.

74,069.—TUNNEL EXCAVATOR.—Theodore A. Fisher and Anson F. Fisher, Beardstown, Ill.

We claim the sliding coffer, A, the excavating disk, D, and the supporting car, E, combined with the cast iron tubing, C, united in sections within the coffer, constructed and operating substantially as and for the purpose herein described.

74,070.—COTTON BALE TIE.—Addison C. Fletcher, New York city. Antedated Jan. 24, 1868.

I claim the plate, A, having an aperture, c e d, lateral side openings, f f, opening, g, and lip, h, for operation in connection with a rope or equivalent material, substantially as set forth.

74,071.—BOOT ATTACHMENT TO CARRIAGES.—Marvil M. Follett, Upton, Westboro Post Office, Mass.

I claim, 1st, A boot attachment to carriages composed of the rollers, C E and D, and the spring, S, and strap, a, whereby a boot for carriages is wound up by the force of a spring, S, substantially as shown and described and for the purposes set forth.

2d, The check, a2, or its equivalent, in combination with the boot, B, and spring, a1 and pin, a3, substantially as shown and described and for the purposes set forth.

74,072.—SECURING HOOKS AND EYES TO CARDS.—James D. Franklin (assignor to Ira Richards & Co.), Attleborough, Mass.

I claim hooks and eyes secured to cards by passing the eyes through the card so as to project on both sides thereof, and fastening the hooks to their ends and bodies, on one or both sides of the card, substantially as set forth.

74,073.—SEEDING MACHINE.—Olney Fry, Jr., Albany, Oregon.

I claim, 1st, The combination of the gear wheel, N, attached to the drive-wheel, A, pinion wheel, M, shaft, L, crank or crank wheel, K, connecting rod, J, and lever, I, with each other and with the seed box, E, and adjustable sliding bar, F, said seed box and sliding bar being constructed and arranged substantially in the manner herein shown and described.

2d, The combination and arrangement of the sliding bar, P, connecting rod R, and lever, S, with each other and with the shaft, L, substantially as herein shown and described, for the purpose of throwing the pinion wheel, M, into and out of gear with the gear wheel, N.

3d, The combination of the posts, T, cross bars, U, longitudinal bar, V, beam, W, plow standards, X, bar, Y, and draft bars or rods, Z, with each other and with the frame, D, and tongue, C, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

4th, The combination of the keeper, C', lever, A', spring, E', and notched standard, F', with each other and with the longitudinal bar, V, substantially as herein shown and described and for the purpose set forth.

74,074.—DITCHING MACHINE.—A. A. Fuselier, Algiers, La.

I claim the excavators, D, formed as described, in combination with the drums, C C', the chute, E, and the rotary cutter, F, and the board, c, all constructed, arranged, and operating as and for the purpose set forth.

74,075.—STEAM PUMP.—J. B. Gardiner, Springfield, Mass.

I claim, 1st, The arrangement of ports, g g', on each end of the valve, and communicating with the exhaust, for the purpose of assisting in the movement of the valve, substantially as set forth.

2d, The arrangement of the steam chamber, A, and exhaust chamber, J, upon the two sides of the steam chest, substantially as set forth.

3d, The arrangement of the screws, o o', wherewith to adjust the amount of steam let on and off the valve, as described.

4th, The stuffing box constructed of the followers, P P', and nut, S, in combination with the piston, A, and plunger, B, substantially as described.

5th, In combination with the central-acting valve, valve rod, C, and steam piston, arranged and operating as described, the plunger, B, of a single acting pump.

74,076.—BUTTER WORKER.—Henry Garrett, Richmond, Mo.

I claim the curved or semicircular butter pan, B, in combination with the pressure roller frame, D, provided with rollers having fluted or smooth peripheries, all arranged substantially as and for the purpose set forth.

Also the cap or hood, C, provided with the strainer, s, and placed or formed at one end of the butter pan, B, substantially as and for the purpose specified.

74,077.—WEATHER STRIP.—W. L. Gilroy, Philadelphia, Pa.

I claim, 1st, The insertion of a flat elastic strip into a molding, such as above described, in an inclined position to its surface, as herein set forth.

2d, Also affixing said elastic medium into the groove in the rigid molding by means of water-proof cement, as and for the purposes specified.

74,078.—MANUFACTURE OF CLAY PIPES.—H. A. Goodrich and Joseph Amos, Joliet, Ill.

We claim the combination of the stationary mouth piece, L, the trough, B, and carriage, G, all arranged to operate as shown and described.

74,079.—BRICK MACHINE.—Ephraim R. Green and Henry D. Phillips, Jr., Trenton, N. J.

We claim, 1st, operating the molds, R, that is to say, feeding the empty ones underneath the press boxes, C, and shoving the filled ones out from underneath the same by means of the slides, P, having weights, V, attached, and connected to the cranks, N, of the shafts, M, by means of the crank pins, J, and slotted arms, O, all arranged substantially as shown and described.

2d, The bars, U, for discharging the bricks from the molds, operated by the levers, T, and wipers, S, from the shafts, M, all arranged substantially as and for the purpose set forth.

3d, The application of a press box, C, to each side of the box, A, of the mud mill, in combination with the four shafts, H, operated from the mud mill shaft, R, and the cams, h, for operating the plungers, F, all arranged substantially as shown and described.

74,080.—FRICTION CLUTCH.—A. W. Hall, East Lebanon, N.H.

I claim the two-part clutch, E and F, substantially as and for the purpose described.

74,081.—MODE OF CONSTRUCTING MOLASSES CUPS OF SHEET METAL.—Griffin B. Halstead, New York city.

I claim a molasses cup constructed of two equal vertical parts, A A, swaged or struck up in proper form, and connected together by solder, substantially as herein shown and described.

74,082.—CULTIVATOR.—John R. Hand (assignor to himself and Johnson Orr), College Corner, Ohio.

I claim, 1st, The draft pole, M, capable of adjustment upon the beam, A by means of the clevis, O, and screw, P.

2d, Also in combination with the elements of claim 1st, the shares, G G' K K', and handles, R R', adjustable in the manner set forth.

74,083.—COMPOSITION FOR ROOFING.—David Harger, Des Moines, Iowa, assignor to himself, D. H. Young, and A. S. Vorse.

I claim a roofing composition composed of unboiled coal tar, sand, quicklime, sulphate of zinc, and flour of sulphur, all combined and used substantially as and for the purposes set forth.

74,084.—STEAM PUMP.—William Harsen, Greenpoint, N. Y.

I claim, 1st, The arrangement and combination of ram and piston with the lateral socket, H, the rocking-way shaft, I, arm, J, crank, K, and shaft, L, substantially as shown and described.

2d, The arrangement and combination of the lateral shaft, L, the eccentric, N, the oblique ports, d d and e, relatively to the axial line of the steam cylinder, and the sliding valve, O, substantially as set forth.

74,085.—HARVESTER.—Bradford G. H. Hathaway, Rock Stream, N. Y.

I claim, 1st, The planet wheels, H, when attached to the inner face of a revolving plate, F, so adjustably connected with the driving wheel that it may be caused to revolve on the axle or remain stationary, substantially as set forth.

2d, The mode of throwing the driving mechanism out of or in gear by the pawl or pawls, G, attached to the driving wheel, notched recess, G1, collar, G3, lever, G5, and rod, G6, acting either by means of the yoke, G4, or its equivalent, substantially as described.

3d, The combination of the bent axle, B, bar, O, lever, P, rod, P1, and wheel, A', for regulating the hight of the cutter bar, M, substantially in the manner set forth.

4th, The mode of suspending the rear of the detachable platform, Q, by means of the stirrup, R, attached to the adjustable bar, O, substantially as set forth.

5th, The arrangement of the bent axle, B B', driving wheel, A, and wheel, A', attached to an adjustable bar, O, substantially as described.

74,086.—DEVICE FOR PREVENTING COWS AND CALVES FROM SUCKING THE TEATS AND FOR LEADING CATTLE.—Asa S. Haven, Barre, Mass.

I claim, 1st, The frame, a, in combination with the adjustable stops or retaining pieces, b c, substantially as and for the purpose set forth.

2d, I claim the eye, g, in combination with the frame, a, substantially as and for the purpose described.

74,087.—BOLT AND RIVET CUTTER.—John S. Henry and Abraham H. Reist, Manheim Pa.

We claim the combination and arrangement of the jaws, D E, unobstructed on one side when said jaw, D, is connected with piece, C, with its fixed loop, L, and pivot connection to H, and the jaw or cutter, E, with its shoulder, e, is on the end of the prolonged handle or lever, B, combined and operating in the manner and for the purpose specified.

74,088.—CHURN.—Porter Hill, Millport, N. Y.

I claim, in combination with the dasher, B, a spiral spring, C, placed below the same, and arranged to operate substantially as and for the purpose set forth.

74,089.—WATER WHEEL.—William J. Hoffman, Croton Falls, N. Y., assignor to George V. Hoffman.

I claim the tangential buckets, A*, constructed with radial or nearly radial end portions, b, and arranged with reference to the inclined passages, c, near the periphery of the wheel, substantially as and for the purpose specified.

74,090.—STEM-WINDING WATCHES.—Edward Howard, Boston, Mass.

I claim, 1st, Applying the winding mechanism directly to the barrel which contains the spring, in the manner and for the purpose substantially as described.

2d, Also the sliding plate, l, in combination with the spur wheel, g, and button or washer, h, as and for the purpose set forth.

3d, Also, in combination with the arbor or key, l, provided with a movable double crown wheel, m, the spur wheel, g, sliding plate, i, and button, h, as specified.

4th, Also the barrel, c, constructed as described and arranged within an opening in the plate, a, in combination with the main wheel, w, spring, v, and pawl, e, substantially as and for the purpose specified.

5th, Also the spring barrel formed with the plate, c, the rim or annular projection, a', and the toothed flange, c', as and for the purpose set forth.

74,091.—FLOUR SAFE AND SIFTER.—F. A. Hoyt, Hanover, Wis.

I claim the flour sifter and safe constructed as described and consisting of the box, B, having door, i, molding board, k, drawer, g, sifter, A a, crank shaft, d S, metallic slotted straps, b, side pieces, c, wheels, m n, handle, h, and connection, e, all arranged and operating as set forth.

74,092.—CORN PLANTER.—N. G. Hughes, Waynesburg, Pa. Antedated January 27, 1868.

I claim, 1st, The combination of the tubes, G and A, with the seed box, E, and spout or tube, F, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the connecting rod, I, spring, J, crank shaft, K, connecting rod, L, and lever or trigger, M, with each other, with the interior tube, H, and plow handle, C, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the hand cover or guard, N, with the plow handle, C, substantially as herein shown and described and for the purpose set forth.

74,093.—VISE.—Thomas H. Humphreys, Trenton, N. J.

I claim, 1st, The combination of the dove-tail formed slide or sword, A, nut, E, and adjustable thimble, D, as arranged, shown and described.

2d, Also, in combination with screw, C, the adjustable thimble, D, operating as herein described.

74,094.—NAIL-PLATE FEEDER.—Cyrus D. Hunt, Fair Haven, Mass.

I claim the method of feeding the nail plate by means of the hinged rest, B, feed rest, E, feed rod, H, the springs, G g, the lever, F, the catches, f f, and the nipper rod, I, constructed and operating substantially as described.

74,095.—MACHINE FOR CUTTING CARDS.—E. J. Hunt, Concord, N. H.

I claim, 1st, The rotary cutter board, B, in combination with the gear wheels, C D, the ratchet wheel, m, and the cutter arm, E, constructed and operating substantially as and for the purpose herein described.

2d, The adjustable sections, c c, with the knives, p p, and the circular slotted plate, H, in the cutter box, F, constructed and operating substantially as and for the purpose specified.

74,096.—SAWING MACHINE.—Isaac B. Jones, Xenia, Ohio.

I claim the combination of the lever, C2, dog, F2, spring, E2, and ratchet bar, H, all constructed as described for the purpose specified.

74,097.—CHAIN SAW.—De Lancy Kennedy (assignor to Henry J. Kennedy), New York city.

I claim the manner substantially as herein described of connecting the several sections to constitute an endless chain saw, as and for the purpose described.

Also, in combination with the chain saw, the guide plate made no thicker than the saw and placed behind the back edge thereof, substantially as and for the purpose specified.

74,098.—DISTILLERIES.—Henry H. Kirk, Springfield, Tenn.

I claim, 1st, The combination of the chambers, B H, and flake-stand, F, first doubler, K, and second doubler, O, with their respective flake-stands and receiving tubs, all constructed by a series of closed pipes for the manufacture by a continuous process of treble-distilled spirits, substantially in the manner set forth.

2d, The arrangement of a pipe, R, for drawing the low wines from the

second doubler, N, to the chamber, B, for redistillation, substantially as described.

3d, The arrangement of the pipe, S, for drawing the low wines from the first doubler, K, to the chamber, B, for redistillation, substantially as described.

4th, The coaling cylinder, Q, constructed with the diaphrams, q and q6, in combination with the revolving plates, q1 and q3, and partition, q2, substantially as and for the purpose set forth.

5th, In combination with a coaling apparatus, substantially as described, the flap valve, q5, as and for the purpose set forth.

6th, The arrangement of the testing pipes, G, substantially as described.

74,099.—GAS TORCH.—William A. Lawton, New York city.

I claim, 1st, A gas torch for all the purposes for which gas torches are used composed of the tube, A, and supply tube, D, and air tube, E, and an enlarged wick tube, F, substantially as shown and described and for the purposes set forth.

2d, The air tube, E, in combination with the tube, A, and the tube, D, substantially as shown and described and for the purposes set forth.

74,100.—SEAT CLASP OR FASTENER.—Edward C. Lewis, Auburn, N. Y.

I claim the clasp, D, levers, B and C, constructed and arranged substantially as and for the purpose set forth.

74,101.—SAP SPOUT.—R. F. Livermore, Starksboro, Vt.

I claim, as a new article of manufacture, a cast-metal sap spout constructed as described consisting of the spout, A, having the head, D, perforated at h, and provided upon its end with the concave surface in the center of which the screw, S, is secured the exterior surface of said head bevelled at a, to form the edge, a', and having upon its upper side the projection, E, as herein shown and described.

74,102.—LADDER.—T. B. Luzier and George A. Haas, Philadelphia.

We claim hooks, e e' and l, and a turn buckle, c, or its equivalent, connected to one section of a ladder and arranged for the reception and retention of thd rungs of another section, substantially as and for the purpose specified.

74,103.—HORSE HAY FORK.—J. R. Lyons, Montrose, Pa.

I claim, in combination with the shank, A, and oscillating tines, B, the rod, C, and lever, D, when said rod is cut away at C1, so that when the tines are extended the point of attachment of the lever and rod shall be behind the pivot of the lever so that the weight of the load shall act to hold back the lever with a force proportioned to the weight of the load, substantially as set forth.

74,104.—CORN HARVESTER.—James Mains, Olena, Ill.

I claim the combination of the gatherers, F, and elevators, H, constructed and operated substantially as described with the frame, A, and box, K, said box being made substantially in the shape and manner herein shown and described.

74,105.—ANIMAL TRAP.—Joel Manchester, New York city

I claim, 1st, The arm or lever, E, constructed substantially in the shape and manner herein shown and described in combination with the toothed plate, H, crank lever, E, and spring, C, substantially as and for the purpose set forth.

2d, The pivoted bait hook bar or plate, I, constructed substantially as herein shown and described in combination with the crank lever, E, as and for the purpopes set forth.

74,106.—HORSE HAY FORK.—L. S. Mason, Middlefield Centre, N. Y.

I claim, 1st, The tines, E E, which project from one or more of the sides of the shank of a harpoon hay fork above the ordinary harpoons, C, and which can be drawn in and out at will, substantially as herein shown and described.

2d, A harpoon hay fork when provided with tines, E E, on the sides of its shank and with pointed side guards, F F, all made and operating substantially as herein shown and described.

74,107.—HAND TRUCK.—William May, Binghamton, N. Y.

I claim, 1st, Providing a hand truck with a hook, C, which slides on the center brace of the truck, substantially as herein shown ahd described.

2d, The arrangement and combination with each other on a hand truck of the hook, C, sliding on the center brace, and of the hooks, D D, fixed to the lower part of the truck, substantially as herein shown and described all made and operating as set forth,

3d, The hinged plate or bar, E, in combinstion with the hooks, D D, substantially as herein shown and described.

74,108.—RAILWAY SWITCH.—Jacob C. McCarty (assignor to William E. Porter), Grafton, W. Va.

I claim, 1st, The binged chair, D, when constructed in the manner and used for the purpose specified,

2d, The combination of the movable rails, A A1 B B', with the fixed rail, A2, connecting rods, R R', pitmen, P P', balance beam, T, chains, S, or their equivalents, and shaft, W, or its equivalent, substantially as and for the purpose specified.

74,109.—EYE GLASS.—John K. McDonald, Newark, N. J.

I claim the nose piece below the extensions, B, when formed of soft rubber tubing upon the spring wire fitted in notches in the rims, as herein shown and described.

74,110.—PAVEMENT.—H. G. McGonegal, New York city.

tI claim the blocks, A A, when provided with perforations, C C, into or hrough the same, substantially as and for the purpose herein shown and described.

74,111.—SNAP HOOK.—John McKibben, Lima, Ohio.

I claim, 1st, The snap hook, constructed as described, having the spring, B, reversed in position, with its outer end riveted within the bow of the hook, A, and its free end passing back within the jaws, C, underneath the lip, D, of the pivoted jaws, C, as herein set forth for the purpose specified.

2d, In combination with the above, the rein loop, F, having formed upon it at right angles the loop, C, for the gag-runner, substantially as herein shown and described.

74,112.—CORN PLANTER.—Wm. McLucas, Reinersville, O.

I claim, 1st, The combination of a lever, B, with its valves, b and b1, operated by a wheel, E, with seed hopper, A and D, all substantially as described.

2d, In combination with the foregoing, the plowshares, G G, and harrow roller, g, substantially as and for the purpose specified,

74,113.—TREATING JUTE FIBER.—James Monarch, Philadelphia, Pa., assignor to himself, Jeffrey Hart and Robert Thorp, Conshohocken, Pa.

I claim jute fiber treated with caustic alkali of the strength of about 60°, substantially as described and for the purpose set forth.

74,114.—MANNER OF WORKING CHURNS.—James H. Monce, Hopkinsville, Ohio.

I claim the arrangement and combination of the regulating and adjustable arm, n, and dasher, adjustable lever, o, when connected with and operated by the verge, b, as herein described and for the purposes set forth.

74,115.—HAND SPINNING MACHINE.—F. D. Moore, Edray, W. Va.

I claim, 1st, The combination of the pulleys, g g', the rod, n, the slide, m, with the uprights, m2, the lever, l, and the treadle, E, arranged and operating substantially as and for the purposes herein described.

2d, The slide bar, v4, operated by the lever, l, in combination with the slotted swing bar, z, and the spring hook, v2, arranged and operating as and for the purposes set forth.

3d, The ratchet wheel, u3, and spring dog, w2, combined with the pulley, g', and operating substantially as and for the purposes herein described.

4th, The combination of the horizontal sliding bar, v4, the slotted swing bar, z, the vertical slide, v3, and the check pulley, x, arranged and operating substantially as and for the purposes herein described.

5th, The square-toothed ratchet wheel, u, the dog, u1, the slide bar, v, the dog, w1, the slide bar, v1, the spring hook, v2, and the slide bar, v4, combined and operating substantially as and for the purposes set forth.

6th, The check pulley, x, the slide, v3, the spring, a, and the slotted bar, z, or its equivalent, combined and operated as and for the purpose specified.

74,116.—LUBRICATOR FOR LOOSE PULLEY.—Geo. M. Morris and John McCreary, Cohoes, N. Y.

We claim the bushing, B, within the hub of the loose pulley, constructed as described, having the chamber, a, around its periphery, communicating with the shaft by means of the opening, e, the ends, b, of said bushing fitting snugly within the hub, and provided with the eccentric grooves, c, communicating with the shaft and chamber, r, by means of the opening, d, whereby a constant circulation of lubricating matter is obtained within and around the bushing, as herein shown and described.

74,117.—CARRIAGE WHEEL.—W. F. Morton, New Haven, Ct.

I claim the hub, cast in one piece with the collars, A A, and connecting bars, a a, when constructed in the shape and proportions as described.

74,118.—OINTMENT.—Lycurgus H. Moseley, Franklin, Tenn.

I claim the ointment, compounded substantially as and for the purpose above described.

74,119.—BREECH LOADING FIREARMS.—Florent Muller, Hartford, Ct.

I claim the combination with the hinged breech-block, E, of the locking slide, G, and lever, J, applied and operating substantially as and for the purpose set forth.

74,120.—PORTABLE HAY AND GRAIN ROOF.—John J. Nayton, Brighton, Mich.

I claim the ropes, G, posts, D, shafts, H, and cranks, J, when used in connectson with the roof, A, substantially as herein shown and described, and for the purpose set forth.

74,121.—SELF-SEALING PAMPHLET COVER.—Wm. H. Nichols, East Hampton, Ct.

I claim a self-sealing catalogue, pamphlet, magazine, etc., substantially in the manner and for the purpose set forth.

74,122.—BRIDLE BIT.—John K. Norton, Flushing, Ohio.

I claim the combination of the bar, A, with the ring, D, and branch, E, and the bar, B, with the ring, F, and branch, G, when constructed as herein described and for the purpose set forth.

74,123.—CULINARY VESSELS.—James Willard Patterson (assignor to Sarah Ellen Patterson), Cincinnati, Ohio.

I claim 1st, The suspending of a series of cooking vessels, having imperforated bottoms and sides, and provided with close covers, in an upright column or series, in such a manner as to form steam chambers above, below and around each, as and for the purposes substantially set forth.

2d, The steam or water coil, K, provided with shield, P, and cap, S, when used in connection with the boiler, E, in the manner and for the purposes set forth.

3d, In each of a series of cooking vessels, arranged substantially as shown, and used in connection with the boiler, the chamber formed between the close sides of the inner and outer cylinder.

4th, The combination of the series of cooking vessels, N M, etc., with the boiler, E, the whole made substantially as described, and so as to operate in the manner set forth.

74,124.—PICKER-STAFF CHECK FOR LOOM.—Ezekiel Phillips and Henry C. Phillips, Blackstone, Mass., assignors to themselves and Daniel B. Pond.

We claim the friction apparatus, substantially as described, that is, as composed of the levers, B B, the friction cylinder and its bearing and cap, and the connection of such cylinder and levers, as specified.

Also, the combination of the friction apparatus, substantially as described, or its equivalent, with the lay and its pickers, or pickerstaves, the whole being arranged and so as to operate as and for the purpose as explained.

74,125.—BOLT FEEDER AND COOLER.—Wm. Pickens, Chicago, Ill.

I claim spindle, G, with saucer, F, breakers, H H, and fans, K K, secured to it, and constructed as described, in combination with conveying case, N, and ventilating case, I, both constructed as described, the whole arranged and operating substantially as and in the manner herein set forth, and for the purpose specified.

74,126.—PATTERN FOR DRAFTING SLEIGH BODIES.—Dennis Pierce, Waverley, Iowa.

I claim a pattern board, A, with elevation, B, constructed and adapted for laying off work for sleighs, substantially as described.

74,127.—STATION INDICATOR.—Anthony Pirz and Manuel Pirz, New York city.

We claim 1st, The application of a clock mechanism, with a spring or weights as a motor, applied to the belt of a street or station indicator for railroad cars, in such a manner as to move the belt when the same is liberated, substantially as shown and described.

2d, The adjustable plate, J, with the gearing, K L, in combination with the gearing, E D, and the drums, C C', all arranged substantially as shown and described, for the purpose of reversing the movement of the belt, F, when necessary, as set forth.

3d, The rod, P, with the notched disk, O, in combination with the belt, F, gearing, M M, and the drums, C C', G G', all arranged to operate substantially as and for the purposes herein shown and described.

4th, The brake arms, Q Q, attached to the slide rod, P, and arranged in such relation with the drums, C C', to operate in the manner substantially as and for the purpose set forth.

74,128.—FLOOR CLAMP.—Warren Portlock, Pleasant Grove, and John H. Smith, Toolesborough, Iowa.

We claim 1st, The back brace, C, provided with a knee or stub joint, constructed substantially in the manner and for the purpose as set forth.

2d, The small levers, D D, constructed and operating together substantially in the manner as above shown and specified.

74,129.—SKATE.—John W. Post, Castile, N. Y.

I claim, 1st, Adjusting the clamps, G, by means of the serrated bar, F, provided with a slot, l, in combination with the serrated forward end of the bar, E, both held in position by a screw, n, substantially as described.

2d, The device for fastening the skate to the boot, consisting of the L-shaped spring lever, e, riveted to bar, E, with serrated and slotted rear end, and ridges, l, fitting into slots, m, on the clamps, G, substantially as described.

74,130.—CARRIAGE BRACE.—Moses Powe, Belvidere, N. J.

I claim the sheath, E, covering three sides of the joint of a brace for vehicle hoods or tops, attached to one of the braces, all substantially as shown and described, and for the purposes specified.

74,131.—DUMPING WAGON.—Joram Priest, Detroit, Mich.

I claim 1st, Having the box, J, upon the longitudinal bars, E, by a proper fulcrum between the front and hind wheels, so that the box will tilt or dump between the hind wheels.

2d, The crank axle, F, when operating for the purposes herein described.

3d, The semi-rotating bar, I, and bearings, H, when constructed and operating substantially as and for the purposes set forth.

4th, The combination of the above parts with the axle, A, the wheels, B and G, the circle, C, the bolster, D, the wagon box, J, the transverse bar, K, the rings, L, and the catch, M, or their equivalents, when constructed and operating as and for the purposes herein set forth.

74,132.—GAS MACHINE.—Iva Prichard, Terre Haute, Ind., assignor to himself and Joseph Raiber, Baltimore, Md.

I claim 1st, The combination of the air chamber, a1, and water chamber, a with the carburetting vessel, B, and the receiving vessel, C, in the manner and for the purpose set forth.

2d, The application of a column of water to a carburetting machine, for the purpose of condensing air and forcing it through the carburetting fluid, substantially as shown and described.

74,133.—CONNECTING PUMP RODS.—H. F. Purmort, Saginaw City, Mich. Antedated Jan. 29, 1868.

I claim jointing the sections of a pump or other rod together by means of the joint, constructed and applied substantially as and for the purpose described.

74,134.—SELF LUBRICATING AXLE FOR CARRIAGES.—Silas S. Putman, Dorchester, Mass.

I claim a chamber, b, within the end of the axle, packed with fibrous or porous material, for receiving and retaining a supply of lubricating substance, which passes through openings to the bearing surface of the axle, substantially as described.

Also, providing the collar, H, with a chamber, e, for containing packing saturated with lubricating substance, substantially as and for the purpose set forth.

74,135.—CURTAIN FIXTURE.—S. S. Putnam, Dorchester, Mass.

I claim the wooden roll, D, having a chamber formed within its end, in combination with the device placed therein for raising the curtain, substantially as set forth.

Also, in combination with the above, a spring or brake, l, operating substantially as set forth.

Also, the bracket, C, with its lip or projection, l, in combination with the flattened end, 5, of the spindle, substantially as and for the purpose described.

74,136.—HORSE RAKE.—Oliver E. Randall, Lewiston, Me.

I claim 1st, The springs, L, applied to the tooth bars, G, and to the bar, K, substantially in the manner as and for the purpose set forth.

2d, The bar, I, placed underneath the tooth bars, G, and connected to the oblique bars, J J, which are secured to the rod or shaft, F, when said bar, I, has the perforated bar, K, connected to it for the upper ends of the springs, L, to pass through, substantially in the manner as and for the purpose set forth.

74,137.—WOVEN FABRIC.—E. F. Richman, Muscatine, Iowa. Antedated Aug. 5, 1867.

I claim 1st, The method herein described of weaving fabrics having two or more thicknesses of separately interlocked weft-threads, whereby the upper or lower surfaces are made substantially alike, and so that the fabric presents no right or wrong sides, substantially as above shown.

2d, A woven fabric, substantially as described, consisting of two or more layers of separately interlocked weft threads, the threads of one layer of weft always lying opposite the spaces between the weft threads of the layer above or below it, and with all the warp threads passing from surface to surface, and binding the whole together, as above shown.

74,138.—CULTIVATOR.—John C. Rickerd, Lewisville, Ind.

I claim, 1st, The double hinge, consisting of the screw bolt, f, bases, g, flanges, h k l, lips, l j, and pins, m, to hinge the cultivator beams to the main frame, all constructed and arranged substantially as described.

2d, The hinged seat, l, supported by means of curved rods, and provided with foot rests, p, substantially as and for the purposes set forth.

3d, The combination of the frame, A, hooks, n, rods, a2, and foot rests, p, substantially as and for the purposes set forth.

74,139.—HOLTZ ELECTRICAL MACHINE.—Edward S. Ritchie, Brookline, Mass.

I claim the combination and arrangement of the supporting plate, C, of glass or other equivalent material, with the several sectors, and the combs arranged together and with the rotary electrizing disk, substantially as specified.

Also, the application of the plate, C, not only to the several sectors and combs, for giving support to them in their proper relations with one another and the rotary disk, but as a support for one of the bearings of the shaft of the rotary disk, the whole being substantially as hereinbefore explained.

74,140.—ENVELOPE MACHINE.—Abram A. Rheutan, Worcester, Mass.

I claim, 1st, The rotary table, B, having one or more receptacles for blanks, substantially as and for the purposes set forth.

2d, The lever, F, arranged for operation substantially as and for the purposes set forth.

3d, The use and employment, in an envelope machine, of a weight separator, for preventing the lifting of more than one blank at a time, substantially as set forth.

4th, The combination, with the base of the folding flaps, of central bearings, substantially as and for the purposes set forth.

5th, The combination, with the folding flaps, I J K and L, of the bearing pieces, 7 8 9 and 10, substantially as and for the purposes set forth.

6th, The combination and arrangement, with the standards, 3 3, of the projections, 4 4, for the purposes stated.

7th, Making the beaded portions, 14, of the folding flaps eccentric, substantially as and for the purposes set forth.

8th, The combination, with the flap, I, of an adjustable or spring face, substantially as and for the purposes set forth.

9th, The combination, with one or more of the bearing pieces, of adjusting screws, 16, for the purposes set forth.

74,141.—PEAT CRIB.—Marvin S. Roberts, Racine, Wis.

I claim the portable peat crib, constructed of light scantling and boards, substantially as and in the manner herein described, and combined with blocks, P P, and wedge-board or boards, F, constructed and operating substantially as herein shown and described, and for the purposes set forth.

74,142.—APPARATUS FOR OPERATING HORSE HAY FORKS.—George M. Robinson, New Wilmington, Pa.

I claim, 1st, The carriage, D, upon the inclined bar, C, having the pivoted catch, I, upon the lower side of which the projection, l, is formed, and also provided with the cam lever, J, in combination with the bars, E F f', pulley, d2, and ball, K, as herein described, for the purpose specified.

2d, The combination of the ball, K, and hoisting rope, G, with the catch, I, having projections, i, the cam lever, J, the pulley, d2, and carriage, D, as herein shown and described.

3d, The carriage, D, operated by the single hoisting and fork rope, when the loaded fork reaches its highest elevation in relation to the carriage, before the latter is permitted to move upon the inclined bar, and when the act of raising the loaded fork disengages the catches of the carriage from their fastenings, as herein shown and described.

74,143.—HOLD-BACK HOOK.—N. W. Robinson, Moriah, N. Y.

I claim the post, F, in combination with the hook, B, substantially as and for the purpose described.

74,144.—GLOBE STEAM VALVE.—E. A. Rock, Ludlow, Vt.

I claim, 1st, The combination of the wedge, m, shell, A, and valve, G, substantially as herein shown and described.

2d, The combination of the ring, G, and the wedge, m, substantially as herein set forth.

74,145.—SPOUT BRACKET.—Jeremiah E. Rohrer, Rohrersville, Md.

I claim the spout-supporting bracket, A, constructed as represented, in combination with the clasp, C, substantially as described for the purpose specified.

74,146.—STEAM GENERATOR.—John B. Root, N. Y. city.

I claim, 1st, In combination with the water tubes, A A, the return pipes or bends, C C, arranged to connect each tube with one above and below it, substantially as specified.

2d, The bend, c, for establishing the connection with the water tubes, by free or socket joints, when furnished with packing, and held to their places by independent outside clamps, stud bolts, and nuts, or their equivalents, essentially as shown and for the purpose described.

3d, The cross-pipes, E E' and F F', or either of them, connected with the tubes, A A, at their ends, by means of independent pipes or bends, C1 or C3 essentially as shown and described.

74,147.—MEDICAL COMPOUND.—Thomas Rosbrugh, Bellefontaine, Ohio.

I claim the medicine prepared from the root of the cohush or blueberry substantially in the manner herein specified.

74,148.—CONTINUOUS LEATHER-PEG STRIP.—Charles Rowland (assignor to himself and Joseph G. Rowland), Quincy, Ill.

I claim the leather strip for pegs, prepared substantially as described, as a new article of manufacture.

74,149.—DRYING AND VENTILATING APPARATUS.—Jarvis Royal, Rochelle, Ill.

I claim the tubes, A, arranged within a bin or other place in which grain or other substance is to be dried, when such tubes are composed of earthen or other equivalent porous material that will absorb the moisture from the substance being dried, as herein set forth for the purpose specified.

74,150.—ADJUSTABLE HEAD FOR BARRELS AND FIRKINS.—Henry D. Ramsey, Homer, N. Y.

I claim the application of the flange to adjustable covers, and the slot to the inside of barrels, casks, or firkins, for the purpose of the more readily opening and closing the same effectually without starting or unhooping them, as herein set forth and described.

74,151.—EYE MEDICINE.—Hugh M. Sanderson, Noble, Ill.

I claim the medicines or compositions numbered 1, 2, 3, and 4, composed of the ingredients and in the proportions substantially as herein described and specified.

74,152.—REVOLVING CANNON.—August Schausten, Michigan City, Ind.

I claim, 1st, A cannon consisting of the barrel, A, having the annular block or ring, B, with the chambers, C, formed therein, arranged to rotate through an opening in the barrel as described.

2d, The combination of the lever, l, locking bolt, E, firing pin, o, and handle, b, arranged to operate substantially as set forth.

74,153.—SPRING-BED BOTTOM.—David A. Scott and J. E. Burdge, Cincinnati, Ohio.

We claim the prolongation, in the arms, E, in the same direction as the arms, b, of the helicoidal spring or coils, a, when constructed and secured to the cross-rail, A, substantially as herein described, as and for the purpose specified.

74,154.—APPARATUS FOR PLAYING PARLOR BASE BALL.—Francis C. Sebring, Hoboken, N. J. Antedated Jan. 23, 1868.

I claim, 1st, The partially revolving bat, E, arranged as represented, moving close to the upper surface of the board, A, and operated at the will of the player, so as to allow the striking of the ball in the several different positions, and with the several different effects, according to the skill of the player, substantially as herein set forth.

2d, Also, the spring, G, in combination with the partially revolving bat E, upon a parlor base ball board, and adapted to move the bat as the operating cord, H, is released, substantially as herein set forth.

3d, Also, the automatic pitcher, B, mounted on a parlor base ball board, and adapted to project the ball at several angles approximating to the right direction, at the will and according to the skill of the player, substantially as herein specified.

4th, Also, the descending motion, in combination with the forward motion of the pitcher, by which the pitching device is carried so low, at the termination of its motion, as to be out of the way of the returning ball.

5th, Also, the semi-rims, I', arranged relatively to the cavities, I, or the corresponding marked spaces in which the ball is to be stopped in passing substantially as and for the purpose herein set forth.

6th, Also, the swiveling-case, L, and its attachments, mounted on a parlor base ball board, and adapted to operate relatively thereto, substantially as herein specified.

74,155.—FOLDING METAL SHUTTERS.—Samuel J. Seely, New York, assignor to J. M. Brown, Brooklyn, N. Y.

I claim forming sheet-metal shutters of leaves, bent in a curved form, transversely, and united substantially as and for the purpose set forth.

74,156.—SOCKET WRENCH.—Jas. M. Seymour, Newark, N. J.

I claim the handle, A, with its broad bottom, made substantially as shown. Also, the shifting socket wrench, as a new article of manufacture.

74,157.—FLOUR SCOOP AND SIFTER.—George W. Sherman and Charles L. Sherman, Seymour, Conn.

We claim the combination of the scoop, A, having beads, a, handle, C, saddle, D, standard, E, crank shaft, F, arms, G G', paddles, H, sifter, B, and lip, L, substantially as described for the purpose specified.

74,158.—TRUSS.—Jacob A. Sherman, New York city. Antedated Jan 24, 1868.

I claim the curved spring, d, carrying the hernial pad, in combination with the bar, a, and spring, f, substantially as and for the purposes set forth.

Also, the sliding finger, h, fitted and acting substantially as specified.

74,159.—MACHINE FOR EMBOSSING WINDOW SHADES.—R. K. Slaughter and J. O. Hundt, New York city.

We claim, 1st, The carriage, G, when provided with an elastic cover, g, which acts as a counter-die for embossing window shades, placed upon the carriage substantially as and for the purpose herein shown and described.

2d, Providing the carriage, G, with adjustable bars, h h, which serve to hold the shade smoothly upon the carriage, and to guide the embossing rollers, F F, substantially as herein shown and described.

3d, The nut, C, when arranged adjustable on the bar, B, in which it is held, substantially as set forth, so that the screw, D, may be moved laterally, as and for the purpose herein shown and described.

4th, The frame, e f, when arranged between the uprights of the press, substantially as described, so as to steady the printing-die or roller in every position, and during up-and-down as well as lateral motion of the same, substantially as set forth.

5th, The press, consisting of an adjustable screw and die-frame, in combination with the movable carriage, G, having an elastic cover, and adjustable guide bars, h, all made and operating substantially as and for the purpose herein shown and described.

74,160.—CARPET HOLDER.—F. Smith, M. D., Alexandersville, Ohio.

I claim a carpet holder, composed of a washer, C, and eccentric plate, A, said plate, A, rotating in a chamber in a washer, C, secured to any mop board, substantially as shown and described, and for the purposes set forth.

74,161.—GRINDING MILL.—John Snyder, Hart's Mills, Ind.

I claim the combination and arrangement of the drive-bar, K, ball or globe, M, and supporting bar, N, with each other, with the upper end of the spindle, E, and with the upper stone or runner, L, substantially as herein shown and described, and for the purpose set forth.

74,162.—BED BOTTOM.—S. L. Southard, Rock Island, Ill.

I claim the springs, C C, constructed as described, consisting of the wires coiled into spirals, e e, at their ends, said spirals fitting upon loops secured to the slats, b c, the centers of said wires bent to form loops or yokes, connected by the tube, m, all arranged as described for the purpose specified.

74,163.—PORTABLE PISTOL GALLERY.—F. A. Spofford and M. G. Raffington, Columbus, Ohio.

We claim, 1st, Providing the platform, A, with two flexible folding shields C C, on both ends, substantially as and for the purpose herein shown and described.

2d, The platform, A, when provided with a flexible folding shield, C, on each end, in combination with the perforated target, D, all made and operating substantially as and for the purpose herein shown and described.

74,164.—ADJUSTABLE BALL HOLDER FOR GAMES.—F. A. Spofford and M. G. Raffington, Columbus, Ohio.

We claim the revolving platform, A, when provided with a ledge, b, and bow, c, in combination with the bar, D, brace, d, and standard, B C, all made and operating substantially as and for the purposes herein shown and described.

74,165.—MACHINE FOR EXTERMINATING THE COTTON WORM, etc.—Chas. Steinmann, Napoleonville, La.

I claim the portable steam generator or boiler, F, or its equivalent, in combination with the pipes, M and K, when these pipes are provided with the jets or nipples, a, and are otherwise constructed as herein described, and the former is used as a steam and the latter as an oil distributer, the whole being arranged substantially as and for the purpose set forth.

74,166.—PORTABLE FENCE.—H. A. Stewart, Minneapolis, Minn.

I claim, 1st, The combination of the supports, B, constructed as described with the sections of fence, as and for the purpose herein set forth.

2d, In combination with the pivoted supports, B, constructed as described, the section of the fence, consisting of the pickets, D, upon the tarred ropes, C, as herein shown and described.

74,167.—BOX OPENER.—P. Stone, Charlestown, assignor to Joseph Veazie and Augustus L. Dole, Boston, Mass.

I claim a box-opener, substantially as described, viz: as constructed with a claw at one end of its stock or shank, and a hammer-head at the other end thereof, and with a ram to slide on the shank or stock, in manner and against a shoulder thereof so as to operate the claw, as specified.

74,168.—LIFE-PRESERVING APPARATUS.—J. B. Stoner, New York city, assignor to himself, L. Mendelson, and T. Crommelin.

I claim, 1st, The chin protector, C, constructed and applied as herein shown and described.

2d, The combination of the open elastic band, D, formed of two elastic tubes connected longitudinally by an elastic membrane, the outer elastic tube, B, auxiliary band, E, and the upper part of the suit, A, as herein described, for the purpose specified.

74,169.—BALLASTING VESSELS.—J. B. Stoner (assignor to himself, L. Mendelson, and T. Crommelin), New York city.

I claim the temporary ballast, when consisting of the weight, F, secured to the lower ends of the rods, I I, and adapted to fit into the metallic socket, G, in the keel of the vessel, and operated from the deck, the rods, I I, working in the vertical tube, S, of the socket, G, as herein set forth for the purpose specified.

74,170.—CALCULATING AND REGISTERING MACHINE.—T. T. Strode, Mortonville, Pa.

I claim, 1st, The combination of disks, A B C D E and F, or their respective equivalents, numbered and arranged as herein set forth and described.

2d, The spur, b', in combination with the pinion, G, and toothed disk, D, or their respective equivalents, substantially as shown and described.

74,171.—BROADCAST SEEDING MACHINE.—Samuel Thomson, Osceola, Wis.

I claim the rotating seed-discharging cylinder, F, in combination with the seed box or hopper, E, having an opening, s, at its lower part, the bottom plate, b, and the scattering board, G, all arranged to operate substantially as and for the purpose herein set forth.

74,172.—ROTARY STEAM ENGINE.—C. B. Turner, Grand Rapids, Mich.

I claim the piston, B, provided with the partitions, J, and chambers, I and arranged to operate in connection with the induction port, g, and valves, D, and D', as herein described and represented.

74,173.—APPARATUS FOR RAISING HEAVY WEIGHTS.—S. E. Tuttle, Genoa, Nevada.

I claim 1st, An improved machine formed by the combination of the shaft

B, the wheel, E, having a spiral groove, e1, formed in its face, the blocks, H, having friction wheels, I, attached to them, and the slide, F, or equivalent, with each other, and with the guides, G, and frame, A, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the flanges, J and h', with the guide, G, and blocks, H, substantially as herein shown and described and for the purpose set forth.

74,174.—VINEGAR STILL.—R. L. Vance, St. Louis, Mo.

I claim, 1st, The tank, A, when divided into two cells, a a1, and combined with the distilling apparatus, e E E', as described and for the purpose set forth.

74,175.—MODE OF PREPARING AERATED LIQUIDS.—P. H. Vander Weyde, M.D., Philadelphia, Pa.—Antedated Jan. 27, 1868.

I claim, 1st, The described manner of dissolving the carbonic acid gas in the water by means of coil, gas jet, and reservoir, with stop cocks, regulator, and safety valve, this solution being made at the place and time it is to be used as beverage.

2d, Mixing carbonic acid water with the required quantities of concentrated solutions of the salts contained in diverse mineral waters, or the concentrated alcoholic extracts of beer, cider, wine, etc., and thus by only supplying one single fountain with so called soda water, or even with pure water, to draw from it, at will, any desired mineral water, beer, champagne, cider, or wine, and, in general, any beverage containing carbonic acid, always fresh and cool, and equally effervescent.

74,176.—WALKING VEHICLE.—R. C. Vernol, New York city.

I claim the legs, C D, of a walking vehicle, when they are connected with the eccentric shafts, E E, and with the crank shaft, B, in such a manner as to receive up and down as well as oscillating motion, substantially as and for the purpose herein shown and described.

74,177.—STEP AND EXTENSION LADDER.—George S. Walker, Erie, Pa.

I claim, 1st, In a combined extension and step ladder, the hooks, i, and arm n, in combination with ladders, A B, cord, b, pulley, m, and crank shaft, a d, all constructed, arranged, and operating substantially as described and for the purpose specified.

2d, In combination with the above, the hook, h, and guides, e, substantially as described.

3d, The combined extension and step ladder, constructed substantially as described, and consisting of the sections, A B, hooks, i, arm, n, guides, e, pulley, m, cord, b, and crank shaft, a d, all arranged and operating substantially as set forth.

74,178.—METALLIC SCROLL ENDS FOR SPRING BARS FOR CARRIAGES.—A. L. Warburton and H. Bendir, Fort Wayne, Ind.

We claim the metallic scroll ends for spring bars and head blocks for carriages, etc., as an article of manufacture, the same being constructed and used in the manner and for the purpose substantially as specified.

74,179.—PEN HOLDER.—C. M. H. Warren, Brooklyn, N. Y.

I claim a pen holder provided with a sliding handle, A, and barrel, B, and with a sliding nosing, C, all combined and arranged substantially as and for the purpose herein set forth.

74,180.—LAST.—G. M. Wells, London, Eng'd, assignor to M. D. Wells, Chicago, Ill.

I claim the last as made with the horn, F, to project from its instep part, B, and be connected therewith as specified.

74,181.—LAST.—G. M. Wells, London, Eng'd, assignor to M. D. Wells, Chicago, Ill.

I claim the last, as made, with its two sections or parts connected by dove tails, and having a slot, opening, or hole made and arranged in each, as explained, for reception of a leg or standard, as described.

Also, the combination of the key or standard with the two last sections connected by dovetails and having slots, or keyholes, or passages arranged in them, as set forth.

74,182.—BENCH HOOK FOR CARPENTERS' BENCHES.—C. H. Weston, Lowell, Mass.

I claim the bolt, H, with its cam-projection, when used with the slotted case, G, for clamping bar, D, the several parts being constructed and operating substantially as specified.

74,183.—PLOW.—Charles White, Bladensburg, Md.

I claim, 1st, The angle iron, I, in combination with the slotted transverse bar, J, and the rear end of the plow beam, for effecting the double adjustment of the latter, in the manner described.

2d, The pivotal support, G, of the plow beam, E, in combination with the perforated horizontal flange or lug, a, on the mold board, as described.

3d, The plow beam, provided with tubular or semi-cylinarical ribs or corrugations, substantially as described.

4th, The yielding tension or draft rod, passing centrally through, or having an equivalent arrangement relative to, the beam, as described.

5th, The yielding draft rod, in combination with the spring, operating as described.

6th, The drum or socket, formed in or attached to the beam, in combination with the spring and draft rod, as described.

74,184.—SUSTAINING DEVICE FOR DRAFT POLES FOR CARRIAGES.—Samuel B. Whitney, Coxsackie, N. Y.

I claim the loop or hook, i, hanging from the bolt, e, and sustaining the spring, F, in combination with the tongue, d, and jaws, c, as and for the purposes set forth.

74,185.—SKATE FASTENING.—Alfred Woodham, N. Y. City.

1 claim, 1st, The heel clamps to the skates when constructed as described, to grasp the heel both upon its sides and edge, under the shank, as herein shown and described.

2d, In combination with the above, the pivoted slotted clamps, C, when provided upon their inner ends with the swivelled right angular nuts, I, receiving the screw bolt, H, whereby the said clamps are permitted to adjust themselves to the sole of the boot or shoe, by combined lateral and longitudinal movements, as herein shown and described.

74,186.—WATER ELEVATOR.—C. F. Woodruff, Newbern, Tenn.

I claim the shaft, b, working in the axle, B, having the bar, D, at its extremity, working through the slot, b'', clutching the drum, C, by the stops, d, in manner substantially as above set forth and described.

74,187.—CHERRY STONER.—Rufus Wright, Brooklyn, N. Y.

I claim, 1st, The reciprocating rod, H, armed with the needles, c, provided with notches or barbs, in connection with the bed, Q, having the recess or cavity, g, made in it, and the hole, f, extending entirely through it, with the arm, S, working underneath the hole, f, in the bed, all arranged substantially as and for the purpose set forth.

2d, The vibrating bar, U, provided with the plates, u u, in combination with the reciprocating rod, H, armed with the neeedles, c, and the bed, Q, provided with the hole, f, all arranged substantially in manner as and for the purpose specified.

3d, The vibrating bottom, L, in connection with the tube, K, the former being provided with the curved projection, N, and arranged to operate in connection with the bed, Q, and guard, R, all arranged to operate substantially as and for the purpose set forth.

4th, The cam, G, provided with the rim, e, and pin, j, and connected with or arranged to operate the rod, H, bottom, L, strike or arm, S, and the bar, U, for the purpose specified.

74,188.—MODE OF COMPOUNDING PRINTERS' INK FROM GRAHAMITE.—Henry Wurtz, New York city.

I claim the use, as an ingredient in printing inks, of the resinous constituent of the Grahamite of West Virginia, called by me viscosine.

74,189.—CARRIAGE SHAFT AND POLE COUPLING.—Edmund A. Harvey, Wilmington, Del.

I claim, 1st, The clevis, A, with pin or bolt, C, with or without either permanent or detachable safety lips, G, in combination with hook box, B, substantially as described.

2d, The hook box, B, in combination with key bolt, D, with spring or elastic washer, E, for the purposes named.

REISSUES.

2,849.—METHOD OF CASTING SCREWS.—William Allen Ingalls, Chicago, Ill. Patented May 15, 1866.

I claim, 1st, The mode herein described for casting seamless screws.

2d, The screw herein described, as a new and improved article of manufacture.

2,850.—HORSE HAY FORK.—Mary Jane Laird, Middletown, Pa., administratrix of the estate of Andrew J. Laird, deceased. Patented August 21, 1866.

I claim, 1st, The tines, D D, having cutting edges, in combination with rod, C, substantially as and for the purpose specified.

2d, Also, the tines, D D, in combination with the rod, C, when the former are pivoted to the parallel bars, A A, and work in slots arranged in the end of the same, substantially as described, and for the purpose specified.

3d, Also, the rod, C, link, E, and lever, F, when the same are arranged and combined, substantially as described.

4th, The bars, A A, when they are connected and arranged as shown in combination with the rod, C, and link, E, substantially as described.

5th, In combination with the sliding rod, C, the lever, F, having its upper horizontal arm adapted to project through the ring, H, substantially as described, and for the purpose specified.

2,851.—INSTRUMENT FOR OPENING SEALED AND OTHER CANS. E. H. Bourne, E. Damon, Jr., and H. M. Knowles, Cleveland, Ohio, assignees of Samuel D. Lecompte, Leavenworth City, Kansas. Patented Sept. 19, 1865.

We claim, 1st, A can opener constructed of a cutter or knife connected to a handle or holder having a point so arranged in relation to said holder as to form an axial pivot for the cutter in opening cans.

2d, The point, when so arranged in relation to the holder and cutter that it acts as a point in perforating the can and an axial pivot for the cutter.

2,852.—THRASHING MACHINE AND SEPARATOR.—Hugh W. Matthews, Chicago, Ill. Patented Aug. 27, 1867.

I claim, 1st, A longitudinally slatted grain rack or platform, C, constructed substantially as described, in combination with vertically and longitudinally moving shakers, D, arranged so as to play between the slats of said rack, substantially as described.

2d, The combination of a thrashing device, a perforated and longitudinally slatted stationary rack, C, and blades or straw shakers, D, operating substantially as described.

3d, A stationary or movable rack, C, composed of perforated slats having longitudinal spaces between them, in combination with serrated blades, D, arranged and operated substantially as described.

4th, The slatted and perforated grain rack, arranged so as to incline toward the thrashing device, and hinged to the main box or frame, substantially as described.

5th, The combination of a slatted rack or grain platform, C, the serrated grain or straw shakers, operating through said grain rack and a conveyer, arranged and operating substantially as described.

2,853.—DREDGING MACHINE.—James H. McLean, St. Louis, Mo. Patented July 9, 1867.

I claim, 1st, The adjustable dredging frame, C, when such adjustment is produced by a derrick, i, and fall, when constructed and operated substantially as shown and specified.

2d, The scoops, d, of a dredging machine, having circular vertical cutting edges in advance of the usual lateral cutting edge w, fig. 1, when constructed and operating substantially as shown and specified.

3d, In combination with the dredging vessels, the pins, L, for the purpose of moving the same, substantially as described.

4th, The dredger, the receiving and discharging apron, and the derrick of a dredging machine, all in combination, when constructed and operated substantially as shown and specified.

2,854.—LAMP BURNER.—William Painter, Baltimore, and Charles Painter, Owing's Mills, Md., assignees of William Painter by mesne assignments. Patented June 30, 1863.

We claim having the side pieces, h h, and the ends, g g, constructed and arranged in reverse inclined positions, in the manner herein shown and described.

The combination of the attachment above specified with the tubes, F A, the latter being screwed into the fountain or body, B, of the lamp, and inclosing the wick adjusting wheels, b, as set forth.

Making the outer case, F, adjustable upon the tube, A, so that the light of the cap, G, may be regulated, as and for the purpose set forth.

A deflector or flame spreader, constructed so as to form a continuous plate around the flame, and fashioned so as to cut off the ascending currents of air from the edges of the flame and deflect them against the sides thereof, substantially as described and for the purpose set forth.

2,855.—COAL OIL LAMP.—Joseph Ridge, Richmond, Ind.

Patented April 15, 1862.

I claim, 1st, The use of transparent material between the base of the deflector and base of the burner, substantially as described and for the purposes specified.

2d, The combination and arrangement of the base, B, of the burner, the transparent inclosure, M, the deflector, D, and chimney, C, substantially as set forth and for the purposes described.

3d, The base of the chimney, located at a point above the base of the burner, and having interposed between said bases a transparent material.

2,856.—OYSTER DREDGE.—Thomas P. Sink, Fairton, N. J.

Patented Oct. 4, 1859.

I claim, 1st, The combination of a horizontal roller, E, turning in bearings adjacent to the gunwale of a vessel, and a horizotal grooved roller or pulley, B, substantially as and for the purpose described.

2d, The combination of a horizontal roller and a vertical roller, when the outer side of the latter is beyond the outer edge of the horizontal roller, and when the said rollers arranged in respect to each other on the gunwale of a vessel substantially as described.

3d, The arrangement and combination, substantially as described, of the chock or block, A, its pulley, B, and the roller, E, for the purpose specified.

2,857.—CRANK PIN BOX.—Thomas Welch, Churchville, N. Y.

Patented Aug. 1, 1865.

I claim, 1st, In combination with the adjustable boxes, B D, a pitman, P, so united therewith that it will freely move and work, for the purposes set forth.

2d, In combination with the adjustable boxes and pitman, a, set screw, S, for the purposes set forth.

3d, The combination of the cap, C, with the boxes, B D, pitman, P, and set screw, S, for the purposes set forth.

DESIGNS.

2,905.—LANTERN.—John Alexander, Brooklyn, N. Y., assignor to Geo. W. Brown & Co., Forestville, Conn.

2,906.—MOLDING.—William Baker, New York city.

2,907.—MUFF.—Frederick Booss, New York city.

2,908 and 2,909.—CARPET PATTERN.—Robert R. Campbell, (assignor to Lowell Manufacturing Company), Lowell, Mass. Two patents.

2,910.—CAR BASKET.—Wm. G. Creamer, Brooklyn, N. Y.

2,911.—TRADE MARK.—Charles Gautier, Washington, D. C.

2,912.—PISTOL BARREL.—Emerson Goddard, Brooklyn, N. Y., assignor to E. S. Renwick, New York city.

2,913.—STOVE.—William Hailes, Albany, N. Y.

2,914.—LABEL.—Margaret J. Hays, Allegheny City, Pa.

2,915.—BOTTLE.—Louis Lacour, San Francisco, Cal.

2,916.—FLOOR OILCLOTH PATTERN.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson.

2,917 and 2,918.—CARPET OR FLOOR OILCLOTH PATTERN.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson. Two patents.

2,919.—STATUETTE.—Carl Muller, New York city.

2,920.—BASE OR STAND.—Nicholas Muller, New York city.

2,921 to 2,926.—CARPET PATTERNS.—Elemir J. Ney, Lowell, Mass., assignor to Lowell Manufacturing Company. Six patents.

2,927.—TOP.—Joshua Pusey, Philadelphia, Pa.

2,928.—BOTTLE.—Frederick Stearns, Detroit, Mich.

NOTE.—SEVENTY-FOUR Patents in the above list were solicited through the Scientific American Patent Agency. The following samples, out of scores of complimentary letters constantly received at this office, we select for publication, as they came to hand at the same time, and emanated from persons residing at such remote distances apart, thus exhibiting unity of sentiment from one end of our country to the other:—

Thomas C. Hammond, of Sacramento City, Cal., writes us:—"I am much gratified to learn that you have succeeded in procuring a favorable termination of the case without any extra trouble or expense, and, as I consider this result due to the able manner in which you have conducted the case, you will please accept my thanks for your kind attention to the matter, and also the assurance that I shall recommend your Agency as the cheapest and best medium for the procuring of patents in the country. I shall secure your valuable services in the transaction of all matters of this kind that I may have in future."

George W. Wheeler, of Hartford, Vt., says:—"Through your Agency we received the Letters Patent on Wheeler & Allen's water wheel, the 13th of January. We were disappointed in obtaining them so soon—only twenty-eight days from the time of making application to the allowing of the patent! I know of cases in our vicinity that have been on the road from three to five months and are not through yet. You have given entire satisfaction in our case, and we would recommend you to others."

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 *Park Row, N. Y.*

67,167.—EYE GLASS.—Charles Parker, Meriden, Conn., assignee of George N. Cummings, Providence, R. I. Dated July 30, 1867. Application for reissue received and filed Jan. 23, 1868.

I claim, 1st, The continuous spring, B, combined with the two glasses A A, when attached and secured to each of the bows at or near the point, D, in the manner substantially as herein set forth.

2d, The arrangement of the guides, E E, upon each of the bows, and so as to wholly or partially surround the spring at the point above the point, D, and so as to leave the spring free in the said guides, substantially as and for the purpose specified.

*562, whole No. 31,566.—DRYING TUNNEL.—Francis H. Smith, Baltimore, Md. Dated Feb. 26, 1861. Application for reissue received and filed Jan. 23, 1868.

1st, I claim the tunnel, A B C, when the same is provided with a furnace, R, and chimney, L, and the whole is constructed and arranged substantially as described and for the purpose specified.

2d, The tunnel, A B C, furnace, R, chimney, L, and gates, F G and H, when the same are so combined and arranged as to operate substantially as described and for the purpose specified.

3d, The tunnel, A B C, furnace, R, and chimney, L, when the same is in combination with the rails, E E, and car, J, and the whole operates substantially as and for the purpose specified.

4th, The furnace, R, having a spiral flue, N, and plates, V and V', when the same is constructed ane arranged so as to operate substantially as and for the purpose specified.

16,094.—MELODEON.—Lafayette Louis, Providence, R. I. Dated Nov. 18, 1856. Reissue No. 2,498, dated Feb. 26, 1867. Application for reissue received and filed Jan. 24, 1868.

I claim in combination with the reeds of a melodeon (or that class of instruments in which the air is drawn through the reeds by the exhaust action of the bellows), a tremolo valve or valves, so arranged that when vibrated it or they shall interrupt the passage of air through the reeds and thereby produce the tremolo sound at the will of the performer.

I also claim in combination with the reeds of a melodeon a rotary fan or blade wheel operating for the purpose of producing or regulating the tremolo.

36,017.—HARVESTER.—Cyrus Newhall, Hinesdale, N. H. Dated July 29, 1862. Application for reissue received and filed Jan. 24, 1868.

1st, I claim the combination in a harvester of a loose driving gear ring revolving on fixed arms with a finger beam suspended from the main frame by connections passing through the driving ring.

2d, The combination with a two-wheeled harvester of a finger beam hinged to the main frame by coupling arms passing through one of the driving wheels.

3d, The combination in a harvester of two wheels, a main frame, a laterally projecting hinged finger beam and a coupling frame, when the frame, the finger beam, and the couplings are all arranged within the periphery of the wheels.

4th, The combination in a harvester of a vertically folding finger beam, with a catch arranged on one of the fixed arms of the driving ring to hold up the cutting apparatus when moving from field to field.

22,681.—COOKING STOVE.—Philo P. Stewart, Troy, N. Y. Dated Jan. 18, 1859. Reissue No. 1,681, dated May 31, 1864. Application for reissue received and filed Jan. 20, 1868. Division A.

1st, I claim the supplying of a continued current of atmosperic air heated by the front plate of the fire box or chamber of combustion and in a flue, chamber or space immediately in front of the same and in combination therewith, without the aid of any intervening plate or plates, to the oven of a cooking stove in which the oven is in the rear of the fire chamber, and at the same time extending under and beyond it so as to include the said flue chamber, or space at the lower part thereof, and thus and thereby permit the said heated air to enter the said oven in the manner and for the purposes substantially as herein described and set forth.

2d, I also claim the flue space or intervening chamber, A A', immediately in front of the fire box or chamber of combustion, with a fire grate and ash pit or chamber combined therewith, and the whole arranged and suspended in the front and upper corner or part of the oven, I, into which space or intermediate chamber atmospheric air is admitted through apertures, X', or any equivalent thereof and therefor, and which are and shall be in and through the plate or door or doors in the front part of the cooking stove, and in combination with the oven of such stove, so that the air heated within such intermediate chamber substantially as herein set forth, may or shall be conducted to and into the oven, for the purposes and by the means substantially as herein described and set forth.

3d, I also claim in a stove constructed with an oven and with a fire box or chamber of combustion having a fire grate therein, and an ash pit or chamber below, and all combined therewith substantially like the one herein above described and set forth, the making of the front plate of the stove to open with a door or doors, k, and the attaching an apron in the front of the stove so as to receive and contain a kitchen or other suitable roaster, substantially as specified herein, so that the heat radiated by the front plate of the fire box or combustion chamber shall be aided by the heat radiated by oven plates therein, in the manner and for the purposes substantially as herein described and set forth.

4th, I also claim the employment and arrangement of the front doors, k, constructed with apertures, x', or any equivalent thereof and therefor, therein, in combination with the fire box or chamber of combustion, a, by means of which atmospheric air in a highly heated condition is admitted to the oven of a cooking stove, for the purposes substantially as herein described and set forth.

5th, I claim the employment and arrangement of a door or doors, k, or any equivalent thereof and therefor, so that the same, or a part thereof shall open (in the front of the cooking stove) in front of the fire box or chamber of combustion having a fire grate therein, and ash pit or chamber combined therewith, and arranged and suspended in the front part of the oven or a cooking stove, in the manner and for the purposes substantially as herein described and set forth.

6th, I claim the arrangement of a fire chamber or chamber of combustion with a fire grate and an ash pit or ash chamber combined therewith, and the whole suspended in the front part and upper corner of the oven of a cooking stove, in the manner and by the means substantially as herein described and set forth.

7th, I also claim the employment and arrangement of the additional or extra bottom and encasement, r, in combination with the flues of the bottom of a cooking stove and immediately underneath the oven, I, and with the space or chamber between the same and the bottom plate of the stove, in the manner and for the purposes substantially as herein described and set forth.

8th, I also claim the employment and arrangement of the additional or extra back or encasement, in combination with the ascending and descending flues in the rear end of a cooking stove, and between the rear end of the oven and the rear vertical end plate of the stove, in the manner and for the purposes substantially as herein described and set forth.

9th, I also claim the employment of a corrugated plate for the top of the oven, I, in combination with the flue, h, and fire chamber or chamber of combustion and with the rear end vertical plate of the oven of a cooking stove, in the manner substantially as and for the purposes herein set forth.

10th, I also claim the employment and arrangement of the front damper or valve, Y, in the front and hearth of a cooking stove, in combination with the flue or flues, as the case may be, immediately underneath the oven and bottom plate of the oven of a cooking stove, in the manner and for the purposes substantially as herein described and set forth.

11th, I also claim the employment and arrangement of the damper, or any equivalent thereof, and so combined with the flue or flues of a cooking stove having a boiler or reservoir supported outside and back of the rear vertical end of a cooking stove and over a heating chamber or flue, so that the direct action of the heat upon such boiler or reservoir may be thrown or shut off, and the same caused to pass through other parts and flues of said cooking stove before entering such chamber immediately underneath such boiler or reservoir and acting thereon for the purpose of warming or heating the water therein, in the manner substantially as herein described and set forth.

12th, I also claim the employment and arrangement of the boiler or reservoir having a removable or detachable cover or top, and containing two inclined flues or tubes, which are separate, at the bottom or lower end thereof, from each other, and which unite at the top or under end thereof, and thus and then form but one pipe, in the manner and for the purposes substantially as herein described and set forth.

22,681.—COOKING STOVE.—Philo P. Stewart, Troy, N. Y. Dated Jan. 18, 1859. Reissue No. 1,684, dated May 31, 1864. Application for reissue received and filed Jan. 20, 1868. Division B.

1st, I claim the employment and arrangement of the top plate of a cooking stove having a flue or flues immediately thereunder and extended over and beyond the rear end and upper portion of the vertical flue or flues back of the oven thereof, in such manner as to receive and support a reservoir or water tank upon or over a suitable opening therein and with a heating chamber immediately below or underneath the same, in the manner and for the purposes substantially as herein described and set forth.

2d, I claim the arrangement and employment of the heating chamber or flue, D, or its equivalent, in combination with the rear vertical end flue or flues of a cooking stove, and with the reservoir or water tank, C, in the manner and for the purposes substantially as hereinbefore fully described and set forth.

3d, I claim the combination of the flue or chamber, D, extending beyond the rear end of a cooking stove, and situated under or immediately below the reservoir or water tank, C, with the flue, H, extending from the fire chamber or chamber of combustion and over the top plate of the oven, and with the vertical rear end flue or flues of a cooking stove, in the manner and for the purposes substantially as herein described and set forth.

4th, I claim the arrangement and employment of the reservoir or water tank, C, in or upon and with the extended top plate, A and A', of a cooking stove, and heating chamber or flue, D, in combination with the heating or warming closet, S, in the manner and for the purposes substantially as herein described and set forth.

5th, I claim the arrangement and combination of the heating or warming closet, S, or any equivalent thereof, upon the rear end of a cooking stove containing a vertical flue or flues, in the manner and for the purposes substantially as herein described and set forth.

6th, I claim an opening, O, in and through the rear end vertical plate of a cooking stove, of sufficient capacity to allow the passage of hot air or of the heated escaping products of combustion through the same and into a flue or chamber underneath a reservoir or water tank, so as to warm or heat the water therein, in the manner substantially as herein described and set forth.

7th, I claim the combination of an exit chimney pipe or flue or flues with the heating chamber or flue, D, underneath the reservoir or water tank, C, in the manner and for the purposes, substantially as herein described and set forth.

8th, I claim the arrangement of a reservoir or water tank upon the extended top plate of a cooking stove and supported over or beyond the rear end vertical flue or flues of a cooking stove, in the manner and for the purposes substantially as herein described and set forth.

9th, I claim the construction of a vertical end plate of a cooking stove containing the opening, O, or any equivalent, therein, for the passage of the hot air or escaping heated products of combustion into a suitable chamber underneath the reservoir or water tank, combined with a cooking stove in the manner substantially as herein described and set forth.

10th, I claim the chamber or flue, P, or any equivalent therefor, arranged upon the rear end plate of a cooking stove and extending outward therefrom, in the manner and for the purposes substantially as herein described and set forth.

11th, I claim the combination of the chamber or flue, P, with the reservoir or water tank, C, in the manner and for the purposes substantially as herein described and set forth.

12th, I claim the combination of the chamber or flue, P, with the vertical flue or flues between the oven and the rear end plate of a cooking stove and with the chamber, D, in the manner and for the purposes substantially as herein described and set forth.

37,526.—PATTERNS FOR CUTTING BOOTS.—Elias Shopbell, Ashland, Ohio. Dated Jan. 27, 1863. Application for reissue received and filed Jan. 24, 1868.

1st, I claim the plate, A, in combination with the pairs of plates, B B' C C and D D', or their equivalents, with their respective slots and angles, producing the simultaneous movement of the several pairs of plates and the consequent unequal enlargement and construction of the pattern, substantially as herein set forth.

2d, The stationary and adjustable plates, so constructed and arranged in relation to each other and the slots as to produce a simultaneous expansion and contraction, substantially as described, according to any required size of the boot.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,542.—TREATMENT OF GUTTA PERCHA, INDIA RUBBER, ETC., FOR PRODUCING CEMENT PAINT, STAIN, ETC.—Daniel Reed, New York city. Dec. 13, 1867.

3,661.—RAILWAY RAIL.—Thomas Harbison, New York city. Dec. 24, 1867.

3,674.—BLANKET FOR PRINTING MACHINES, AND MODE OF JOINING THE ENDS OF DOUBLE-WOVEN FABRICS.—Seth W. Baker, Providence, R. I. Dec. 27, 1867.

3,690.—MAKING SHOT AND SHELLS FOR ORDNANCE.—John B. Tarr, Fair Haven, Conn. Dec. 28, 1867.

3,690.—GENERATING AND APPLYING MOTIVE POWER.—Benj. T. Babbitt, New York City. Dec. 28, 1867.

3,696.—GAS BURNER.—Willis Churchill, New York city. Dec. 28, 1867.

3,337.—MANUFACTURING CAST STEEL AND MALLEABLE IRON.—Edward L. Seymour, New York city. Dec. 12, 1867.

3,622.—CIRCULAR KNITTING MACHINE.—Geo. Johnstone, Philadelphia, Pa. Dec. 20, 1867.

3,681.—SOLES FOR BOOTS AND SHOES.—John Chilcott, Brooklyn, N. Y. Dec. 27, 1867.

3,689.—BUTT HINGE.—Benj. F. Barker, San Francisco, Cal. Dec. 28, 1867.

3,691.—APPARATUS FOR CUTTING SOAP.—Campbell Morfit, New York city. Dec. 28, 1867.

3,716.—MANUFACTURE OF HATS, ETC.—Rudolf Eickemeyer, Yonkers, N. Y. Dec. 31, 1867.

3,719.—MACHINERY FOR SPINNING COTTON, ETC.—James Eaton, Boston, Mass. Dec. 31, 1867.

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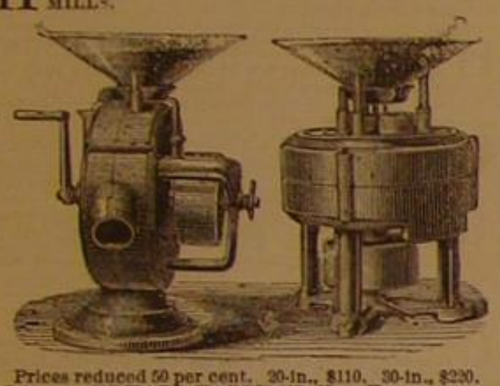

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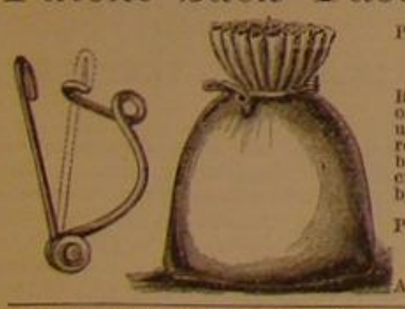

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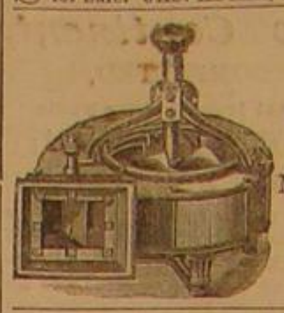

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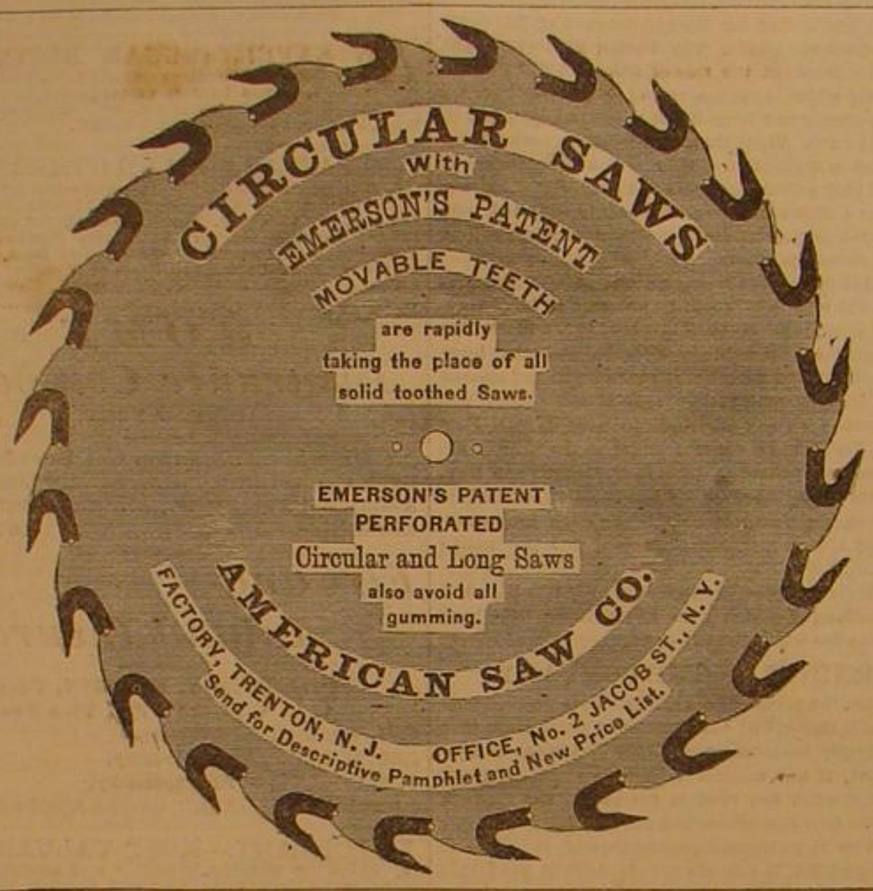

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Vol. XVIII.—No. 9. [NEW SERIES.] NEW YORK, FEBRUARY 29, 1868. $3 per Annum [IN ADVANCE.]

The Nashville Suspension Bridge.

The engraving gives an excellent view of the suspension bridge over the Cumberland River, Tennessee, connecting Nashville and Edgefield, built to replace the bridge destroyed by the confederate general, Floyd, when in possession of Fort Donelson. The floor of this bridge is about one hundred feet above low water mark. It has a carriage way with a foot-path on each side. Two cables, eight inches in diameter, support the structure, the span being six hundred and fifty feet and the roadway being twenty-eight feet two inches wide. At the north end it is slightly higher than at the other. It was built under the direction and superintendence of W. F. Foster, C. E., and is a work reflecting credit upon its constructor and the engineering and mechanical talent of the country.

THE NEW SUSPENSION BRIDGE OVER THE CUMBERLAND, AT NASHVILLE, TENN.

Suspension bridges are of very remote origin. Kirchen, in his "China Illustrated" mentions one in China which according to tradition was built A. D. 65, and is now in existence. It is supported by chains, the roadway of plank resting directly upon them. Rope suspension bridges were used by the ancient Peruvians, and have been employed in Europe. The first iron suspension bridge in England was built 1819, across the Tweed at Berwick, by Sir Samuel Brown. It was constructed with chain cables, twelve of which were used. Its span was 449 feet and its versed sine 30 feet. The Brighton chain pier and the Montrose bridge were subsequently built by the same engineer. The former was destroyed by a gale in 1836. Its entire length was 1,136 feet in four openings, each of 255 feet span. The latter was built in 1829 and destroyed by a hurricane in 1838. The Menai bridge, built by Telford, was erected in 1826. Its span was 580 feet and hight of roadway above the water 102 feet. It was severely injured by a gale which produced so great an oscillation of the main chains as to dash them against each other and break off the bolt heads. The bridge was afterward repaired, and strengthened by additional braces.

One of the most beautiful suspension bridges in Europe is that of Freyburg, Switzerland; the cables are of wire and the span 870 feet. In this country the most remarkable specimens of this style of bridge are the Niagara with a span of 821 feet, the Wheeling with a span of 1,010 feet—blown down in 1854—and the one represented in the engraving. It would seem that the want of confidence generally expressed in suspension bridges is due rather to defects in their construction than to inherent faults of the system.

EDITORIAL CORRESPONDENCE.

The Antiquities of Pisa—The Leaning Tower—Galileo—Florence as a City—Its Palaces, Paintings, Sculptures, Cathedrals, and Churches—Old Artists—A Visit to American Sculptors.

FLORENCE, Jan. 17, 1868.

The railway from Spezzia to Pisa passes for some distance near the base of the Carrara Mountains, from whence for centuries past has been furnished the amount of marble with which the cities of ancient Rome and modern Italy have been adorned and beautified. After a ride of three hours on this railway, we reached the old city of Pisa, standing upon an open plain, now a sort of imperial widow, mourning over buried hopes. At one period of its history, Pisa contained upward of one hundred and twenty thousand souls, and had considerable commerce; but to-day it is probable that there are not over twenty thousand permanent residents. Still, the old city has many monuments of antiquity, grand even in the solitude that surrounds them, which are well worthy a few hours' attention. I think it would be difficult to find in any other city in Europe, within an enclosure so comparatively small, four objects of greater interest than the Cathedral, Baptistery, Leaning Tower, and Campo Santo, of Pisa.

The Cathedral is a very extraordinary edifice in every respect, considering that it was built upwards of eight hundred years ago. The style of external architecture is quite novel, and original perhaps, with the architect, Buschetto, who had the reputation of being an original thinker, and creative, mechanical genius. A poetical inscription is preserved in the church, which declares that Buschetto once invented a machine whereby ten young maidens were enabled to raise weights that a thousand oxen could scarcely move, and by means of which a raft was transported to the sea, but, as the poet says, not without considerable difficulty. All traces of this wonderful invention, however, are lost. The interior is cheerful and exceedingly beautiful, having an elaborately gilded ceiling, precious marbles of variegated hues, porphyry columns, a fine pavement of mosaic, and pictures executed by some of Italy's greatest masters. The most interesting single object in the Cathedral is the old bronze lamp of Galileo, suspended from the ceiling. When but eighteen years of age, Galileo noticed its regular and synchronous vibrations, and it suggested to him the measure of time by the pendulum, a fact he afterwards improved by constructing a clock for astronomical purposes.

The famous Leaning Tower of Pisa was built about a century after the Cathedral, and though standing several feet from it, forms its campanile, or bell tower, and mounts seven bells, the largest of which is hung so as to constitute a sort of counterpoise to the line of inclination. The form of the Tower is that of a gigantic cylinder built of white marble, 179 feet high and 53 feet in circumference. On the outside are several tiers of marble pillarets, forming circular piazzas. Within the shell is a winding staircase leading to the top, where a very fine view is obtained, extending one way to Leghorn on the Mediterranean, and far inland on the other. The inclination of the tower is thirteen feet from the perpendicular, and on that account the ascent, otherwise easy, is liable to produce a disagreeable, sea-sick sensation, as at every turn of the spiral staircase one seems to be alternately going up and down. There is still considerable mystery as to the cause of this inclination. Some say it has settled since it was

built, but there are no cracks any where visible in the structure to support this theory, therefore it is more reasonable to suppose from the present appearance of the Tower, which indicates an attempt to rectify it above the second story, that the foundations yielded soon after the structure was commenced, and that having settled as much as it could, the builders went forward and completed it. Under any circumstances the Tower is a singular edifice and would be worth seeing, even if it had been erected upon a plumb line. Galileo was once a professor in the University of Pisa, and his acute mind enabled him to make good use of the Tower to ascertain the measure of time, and to calculate the fall of heavy bodies. Many times, with instruments in hand, did he climb the winding staircase to pursue his profound studies, which so much perplexed and angered the doctors of the church, and thus it is that these old monuments of Pisa which now attract the notice of the curious, are also mementos of some of the grandest discoveries of science in Italy.

The Baptistery, a singular round edifice standing by itself in the open place, is one hundred feet in diameter within the walls, which are eight feet thick, surmounted by a fine dome, forming the frustrum of a pyramid. The interior is destitute of embellishment, but the marble font and pulpit are exquisite specimens of the art of carving, showing to what great perfection the art had advanced during the middle ages.

The Campo Santo forms one side of the area in which the Cathedral is situated, and may be regarded as a funereal museum of all ages and nations. It is a quadrangular-shaped structure, having extensive cloisters that open upon an interior court, covered with earth taken from the holy places of Jerusalem, and in the year 1228 brought to Pisa in fifty vessels, under direction of a prelate who was expelled from Palestine by the heathen. Within the cloisters are several fine monuments and slabs, which cover the remains of some of the most eminent men and women of Italy. There are also Pagan sarcophagi, which look somewhat odd in a consecrated Christian burial place. It appears from some very remarkable frescos upon the walls, that the Pisans, in those early time, were not very much afraid of the priests, if one may be allowed to judge from the manner in which the artist was permitted to bestow them after death. In the great fresco of the Last Judgment, the nude body of a priest is represented as being contended for by an angel on the one hand, and the prince of darkness on the other, while upon the left, among the outcasts, are seen the figures of kings, queens, cardinals, prelates, and other dignitaries of the church. The judgment, according to this picture, appears to have been rendered with strict impartiality, and without respect to rank or position—a fact which seems to accord with all scriptural testimony on that subject.

In passing from the Cathedral to the Tower, we saw a tall, masked figure, clothed in black, approaching rapidly toward us, holding a small box in his hand. The first impression made on our minds, upon seeing this novel, grotesque object, was that some black-friar had come up from one of the tombs of the Campo Santo, to warn us that our turn had come; but we were soon relieved of all apprehension upon being informed that it was simply one of the many ingenious methods adopted by religious associations for raising money. We were glad to get rid of the apparition by the bestowal of a small contribution.

Having indulged our curiosity for a few hours among the singular monuments of Pisa, we took the cars for Florence. The trip occupied a little less than three hours, and upon our arrival we found comfortable rooms awaiting us at Hotel de la Paix, which I mention by name simply to say that it is the best hotel we have yet found in Europe. We feel at home in Florence. It is one of those choice spots where the soul and body find a continual feast of good things, as upon every hand there are evidences of taste, culture, and good order, in marked contrast to the hubbub observable about the narrow streets and filthy docks of Genoa. We labor under the disagreeable necessity of seeing Italy in winter, which I regard as a misfortune, especially when the mind has accustomed itself to think of it only as a land of balmy air, cheerful sunshine, and glorious sunsets—a sort of second Paradise of fruits and flowers, history, poetry, song, painting, sculpture, and classic ruins, which charm away existence in grand dreams of romance. It has been unusually cold this winter in the south of Europe, and all this portion of Italy is clothed in a mantle of snow. One of the great charms of Italy is to see it in full bloom, to

> "Scent the new fragrance of the breathing rose,
> And quaff the pendant vintage as it grows,"

as we were permitted for a few days in summer to enjoy it about the Italian lakes. At such a time I am prepared to think that no other country in Europe can offer so much to interest and instruct the traveler.

Florence is a bright, well built, cheerful city—no dirt, no ruins, the streets usually wide, regular, and laid with flat paving blocks, such as we usually employ for sidewalks. The people appear calm, dignified, and orderly, with nothing either in dress, manners, or customs, to distinguish them from the French or English. An American on the streets of Florence is no more noticed than a Tuscan, and there is no peculiarity of physiognomy to stamp their nationality and mark them as a race. The public buildings and palaces are usually of the Tuscan order of architecture, with heavy stone fronts, rustic basements, severely simple, often imposing; though I must confess that with their small, heavily-grated windows, and unadorned fronts, they sometimes appear more like prisons than palaces.

Florence is divided by the river Arno, spanned by noble stone and suspension bridges; but the stream is small, and no other craft are seen upon its waters above the dam except small boats employed for carrying sand, scooped up from the river's bed for building purposes. There is also a fine, well-shaded park, called the "Cascine," a name applied to it because upon it is located the royal dairy, which furnishes milk and butter for the king's table. The fashionable drive extends for a long distance down the banks of the Arno, and if one can judge the wealth of a people from the style and number of equipages, I should say that the people of Florence enjoyed a full share of this world's prosperity. The environs of Florence are charming even in winter. The country is diversified with hill and valley, thickly studded with large villas, usually, however, of a mean style of architecture, snug little cottages, with surrounding grounds tastefully laid out, and well kept. In the season of flowers, when the orange blossoms, roses, verbenas, heliotropes, and carnations are in bloom, these suburban places must constitute a scene of great rural beauty.

The King Victor Emanuel resides in one wing of the famous Pitti Palace, a plain but imposing building on the outside, the inside containing some of the choicest treasures of the kingdom. We were admitted to view a suite of apartments fitted to receive one of the Princes, who was expected to occupy them the next day with his bride. All was regal, comfortable, and even homelike; but what pleased us most was a fine piece of sculpture by a young Florentine artist, which represents Michael Angelo as a mere boy in cap and apron, with mallet and chisel, intently at work carving a human face upon the surface of a block of marble. It is no ideal work, but the illustration of a fact in the boyhood of the great man, the ugly face now forming an object of interest in the gallery of sculpture.

The Pitti Palace is the offspring of a gentleman of Florence, who conceived the notion that he must do something to outrival a popular family of McFlimseys, that dwelt in another palace in a style which excited the envy of Pitti, who declared that he would have something so large and so grand that he could stow away the palace of his neighbor within the court yard. He succeeded well in his project so far as dimensions were concerned, but fell into disgrace before he could enter upon full realization of his vain pretensions, and now this grand palace is the abode of a king. On its upper floor is displayed one of the choicest collections of pictures to be found in Europe. On the opposite side of the Arno from where the Pitti Palace stands, is the famous Uffizzi, another of those immense palaces so common in Italy, this one having been built by Cosmo de Medici, a name intimately associated with the earlier history and fame of Tuscany. He bore the title of "Father of his Country." The two palaces are connected by a long covered passage, extending across the river, a distance of more than one-fourth of a mile, and lined on either side by tapestries, historical pictures, and, more interesting still, a fine collection of the studies of the famous old Italian painters. At one time this covered way was only used by the occupants of the palaces; but now it is thrown open to the public as an easy means of communication between the two buildings.

The spacious upper rooms of the Uffizzi are used for paintings and sculpture, the whole forming one of the richest and most varied collections in the world. Apart, however, from the statuary and antiquities, which are very rich, the collection of pictures, as a whole, is inferior to the famous Madrid gallery, of which I spoke in one of my letters from Spain. The pictures of the Pitti and Uffizi comprise some of the master works of Raphael, Andrea del Sarto, Perugino Carlo Dolce, Titian, Reubens, Correggio, Van Dyke, Michael Angelo, Salvator Rosa, De Vinci, Dominichino, and others of the dead generations of great painters of the Italian and Flemish schools, whose works living artists vainly attempt to reproduce, for of living original painters the Italy of to day is almost equally poor with old Spain. I think it may be said with truth, that Germany is the only country on the continent where the art of painting flourishes with any considerable boldness and originality, and the seat of this department of fine arts has been transferred from Rome and Florence to Munich, a city that contains more resident artists than any other in Europe. Italy is still the repository of ancient and modern sculpture. In this higher and nobler art, Florence and Rome hold undisputed supremacy, not, however, in their native artists, for it is with some degree of pride that I can speak of our own Powers, Crawford, Rogers, Ball, Hart, Hosmer, Story, and Mead, as among the very first sculptors in the world. The Uffizi contains the celebrated Venus de Medici, The Apollo, The Slave Whetting his Knife, The Dancing Faun, and The Wrestlers, while here, as in other places about Florence, the works of Cellini, John of Bologna, and Michael Angelo, sculptor, painter, and architect, make this fair, clean city a central spot of noble, exquisite skill in this department of the fine arts. Michael Angelo was a native of Florence, and the old house where he lived is now shown to visitors as one of the sights of the city. With his right hand he could chisel a David, with his left hand he could paint The Fates, and with both, when combined with his extraordinary fertility of genius, he could plan St. Peters, the grandest architectural structure in the world.

I have said that Florence had no ruins of fallen greatness, but it has very ancient buildings, some of which would have gone to decay centuries ago but for the frugal care of its people. The city is especially rich in the number and magnificence of its Christian edifices, the first and foremost being, of course, its noble cathedral, the most impressive, externally, I have yet seen, and possessing the rare advantage of standing by itself, and not encumbered, like many other similar edifices in Europe, by mean shops and market stalls, to destroy its symetry and effect. The exterior is a grand mosaic composed of different colored marbles, which imparts to it a novel and very singular effect. The interior is in the form of the Latin cross, cold, severe, and lofty, surmounted by a central dome which impresses the mind with awe. This dome measures 138 feet in diameter, and mounts upward 133 feet above the cornice, and is said to have furnished Michael Angelo with his idea of the dome of St. Peter, which is several feet higher, but of less circumference than this great original. On Sunday morning we attended high mass at the cathedral. The service was conducted by upwards of two hundred priests and boys, who occupied a chapel in one of the transepts, shut off from the main body of the church by a high wood and glass partition.

The attendance upon the service, which was conducted with great dignity, was comparatively small, but neither here nor elsewhere in Italy have I seen anything of that degrading superstition which I noticed everywhere in Spain. The baptistery of the cathedral, like the one at Pisa, stands by itself. Its exterior is of black and white marble, but the interior is richly ornamented by sculpture, mosaic, and frescoes. In accordance with an ancient ritual, all the baptisms of the city are performed here, and at the time of our visit several were being presented by their loving mothers to receive the baptismal water, which, after a simple service performed in each case, is poured over the little one's head from a small silver cup. About a dozen baptisms are performed each day, the females, according to the records, outnumbering the males thirteen in every one hundred.

The Campanile or bell tower is a square isolated pile of black and white marble, 275 feet high, and intended by its architect to reach a higher altitude than any structure ever raised by Greek or Roman, and yet it is not so high as the grand dome of the cathedral which stands near it. Upon the lower panels are several sculptured bas-reliefs of a scriptural character, the whole forming one of the most singular looking yet graceful structures ever erected.

I have only space to speak of one other church in Florence, which is perhaps the most interesting one to be found in the city. I refer to the Santa Croce, filled with illustrious tombs and justly styled the Pantheon of Florence. The religious character of the edifice is almost lost in its national character. Michael Angelo is buried here, though he died in Rome. The Pope directed that his body should be buried at St. Peter's, but Cosmo de Medici, jealous of such an honor, had it secretly removed at night in a box of merchandise. His marble monument, though somewhat deficient in grandeur, is nevertheless a fine work. Galileo's tomb stands opposite to Angelo's. He died at the age of 78 years, and is said to have entered the world the very day and hour that Angelo left it. The monument is a fine one, and was erected as an affectionate memorial to a great genius and persecuted man, by the heirs of his favorite pupil, Viviani, but nearly a hundred years after Galileo's death, and when permission was given by Clement XII. to have his bones removed to this church. Here are also the tombs of Dante, Machiavelli, Alfieri, Aretino, Lanzi, and many other great men who have honored art, science, and literature.

The Museum of Natural History, among other wonders, contains the finest collection of anatomical preparations to be found in Europe. They exhibit every portion of the human body with astonishing skill and fidelity, from the earliest form of animal life to the last stage of decomposition. Here is also to be seen, within a beautiful court fitted up at great expense, the "Temple of Galileo," which contains a collection of his manuscripts and inventions, including the telescope with which he discovered the satellites of Jupiter, and the old astronomical clock made at Pisa. The room is railed off to keep persons from getting near to the cases, from fear that some of these old treasures might inadvertently slip away. I got permission from the director to go inside, but the collection of objects was so numerous and the place so cloudy at the time that I could not examine them with any care. The walls of this little temple are beautifully inlaid with marble and jasper, and the ceilings are richly frescoed, illustrative of the principal events in the life of Galileo.

I spent one delightful day in visiting the studios of our American sculptors. Powers has in hand several busts, also an ideal piece which is intended to represent the "Last of the Tribes," a memorial of the expiring races of Indians in our country. The female figure, already in plaster, is exceedingly beautiful, and with the accessories of the kirtle, the moccasins, and other simple appendages to be added, I feel warranted in saying that when finished it will be worthy the skill of the great artist whose fame belongs to our own country.

Hart has just finished a bust of General Jackson, one of the finest heads I have ever seen. It was modeled in 1839 at the Hermitage, during the last days of the old hero, but his death following soon afterward, the family took no interest in the work, and its completion was delayed. The marble is beautiful, the chiseling perfect, the face magnificent. It is worthy of a good place in our country. He has also in hand an ideal group of rare force and beauty, entitled "Woman's Triumph." The female figure is life size, standing upon the right foot, the left being partially lifted, the head bending gracefully down to look at a little Cupid who has exhausted his last arrow upon the object of his attention, the arrow being held upward in the hand of the woman, who seems to say, with a firm tenderness, "I am to be wooed and won, but not assailed." It promises to be a charming work of art.

Ball, who is a very careful, painstaking sculptor, is working some fine busts; he has also an ideal subject in hand, intended to represent our mother Eve at the moment of her creation. The figure, very gracefully posed, is the embodiment of innocence and surprise—when the first thoughts of the world are breaking upon her senses—there is remarkable simplicity and sweetness in the face and the whole attitude is well conceived and expressed. It was ordered by a wealthy

New Yorker since deceased, whose family no doubt would prefer to have the figure possessed by some other party. Whoever gets it will have "a thing of beauty," which is said to be "a joy forever."

Mead, an industrious artist whose group of marbles exhibited in New York some two years since gave him a good name, has a great deal of work in hand, having received an order from the government to carve some caps to ornament the pilasters for a room in the Treasury at Washington. This work however, is being done under Mead's direction by skillful Italian artists. The chief work in his studio is a fine group for Legrand Lockwood, representing Columbus' Last Appeal to Queen Isabella. The queen is attended by her page, and the group is intended to represent the moment when Isabella has decided to further the project of Columbus. She says: "I will assume the undertaking for my own crown of Castile, and am ready to pawn my jewels to defray the expense, if the funds in the treasury shall be found wanting." It is a grand life-size composition, and will require from three to four years to complete. Meade is also designing a Lincoln monument for Springfield, Ill.

I have already extended this letter beyond the limit intended, but the subjects have grown in number and interest as I have progressed, therefore I will stop just here.

S. H. W.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Carboniferous Formation of Mississippi.

MESSRS. EDITORS:—None of the formations of this State are of so much national importance as the carboniferous and the miocene overlying it.

1st. Its building, mill stone, and grind stone are found in various places in Tishemingo county; fine grained, compact, resisting disintegration, and of the required thickness, easily quarried, and convenient to navigation.

2d. Very fine carbonate of lime, along the Memphis and Charleston Railroad, Big Bear Creek, and Tennessee river.

3d. Aluminous limestone in great abundance and of excellent quality, easily quarried, accessible, and unsurpassed for making hydraulic cement, which is an article of extensive consumption in all the States, for lining cisterns, cellars, cementing culverts, walls, bridges, pillars, etc. It is found near the Tennessee river, in the northeastern corner of the State, in cliffs of fifty feet in hight, and bordering on the southern banks for miles. It is perhaps the largest accessible deposit in the Southern States, and of a quality unequalled. The cement made of it sets almost as rapidly as plaster of Paris, and becomes very hard under water. Analysis: Insoluble matter, 54.201; potash, 0.473; lime, 23,247; magnesia, 0.788; peroxide of iron, 0.903; alumina, 1.064; phosphoric acid (a trace); carbonic acid, 15,572; organic matter. water, and loss, 3.750=100 parts. The location is within seven miles of the Memphis and Charleston railroad, as well as on the river, and I have no doubt it will be found much nearer. The demand is very great, and is annually increasing; the long transportation from the Northern States renders it very burdensome to the Southern consumers. If this immense deposit was fully developed, and only a tithe of it manufactured, it would add many millions to our national wealth, as well as enrich the company that first presented it to the public. It is a mine more valuable than silver or gold, the quantity is inexhaustible, the quality is unsurpassed.

4th. Terra Sigibbatta, or red ochre, is found six miles from Iuka and two miles from the river, in such quantities and so easy of access, as to render it very profitable. The stratum has a visible thickness of fifteen feet, forming the bank of a rivulet; and is overlaid like the white clay found in its vicinity and elsewhere, by strata of ferruginous, conglomerated pebbles. It has a dull, red color, resembling burnt sienna; is indistinctly stratified, cleaves into irregular, massive fragments, is smooth, oily to the touch, and readily polished, writes readily on wood or paper, is easily cut into pencils, slightly effervesces when mixed with water, dissolves readily, and adheres with much tenacity when applied as paint, without any addition of oil and is believed to be as durable as white lead. When kneaded, it forms a plastic mass, susceptible of manipulation by the lathe, and could be readily made into crucibles and other earthern ware. When mixed for paint, with either water or oil, the compound is so smooth and perfectly uniform that the eye cannot detect the smallest particle of coarse ingredients, even on a white surface, and when nothing but a wooden pestle has been used. The color is a reddish brown, and by the admixture of lampblack could not be distinguished from burnt sienna, an article very extensively sold. An immense fortune, at a very small outlay, could be made by a man of energy and experience. The mixture does not easily fuse, but is quite refractory. The deposit is extensive.

5th. Kaolin. The most extensive bed of this highly practical deposit, in the known world, is found in Tishemingo county, near Iuka. It is thirty-two miles long, from two to three miles wide, and is in some places twenty feet deep. It is soft, fine, friable, resembling starch, and is of various colors. Kaolin mines in Europe belong to the government, and are considered more valuable than gold and silver mines. The most valuable are found in Saxony, and are there made into fine porcelain ware. A set of this porcelain, valued at $55,500, was presented to the Duke of Wellington by the King of Prussia, in 1816. The profits of the mines are immense. The porcelain mines of England are not so valuable, though 60,000 workmen are engaged at Staffordshire. A porcelain manufactory in Tishemingo would be a national benefit, giving employment to thousands, in the healthiest county in the United States, according to the census of 1850. All kinds of queensware, pipes, artificial teeth, etc., could be manufactured from this deposit. Fire brick, too, could be made at a great profit, say $30 per 1000; since $10 would make them, $10 take them to market, where they bring $50.

6th. Silica, is perhaps the most profitable deposit in the State. It is abundant, of fine quality, and within a mile of uninterrupted navigation, in the midst of any quantity of fuel, and very accessible. It is almost as pure as quartz itself, containing about 98 per cent of silica. Nearly all the English glass manufactories obtain their silica from Lynn and Ryegate. The Pittsburg glass houses send to Missouri for their silica. A better material for the finest kinds of flint and crown glass, is not known anywhere. Bohemian crown glass is an article of commerce throughout the civilized world, and very profitable. There is no glass factory in the Southern States. The deposit is six feet deep, and forms the base of a large hill, containing silica enough to supply America for a thousand years. Water-glass, or silicate of soda, is much used for an enamel, or varnish upon plastered walls, and could be very extensively used in making fire-proof wood, cloth, and paper.

These six minerals are all found within a few miles of each other, and are all abundant, accessible, surrounded by fuel and other requisites, located on lands that can be bought for five dollars an acre, or less, in the midst of well-watered, pine-clad hills, and the healthiest district of America; thus affording rare inducements to emigrants, capitalists, philanthropists, and state and national companies.

Iuka, Miss. J. M. D. MILLER.

Heating and Ventilating Railroad Cars.

MESSRS. EDITORS:—Since that terrible railroad accident, by which forty or more persons were burned to death, the attention of the public has been very properly drawn to the subject of devising some mode of heating cars which will obviate the danger we are all exposed to in traveling, under the present method of warming them by stoves. Allow me to submit the following suggestions on the subject:

I would have the cars constructed with double floors, with a space say of from six to nine inches between them, and in this space place lead pipes for the conducting of steam and the radiation of heat, with openings in the sides of this space for the admission of cold air, and registers in the upper floor to allow the heated air to pass into the cars. I would have a heating car to be run in the rear of the train. This car should be large enough to contain the boiler and fuel, and room for a man to attend to it. It should be built of white oak timber six inches thick, and lined with boiler iron. The boiler should be made in the strongest manner, and well secured to the floor of the car. The steam could be conducted to the passenger cars by metal pipes, with couplings between the cars made of some elastic material, like gutta percha, or sole leather. The advantages from this plan would be—

1st. Entire safety from fire in case of accident.

2d. The floors of the cars would be always warm, thus ensuring warm feet.

3d. The heat would be of the pleasantest and most healthful kind, and thoroughly distributed in the cars.

4th. In connection with ventilators near the top of the car, the most perfect system of ventilation would be established, as there would be constant streams of warm air coming in, and displacing that already in the car.

The first cost of this mode of heating would be somewhat more than the present method, but when we take into consideration the destruction of cars by fire, it is doubtful if it would cost more in the end: but supposing it did, who would not be willing to pay something more for transportation for the advantages above enumerated? Indeed, in point of economy, we could well afford to pay for the extra cost, as we should save much more than that in the time and money now lost by sickness, occasioned by cold feet and bad air, incident to the present mode of heating cars, and the total want of ventilation which now prevails.

The public demand a total change in the whole system of warming and ventilating passenger cars, and the first of our great lines, from the east to the west, that meets this want, will be much more than compensated for the cost by the patronage of the traveling community. P.

Milwaukee, Wis.

Steam Expansion.

MESSRS. EDITORS:—In your issue of January 25th there appeared a communication under the above title from your Buffalo correspondent, Mr. Sisson. It appears that a new light is dawning upon the engineering world, which is calculated to dissipate old errors, to cause theories accepted by such authorities as Watt, Mariotte, Gay Lussac, Biot, and a host of other savans to vanish into thin air and before which such celebrities as Fulton, Ericsson, Bourne, Isherwood, and Dickerson, dwindle into insignificance. But let us look for a moment at some of Mr. S's assertions. First, he says, "the expansion of steam is in proportion to its temperature above 212° heat." Now if we understand Mr. S. steam must have a temperature of 2×212=424° before it can expand to twice its original volume. The pressure of steam at 424° is according to the experiments of the French Academy, 315 pounds per square inch. It follows therefore that, in order to cut on steam at half stroke, and maintain a pressure on the steam side of the piston throughout the stroke, the initial pressure of the steam must be 315 pounds per square inch.

Has Mr S. ever seen steam used in an engine at that pressure

It is a well known fact, of every day occurence for more than a third of a century that steam engines are run with pressures considerably below 100 pounds, cutting off at one-eighth to one-tenth of the stroke and the "indicator" shows that steam pressure is maintained to the end of the stroke, in other words, that a vacuum is not formed.

If Mr. S's assertion be true, steam cut off at one-tenth of the stroke, and maintaining a pressure throughout the stroke, must have a temperature at least equal to 10×212=2120°, or about the welding heat of iron. The pressure corresponding to this temperature has never yet been, nor is it likely that it will ever be ascertained. The experiments of the French Academy extended up to 510°, and the corresponding pressure was found to be 750 pounds per square inch. The increase of temperature between the pressure of 675 and 750 pounds being only about 11°. If we suppose now for the purpose of comparison that the increase of pressure and temperature above 750 pounds be proportional (it is not however) to the increase between 675 and 750 pounds we shall find that the pressure corresponding to 2120° will be about 4300 pounds per square inch. Does S. perceive the utter absurdity of his assertions?

Second, S. says "steam cannot exist in a temperature below 212°." Any school boy of average attainments, can tell Mr. S. that he has seen water boil in the exhausted receiver of an air pump at a temperature very much below 212°. Now if water boils under such conditions steam must be formed and must therefore exist at a temperature below 212°.

Third, S. says, "I affirm that steam of 75 pounds of pressure cannot expand to twice its bulk without going below 212° heat."

Steam of 75 pounds expanded to twice its bulk will exert a pressure of 37½ pounds. This result is in accordance with Mariotte's law and its truth having been abundantly established by experiment, no longer admits of a doubt. But steam of 37½ pounds has a temperature, also determined experimentally of 285°, instead of 152° as stated by Mr. Sisson.

Fourth, Mr. S. says "The temperature which corresponds to 75 pounds of steam is about 304°, expand this temperature to double its *bulk* etc., etc." We never before heard of expanding a *temperature*. JOHN L. LAY.

Buffalo, N. Y.

Oil of Steel.—New Plan of Welding.

MESSRS. EDITORS: Is there such an article as *Oil of Steel* (!) or any thing by which a bar of iron or steel broken short off can be welded together without hammering. I understand there is some substance used in welding band saws when broken.

There is in the shop where I work an iron vise, the screw of which was once broken and stuck together again by a blacksmith without injuring the thread of the screw. It has been in use fifteen years since and still holds. If you can inform me how it is done do so and oblige, G. H. A.

[We have heard of "oil of birch" and "oil of strap", both said to be useful in sticking a boy and his work together, but "oil of steel" greets our ears with an unfamiliar sound. We know of no substance with which "iron or steel broken short off can be welded together without hammering"—which, of course, comprehends heating. The brazing of a broken vise screw is too common to make any special note of.

But that there is a way of uniting two pieces of steel which have been broken apart we firmly believe; for, although we never witnessed the operation, we have seen its results. Some years ago we carried on the machine making business in Nova Scotia, and heard of a "Frenchman"—as the descendants of the Norman colonists of Acadie were called—who mended broken scissors and knife blades, augers, etc re-uniting the two pieces without brazing or welding. Several specimens of his handiwork came under our notice, but, to be assured of the fact, we made a test in giving him a broken penknife blade to repair. He completed the job in his shop in fifteen minutes while we waited in his house. The mark of fracture was just visible on the blade but no evidence of heat sufficient for brazing. The blade did satisfactory duty for several months, when the knife was unfortunately lost. Truly our knowledge of that mysterious product, steel, is limited, and there is much yet to be learned as to its treatment.—EDS.

The Scuppernong Grape.

MESSRS. EDITORS:—This grape, the grape of the Southern States, is destined to revolutionize grape growing and wine making in America. It has no equal, much less a superior, in productiveness or quality. It never rots, never mildews, never fails to bear immense crops. A vine will live for a hundred years, bearing yearly, after ten years of age, from twenty to fifty bushels of grapes, yielding from fifty to one hundred and twenty gallons of wine. It needs no training, no pruning, no trellising. It is emphatically the poor man's friend. There are three varieties, the white, black, and golden-hued, each making an excellent wine, but of a different color. Dr. Jackson, the celebrated chemist of Boston, says, "Scuppernong wine can be made so fine as to excel all others made on this continent." It is sweet, rich, juicy, and luscious, and has no superior as a dessert grape; bears carriage, and keeps well. It will grow anywhere South where corn or cotton will flourish. It has never been tested in the North. It is the grape of all grapes, possessing more good qualities and less imperfections than all others combined.

Iuka, Miss. J. M. D. MILLER.

THE momentum of an ancient battering ram of 180 feet in length and 28 inches in diameter, armed with an iron head weighing a tun and a half, and moved by the united strength of a hundred men, was equal to the momentum of a 36 lbs. shot discharged point blank.

Science Familiarly Illustrated.

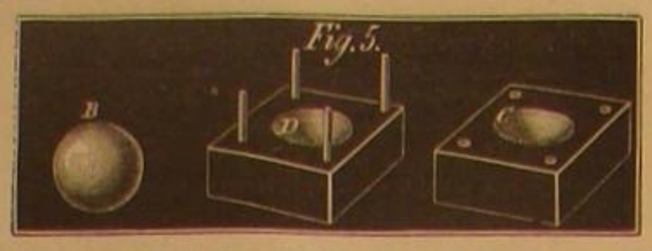
HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D, FRS.

Lecture III.--Continued.

I want to show you now how it is that ice can behave like treacle, or honey, or tar—how it is that it behaves like lava, or paste, or a viscous body. In order to make this plain I have asked Mr. Cottrell to bring me in a mass of ice; and I hope to be able to show you by experiments in this room that we can make ice behave almost like a piece of paste—that we can mould it into any form we please. Here is our ice, and we will place it on the table in this blanket. It is clinging to the blanket, being, in fact, frozen to it. I will show you how, from an apparently little thing, we can get an explanation of a fact observed in the glaciers. This explanation is due to a little fact first observed by the greatest experimental philosopher that this world ever produced—a man who is to my feeling almost living here among us at the present moment, a man who lectured to the boys here, and who himself had all the tenderness, and all the brightness, and all the joyousness of a boy. I say it is by a little observation of this great man that we are able to explain those facts observed in connection with the glaciers, and to show how it is that a body so brittle as ice can behave almost like lava. I will show you the brittleness of ice. I have here a pointed instrument, a small awl, and if I prick this into the ice you see that it chips off little pieces, and that the ice breaks as clearly as any crystal would break. Now just observe what occurs among these glaciers. If we make accurate measurements upon this *mer de glace* we ascertain a very striking fact. You see in the diagram a great white glacier. Here you see another, and you see another there. I measured the width of the first glacier, and it was 1,134 yards. The second glacier is 825 yards; and the third 638 yards. If you add these together, the sum of the widths of these three tributaries of the Mer de Glace is 2,597 yards. Now, all of these three tributaries of the Mer de glace are squeezed into a space, which measures only 893 yards, a channel only one-third of the width of the sum of the three tributaries. Now it is one of the wonderful properties of this ice that it can be thus squeezed into a narrow bed. If we take a number of stakes and set them in a perfectly straight line across this channel, and allow them to remain there for a day, and observe their position on the following day, we shall find that they are no longer in a straight line. In the observation that was made there were no fewer than 16 stakes fixed in the ice in a straight line. The stakes nearest one side of the glacier moved at the rate of 7 inches in a day; the next stake moved at the rate of 8 inches—the next 13 inches—the next 15 inches—the next 19 inches, and the next 20 inches; and then the speed began to fall off, and fell back to 15 inches at the other side of the glacier. These numbers prove a fact which is also observed in the case of rivers—that the middle of the line moves more quickly than the sides. In the same way, as was proved by Principal Forbes, the top of the glacier moves more quickly than the bottom, or the part nearest its bed, which is held back by the friction of the bed. When I visited the Mer de Glace in 1857 there was a precipice of ice, and I measured the motion of that precipice at the top and at the bottom. The top stake moved 6 inches, while the middle stake moved 4½ inches, and the bottom stake moved 2½ inches. This shows that the top of the glacier moved more quickly than its foot. Furthermore and—this is a point of great importance—if you had a river flowing through a straight valley, the middle of the river would be its point of quickest motion; but if you had a river flowing through a valley of this kind (Fig. 4) the point of quickest motion would be always at the point where it is curved. It is exactly the same with a glacier. This on a large scale will represent the bed of the Mer de Glace from actual measurement. At the parts, A A, the point of swiftest motion is really the center of the glacier. Here, again, at *a* and *c*, the point of swiftest motion is on one side of the center. Here, again, at *b*, it crosses to the other side of the center. The dotted line is the center, and the continuous line marks the points of the quickest motion on the Mer de Glace.

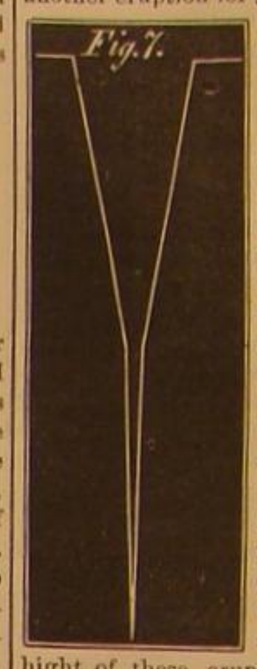
Now, how is it that a glacier is thus able to behave as a river? We will see. I will now cut two pieces from this block of ice. We see that the ice is now melting in the atmosphere of this room, and there is no surplus cold in it to enable it to freeze again; and still, strange to say, (and this was the observation that Mr. Faraday made), if we place those pieces of ice together, though the surfaces are now melting, they instantly freeze together. Although there is no surplus cold in the ice, the mere bringing them together causes the film of water, which a moment ago was moisture, to become ice. This curious freezing together has received the name of "regelation," a term for which those who first worked at the subject were indebted to Dr. Hooker. In consequence of this freezing together you can actually convert snow into ice. Every boy knows the state of snow which is fit for a snowball. It ought to be soft, and yet by proper pressure you can make it perfectly hard if you are wickedly inclined. Now, I have no snow here, but I will try and obtain snow by scraping the surface of the ice. In this way I get a kind of snow, and here is a flannel in which to receive it. I will take this snow and put it into a proper mold C D, and squeeze it together. In the absence of real snow I make the snow required for the experiment by crumbling the ice in this way. I will now make a snowball, and I am enabled to do this by the power which the small particles of ice have of freezing together in the manner I have just indicated. I cannot by my hand squeeze strongly enough the mold containing these particles

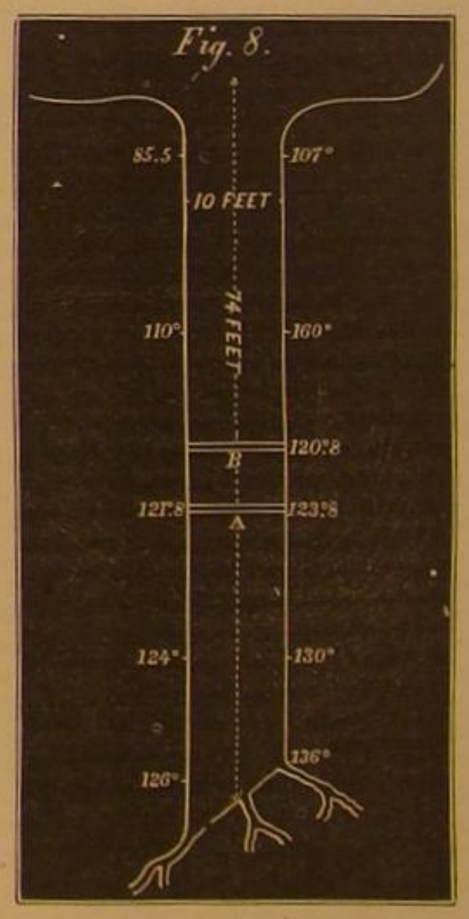


of scraped ice; and therefore I will place the mold under the hydraulic press, as this machine is called. In this way I hope to obtain a snowball. [The operation described was then performed, and the mold, on being withdrawn from the press, was found to contain a ball of solid ice.] Now, here we have a snowball (B), such as you have never seen before, and this is due to the fact that on bringing the surfaces of the little particles of ice in contact they freeze together. This is not an ordinary snowball at all, and it is one which no boy would like to be hit with. It is a ball of solid ice, produced from the small particles which have frozen together in virtue of this property that ice on the surface of water, though shattered into pieces, will mend itself; and all the tearings and ruptures of the glaciers are mended by means of this quality of regelation which was discovered by Mr. Faraday. I have here several experiments arranged to illustrate this subject. [Particles of scraped ice were then molded into the form of rings and hemispherical cups, by the same means as had been employed in the production of the solid ball. Two hemispherical cups were afterwards placed with their edges in contact, when they froze together and formed a hollow sphere of ice.] These experiments will show you on a small scale how possible it is for particles of a substance perfectly brittle to freeze together wherever they touch, on account of the substance possessing the power of regelation. You see that a substance of this character behaves as if it were not brittle at all, and acts like a paste. In this way we might make statuettes, or, in fact, mold the ice into any form we pleased. You might drink out of these cups, and the ice of which they are made would cool the water for you. I am sorry I have not a little cooled wine to offer you from a cup of this kind. (Laughter.) I have made champagne glasses and all manner of things by thus compressing ice. In this way by these small experiments we illustrate and make plain to ourselves those wonderful things that go on among the glaciers of the Alps; and we entirely clear up the difficulty as to how it is that a body so brittle as ice can behave as a viscous body. I must now leave this subject of ice and its properties.

There is in operation before you an apparatus for illustrating the action of the geysers in Iceland; and in the other room is a beautiful painting of the geysers, presented by our president, Sir Henry Holland, who was there in 1810 with Sir George Mackenzie. In a short time this tube will throw out a column of water, but I do not think I shall be able to make the operation plain to you in this lecture. When Sir

Henry Holland and Sir George Mackenzie visited the great geyser, Sir George Mackenzie supposed that the geyser had underneath it a great cavern, and that this was partly filled with water, the geyser itself being a tube. He supposed the water to become heated beneath, and the steam to force the water up into the tube. This is the theory given by Sir George Mackenzie; but it is not at all necessary to suppose the existence of this cavern. The spring itself has built its own tube, and the tube is a sufficient apparatus to produce these wonderful eruptions that astonish everybody who has ever seen them. The geyser tube is represented here in section (see Fig. 8). It is seventy-four feet deep, and is lined with a most beautiful plaster. It opens out at the top into a basin fifty-two feet wide in one direction, and sixty feet wide in the other. [The apparatus for illustrating the geyser was then put in action, and a thick stream of boiling water was presently ejected upward. (See Fig. 6).] Now, I must make another eruption for you. I want to produce an imitation of the spring called the strokkur (shown in section at Fig. 7). This is a very celebrated spring which you see in Sir Henry Holland's painting beside the real geyser. (I must explain in the next lecture how it is that we have two fires in this apparatus.) It is usual for the natives of Iceland to stop the mouth of the strokkur by throwing in clods. I will now imitate that practice by putting in a cork at the end of the tube. In a short time the cork will be ejected, and I should not be at all surprised if the water reached the ceiling. I think the last experiment made at the strokkur was made by Commander Forbes. He wrapped a leg of mutton in a towel and stopped the mouth of the strokkur by means of that leg of mutton. The leg of mutton came out well cooked, and was projected to a great hight in the air. Various people have estimated the hight of these eruptions in Iceland. Sir Henry Holland tells me that he saw one of more than one hundred feet; and Sir George Mackenzie gives ninety feet as the hight of the eruption. The earlier observers made the hight very much more. Two Danes, named Aulafsen and Paulson, who were the first to observe the hight, state that the geyser pitched its water to a hight of 360 feet. Two observations, which may be regarded as perfectly trustworthy, were made by Bunsen, of Heidelburg, and the hight was measured by a theodolite. In the last of these observations, which was made on the 16th of July, 1841, the hight was estimated at 162 feet, and we may rely upon this observation as being accurate. Now, as I have said, the tube of the geyser is the cause of the eruption; and when we see an eruption produced by a small tube, as in this model, we may regard it as proved that it alone is a sufficient cause, and that there is no need for the supposition that there is a cavern underneath. Bunsen suspended thermometers at various depths below the basin of the geyser to ascertain the temperature of the water. I have marked on this diagram the various temperatures





which he found at different depths. At the top the temperature was 8·45° C., and extended to 126·5° C., as the depth increased. Now, how is it that the water does not boil in the geyser when the temperature is over 100° C.? Every boy here will be able to tell me that it is because the water at that depth has to bear not only the pressure of the atmosphere, but also of the mass of water which is above it in the tube. For this reason it cannot boil at the temperature which Bunsen ascertained. At the depth at which the water in the geyser was found to have a temperature of 126·5°, the boiling temperature would be 136°. At no point does the temperature of the water reach the boiling point for the pressure to which it is subjected.

[At this stage of the lecture the cork flew from the mouth of the model of the strokkur, and a copious stream of boiling water was projected to the ceiling of the theater.]

I must defer the explanation of the geysers until the next lecture.

THE OPTIC WONDER is the name of a scientific toy just introduced by the London Stereoscopic Company. It is a creator of apparently solid form out of a mere line. A piece of wire or glass, bent to the form of one side of a cup or vase, is made to faithfully portray the whole article. This is done by simple mechanical means, a quick motion gearing being the whole secret. It illustrates in a striking manner the persistence of vision and can be rendered instructive as well as highly amusing.

TURNING A MOVABLE WHEEL AROUND A FIXED WHEEL.

"How many revolutions on its own axis will a movable wheel make in rolling around a fixed wheel of the same diameter?" Answer, "One."

The question and answer thus originally published, although apparently simple and direct, have given rise to a very animated and extended discussion. The subject has proved to be an interesting topic at the tea table, counting room, work bench, machine shop, and various colleges, schools and societies.

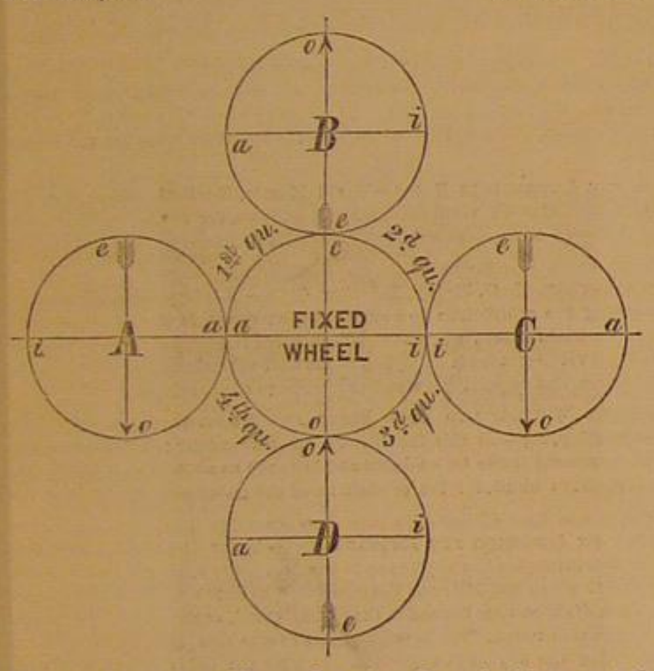
This lively interest is probably not due to any thing contained in the mere question itself. But it is one of those queries that easily and, with some minds, imperceptibly lead off into a variety of collateral questions, each of which involves its special consideration. It is, therefore, a first-rate thing to talk about, readily stirs up conversation, and amid its prolific branches everybody quickly finds something to say, and we all take pleasure in hearing ourselves speak.

The pile of letters we have received upon the subject is of itself a curiosity. They come from esteemed correspondents in all parts of the country—professors, engineers, mechanics, mathematicians, students, and scientists. The mass would fill a large volume. A variety of opinions are expressed in these letters. Some of the writers affirm that it is equally correct to say that the wheel makes one revolution on its axis, or that it makes two revolutions. Take your choice, say they, both answers are right. The majority conclude that the moving wheel makes one revolution on its own axis and one revolution around the axis of the fixed wheel.

We subjoin a few selections:

MESSRS. EDITORS:—Referring to the diagram in your last number, it is evident enough that, in passing from the position, A, to that of B, the rim of the wheel travels only over the space from *a* to *c*, or one quarter of its circumference, and of course one quarter of a revolution on its own axis; but in so passing it has also made one quarter of a revolution on the fixed wheel; or, in other words, the axis itself has made one quarter of a revolution. These two together give the wheel the appearance of having made one half revolution on arriving at B. This is my explanation, and I think it is correct.

Portland, Me. G. L. BAILEY.



MESSRS. EDITORS:—Through a singular coincidence, at the very time you published L. M.'s diagram of the moving wheel passing around the fixed wheel, I had just conceived a device requiring precisely that movement. Now had the moving wheel revolved twice it would have interfered with my purpose; but as it revolved but once it effected the object of its use perfectly, I therefore side with you and say "one." As you do not explain why there can be but one revolution, will you allow me to do so, and thus settle this "still vexed Bermoothes?" In the first place, if a wheel be one foot in diameter its circumference will be six radii or three diameters in length; that is, three feet. One revolution of this wheel, then, will measure—from any given point of contact with any surface, whether straight or curved—just three feet, neither more nor less. I presume none will deny this. If there were two revolutions, there must be a measurement of six feet. On reference to your diagram it will be perceived that the moving wheel, from the starting point, *a*, to its return to the same point gives just one circumference. *Ergo*, there can have been but one revolution.

But I see the cause of the delusion into which the dualists have fallen. It is a mere optical illusion rising from the apparent positions of the arrows in the circular movement. Let them follow the line made by the point, *a*, in the passage of the moving wheel, and they will see that it makes but one parabolic curve, ending at *a* again. If two revolutions were made, the point, *a*, must touch the circumference of the fixed wheel at some intermediate point. and two parabolic curves must result. It is quite clear that neither of these occur, *ergo*, there can have been but one revolution. C. H. G.

Saco, Maine.

MESSRS. EDITORS:—I think the subject in regard to a wheel rolling around a fixed wheel of the same diameter is somewhat misunderstood by your various correspondents, and might be settled by stating that to make one revolution it is necessary for the axis to make one revolution around the said fixed wheel. This is the natural consequence of one body revolving around another of the same diameter. A given point on the axis must keep the given distance from the axis of the fixed wheel. J. P. W.

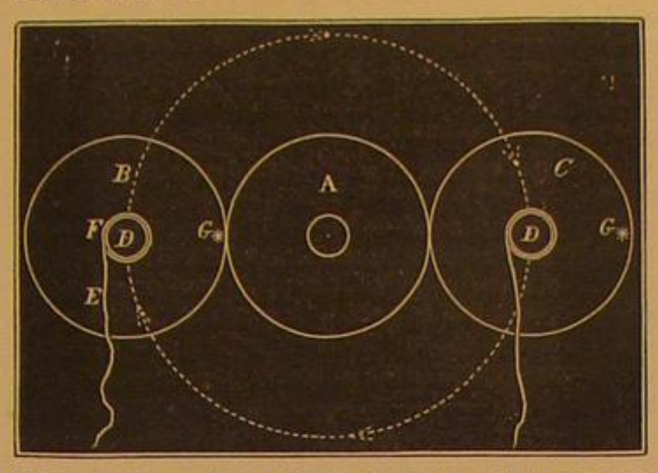
Pennington Furnace, Pa.

MESSRS. EDITORS:—In discussing the fixed and loose wheel question your correspondents have omitted the main point in the problem, viz., the axis. The difficulty with L. M's diagram is, that it does not represent the case. The phrase revolutions on its own axis, supposes the axis or arbor not to perform any part of a revolution. [See, diagram in last number.] Let *a* be the arbor or axis, (infinitely small, if you choose], *a'* the loose wheel: now as the wheel advances through the first quarter the point, *a'* recedes with reference to the arbor *one* quarter: and similarly through the remaining quarters, the wheel revolving *once*.

Rochester, N. Y. F. H. CLEMENT.

MESSRS. EDITORS:—Let A be a fixed wheel, and B a movable one. To the shaft, D, of B, attach a thread, E, at F. Holding the thread in the left hand, with the right hand move the wheel, B, around the fixed wheel, A. When B reaches the position of C you will find the thread, E, wound *once* around the shaft, D, and when B reaches its starting point, or first position, the thread, E, will be wound *twice* around D,—which could not possibly be the result did B make but *one* revolution. H. ANDERSON.

Peekskill, N. Y.



[If our correspondent will attach the thread to any convenient point upon the periphery of the wheel, B, and allow the thread to wind upon the periphery as fast as the wheel revolves upon its own axis, he will find that when the wheel, B, has traveled once around A, the thread has been wound only once upon B.]

MESSRS. EDITORS:—I am sure that it is very plain to see that a wheel only turns once on its own axis in rolling around another one of the same diameter. For instance, take, D, on page 106, Vol. XVIII for the starting point. The point of the arrow is pointing direct to the center of the fixed wheel, now L. M. and Professor Hepburn or any body else will have to bring the wheel D around to its starting point to make the arrow point again towards the center of the fixed wheel. WM. F. GORDON.

Ann Arbor, Mich.

MESSRS. EDITORS;—"How many revolutions *on* its own axis will a wheel make in rolling once around a fixed wheel of the same size"? In my opinion the supporters of the two revolutions, overlook a very important point in the case. They all seem to argue on the supposition that the position of the axis of the moving wheel remains unchanged. This is not the case. The side of the axis for instance, A, which faces the fixed wheel, A, stands east, in A, south in B, west in C, and north in D.

Let us take the diagram of L. M. once more, with this difference only that we mark the axis with a small arrow to show the way it moves around the fixed wheel. Now let us follow Professor Hepburn. He says "we will now start at A, *i* in the moving wheel is now west, arriving at B, *i* will be east; pursuing on to C, *i* will be then west again, being a full rotation made by the outside wheel." Not at all. At the time when the rolling wheel arrives in C, its axis has changed its position also, the side of the axis which faces east in A, stands west in C, that is, has traveled half around the fixed wheel, with the same speed as the rolling wheel and in the same time the rolling wheel has revolved *half* around its axis, as the position of the small and large arrow clearly shows, the point being just opposite from what they were at the starting point. Not before the wheel shall have reached the starting point, the point of the arrows will regain the same position as they had at starting, and the outside wheel will have made one full rotation around its axis. The position of *i* in C is the same as in A, Professor Hepburn says, therefore he argues, the wheel must have made one full rotation, but he overlooks the fact, that this position is gained by two movements, different from each other, first by revolving half around its axis, second by moving half around the fixed wheel.

It is further evident that the rolling wheel makes only one revolution around the fixed wheel as the point A never strikes the periphery of the inside wheel, until after it comes to the starting point again, consequently it cannot make two revolutions around its axis in the same time it makes only one. J. JOBSE.

Milwaukee, Wis.

MESSRS. EDITORS:—L. M. demonstrates fully that a wheel rolled round another of the same diameter revolves "twice" on its own axis. You still adhere to "once." I have tried it. It certainly revolves twice on its own axis in rolling around the fixed wheel once. Now use a point on the circumference of a wheel as a center, and revolve it around that center, and the wheel revolves once on its axis. Now, if that wheel is rolled round a fixed one of same diameter, or any other diameter, it will revolve as many more times than once on its axis as the fixed one is larger than the movable one; but if a point on the axle of the movable wheel is kept in the same relation to the fixed wheel of same size, while rolling round it, it will as certainly revolve only once on its own axis, but the wheel will make two revolutions; in the one case the axle of the movable wheel revolves once, in the other it does not.

JAMES TAIT.

Rochester, N. Y.

[The above strikes us as being a little mixed.]

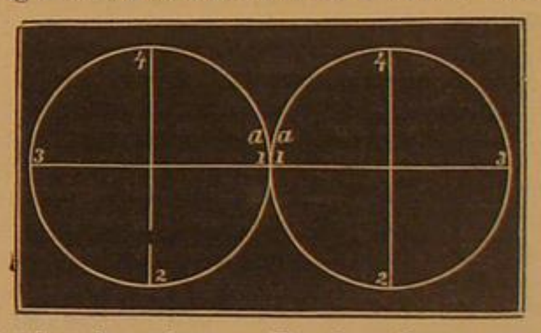
MESSRS. EDITORS:—Feeling like all of your other correspondents confident that we see the point, we are constrained to say that, as paradoxical as it may seem, both the SCIENTIFIC AMERICAN and the "half bushel of letters," are right; or, in other words, that the shield is gold upon that side and silver upon this. In proof of which, we claim that if we detach from an ordinary cart one wheel, and place it upon and secure it to the ground and place the other wheel upon the ground, also with the axle (with tongue attached) inserted and standing erect, the periphery of the two wheels in contact, and now take hold of the tongue and draw the loose wheel around the stationary one, keeping the bottom of the axle in the same relative position to the stationary wheel, we shall find that the loose wheel has made two revolutions and the axle one in the same direction, hence the wheel has turned but once upon its axis. But if we take hold of the tongue and cause the loose wheel to pass around the stationary one, keeping the tongue always pointing toward the same point of the compass, say to the east, we prevent the axle from turning, in which case the wheel will revolve twice upon its axis. G. H. & A. S.

Plano, Ill.

MESSRS. EDITORS:—The problem referred to in to-day's issue, "How many revolutions on its own axis will a wheel make in rolling once around a fixed wheel of the same size?" is merely another form of the old question, "Does the moon turn on its own axis in revolving around the earth?" If the moon turn on its axis, then the wheel makes two revolutions, if not, *not*. If the wheel when dragged (not rolled) around the fixed wheel (keeping the point, A, at all times in contact) revolves once on its own axis, it would revolve twice on its own axis if rolled around. F. S. COBURN.

Boston, Mass.

MESSRS. EDITORS:—I see in perusing your paper of the 15th February that several have expressed their opinion in regard to the number of revolutions that a wheel will make in rolling around a fixed wheel of the same size. Now I con-



tend that it makes only one. The above diagrams are divided into quarter sections and you will notice that the wheel commences to revolve at *a* or No. 1 and consequently the figures on the movable wheel will exactly match the figures on the fixed wheel therefore if *a a* be the starting point when the wheel arrives at *a a* it has certainly made a revolution around the fixed wheel and it has made only one revolution as the quarter sections on the two wheels will show.

Sandy Hook, Conn. M. J. B.

MESSRS. EDITORS:—I am astonished at your patience with your subscribers, in setting type and diagram to their arguments in reference to the movable wheel around a fixed one of like diameter. I am mortified that any one who is a conftant reader of the SCIENTIFIC AMERICAN cannot comprehend a problem so simple. It may be demonstrated to a child in the following way: Take two wheels whose circumferences are three feet; glue on their periphery a tape measure laid off in inches make one stationary—then begin to revolve the other around it, placing figure 1 on each together. If on rolling it around three feet on one only reaches eighteen inches on the other, then L. M. is right and you are wrong.

South Union, Ky. H. L. E.

MESSRS. EDITORS:—When perusing No. 7 of the SCIENTIFIC AMERICAN I was somewhat surprised at the lively controversy excited by L. M.'s problem regarding the number of revolutions a wheel will make on its own axis in rolling once around a fixed wheel of the same size. The difference in opinion between you and your correspondents results from a mere oversight on the part of the latter when making their diagrams. The true answer to the question raised is very simple: If the plane of the movable wheel is perpendicular to that of the fixed one (which is the supposition I believe), there will be only *one* revolution; if both wheels are in the same plane, as represented in Prof. Hepburn's diagram, the number of the revolutions must necessarily be *two*; for in the one case the distance traveled is equal to the periphery of the fixed wheel, while, in the other case, the distance traveled is equal to the periphery of a circle described through the center of the movable wheel with a radius equal to the sum of the radii of both, *i. e.*, exactly double the periphery of the fixed wheel. Hence the palm of victory belongs to "one."

Milwaukee. C. H. DOERFLINGER.

MESSRS. EDITORS:—Is not the diagram and demonstration of L. M., in the SCIENTIFIC AMERICAN of the 1st inst., exactly the converse of Watt's "sun-and-planet" wheels in the steam engine? "A toothed wheel called the sun wheel, was fixed on the axle of the fly wheel to which rotation was to be

imparted. The wheel called the planet wheel, having an equal diameter, was fastened on the end of the connecting rod so as to be incapable of revolving. This contrivance, although in the main inferior to the more simple one of the crank, is not without some advantages: among others, it gives to the sun wheel double the velocity which would be communicated by the crank; for in the crank one revolution only on the axle is produced by one revolution of the crank, but in the sun-and-planet wheel two revolutions of the sun wheel are produced by one of the planet wheel: thus a double velocity is obtained from the same motion of the beam."

I quote from Dr. Lardner's work on the steam engine published at London in 1851, pp. 118-19, where the *modus operandi* is described. Now fix the sun wheel and give rotation to the planet wheel of Watt, and they are represented in the diagram of L. M. Instead, then, of the sun, the planet wheel must make two revolutions in passing round the former.

Philadelphia. J. J. W.

MESSRS. EDITORS:—We will take L. M's diagram, on page 67, and while I "go one eye on it", (for I have lost the other) you may "go two eyes on it", unless you have been equally unfortunate. Make the axis of each wheel fixed and start the wheels at the point, *a*; revolve each wheel once and the same points come together again, and there has been two revolutions made. Now make one wheel fixed and revolve the other around it, and of course it must make two revolutions, but while the wheel has made two revolutions, what has its axis been doing? it has made one revolution, and the wheel has actually made but one revolution on its own axis.

Gents, you asked a question on the axis of the wheel, and looked at and talked of the periphery all the time.

Marshalltown, Iowa. S. L. LOVELAND.

MESSRS. EDITORS:—You said the movable wheel made "one" revolution on its own axis, L. M. said "two." Again, on page 105, the question comes up, and the writers all oppose you, and say "two." Now I say you are right, it makes "one." The movable wheel has two centers around which it revolves. First, the point at which it rests on the fixed wheel, and around which it makes one revolution. Second, Its own axis, around which it also makes one (and only one) revolution. S. H. BLACKWELL.

Kendall's Mills, Me.

"P. C." is apparently in doubt upon the whole subject and in order to arrive at a clear understanding of its bearings he asks how many times a one foot wheel will revolve on its own axis in rolling around the inside of a three foot hoop, or the outside of a one inch wheel. He also asks other questions equally pertinent. We think it better to settle the original question.

MESSRS. EDITORS:—In regard to the article headed "Turning a movable wheel round a fixed wheel," in last number, I would beg to inform L. M., of Germantown, Pa., that I have some leather belting from one of the best manufacturies in the country to sell, and would like to have him purchase some, he measuring it on a fixed wheel from the circumference of a movable one of same size—three feet in diameter, for instance. Two revolutions would equal eighteen feet ten inches. I will consider that it makes only one and one quarter revolutions in traveling round the fixed wheel. He will thus get eighteen feet ten inches for eleven feet nine inches.

La Salle, Ill. WM. B.

Manufacture of Soda and Potash.

By A. G. Hunter, of Flint, Wales, temporarily residing in Fair Haven, Conn.

The object of my invention is to convert chloride of sodium (common salt) into silicate and carbonate of soda and caustic soda, and chloride of potassium (muriate of potash) into silicate and carbonate of potash, and caustic potash, with the production of muriatic acid from the said chlorides. I effect this by subjecting the chloride to be decomposed, to a heat sufficient to volatilize it, and causing the chloride vapor to act upon highly heated silica in the presence of aqueous vapor, whereby a silicate of soda or silicate of potash and muriatic acid are produced.

The muriatic acid is condensed and utilized for any of the purposes to which it is usually applied, and the silicate of soda or of potash under treatment is converted into a silicate soluble in water by fusing or boiling it with carbonate of soda or caustic soda, or with carbonate of potash or caustic potash, and the soluble silicate of soda or of potash thereby produced is dissolved in water and converted into the corresponding carbonate by treatment with carbonic acid, or into the corresponding caustic alkali, by treatment with caustic lime, baryta, or magnesia. Several forms of apparatus may be employed to expose the silica to the action of the alkaline chloride vapor, among which are the following:—

A stationary reverberatory furnace, on the hearth of which, nearest the fire, is placed the chloride to be treated, and beyond it is placed the silica or silicious mineral to be acted on, steam being admitted to the furnace at the fireplace, so that flame or heated steam, and chloride vapor all pass together over and among the silicious mineral, thence through a condenser for the resulting muriatic acid, and thence to a chimney. The fused silicate of soda or of potash is allowed to flow out through an aperture in the furnace provided for this purpose.

A vertical furnace, similar in construction to an iron founders's cupola for melting iron, or to an iron smelter's furnace for making pig iron; the fuel, chloride to be treated, and silicious mineral being supplied from the top of the furnace, air and steam being admitted by tweers near the bottom of the furnace, the fused silicate flowing out at a suitable tap hole near the bottom of the furnace, and the muriatic acid conducted from the furnace to a condenser. In employing this kind of furnace, the muriatic acid may be led off either from a hood covering the top, or from an opening in the side of the furnace. In the latter case, the furnace top should be closed, either by a movable bell-shaped cover, or by enough depth of the materials to be furnaced above the muriatic acid outlet-flue, as to prevent the escape of vapors, as is ordinarily practised by iron smelters who utilize the waste heat from their blast furnaces for steam boilers or air superheaters.

A stationary or revolving horizontal reverberatory furnace, or a vertical cupola furnace, in which the chloride to be treated is volatilized, its vapor mixed with steam and the mixed gases, viz: the furnace flame, chloride vapor, and steam passed into a tower lined with fire brick, and filled with the silicious mineral to be acted on, the resulting silicate flowing down and out at the bottom of the tower, and the muriatic acid led off from the top of the tower to a condenser.

It is advantageous to cause the melted silicate produced in any of these forms of furnace to flow directly into another furnace, to be fused with its corresponding caustic or carbonated alkali, or to flow directly into a solution of its corresponding caustic or carbonated alkali, to be by either of these modes converted into a soluble silicate of the alkali under treatment. It is advantageous to use, (when they can be cheaply and readily obtained,) silicious minerals containing silicate of the alkali whose chloride is to be treated, such as felspar or granite in the case of chloride of potassium.

The proportions of materials are readily determined by practical chemists, from their chemical equivalents, and from the composition of the materials from time to time treated, care being taken at all times to present sufficient silica to the chloride vapor, and sufficient caustic or carbonated alkali to render the resulting silicate soluble in water. The silica or silica of lime, baryta, or magnesia precipitated from the soluble alkaline silicate is useful for glass makers and potteries. The soluble alkaline silicate may be decomposed by injecting carbonic acid into an aqueous solution of the silicate till the silica is precipitated, and the solution of carbonated alkali then run off from the silica and boiled to dryness, or the solution of alkaline silicate may be decomposed by caustic lime, baryta, or magnesia, the silicate of lime, baryta, or magnesia allowed to settle, and the solution of caustic alkali run off and evaporated till sufficiently concentrated to solidify when allowed to cool.

BREAKERS AHEAD.—One of our city papers publishes the startling predictions of Professor Delisser, who declares that a series of celestial and terrestrial phenomena are close at hand. He says that on the night of the Feb. 27th, in the Western heavens there will be a conjunction of the moon with Jupiter and Venus, and three nights later Jupiter will pass Venus by only twenty-three seconds of a degree. The results of these conjunctions and perturbations will be atmospheric commotion, electrical discharges, heavy gales, and high tides, with a succession, through the remainder of the year, of the unpleasant terrestrial agitations of which a foretaste has already been granted to our West India neighbors. With vast inundations, volcanic eruptions, and quakings of the earth, what a sensation is in store for us. The correspondent of the *Mechanics' Magazine*, whose hurricane preventer we noticed in our last issue, should perfect his invention, and act on our suggestion for a defense against earthquakes.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

It appears from the report of the English Secretary of Legation at Berlin, that of the railways in use in Prussia, 225,947 miles belong to the State, and 201,833 miles are private property, under the control of the State, and 487,587 are under private administration; this includes 86,598 miles of Prussian railways in foreign territory, but does not include 12,833 miles of foreign railway on Prussian territory.

Over five hundred tuns of borax was manufactured in California last year. The pure salt is found but in few localities in the world, and its existence in great abundance at Borax Lake makes the deposit a very valuable one. Refined and delivered in San Francisco, the salt costs but $90 per tun; usual market value in that city, about $280 per tun. As but little borax is required for consumption in California, the most of it is shipped.

On the one hundred and forty-four miles of track on the Hudson River railroad, one hundred and forty-seven flagmen are employed, whose sole business it is to pass over the entire length of the road after the passage of every train, day or night, inspecting each rail and tie, and seeing that there are no obstructions of any kind to render travel dangerous. The fact that three million passengers were last year transported over the line without a single loss of life may be attributed to these precautionary measures.

The Kentuckians are beginning to take an interest in the rich mineral deposits of their State. The mountain counties are known to abound in iron, coal, copper, and nearly every species of mineral wealth. Indian traditions used to tell of the Cherokees of North Carolina going to Kentucky for silver and gold, which they made into horseshoes, and the latest discovery of a rich vein of silver in Rockcastle county, where exists an ore yielding forty-five per cent of the virgin metal, may be the realization of these ancient legends.

The proposed bridge across the Hudson, to which we referred in a late issue, is to be built by the Hudson Highland Suspension Bridge Company, at some point between Verplanck's and Buttermilk Falls. In addition to its use by the Erie and New England Railroad, the projected line to connect Boston with the coal regions, via New Haven, the bridge, if built, would undoubtedly be used by the New York and Erie road, also by the West Shore railroad from Albany. The Oswego and New York Midland road would unite with the Erie at Middletown, and follow the same general route. The capital of of the bridge company is fixed at $2,500,000, and it is stipulated that the structure shall be complete by the 4th of July, 1871.

The Omaha *Herald* vouches for the great value of the gold deposits of the newly discovered Sweetwater mines, which, it asserts, indicates an immense addition to the mining industries of the Mountain region. That these mines are veritable discoveries, and are rich beyond estimate, is as true as any other well established fact can be. The location of this new mining interest within striking distance of the Union Pacific railway, affords great advantages for their speedy development.

The plan proposed fifteen years since, of tunneling the Niagara river at Buffalo, has been revived, and is now in the hands of capitalists and practical men both in Canada and New York. If, as seems probable, the project is carried out, a direct, uninterrupted railroad connection will be established between Buffalo and Chicago, via Canada.

The new watch manufactory at Springfield, Mass., turns out time pieces claimed to be equal to any watch of foreign make. Watch keys are entirely dispensed with, for, besides the stem-winding arrangement, the hands may be set when required by means of a new contrivance, lately introduced.

A correspondent wishes us to call attention to the great mineral resources of Southern Illinois. He reports a fact known to very few beyond the immediate neighborhood, that a few miles southwest of Cobden Station, on the Illinois Central railroad, there is one of the richest beds of iron ore to be found anywhere in the West. The deposit forms a lofty hill, which is known in that section as the "Iron Mountain." The surrounding country is well wooded, there is a copious supply of water, limestone suitable for smelting purposes is found in the vicinity, and beds of bituminous coal underly nearly the whole of that section of the State.

The palace coach "City of Chicago," burnt a few days ago while running on the Burlington and Quincy road, was built at an original cost of $24,000. The fire is believed to have been caused by the explosion of a kerosene lamp in the car, and to guard against any possible repetition of such an accident, the officers of the road have taken what may be called in this age of progress a backward step in ordering the substitution of the more primitive source of illumination—candles.

A stock company has been organized in Boston for making wood veneers, the new substitute for wall paper-hangings. The price is about the same as a good quality of paper, and they are applied in the same way, with paste. Age augments, rather than destroys, the beauty of these hangings, and being varnished, or finished in oil, the walls may be cleaned in the same way as ordinary furniture. Although first brought to public notice by the Boston papers, the natural inference that such wall hangings were first made at the "hub" is an erroneous one. A few in this city introduced them to our certain knowledge, many months ago.

The Chicago, Rock Island and Pacific road are building a refreshment car, furnished with a lunch counter for the benefit of the passengers. The car is intended to run in the middle of the train, with every facility for free ingress at either end.

It is the opinion of many practical miners that in five years California will be at the head of the copper producing States. Large lodes, containing ore varying from ten to twenty-five per cent of the pure metal, are found in no less than a dozen counties, from Del Norte to San Diego, lodes, though worth millions, now lying idle on account of the high cost of freight, the dearness of fuel, or the lack of skilled labor.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

PACKING TOBACCO.—Louis H. Marburg, Baltimore, Md.—This invention relates to the packing of smoking tobacco in small bags or pouches and consists in applying an elastic band to said bags, whereby they close automatically, and by the use of which they can be instantly opened without the necessity of untying a knot.

MACHINE FOR DISTRIBUTING GUANO AND OTHER MANURES.—John Franklin Thomas, Adamstown, Md.—In this invention the escape of the fertilizer from the feed box is adjusted by a couple of paralell ruler slides and the agitating apparatus is thrown into or out of gear by a novel and simple arrangement.

WASHING MACHINE.—Josiah Webb, Spartansburgh, Pa.—This invention combines an improved method of rubbing the clothes, with a novel device for adjusting the rubbing blocks to the quantity of clothes or size of the article in the wash, and a device for holding the clothes during the process of washing.

TOOL FOR EXTRACTING NAILS.—David Morris, Bartlett, Ohio.—This improved tool contains several different sets of jaws, for taking hold of nails under different circumstances, combined with a hammer having a curved face.

WHIFFLETREE.—L. G. Binkly, Fairview, Ohio.—This improvement consists in attaching the whiffletree to a spring, which supports it and allows it to yield to a certain extent when any sudden force is brought to bear upon it, thereby preventing it from being broken as well as rendering its action easier for the horse, and imparting a steadier motion to the carriage.

COMBINED WINDOW AND DOOR BLIND AND AWNING.—G. M. McMahan, Mount Sterling, Ky.—In this invention a metallic awning is so constructed that when desired it can be let down and fastened so as to form a strong metallic shutter, or blind, for the protection of the doors and windows of the building.

SYSTEM OF INDEXING FOR RECORDS, ETC.—Abner Campbell, Frederick, Md.—In this invention the names are in the first place arranged in divisions, according to the initial letter of the surnames, as in the indexes in common use. Each division thus formed is then subdivided, according to the initial of the Christian name. The invention consists in this arrangement and in so combining the key of the subdivisions with the index of the divisions, that by their means a name can be found in the index much more readily than by any system hitherto employed for the purpose.

CORN SHELLER.—P. Charles Chipron, Highland, Ill.—This invention relates to an improved corn sheller, and consists of an oscillating cradle set in a box frame and of a fan revolving in a cycloidal drum and blowing away the dust and dirt from the corn in the cradle. The cradle is furnished with longitudinal bars arranged at such a distance apart as to allow the grains to pass through, but not the cob, which passes down the bars outside the cradle. Other devices complete the operation in a perfect manner.

MACHINE FOR BUNDLING AND TIEING FAGGOTS OF KINDLING WOOD.—Frederick A. Myers, New York city.—This machine binds and ties faggots of kindling wood in portable bundles ready for sale. It consists in general terms of a series of boxes borne on a belt which passes them under a chute of peculiar construction, and through which the loose faggots are conducted from the chopper. The filled boxes pass on successively to a position over a pair of clamps, and discharge the faggots therein by means of the hinged bottoms forming part of each box. The clamps are then closed by the action of spring cams, and a binding wire traveling in a groove in the inner face of each clamp passes around and completely encircles the faggots and again enters a slot in a twisting spindle at the bottom of the clamps, by which spindle the wire is locked. The wire is severed by a cutter, and a plunger disk delivers the bound bundle out of the machine. Other devices perfecting the whole render the machine a perfect and practical success. The right for the city of New York in this invention, we are informed, has been sold for the sum of $50,000.

CLOTH RACK.—H. C. Smith, D. A. Kelley, and J. E. Murdock, 2d, Clarksville, Ohio.—This invention refers to cloth racks designed for stores, etc., and consists of a frame bearing horns, and rotating upon a pivot spindle.

COMBINED SQUARE AND GAGE.—Thomas C. Hendry, Union Point, Ga.—The nature of this invention consists in combining a gaging device with a common carpenter's square.

MACHINE FOR FORMING EYES IN METAL RODS.—Charles Kellogg, Detroit, Mich.—This invention relates to the formation of eyes in any metallic rods or bars, but is designed more particularly for the iron rods entering into the construction of bridges or other engineering structures where it is important to preserve the integrity of the iron at the eye by retaining the normal parallel character of the fibers of the iron when the eye is being formed.

HAY HOISTING DRUM.—Henry Strickler, Carlisle, Pa.—This invention refers to a drum or whin for the purpose of unloading hay from a wagon, and is designed to be located in some suitable place near or within the entrance of a barn.

MACHINE FOR CUTTING MEAT.—Jacob Nacher, La Crosse, Wis.—This invention relates to a new and improved method of cutting or chopping meat for sausages, etc., whereby the same is more rapidly and economically done. It consists in two or more knives bolted to a reciprocating cross head, said knives moving up and down between cleaners, whereby the meat is prevented from adhering to the knives.

HARNESS TRIMMINGS.—Thomas J. Magruder, Marion, Ohio.—This invention relates to a new and improved method of constructing center bar rein hooks and terrets for various styles of harness, whereby the same are more cheaply made, and whereby they hold the rein more securely, and the same being movable, they may be used near the top of the hames, whereby also they make no swell underneath the pad, and the same are less liable to injure the horse by chafing.

PLATE FOR BORING LINKS OR EYES.—Charles Kellogg, Detroit, Mich.—This invention relates to the boring or reaming of the links or eye rods used in bridges and other structures where the distances between the centers of the two eyes of such links or rods require to be exactly equal to some distance taken as a standard, so that the links or rods so bored or reamed shall not vary one with another by any appreciable difference.

CLOTHES DRYER.—Isaac N. Deal, Brooklyn, N. Y.—This invention relates to a new and improved method of constructing an apparatus for the drying of clothes, whereby the same may be folded up either in part or in the whole, so as to be compact and occupy less space than the clothes dryers now in use. It consists of a center stand around which are arranged and to which are hinged any desired number of arms, in such way as that the arms may be folded up upon the center stand. Other devices perfect the whole and render its operation complete.

CORN PLANTER.—Curran W. Henkle, Washington, C. H., Ohio.—This invention relates to a device for planting corn, of that class in which the corn is dropped by a direct manipulation of the operator, as the device is drawn along. The invention consists in a peculiar construction and operation of the parts, whereby a very durable and economical device for the purpose specified is obtained, and one which may be manipulated with the greatest facility.

HAND CORN PLANTER.—Hermann Koeller, and Wilhelm Uecke, Camp Point, Ill.—This invention relates to a new hand corn or seed planter, which is so arranged that it can be adjusted to drop larger or smaller quantities of grain at each stroke, and consists mainly in the use of a perforated disk, which receives oscillating motion, and which rests upon a stationary plate that is perforated with one hole.

CHILDREN'S CARRIAGE.—Julius Bein and Wm. Ulrich, Newark, N. J.—This invention relates to a new child's carriage, which is so arranged that the seat and top can be reversed, and that the latter may be supported above the middle of the carriage, to act as a sun umbrella.

EQUALIZING DOUBLETREE.—Edward Griswold, Joel B. Cramer, and Wm. Blay, Helena, Montana Territory.—This invention has for its object to furnish an improved doubletree, so constructed and arranged as to promote safety and economy, and avoid noise and disarrangement.

SCHOOL DESK AND SEAT.—J. P. Scott, and S. H. La Rue, Lewisburg, Pa.—This invention has for its object to so improve the construction of school desks and seats, as to make them more convenient in use and noiseless in operation.

COMBINED PLOW AND ROLLERS.—J. A. Alley, Clifton, Ind.—This invention has for its object to furnish an improved, combined plow and roller, which shall be cheap, simple in construction, and effective in operation.

CULTIVATOR.—T. Green, and J. Sommer, Metamora, Ill.—This invention has for its object to furnish an improved cultivator, simple in construction, durable, easily adjusted to cultivate roads at any distance apart, and which may be used with great advantage for putting in wheat and other grain.

FISH AND BAIT PRESERVER.—T. D. Kellogg, New York city.—This invention has for its object to furnish an improved means for freezing and keeping frozen meat, fish, etc., for hotels, market and transportation purposes, and especially for preserving bait for fishing vessels so that the voyage need not be shortened and the vessel be compelled to return to port without completing her cargo on account of the bait spoiling.

BEEHIVE.—J. M. Patton, Tipton, Iowa.—This invention consists in a mode of constructing the hive, whereby the temperature of the same is rendered quite uniform, the bees and contents of the hive being protected from severe cold in winter and from heat in summer. The invention also consists in a new and improved trap for protecting the bees from the ravages of the bee moth.

PUMP.—J. W. Douglass, Middletown, Conn.—This invention relates to an improvement in pumps for domestic or household use, such as are commonly termed "yard pumps," and it consists in the application of a valve to the air chamber thereof, whereby the pump may be rendered available for use as a force pump to turn a stream of water a considerable distance, and also rendered available as an ordinary lift pump.

ICE PITCHER.—William Bellamy, Newark, N. J.—This invention relates to an improvement in double walled metallic pitchers designed as receptacles for ice water and iced liquids.

SKIRT HOOP FASTENING.—James F. J. Gunning, New York city.—This invention relates to a fastening for securing the ends of skirt hoops together and has for its object the production of such a fastening which, while it will firmly secure the ends of the hoop together, will admit of said ends being readily disconnected at any time when necessary or required. The invention is more especially designed for hoops to be used in skirts which are woven with or have pockets formed in them to receive hoops so that when the skirt requires to be washed the ends of the hoops may be disconnected and the latter drawn out from the skirt and after the skirts are washed the hoops replaced in them and their ends secured by the fastening.

COMBINED FRUIT MILL AND PRESS.—Henry A. Holderman, North Manchester, Ind.—This invention relates to a combination of a fruit mill and press designed for family use and for the manufacture of cider, wine, etc. The object of the invention is to obtain a simple, economical and efficient device for the purpose which, so far as expense and the convenience of operation are concerned, will be within the reach of all persons of the community requiring such an article.

DIVERTING GAME.—H. Jackson, New York city.—This invention relates to a new and diverting game which is termed the "Game of the Government," and it consists of a box divided into a suitable number of compartments representing the treasury and different departments of the Government and in using, in connection with the box, a series of counters and cards which are played in such a manner as to afford much amusement.

STAGING FRAME.—Horace Wood, Leverett, Mass.—This invention relates to a staging frame designed to facilitate the application of covering materials to the pitch roofs of buildings. The invention consists of a framing constructed in a novel manner and provided with windlasses operated in a novel way, whereby the staging frame may with the greatest facility and safety be raised from the eaves to the peak of the roof and lowered from the peak to the eaves by workmen on the staging frame.

MANUFACTURE OF PAPER AND OTHER BAGS HAVING PASTED SEAMS.—James Arkell, Canajoharie, N. Y.—This invention relates to a machine for manufacturing paper and other bags having pasted seams direct from a continuous roll. The machine folds the paper or other fabric and pastes it so as to form a flat tube and then creases and cuts it at proper points in such a manner as to admit of the bottoms of the bags being properly folded and formed and finally cuts the pasted flat tube into suitable lengths. The folding and pasting of the bottoms of the bags to complete the same being afterward and separately performed.

SOLDERING TIN CANS.—John G. Borden, Brewster Station, N. Y.—This invention relates to a new apparatus for soldering tin cans or all other cans which have round heads.

FILTER FOR CISTERN WATER.—Nicolas Ganner and Herman Bader, Cape Girardeau, Mo.—This invention relates to a new device for filtering rain water on its passage from the roof of a building to the cistern. Such water is generally filled with leaves, pieces of shingles and other impurities. The object of this invention is to clear it of such impurities before it enters the cistern.

GRAIN THRASHING MACHINE.—Felix A. Finn, Salt Point, N. Y.—The object of this invention is to obtain a machine by which grain may be thrashed by power and without bruising or breaking the straw. The invention consists in the employment of one or more rotating cylinders provided with pivoted bars or flails, and placed within a box having an inclined floor or bottom whereby the straw may be fed along underneath the beaters or flails by the action of the latter and the grain thoroughly thrashed out of the heads. The invention also consists in a novel manner of operating or giving the necessary shake motion to a screen which separates the grain from the straw.

CROZING MACHINE.—Henry DeBus, Cincinnati, Ohio.—This invention relates to an improvement in the construction of a machine for cutting the croze or recess in the ends of barrel staves for receiving the head of a barrel.

CARPET LINING MACHINE.—Joel F. Fales, Walpole, Mass.—This invention relates to an improvement on a carpet lining machine.

SELF ACTING WAGON BRAKE.—J. A. Williams and W. W. Williams, Mattoon, Ill.—This invention relates to an improvement in a wagon brake or wheel lock, and consists in a self-acting arrangement of the brake in connection with the singletrees of a wagon or other vehicle.

STEAM GENERATOR.—V. D. Anderson, Milton, Wis.—This invention has for its object to furnish a portable apparatus for generating steam for domestic and other purposes.

TOP PROPS FOR CARRIAGES.—John F. Mullin, New York City.—This invention consists in so forming the prop, that the working of the joint up and down shall not loosen the nut by which the joint is fastened to the prop.

WAGON SPRINGS.—Elijah Horton, Okee, Wis.—This invention relates to a method of applying springs to wagons, whereby the ordinary lumber wagon is rendered suitable for the transportation of many articles to which it is not adapted as it is ordinarily made.

CORN SHELLER.—Michael Housman and Simeon Housman, Huntington, Ind.—This improvement consists in surrounding the claw projections or clamps of the corn sheller with a shell or shield for the purpose of preventing the grains of corn from scattering, and to protect the hand of the operator from injury.

GRAIN SIEVE.—Jacob Corson, Clinton, N. J.—This invention relates to a new grain sieve, which is so arranged that the grain may be most thoroughly separated from dust and dirt, and that the small grain may also be separated from the large grain.

AXLES FOR VEHICLES.—William Knoch, Alleghany City, Pa.—This invention relates to a new manner of arranging the spindles around wagon axles, so that the hub can be easily oiled and that the spindle can be easily replaced when desired.

BELT COUPLING.—John L. Thomas, Newburgh, Ohio.—This invention relates to a device for coupling pulley belts, and the improvement consists in a metal clamp applied to both sides or ends of a lap of a belt, to hold them together.

FIRE AND BURGLAR ALARM.—O. E. Pickett, North Auburn, Pa., and R. S. Luce, Lawsville, Pa.—This invention relates to improvements in the construction of a fire and burglar alarm, which consist in an arrangement of tripping devices in connection with a clock movement and bell, whereby an alarm is sounded when by fire or the entrance of a burglar in a house the connection is broken by which the alarm is held.

SEWING MACHINE CAST-OFF.—Edmund M. Comery, Hudson, Mass.—This invention relates to an improvement in the construction of a cast-off for a wax-thread sewing machine, and consists in a slide collar fitted to the needle and attached by a pin joint to a bar or handle.

SAFETY CLASP.—C. E. Candee, Jersey City, N. J.—This invention relates to an article to be used by travelers and others in securing their passage tickets to their persons in railroad cars, and to be used also as a shawl pin and for purposes of a similar nature.

GOLD WASHING MACHINE.—Seth L. Beckwith, San Francisco, Cal.—This invention relates to a gold washing machine, and consists of a washer pan hung over a receiver.

CLOTH GIG.—Osimus M. Stillman, Westerly, R. I.—This invention relates to improvements in the construction and operation of gigs for raising the nap upon woolen cloths, and consists in simple devices for bringing the cloth into contact with one raising cylinder at four distinct points or places.

PHOTOGRAPHIC PRINTING FRAME.—Samuel F. Conant and Horace A. Manley, Showegan, Me.—This invention relates to a frame or clamp for holding the negatives while the photographs are being copied or printed therefrom. The object of the invention is to obtain a device for the purpose specified, which will admit of the paper and negative being readily fitted in and removed from the frame, the progress of the printing or copying readily inspected from time to time, and the negative and paper firmly retained in contact on the frame.

STEAK CRUSHER.—Alfred Castellaw, Chester, Ill.—This invention consists in constructing a machine with a fluted cylinder, which is geared to another smooth or plain cylinder or roller, in combination with a suitable frame, the cylinders being revolved therein, and the steak to be crushed being passed between them.

BEEHIVE.—James A. Jackson, Macon, Mich.—This invention consists in a novel manner of constructing a beehive, whereby a large number of spare honey boxes may be used or applied, the bees allowed to work with facility, and moths entrapped so that the bees will not be materially annoyed by them.

TIME REGISTER.—Wm. A. L. Kirk, Hamilton, O.—This invention relates to an improvement in the construction and arrangement of a time register, or instrument for recording the working hours of operatives in a shop or factory, and consists in a deep, horizontal cylinder, divided circumferentially into twelve compartments or other subdivisions, corresponding to hours, or fractions of time; the cylinder thus subdivided is fixed on a vertical spindle, attached to a coil spring, which gives it motion when free to move, and is provided with a catch lever connected with a clock movement that trips the lever from time to time, as desired to allow the time box to revolve a certain space to change the position of the compartments therein for receiving checks of the workmen as they commence or quit work to indicate the time, which is registered by a series of figures in the circumference of the cylinder.

WATCH.—Arthur Wadsworth, Newark, N. J.—This invention relates to the main-spring barrel of the movement of a watch, or other time pieces, and the principle of the invention consists in so constructing either one or both of the heads or end plates to such barrel, that when applied to the body portion of the barrel, such body will be confined and bound upon and around its outside, and thus strengthened and stiffened, as well as in many other respects improved and rendered more efficient and practical.

SODA WATER BOTTLES OR VESSELS FOR CONTAINING BEVERAGE FLUIDS.—Wm. W. Timmons, Rahway, N. J.—The particular object of this invention is to provide a portable substitute for soda water fountains, but the invention may be applied to other purposes for which it is suitable. It consists of a chamber attached to or forming part of the vessel containing the pure soda water or other fluid, the chamber containing the acid preparation or other ingredient which escapes therefrom and communicates with the soda water or other fluid when the latter is being poured out, whereby the effervescence takes place at that time.

HANGING WINDOW SASHES.—Charles H. Palmer, New York city.—This invention relates to a new manner of hanging window sashes, and its object is to so arrange the hanging that the sashes can be moved up and down as usual, and that they can be turned into a horizontal position so as to open the whole window whenever desired.

WEEDING IMPLEMENT.—C. S. Jewell, Black's Mills, N. J.—This invention relates to a new weeding implement, which is so arranged that, by its aid, noxious weeds can be easily drawn out of the ground, without cutting them.

CHISEL.—Amos B. Simonds, Youngstown, Ohio.—This invention relates to an improved chisel or tool for turning the heads of bolts or other articles, in connection with the turning of which hand tools are used. The tools or chisels heretofore used are made with solid shanks, and when the cutting part is worn out the whole tool is destroyed and rendered useless, and the present invention consists in so attaching the cutter to the shank of the tool that it can be removed or detached therefrom when worn and a new one applied.

APPLICATION OF SPRINGS TO WHEEL VEHICLES.—Charles L. Rice, Dunmore, Pa.—This invention relates to an application of springs to wheel vehicles, whereby the body of the vehicle is prevented from moving longitudinally forward or backward, and also prevented from tilting sidewise, in an appreciable degree, while at the same time the body is better supported than usual by the springs.

HEATING APPARATUS.—Thomas Williams, and Joseph J. Yates, New York city.—This invention relates to a device for evaporating the liquors in whisky distilleries, and for other purposes, in which liquids are to be heated by blowing steam into them. The invention is designed to overcome the difficulties heretofore experienced, that when the steam was cut off a vacuum was created in the steam pipe so that the material in the mash, or other pan, flowed into the pipe, and clogged the same, thereby creating frequent annoyance and loss of time.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. M. D., of Ill.—"What is the best steam joint cement that can be ready for use at any moment?" How can I protect rubber packing from burning out by steam?" By "steam joint cement" we suppose you mean a cement for sections of steam pipes which are not required to be taken apart after being connected. The ordinary cement, composed of iron filings or borings, salammoniac, and water—a little sulphur being added if desired—is what you want. The exact proportions are not of great consequence, the iron filings constituting the mass. For two quarts of the iron filings, however, two ounces of salammoniac are sufficient. We do not approve of the addition of sulphur, but if used it should be in very small quantity. A packing, to be removed if desired, is made by mixing two parts white lead with one of red lead with linseed oil, making a thick paste, and used with canvas or leather glands, the pipe joints being held by bolts and nuts. Rubber packing will be more or less affected by a high temperature. For packing steam engine stuffing boxes, etc., there is manufactured a packing of cotton webbing in combination with rubber, which is durable and effective.

P. H., of Ky., asks how the glazed and highly polished surface on linen is produced. There are preparations in the market which pretend to produce this effect, but probably much of it is due to the skill and "elbow grease" of the operator or the use of heavy calendering rolls.

D. J. W., of Ky., asks if Bessemer steel can be used to make plows of, and whether it can be worked and hardened as other steel. It is claimed that steel manufactured by the Bessemer process can be made with the qualites of receiving and retaining temper. We have seen tools such as cold chisels and turning tools, made of it, but as we never tested them we are unable to say how well they retain temper. We think, however, that this steel would prove admirable for plow shares. It would probably recieve sufficient hardness for that purpose.

J. F. G., of Ohio, says we gave, in a former number of our paper, the following as a recipe for a varnish for lithographs, drawings, etc.: "Dextrine, 2 parts; alcohol, 1 part; water, 6 parts," and asks if it is applicable to oil or canvas paintings. Oil paintings on canvas are seldom varnished, but when so treated for preservation the varnish generally used is mastic.

H. M., of N. J.—"How can I extract acetic acid from pyroligneous acid." The latter may be considered an impure condition of the former. Muspratt's Chemistry or Ure's Dictionary will give you the information as to processes necessary, which it would be inconvenient to transfer to our pages.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Inventors and Patentees wishing to get small, light articles manufactured for them in German Silver or Brass, address Schofield Brothers, Plainville, Mass.

$300 will buy a Patent of A. Grushus, St. Paul, Minn.

Agents wanted everywhere—enormous profits. Sample doz. $1 50. Retail for $3 each. Thomas Powell, Milroy, Ind.

Scale removed from Boilers by Winans' Powder (11 Wall st., N. Y.), 12 years' use proves it reliable an uninjurious.

For Steam and Gas Fitters Tools, Machines for Hand or Power to Screw and Cut-off Gas pipe; stocks, dies, pipe, vises, Peace's adjustable pipe tongs, address Camden Tool and Tube Works Co., Camden, N. J.

Address J. S. Elliott, East Boston, Mass., for best machinery for making lime and sand building blocks.

Good 2d-hand engines, all sizes & styles. A. Logan, Tideoute, Pa.

Manufacturers of Ditching Machines of from three to four feet wide by same depth, address M. White, Jr., New Orleans.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

County Rights to the Pew Hat Rack for sale. Address E. S. Blake, Pittsburgh, Pa.

For Bosom and Collar Plating Machines, Address W. H. Tolhurst, Troy, N. Y.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. The Bartlett Machine and Needle Depot is at 569 Broadway, New York.

Wanted—A Tennoning Machine, Sticker, and heavy 36-inch Swing Lathe, either new or second-hand. Address Frey & Sheckler, Bucyrus, Ohio.

Spicer & Phelps, Marshall, Mich., manufacture Horse Hay Forks. Makers of Wooden Pulleys please send them your best terms and prices.

Wanted—A first-class mechanic who has had practical experience in adjusting Shuttle Sewing Machines. He must also understand packing and shipping machines. Business permanent. Address W. G. Wilson & Co., Cleveland, Ohio.

C. B. Manchester, Pawtucket, R. I., has unequalled facilities for manufacturing articles from sheet metal. Inventors and others will find it to their advantage to consult with him in regard to the manufacture and introduction of new inventions.

Four men wanted, with small capital, to sell patents on Commission. A splendid offer. Address J. K. Reiner, Line Lexington, Pa.

Manufacturers of small water pipe please send price list and description to J. C. Burruss, Carrollton, Greene county, Ill.

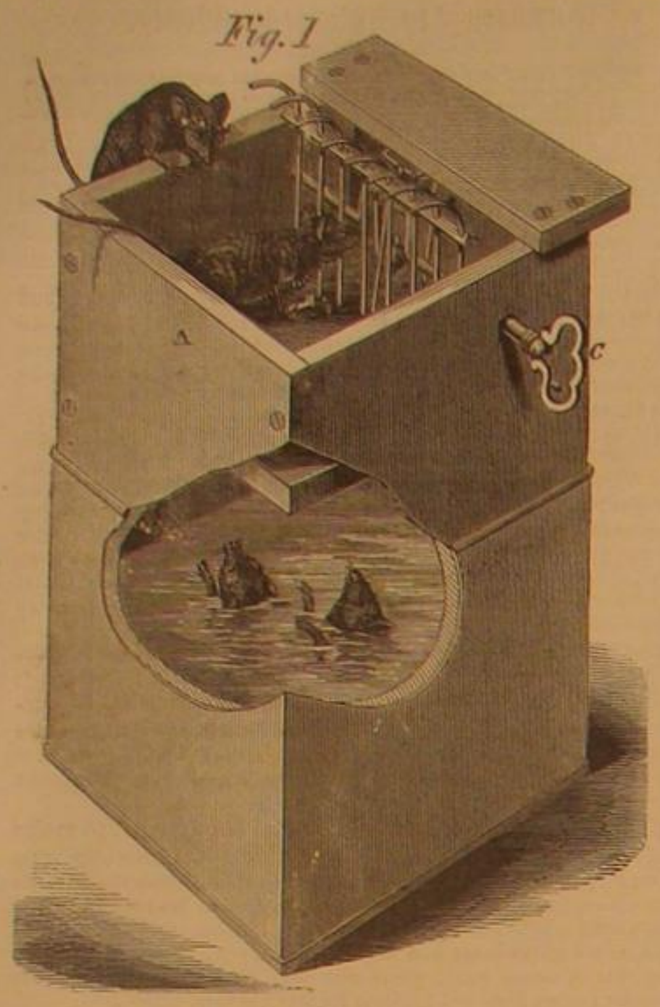
Sam'l W. Gardiner, Newark, N. J., practical machinist, having a shop of good tools, desires to correspond with those who wish work in this line.

Make your Patents Pay!—J. H. White, Newark, N. J., will make and introduce all kinds of Small Wares in Brass, Tin, and Iron.

HARLAN'S PATENT ANIMAL TRAP.

It is well known that the fierce and gigantic Norway, or brown rat, is fast increasing in numbers, and while assisting in the extermination of the weaker black, or ordinary rat, is rapidly supplanting that pest by one far worse. This is the case not only at our seaports, and places adjacent, but their incursions reach almost the confines of our continental civilization. It is not improbable, if the story of the Bishop of Treves is true, that this voracious and aggressive variety of rat was the one that swam the Moselle and took possession of his grain-stored castle. Be this as it may, it is certain that

Fig. 1



the rat is a nuisance, to be abated only by extermination. But the common traps and other devices contrived for his capture, have proved so defective in plan or inefficient in operation that we are compelled to submit to his ravages without hope of effectually depriving him of his ability for evil, or of offsetting it by a "counter irritant," or something of similar efficiency.

The unique trap shown in the engravings is intended not only for the destruction of rats and mice, but for entrapping other animals, and even for catching fish, for which purpose it may be adapted to the end proposed. The inventor says that by experiments he has found that the true cause why other traps have not proved successful rat catchers is, that when caught the rat becomes excited and angry, and in that state emits a powerful and peculiar odor, that scents the trap and serves as a warning to others. In this, the rat is quickly drowned, and has not time to contaminate the trap with his effluvia.

Fig. 2

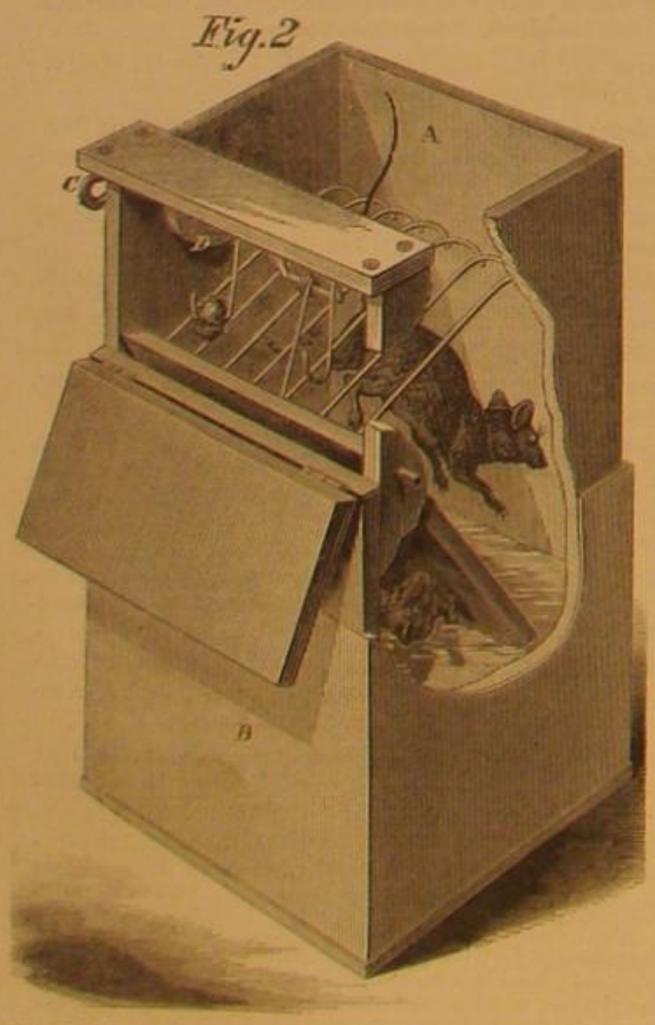
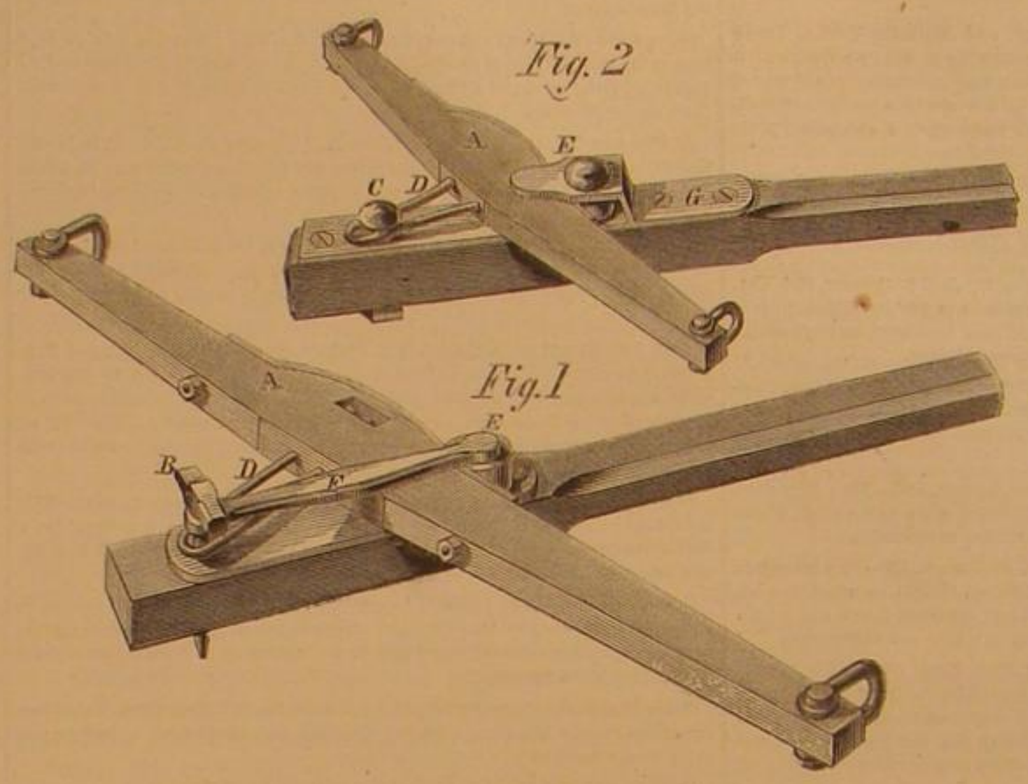


Fig. 1 shows the trap ready set for its game; two rats, seen through the broken side, drowning, and two others in danger of sharing their fate. Fig. 2 is the trap in act of operation, and while one rat is imprisoned in the tank another is about taking his last bath. The trap is self-acting. The upper portion, A, is a box partially open at the top, its floor being hinged. The lower portion, B, is a tank of metal nearly filled with water. To the hinged floor is secured a grille of wires curved at one end. A key, C, winds up a powerful coiled spring held in a box seen at D, Fig. 2, one end of the spring being secured to a crank shaft, and the other to the box. A catch holds the floor in position by means of a wire latch, the two ends of which are hooks for bait. Soon as these hooks are touched, the floor and grille fly downwards, as in Fig. 2, the wires compelling the rat to go with the floor, when they instantly fly back, setting the trap ready for another spring. As the bait is behind the grille, the bars of which are only wide enough to allow the rat's nose to pass between, he cannot steal the bait, but only nibble or touch it, and thus the trap will be always baited as well as set. The spring can be long enough to secure as many operations as the number of rats the tank may hold. The trap will work equally well under water for mink, muskrats, fish, etc.

Patented through the Scientific American Patent Agency, Dec. 24, 1867, by W. H. Davis, assignor to Joseph Harlan, to whom all communications for rights, etc, should be addressed, at Lexington, Scott Co., Ind.

Improvement for Equalizing the Draft of Teams.

The object of the invention shown in the accompanying engravings is to adjust the draft of animals drawings together in harness, so that the weaker animal shall have the longest arm of the lever. It consists in the peculiar form of the double-tree and the method of its attachment to the pole. The center of the front or straight side of the double-tree, A, is formed on a segment of a circle and faced with iron or steel, the center of the circle being represented by the hammer pin, B, Fig. 1, or the ordinary pin, C, Fig. 2. From the center and rear of the double-tree or equalizer projects a long staple, D, or double bar, its sides embracing the pin, B or C; this is so long that under no circumstances shall its end bear against the pin and take any portion of the draft, it being intended only as a guide to the motions of the double-tree. The draft is received on a pin and roller, E. The bar, F, Fig. 1, connects the two pins, the plate, G, Fig. 2, serving the same purpose of keeping the double-tree to the pole. The pin, B, in Fig. 1, is made with a hammer head to serve the purposes of a hammer in emergencies. Its removal and a turning partly round of the bar, F, will permit the double-tree to be taken from the pole. The same result is obtained in that form of the device seen in Fig. 2, by enlarging the spread of the staple, D, where it enters the double-tree, sufficiently to allow the head of the bolt, C, to pass through when the double-tree is thrown back far enough. The two figures show different forms of the same invention, either of which seem well adapted for the object designed.



AVERILL & FITCH'S PATENT DRAFT EQUALIZER.

Patented through the Scientific American Patent Agency January 28, 1867. For further information address James Averill, owner of the patent, Champlain, N. Y.

BRUCE'S AMERICAN FOOT STOVE.

Danger of sickness may not always induce the careless to to take trouble enough to protect the feet from cold, but the

inconvenience and uncomfortableness of cold feet will frequently compel that attention which more important considerations fail to exact. Yet clumsy feet clothings are unsightly and ordinary foot stoves inconvenient. That, however, shown in the engraving is elegant in form and decoration, convenient to handle, free from smoke or fumes, safe, and durable. The stand, of open work cast iron, supports a bowl, also of cast iron, which is hinged on one side to the base or stand, and secured when closed, by a catch or latch on the other side. The top of the bowl, neatly carpeted, is inclined to accommodate the natural position of the feet. Attached to a socket in the center of the base is a lamp for burning sperm or kerosene oil or a candle taper. Atmospheric air is furnished for combustion through holes in the base, and an open space between the base and the bottom of the bowl, which do not quite meet, being held apart by small projections or lugs. The top of the bowl is also slightly elevated from its rim by similar appliances, which give opportunity for the escape of whatever gases may be evolved. Directly over the flame of the lamp is a tin disk secured at a little distance from the cap or cover of the bowl—which is a circular cast-iron plate—and serves to radiate the heat of the flame. The top of the cover is concealed by a carpet mat, which adds to the comfort as well as the beauty of the article. The lamp flame, being defended by the sides of the bowl portion, does not flare in being carried about by hand, or in a carriage or sleigh. One of the figures in the engraving shows the stove open, and the other closed. It is carried by slings of worsted or silk cord.

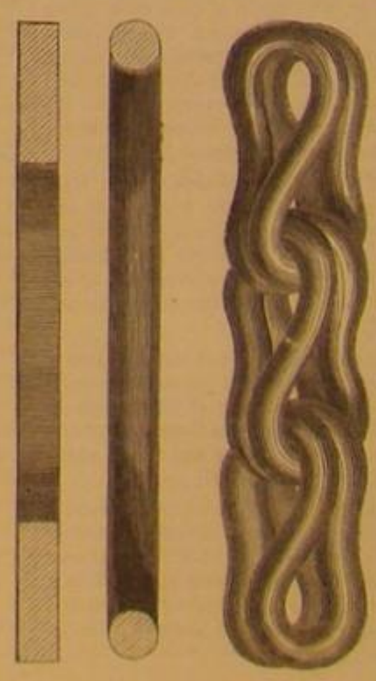
Patent granted Sept. 17 1867, through the Scientific American Patent Agency to N. H. Bruce. Address for the purchase of rights or warmers American Foot Stove Company, Lowell, Mass.

Death of M. Claudet.

We regret to announce the sudden death of M. Claudet, the veteran photographer and distinguished artist. Among the earliest and most successful followers of Daguerre, M Claudet was almost the las to abandon the use of metal plates for the more modern and improved processes of photography, and it was in some degree due to his skill and knowledge that daguerreotype at first made such progress in this country, while the inventor's own countrymen were as eagerly bent upon developing the new art in the direction traced by our Fox Talbot. M. Claudet's nice discrimination and manipulative dexterity gave to the productions of his camera an extraordinary refinement. He was a Fellow of the Royal Society and other learned bodies.—*Mech. Magazine.*

MAKING CHAINS WITHOUT WELDING.

An exceedingly simple method of making chains without welding the links has recently been patented in France, and of which Messrs. Chapman & Boyle, of John street, Adelphi, are the English concessionaires. The sample from which our engraving has been taken was manufactured by taking a disk of the diameter of the flat ring, shown in the cut, and punching a hole in it, so as to leave the ring, just as washers are made. It then measures 5·5 inches in length, 0·51 inches in thickness, the hole being 3·62 inches in diameter, leaving the metal of the ring 0·94 broad. This ring is then rolled by spinning it on outside rolls till it acquires the round bar section—0·59 inches in diameter—shown in the next figure, by which process also the direction of lamination or fiber is modified. The ring is then drawn out into a long hoop, and interlocked with others, as in the engraving. The chain so formed is particularly flexible, though it "kinks" rather more readily than ordinary chains. This however, may be avoided by a slight change in the form to which the links are set. A length of this chain has been laid down in the Seine steam towage navigation, and answers the purpose very well. It will be observed that the strength of each link depends on the strength of two members instead of one, in which—section and quality equal—there is an advantage in point of safety, just as there is in a wire rope composed of strands over a single bar of a section equal to the aggregate of the strands. The invention is one of promise, especially with regard to steel cables, to the manufacture of which the necessity for a weld has always been an insuperable objection. We believe this method of making chains was patented in England several years since.—*Mechanics' Magazine.*



THE Senate has refused to confirm the Hon. W. D. Bishop for the office of Commissioner of Patents.

Scientific American.

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VOL. XVIII., No. 9....[NEW SERIES.].... *Twenty-third Year.*

NEW YORK, SATURDAY, FEBRUARY 29, 1868.

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BADLY PLANNED BUILDINGS.

Probably quite a number of the splendid architectural structures in New York city, the exteriors of which arrest the attention by their imposing grandeur and delight the eye by their beauty, are internally monuments of the folly of owner or architect and evidences of a lack of the most necessarily required knowledge, that of adaptation of means to the end. Insufficient supports to floors; improper connection of floors and walls, imperfection of material, sacrifice of utility to elegance, defective water, steam, and gas systems are to be found under circumstances which show that ignorance and sham have been victorious over knowledge and reality.

It is hardly to be supposed that professional architects should be also mechanical engineers, yet large buildings are erected in which steam is used not only for heating, but for working purposes, the details even of the boiler and its appliances being designated by the architect, not always with the happiest results. A case was brought to our notice the other day in which the building—a magnificent edifice—was intended to be heated with steam and a steam engine was to be employed to raise and lower goods through the successive stories. The boiler was amply sufficient, properly set, the engine of good plan and workmanship, yet the boiler would not generate steam sufficient either for heating or hoisting. An examination showed that the flue or chimney, by which the products of combustion were intended to be passed off from the boiler furnace, had an area of only 90 square inches when it should have had at least 400. A larger chimney would have impaired the elegance of the rooms through which it passed, and so utility was sacrificed to appearance. This is not a solitary case and such mistakes, the results undoubtedly of ignorance, are not uncommon, but they are costly.

A few days ago, while in a large wholesale establishment, one of the proprietors, pointing to a crack in his chimney flue which had evidently been plastered over several times, but still defaced the wall of the room, asked what he should do with it. We could only advise an expedient, which he rejected because it would still more, in his opinion, detract from the elegance of the room. When that building burns—as it probably will—the record will be published as "Another Incendiary Fire", or caused by a "defective flue" or 'spontaneous combustion". On the wall where the chimney flue passed was an iron bracket built into the masonry of the chimney, its projection receiving the end of a flooring beam. As the masonry of the chimney became heated it expanded, raising the beam, misplacing the floor, and contracting the wood, which, of course opened a crack through the brick work to the interior of the flue. Temporary plastering availed nothing; the causes were still at work and would produce again the same results. The remedy advised was to give an independent support to the obnoxious flooring beam either by a separate post or by a cross framing between contiguous beams.

It is evident that something more than taste, the gratification of the eye is to be consulted if we desire to make our "palatial marts" anything better than shams valuable mainly for the materials of which they are composed.

THE COMMISSIONER OF PATENTS.

Judge Charles Mason of Iowa was Commissioner of Patents from 1853 to 1857, and inventors and business men well know that his wise administration was a benification. He rescued his Bureau from disorder, brought up the work, made new and important rules, and secured uniformity in the actions of the several examiners, settled vexatious questions in Patent law and practice with such wisdom that his decisions are followed as precedents, suggested reforms in the law, established the wholesome system of appeal to the Commissioner in person without any extra fees, and worked fourteen hours a day to accomplish the tasks he imposed on himself. To be sure he was singularly fitted for the office. He was educated at West Point, standing at the head of his class, and after graduating, served as one of the Professors for several years. When he resigned his commission he studied law and became eminent in that profession. His scientific and legal acquirements were of great value to the office and all men look back to his administration with regret that it was interrupted through the action of the notorious Jake Thompson then Secretary of the Interior, and so far as we know, it is the unanimous wish of inventors that he be reinstated.

We hope the President will nominate Judge Mason for the Commissionership and that Congress will not delay confirming him. Politics should not influence either the President or Congress in this appointment. Legal and executive ability are most required after integrity, in filling the Commissioner's chair. Judge Mason possesses all these qualifications to an eminent degree. The interests of inventors and all persons doing business with the Patent Office are suffering for the want of a head. We trust that the President and Congress will agree in this matter and see that the vacancy is immediately filled.

PATENT BILLS BEFORE CONGRESS.

A report of the Congressional proceeding in the House of Representatives on the bills for the relief of Professor C. G. Page, and the heirs of Thomas W. Harvey, the former on his Induction Coil, and the latter for a re-extension of the Screw Machinery patent, is published on another page. The petition of Harvey after some spicy debate was rejected. The application of Dr. Page passed without discussion. This permits the Commissioner of Patents to grant a patent to Dr. Page if satisfied that the applicant was the original inventor of what is known as the "Induction Coil." In other words the length of time since the invention was made and introduced to the public shall not be a bar to the issuing of the patent.

We disapprove of special legislation on patents, but if any one is to be privileged by relief of this kind we are glad Dr. Page is to have the opportunity of proving his claim to an invention which he has stuck to with pertinacity for so many years.

But the thought arises in this connection who is to decide in the Patent Office the claim of Dr. Page to a patent? The bill says the Commissioner of Patents, but will the Commissioner personally examine the evidence or will Dr. Page who is the Chief Examiner in the class under which his invention comes make the examination and report to the Commissioner the result?

CONSUMPTION AND NATURE OF MATERIAL USED IN THE MANUFACTURE OF MATCHES.

The manufacture of those little conveniences, matches, which are valued and cared for at about the same rate as pins, constitute one of the important industrial interests of the country. While nobody thinks of saving a match, but lights one after the other and throws the stick away, deeming it of no more use than the rocket stick after it has served the purpose of guiding the fiery meteor in its sky-ward flight, it is a fact that the demands of the match manufacture are making serious inroads into the supply of clear white pine timber which is needed for other purposes.

As an instance, of the amount of timber consumed by a single establishment, it may be stated that the one owned by Mr. William Gates of Frankfort, N. Y., uses annually 700,000 feet of choice, white pine, making 200,000 gross. The number of persons employed is 300, many of them being children. The amount of sulphur annually used is 100,000 pounds, and of strawboard for boxes 150 tuns. Everything is made on the premises—matches, boxes, packing cases, etc. All of this large amount of matches is consumed in this country, Mr. Gates' trade being principally in the west. The phosphorus used is imported from Europe, and great care is exercised that the employés do not suffer from its deleterious influences. Its affinity for bone, of which it is one of the important constituents, makes it noxious to those persons whose teeth are decayed, the phosphorus attacking the internal portion of the teeth and decomposing the jaw bone, so that sometimes a surgical operation, requiring the removal of a portion of the jaw, is necessary. Choice of persons for employés having perfectly sound teeth and a thorough ventilation of the rooms in which the work is performed are necessary precautions.

HARDENING AND TEMPERING STEEL—THE VALUE OF BATHS.

One of our most valued correspondents, P. McC., of New Jersey, a practical man, speaking of the inquiries and replies regarding the tempering of mill picks, expresses decided doubt as to the assumed advantages of baths or pickles for hardening steel. He says a mill pick should be made light enough to be readily handled, having a short edge to prevent its splitting or bending, and made as hard as the steel will stand; in short, the edge should be thick enough to stand and hard enough to cut. He believes that oil for very light articles and pure water for heavier articles is better than any pickle of salts, etc. Dies for a press, with a hole inside should be hardened by two streams of water coming from opposite directions and meeting in the hole. By this means the cutting part is made hard and breaking or cracking avoided.

The ideas of our correspondent in relation to the inutility of composite baths, correspond with our experience. There is much bosh written and believed by mechanics on this subject. Verbal directions and instructions for hardening and tempering are of little use. Only the experience and practice of the steel worker, his knowledge of the different qualities of steel and proper methods of working are of real value. We have more faith in the good judgment of an experienced steel forger than in the statements of any theorizer.

PHOSPHORUS.—ITS CHARACTERISTICS.

Phosphorus is one of the most remarkable substances known to science or the arts. It was discovered in 1669 by the alchemist, Brandt, of Hamburg, who found it in the solid constituents left by the evaporation of urine. Thus obtained it was very costly, but for a century it was produced in no other way. In 1769 the Swedish chemists, Gahn and Scheele, found it to be an ingredient of bones and separated it at much less cost than the Brandt process demanded. It has since been found to be an ingredient in the composition of many minerals, its presence in iron ore being a great annoyance to the iron worker, although it may be removed from the ore in the puddling furnace. It is now obtained from bones, which are calcined until they cease to smoke when they are ground to a fine powder and digested with sulphuric acid, one part by weight with twelve parts water. Sulphate of lime is precipitated, while superphosphate of lime remains in solution. Straining and evaporation, perhaps several times repeated, prepares it for the last process, that of distillation. In this process the phosphorus in drops passes from the worm of the retort to a vessel filled with cold water where it congeals.

It may be moulded, by means of a glass tube kept under lukewarm water, into cylinders. The precaution of keeping it under water is necessary from the low atmospheric temperature at which it ignites, it being liable to take fire at only 100° Fah., and is dangerous to handle at any ordinary temperature. When exposed to the air under any circumstances, even at a very low temperature, it undergoes combustion, although slowly, and emits vapors which are luminous in the dark.

Phosphorus combines with oxygen, hydrogen, nitrogen, sulphur, many of the metals, and some of the earths. With oxygen, by combustion, it forms phosphoric acid. In combination with the lime of bones it is well known as a valuable fertilizer under the name of phosphate or superphosphate of lime. In iron ore it causes the production of that quality of iron known as "cold short", which is brittle when cold and malleable when heated. Rubbed in a mortar with iron filings or triturated with particles of other metals phosphorus readily takes fire. Mixed with olive oil in the proportions of one part phosphorus to six of oil, it makes an unguent which is luminous in the dark, but will not burn the flesh if put on the hands or face. By this compound many startling effects may be produced in the way of amusement.

Phosphorus taken into the stomach is a virulent poison, the remedy for which is copious drafts of water with magnesia. Those who work in it, as in the manufacture of matches, are liable to a disease which attacks the jaw bone, producing caries or decay to such an extent as to necessitate sometimes the removal of the bone by a surgical operation. Its use, however, in the manufacture of matches is now generally superseded by other materials as sulphate of potash, etc. Phosphorus is chiefly valuable as a medicine, except where in combination with lime it is a fertilizer. It is singular that while bones contain so large a proportion of this substance as to be the principal source of its supply, shells, as those of the oyster, clam, etc, and coral contain none of it, they being almost pure carbonate of lime. We think also, that the commonly received notion of its abundance in the flesh of fishes is erroneous.

In appearance phosphorus is translucent, slightly yellow, can be cut with the knife, and has a waxy luster.

Scientific and Technical Terms.

MESSRS. EDITORS:—We mechanics who have been limited to a public school education, find great difficulty in reading understandingly many scientific articles contributed to your paper on account of the many mechanical, chemical, and other scientific terms requiring definition. This is suggested to my mind by the complaining remarks of some worthy apprentices to whom I have presented bound volumes of the SCIENTIFIC AMERICAN for the last ten years, and who are desirous of a more full definition than is to be found in Webster or Walker. These definitions, if published in pamphlet form, alphabetically arranged, by your office, and furnished to each subscriber, would make a valuable accessory to the paper and be very acceptable to many subscribers. The small cost of such a pamphlet to each subscriber would be no consideration in view of its value. J. H. I.

[We have no doubt many readers of this paper and of other publications containing articles on scientific subjects find the same difficulty. It is one we studiously endeavor to reduce to the smallest possible amount, by the avoidance, as far as possible, of technicalities and by the adoption of a plain and unpedantic style of writing. It is not, however, always possible to avoid the use of chemical symbols and mathematical abbreviations in articles where chemistry or mathematical problems are the subject. In mechanical descriptions we employ very few purely technical terms, preferring an appearance of lack of experimental knowledge to a display of shop lore which would befog the uninitiated. The proposition for us to compile a glossary of scientific and technical terms could not be entertained; the "pamphlet" would prove to be a mammoth one. We believe there is a book published entitled either "Dictionary of Technical Terms," or "Technical Dictionary," which answers the purpose of our correspondent. The knowledge necessary to understand scientific terms is easily acquired without a collegiate or academical education, and we would recommend apprentices and others to employ some of their leisure hours to this end.—EDS.

Patent Bills before Congress.

On Friday, February 14th, petitions were presented and discussion was had in the House of Representatives, on the following bills for the relief of inventors and their heirs:

PROFESSOR PAGE'S INDUCTION COIL.

Mr. Myers, of Pa., from the Committee on Patents, reported a bill authorizing the Commissioner of Patents to receive and entertain a renewed application of Charles Grafton Page, of Washington, for letters patent for his induction apparatus and circuit breakers, known as the "induction coil," and if he be found the first inventor thereof to issue a patent, reserving the rights of persons now owning and using such apparatus. After explanation by Mr. Myers and the reading of the report, from which it appeared that the induction coil of Rhumenkorff, for which he was in 1864 awarded the French imperial prize of 50,000 francs, was substantially the invention of Page, exhibited by him in 1839 and 1840, but not patented because he was in the Government employment. The bill was then passed.

HARVEY'S SCREW MACHINERY—APPLICATION FOR RE-EXTENSION.

Mr. Bromwell, of Ill., from the same committee, reported a bill authorizing the Commissioner of Patents to hear the application of the widow and heirs of Thomas W. Harvey for the re-extension of the patent of the 30th of May, 1846, re-issued on the 28th of December, 1858, for an improvement in the machine for cutting screws; and of the patent of the 18th of August, 1846, re-issued on the 4th of January, 1859, for an improvement in the machine for drilling screw heads, the re-extension to be only for the benefit of the widow and legal heirs.

Mr. Farnsworth, of Ill., asked if this was not the same proposition as was before the House last year, and was then defeated?

Mr. Bromwell said that it was.

Mr. Washburn, of Mass., suggested that the patentee had had the benefit of the invention for twenty-one years.

Mr. Van Wyck, of N. Y., remarked that the American Screw Company, which had the use of the patent, had made an enormous dividend.

Mr. Scofield, of Pa., made a plea for the inventor, whom he had known in his youth in Western New York.

The previous question was then moved and seconded.

Mr. Farnsworth moved to lay the bill on the table. The motion was negatived by yeas 43, nays 89.

Mr. Bromwell closed the discussion by an argument in support of the bill, which he assured the House was intended solely for the benefit of the widow and heirs of Harvey, the bill containing an express provision that it should not be valid for the purpose of carrying out any alleged assignment, transfer, arbitration, or award, heretofore had between the heirs and any other person. This provision had been put in the bill because the bill of last Congress was defeated on the sole ground that it would inure to the benefit of the American Screw Company.

Mr. Butler, of Mass., asked Mr. Bromwell whether he would say that there was no understanding between the widow of Harvey and the American Screw Company for the transfer of her interest under the bill?

Mr. Bromwell replied that he did not know what understanding there was between any widow and anybody else. (Laughter.) The widow and heirs would, of course, have the full right to dispose of their interest under the bill.

Mr. Butler stated that his information was that Harvey had entered into a bond of $10,000 with a Massachusetts man to assign the patent to him, but that he subsequently sold it to the Providence Company for $125,000, paying the $10,000 forfeit. That explained why Massachusetts was not in favor of paying any more money by way of royalty to Rhode Island.

Mr. Jenckes, of R. I., denied that the Providence company had obtained the patent for any such consideration.

Mr. Butler said he had his information from a member of the House (Mr. Washburn of Massachusetts), who had himself made the bargain and received the $10,000 forfeit from Harvey.

Mr. Stevens, of Pa., remarked, that while he was a member of the Committee on Ways and Means, that committee investigated this matter for three years, and ascertained that all the inventions of screws had been monopolized by the Providence company, and that an English company, which had been established in the United States for the manufacture of wood screws, had been bought up by the Providence company.

Mr. Washburn, of Mass., opposed the bill, arguing that it was for the benefit of one of the greatest monopolies in the country, and that, without any extension of the patent, it would take at least five years to allow other companies to compete with the American Screw Company.

Mr Van Wyck opposed the bill, and related some facts published in the New York *Evening Post*, showing that the American Screw Company, starting with an original capital of $75,000, had now a capital of $1,000,000, after making dividends estimated at $10,000,000. He asked whether the industry and labor of the country should be any longer taxed to glut such a rich corporation.

Mr. Bromwell said that he knew it was on just such statements that the bill of last Congress was defeated, but that, although notice was given to all the manufacturers of wood screws in the country, no opposition was made before the Committee on Patents to this bill.

Mr. Myers repeated that statement, and protested that the bill was not for the benefit of the American screw Company, rather intimating that the opposition came from that source.

Mr. Boutwell, of Mass., characterized the bill as a proposition to tax the laboring and industrial interests of the country for seven years to the extent of millions of dollars. If the committee believe that the widow and heirs of Harvey were proper objects of national charity, it would be better to report a bill giving them $100,000 or half a million than to pass this bill.

Mr. Butler said that he found from further inquiry that the only mistake in his statement was the assertion that Harvey had paid the forfeit of $10,000. He had not done so.

After some further discussion the House proceeded to vote on the bill, and it was defeated—yeas 58, nays 70.

THERE are several nice schemes before Congress for obtaining extension of patents. One of the applicants for relief (?) admits in his petition that he has made $685,000 already, and that the amount will probably exceed $1,100,000 before the present term of patent expires; and still the heirs of the petitioner plead for a further monopoly! Pray, what amount will satisfy the rapacity of some? Want of space precludes our saying more on this subject this week.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 11, 1868.

Reported Officially for the Scientific American.

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74,190.—MACHINE FOR MAKING PAPER TUBES, ETC.—James Arkell (assignor to himself, Benjamin Smith and Adam Smith), Canajoharie, N. Y.

I claim, 1st, The notched and laterally-adjustable paste wheel, F, in combination with the elastic covering, b, on the roller, D, arranged to operate for pasting one edge of the paper, substantially as shown and described.

2d, The curved former, I, arranged in relation with the upper tension roller, E, for the purpose of admitting of the folding and pasting of the paper in flat-tube form, as set forth.

3d, The extension rods, J, applied to the former, I, and frame, A, for the purpose of adjusting the former, I, substantially as set forth.

4th, The pressure rollers, h, applied to adjustable bars, K K, and arranged relatively with the former, I, to hold up the edges of the paper sheet preparatory to the turning over or folding of the same, as shown and described.

5th, The adjustable blades, L L, arranged and applied substantially as shown and described in combination with the former, I.

6th, The adjustable blades, n, fitted in swivel brackets, m, in adjustable arms, O, on upright shafts, N N, substantially in the manner as and for the purpose specified.

7th, The securing of the shafts, N, and consequently the bracket arms, O, in proper position by means of the levers, P, and racks, o, arranged substantially as set forth.

8th, The two cylinders, Q Q', provided one, Q, with the grooves, r r' r" s s, and the cutters, t t, and the other, Q', with the bars, u u' u", substantially as and for the purpose specified.

9th, The stationary or fixed cutter, R, in combination with the cutter, R', attached to the vibrating plate, S, substantially as and for the purpose set forth.

10th, The loop or guide, Y, attached to the pivoted bars, a' a', which are connected to the plate, S, and arranged to operate in the manner as and for the purpose specified.

74,191.—FINGER BAR FOR HARVESTERS.—J. J. Barnes, Monticello, Ind.

I claim the series of loose friction rollers, 2, in combination with the guards, 1, rod, 4, and finger bar, A, arranged and operating substantially as and for the purposes set forth.

74,192.—WINDOW SASH FASTENER.—Robert Bates, Cohasset, Mass.

I claim, 1st, The combination and arrangement of the standard, D, the fillet, d, and barrel, C', made substantially as described and for the purpose set forth.

2d, The housing, K, cast with the projection, M, substantially as described and for the purpose set forth.

74,193.—BEDSTEAD.—Gottlieb Beurer, Brooklyn, N. Y., assignor to himself and F. Zimmerman.

I claim constructing the sides, A A, with the posts, C C C C, and legs, D D D D, and made in halves as shown and provided with the cross bar, A, combining said halves in combination with the end pieces, B B, constructed in the manner substantially as herein shown and for the purpose described.

74,194.—HARROW.—Mathias Boshenz, Chili, Ill.

I claim, 1st, The bars, c d and y, the lever, J, the upright, K, all constructed and arranged as described and combined with the frame, A, substantially as specified and for the purpose set forth.

2d, The bars, c d and y, the lever, J, the upright, K, combined and arranged as described in combination with the rod, y", and wheel, R, substantially as described and for the purpose set forth.

3d, The rods, T, in combination with uprights, E combined, arranged and attached as described and for the purpose set forth.

4th, The cutters, F F F F F, attached as described and for the purpose set forth.

74,195.—METHOD OF PREPARING PAPER FOR WRAPPING TOBACCO, SNUFF, SOAP AND OTHER ARTICLES.—Morgan W. Brown, West Farms, N. Y. Antedated January 27, 1868.

I claim a composition of matter as herein substantially set forth and specified and its uses and application to the preparation and treatment of paper, cloth and vegetable fibrous substances, for the uses and purposes herein specified and set forth.

74,196.—HYDRO-CARBON BURNER.—Calvin Carpenter, Jr., Astoria, N. Y., assignor to H. H. Wolcott.

I claim, 1st, The within-described process of burning crude petroleum and separating from it the heavy parts fit for lubricating oil by passing currents of air up through the body of the petroleum to be burned said petroleum being made to float on water, substantially as and for the purposes set forth.

2d, The arrangement of one or more cisterns, B, surrounded by a water jacket, C, and provided with air bonnets, b, below and with pipes, e, to draw off the heavy oil, substantially as herein described.

3d, The arrangement and combination of the slide, l, with the cisterns or cisterns, B, in the burner, A, substantially as and for the purpose set forth.

4th, The arrangement of a rose, j, over each of the cisterns, B, in combination with the air bonnets, b, below, substantially as and for the purpose described.

5th, The escape apertures, g, in the water jacket, C, surrounding the cistern or cisterns, B, substantially as and for the purpose set forth.

74,197.—BELT PUNCH.—James T. Carson, Greensboro, N. C. Antedated January 6, 1868.

I claim the combination belt punch, constructed as described, consisting of the awl, A, having the handle, B, split to receive the knife blade, E, the adjustable hammer, D, carrying the punch, C, with its ears, b, fitting over said handle and pivoted thereto, the spring, f, secured, at d, in the handle, B, and operating the knife blade and punch, substantially as herein set forth for the purpose specified.

74,198.—WAGON BRAKE.—E. M. Chumard, Pittston, Pa.

I claim, 1st, The arrangement of the roller, R, with the arms, n and h, and the brake bar, F, when constructed in the manner substantially as and for the purposes herein specified.

2d, The slide, m, constructed as described and used with the brake bar, F, in the manner substantially as and for the purposes set forth.

74,199.—CORKSCREW.—Seth E. Clapp, Cambridge, assignor to himself and Charles L. Ridgway, Boston, Mass.

I claim the sleeve, E, and stud, F, or their mechanical equivalent, in combination with the jointed corkscrew, B C, substantially as described and for the purpose set forth.

74,200.—FLOUR AND MEAL CHEST.—T. J. Corr, Carlinville, Ill.

I claim the rectangular box, A, with partition, b, and sliding cover, d, by means of grooves, e e, drawers, c c, and inclined lid, f, all constructed and used substantially as and for the purposes set forth.

74,201.—CLOTHES WRINGER.—E. Hall Covel, N. Y. city.

I claim, 1st, The chamber in the upper part of the frame for holding the ball in combination with the cup, h, above the ball, for the purposes herein recited.

2d, The ball, f, made of rubber or some elastic material for forming a spring bearing for the rollers, substantially as described.

3d, The double inclined box, g, for the adjustment of the rollers in combination with the ball, f, as and for the purpose specified.

74,202.—CLEANER FOR DRAWING ROLLERS.—Daniel Crowley, Philadelphia, Pa., assignor to himself and J. Stanley Bruner.

I claim the combination of cleaners, B B, constructed as described with the rollers, A A, substantially as and for the purpose herein specified.

74,203.—LINE FASTENER.—W. P. W. Dana, Newport, R. I.

I claim, 1st, A line fastener in which the griping hook, or its equivalent, is combined with a vibratory arm to which it is pivoted or hinged substantially as described so that the strain of the tightened rope which passes under the hook shall force together the said hook and vibratory arm and cause the rope to be griped and held between them, as set forth.

2d, In combination with an arm or bar capable of a vibratory motion as set forth, the double hook or griper with or without the spring by which said hook is held in position, substantially as herein shown and described.

3d, The line fastener herein described in combination with a pulley and pulley block, under the arrangement and for operation as set forth.

74,204.—WATER GAGE.—Clarence Delafield, Factoryville, N. Y.

I claim, The use of a funnel-shaped tube fitted with a valve and combined with the boiler shell substantially as described by which the escape of the steam around the valve steam is stopped and the motion of the float and dial point provided for.

2d, The whistle, a, in combination with the valve stem when said valve is made with a hole through the same leading from and matching with a hole in the valve seat and discharging in the whistle, substantially as described, by which the escape of steam is regulated and made to sound an alarm at a certain stage of the water.

74,205.—MEDICAL COMPOUND.—Charles A. F. Dietz, New York city.

I claim a medical compound, made as herein described.

74,206.—MACHINE FOR GRINDING THE ROLLS OF ROLLING MILLS.—Henry Disston, Philadelphia, Pa.

I claim, 1st, A plate, E, secured to the frame of a rolling mill and having a guide for receiving a traversing slide which carries a grindstone or the grinding wheel to which a rotary motion is imparted, all substantially as and for the purpose herein set forth.

2d, The plate, E, in combination with the within-described devices, or equivalent devices, whereby it can be made to assume different curves, as and for the purpose specified.

74,207.—BRICK MACHINE.—David P. Dobbins and John S. Richards, Erie, Pa., and James Sangster, Buffalo, N. Y.

We claim, 1st, The combination and arrangement of the mechanism for regulating the size of the mold while open consisting of the adjustable strap, S, keys, W X and Y, for holding said strap in position, substantially as herein described.

2d, Also the friction rollers, P, when in combination with and connected directly to the sliding molds, O, as and for the purposes described.

3d, Also the stationary perforated platen or platens, E, in combination with the friction rollers, O, the sliding molds, U, and cam, No. 2, substantially as and for the purposes herein described.

4th, The combination and arrangement of the rods or arms, D' and C', for the purpose of keeping the litters, A', in a vertical position and to prevent the parts from being clogged up while working, substantially as described.

5th, The arrangement of the cams, 1 2 3 and 4, on the wheels, J, so as to produce from one set of wheels and one set of cams on each wheel the alternate reciprocating motions of the sliding molds at opposite ends of the machine, substantially as herein described.

6th, Also the pin, Z, or its equivalent, substantially as herein described.

7th, The arrangement of the frame, N, for supporting the upper gearing and affording a shield to the wheels, J, substantially as herein described.

74,208.—HARVESTER.—Rufus Dutton, New York city.

I claim, 1st, Making the foot board and tool box of harvesters of a single metallic piece when such foot-board at the same time forms a support for the seat spring and seat, substantially as and for the purposes set forth.

2d, Supporting the seat by means of a main spring, Z'", in combination with a spring brace, Z', arranged with respect to each other, substantially as described, both being rigidly attached to the frame or foot-board and at their other ends to the seat and having a short intermediate spring, Z", between them at their upper ends and free at its lower end, substantially as and for the purposes set forth.

3d, Extending back and upward the rear part of the foot-board to form a support or brace for the main seat spring, substantially as described.

4th, Fastening the foot board and seat springs by one and the same clasp or fastening passing around the axle or axle sleeve of the machine, substantially as set forth.

74,209.—HARVESTER.—Rufus Dutton, New York city.

I claim, 1st, In a harvesting machine having the four sides of the frame constructed of separate parts and rigidly fastened together, making one side of such frame encase and protect all the turning shafts of the machine and another side encase the axle, for the purposes set forth.

2d, In a harvesting machine having a rectangular frame, its several sides being separate pieces and rigidly connected together, making one of the sides of such frame of two or more pieces so that they will not only constitute one of the sides of the frame but will also encase and protect the secondary gearing and pinion and shaft, substantially as and for the purposes set forth.

3d, In a harvesting machine having a rectangular or four-sided frame, its four sides rigidly fastened together making the end of the frame which is supported by the axle of the machine hollow and passing the axle through it, substantially as and for the purposes set forth.

4th, In a two-wheeled harvesting machine having a hinged finger bar and a loose pole and having the pole hinged to the frame so that the center or axis upon which the pole turns shall be the same with that upon which the frame turns attaching the draft to the front end of such frame and supporting the whiffletree or evener from the pole or shafts by a sliding or yielding support, substantially as and for the purposes set forth.

5th, Constructing the crank wheel fender so that it will be not only a guard for the crank wheel but will also support and keep the end of the connecting rod on the crank pin, substantially as and for the purposes set forth.

6th, Forming the crank fender in two parts which are hinged to and upon each other, substantially as and for the purposes set forth.

7th, The metallic piece, y, for attaching to and supporting the evener from the pole having flanges on its sides, or their equivalents, and open at the forward end so that the evener can be connected or disconnected without the use of any bolt or pin.

8th, In a machine, having two driving or supporting wheels, and having a loose pole supporting the raker's stand by the pole and behind and below the axle tree, substantially as and for the purpose set forth.

9th, The arrangement and use of the adjusting screw passing through the shifter lever, or equivalent support, and operating upon the end of the bevel wheel shaft, substantially as and for the purposes set forth.

74,210.—HARVESTER.—Rufus Dutton, New York city.

I claim, 1st, In combination with a lever for raising the finger bar, when such lever is forked, or in two parts, at its lower end, so that it will have two points or surfaces to act upon the shoe, the double sheave, VI, attached to the frame of the machine, substantially as and for the purposes set forth.

2d, The use and application of the double sheave, VI, in combination with a lever for raising the finger bar, operating substantially as and for the purposes set forth.

3d, In combination with a device for rolling or turning the points of the fingers, so attaching to the machine the hook that holds up the finger bar when folded that such hook shall receive the same motion when the points of the fingers are raised or lowered as is communicated to the shoe, for the purpose set forth.

4th, In combination with the hook that holds the finger bar when folded when such hook is so attached to the machine that it moves with the shoe when the finger bar is turned the application of a spring for holding such hook to the shoe, substantially as and for the purposes set forth.

74,211.—CUTTING APPARATUS FOR HARVESTER.—Rufus Dutton, Brooklyn, N. Y.

I claim, 1st, A knife bar having both its front and back edges depressed so as to form, when combined with the knives or cutters, recesses or openings between the edges of the knife bar and the knives and having its central part recessed or raised longitudinally from the under side, the whole constructed substantially as and for the purposes set forth.

2d, The application and use of the plate, D, arranged and held as described for holding down the front edge of the knife bar, substantially as and for the purposes set forth.

3d, In combination with such plate, D, for holding down the front edge of the knife bar, the button, E, arranged as described, for holding down the back edge of such bar.

74,212.—CUTTING APPARATUS FOR HARVESTERS.—Rufus Dutton, Brooklyn, N. Y.

I claim, 1st, Fastening or securing the leger plate between the finger and finger bar, substantially as described, without the use of a separate rivet, or its equivalent, to fasten such leger plate when the finger bar is raised or turned up on its front edge to a level with the upper surface of the leger plate and so as to form the guard or cross bar for the support of the knives.

2d, Constructing the leger plate so that a part thereof may pass between the finger and finger bar, to hold such plate in position upon the finger, and a part thereof may pass over the knife bar, to act as a button to hold down the front side of such bar, and keep the knives upon the leger plate, substantially as and for the purpose set forth.

3d, In combination with a leger plate, constructed as described in the last claim, recessing the front edge of the finger bar to receive the projecting part of the leger plate, substantially as and for the purposes set forth.

74,213.—CUTTING APPARATUS FOR HARVESTERS.—Rufus Dutton, New York city.

I claim, 1st, Constructing the finger bar of harvesters by curving and raising the front edge above the upper surface of the bar, sufficiently to give room for the knife bar, when placed on the under side of the cutters, and allow open space between such knife bar and the top of the finger bar, for the escape of dirt, grass, etc., substantially as described.

2d, Making the upper edge of the finger bar, when constructed as described in the last claim, form a continuous guard bar in front of the knife bar, substantially as and for the purposes set forth.

3d, In combination with a finger bar constructed as described, the use of a button for holding the knife bar in position, constructed substantially as described, of soft or flexible metal, with a steel or hardened surface, against which the knife bar acts, for the purposes set forth.

74,214.—APPARATUS FOR GRINDING CUTLERY.—Wm. Fosket, Meriden, Ct., assignor to Meriden Cutlery Company.

I claim constructing the matrix in machines for grinding cutlery, substantially in the manner described so that a single and direct movement only required for the matrix to present the blade to the grinding apparatus.

74,215.—CISTERN FILTERS.—Nicolas Ganner and Herman Bader, Cape Girardeau, Mo.

We claim, 1st, A filter, consisting of the parts A, B, C, D, E, F, G, and a, substantially as described.

2d, In combination with the above, the valve, H, faucet, I, and stopper, J, substantially as herein described.

74,216.—MACHINE FOR BEVELING THE EDGES OF SLATES.—Stinson Hagaman, Wiessport, Pa. Antedated Jan. 27, 1868.

I claim, 1st, The beveled grinding wheels, arranged and operating substantially as and for the purpose described.

2d, In combination with the beveled grinding wheels, the guide timbers, E E', arranged substantially as and for the purpose described.

3d, In combination, the drum, B, the belts, D and D', the beveled wheels, C and C' and the guide timbers, E and E', all arranged and operating substantially as described.

74,217.—SMELTING AND DESULPHURIZING IRON ORE.—Alexander Hamer, New York city.

I claim, 1st, The method herein described of desulphurizing both the ore and the fuel in a blast furnace, by the introduction of nearly pure hydrogen, in combination with the blast, as set forth.

2d, The method herein described of desulphurizing both the coal and the iron in a puddling furnace, by means of separate jets of hydrogen, as set forth.

74,218.—WOOD PLANING MACHINE.—David A. Harris, Ithaca, N. Y.

I claim, 1st, The arrangement and construction of the treadle, N, slotted lever, M, and cam, K, on the shaft, L, slide or frame, H, and mandrel in the slide or frame, so that the treadle raises and lets fall the tools on the mandrel, substantially as and for the purposes set forth.

2d, The arrangement and construction of the treadle, N, lever, M, shaft, L, cam, K, slide, H, and its mandrel, in connection with the slotted lever, R, rod, S, angle, T, slide, U, pulleys, W X Y, and two belts changeable by the guides V thereon, for reversing the direction of the revolution of the mandrel and tools, and bringing into action either set of tools at pleasure, substantially as and for the purposes set forth.

3d, The arrangement of the treadle, treadle lever and cam, mandrel, tools, slide, guide rod and belts, in connection with the fixing rod, P, that the changeable belts can be run and not the mandrel, or the mandrel and tools, uniformly and constantly, for any given time, substantially as set forth.

74,219.—HOSE COUPLING.—Charles F. Hartwig (assignor to himself and George R. Kelsey), West Meriden, Ct.

I claim the arrangement of the ring, G, provided with its flange, H, upon the part, A, in combination with the ring, E, constructed so as to operate substantially as set forth.

74,220.—PADLOCK.—Wm. Harvey, Albany, N. Y. Antedated Sept. 12, 1867.

I claim the combination of the pivoted tumblers or bolts, C D, with the spring I, constructed, arranged and operating substantially as described.

74,221.—BUTTER DISH.—Westel E. Hawkins (assignor to Simpson, Hall, Miller & Co.), Wallingford, Ct.

I claim the arrangement of the projection, d, upon the bearings, combined with the groove, f, in the knob around the trunnion, so as to operate in the manner substantially as described.

74,222.—WHIFFLETREE HOOK.—W. H. Hawley, Utica, N. Y.

I claim the whiffletree hook, composed of the thimble, A, hook, B, and latch or stop, C, constructed and operating in combination, substantially as described, and for the uses and purposes mentioned.

74,223.—WHIFFLETREE HOOK.—W. H. Hawley, Utica, N. Y.

I claim the whiffletree hook, constructed of the thimble, A, with the curved end, D and E, in combination of the ring, B, and hook, C, all constructed and arranged substantially as described, and for the uses and purposes mentioned.

74,224.—BRUSH HANDLE.—George Hergesheimer (asssignor to himself and Cornelius V. Foote), Philadelphia, Pa.

I claim the arrangement of brush bridle, B, with the suction cup, S C, and flanges, F L, constructed and operating in the manner and for the purpose as herein set forth and described.

74,225.—COMPOSITION OF MATTER FOR FORMING ORNAMENTS, ETC.—Eugenius A. Hildreth, Wheeling, W. Va.

I claim, 1st, The method herein described of molding saw dust, or pulverized wood, into shapes and forms that will become hard and strong, that is to say, by mixing the said saw dust or pulverized wood with a solution of silicate of soda or potassa into a plastic mass, and then molding the same, substantially as described.

2d, The method of immersing or saturating objects molded from saw dust or pulverized wood, and silicate of soda or potassa, as above described, in a solution of the chloride of magnesium, barium, calcium, ammonium, zinc, iron, lead, or copper, or equivalent decomposing salt, while in a soft or plastic state, substantially as and for the purpose set forth.

3d, As a new article of manufacture, architectural ornaments, and other similar hard substances, composed of saw dust or pulverized wood, cemented together by sillicates, and molded into forms, substantially as herein described.

74,226.—HAY LOADER.—Harvey Hull, West Exeter, N. Y.

I claim a hay-loading wagon, so constructed that the draft horses may travel over the same, and draw it from either end, substantially as described.

74,227.—OPERATING WINDOW SHUTTER.—Sewell E. Jewett, Haverhill, Mass.

I claim, 1st, The peculiar construction of cam, C, especially with reference to the projecting point, J, as shown in fig. 2, when applied to and used for the purpose of opening and closing a window shutter.

2d, In combination with said cam, C, knob, K, interior and exterior escutcheons, E and E', slotted connecting bar, B, vibrating pin, P, and lever plate, L, all operating as specified, and for the purpose as set forth.

74,228.—COOKING STOVE.—John L. Kastendike, Albany, N.Y.

I claim, 1st, The combination of the hot air chamber, B, hot air flues, I I I J m, and valves, l n, with the smoke flues, substantially as set forth.

2d, The axis, P, provided with the triangular plates or "rakers," q q, in combination with the divided frame, N N, arms, y, and lever, z, arranged and operating substantially in the manner and for the purpose specified.

74,229.—MANUFACTURE OF BOOTS AND SHOES.—Wm. Keats and John Keats, Leek, England. Patented in England, April 14, 1863.

We claim the construction of boots, shoes, or other coverings for the feet, with an insole, a welt, and an upper, first stitched together and afterwards stitched or otherwise connected to a bottom or outer sole, substantially as described and illustrated in the drawings.

74,230.—GAS GENERATOR.—Ferdinand King, Richmond, Va., assignor to himself and C. W. Neudecker.

I claim, 1st, The method herein described of producing carburetted hydrogen gas, by introducing dissolved tar, or its equivalent, and steam, into a red hot gas generating retort, substantially as set forth.

2d, The improved gas generator herein described, constructed and operating substantially as set forth.

3d, In an apparatus for generating gas from dissolved tar or other liquid hydrocarbon, in a heated retort, a jet of steam introduced into said retort, to act chemically in modifying the gas generated as described, and mechanically to force the gas from the retort, as set forth.

4th, In combination with the retort, A, and a tar reservoir, the two vessels, D and E, and the pipe, C, constructed and arranged substantially as described, for introducing the dissolved tar into the retort.

74,231.—HAND CORN PLANTER.—J. S. Lawson, Disco, Mich.

I claim a combination of all the principal parts above described, essentially and for the purposes set forth, constituting an entire machine.

74,232.—BAG HOLDING APPARATUS.—J. S. Lehman, Mount Joy, Pa.

I claim the construction of the flanged or slotted jaws, B B, clamping rod, D, and spring, E, with the angular frame, C, in combination with the truck frame, A, all arranged and operating as and for the purpose herein described.

74,233.—MACHINE FOR MAKING WIRE SPRINGS.—David Mansel (assignor to himself and Willard Mansel), Boston, Mass. Antedated Jan. 24, 1868.

I claim the couplings, B and C, with the thimble, D, in combination with frame, A, as and for the purposes specified.

74,234.—DEVICE FOR OBTAINING MOTION BY MEANS OF FRICTION.—Samuel Marden, Newton, Mass.

I claim the wheel, A, with its rim, a, in combination with the lever, D, and the pawl, l, substantially as described.

74,235.—CAR BRAKE.—Samuel Marden, Newton, Mass.

I claim, 1st, The stationary abutment, a, with its spline, f, in combination with the wedge brake, c, with its groove, e, substantially as described.

2d, The levers, C C, in combination with the brake wedge, c, substantially as described.

3d, The wedge brake, c, with its projection or cam brake, d, for the purpose of operating on the periphery of the flange, as well as on the tread of the wheel.

4th, The wedge brake, c, constructed, arranged and operated substantially as described.

74,236.—ICE CUTTER.—George R. Marvin, Keokuk, Iowa.—Antedated Jan. 20, 1868.

I claim the improved ice cutter, formed of a box, A A A', and the cutter, B, with teeth, F, and a hand lever, C, in combination with the toothed ice cutter, B, and stop bars, G G, substantially as and for the purpose set forth.

74,237.—MODE OF FASTENING TEETH.—John A. Mason, Keokuk, Iowa.

I claim the construction of fastenings for artificial teeth, substantially in the manner and for the purposes described.

74,238.—GANG PLOW.—W. W. Mathews, Yates City, Ill.

I claim, 1st, The braces, a a, draught bars, b b, standards, c c, constructed and in combination substantially as shown, for the uses and purposes herein set forth.

2d, The method of raising, lowering and securing the front end of plow beams by means of the levers, e and K, pin r, clevises h h, draught bar i, cog-wheels, m and n n, with their friction rollers, flanges, the lock o, crank lever p, and treadle, q, or by any means substantially the same, all in combination and as shown, for the uses and purposes herein set forth.

74,239.—MACHINE FOR GRADUATING RULES.—Norman Millington, Shaftsbury, Vt.

I claim, 1st, The changeable ratchet, K, arranged and operating substantially as and for the purpose herein set forth.

2d, The gage wheel, M, arranged and operating relatively to the carriage, C, and its connections, substantially as and for the purpose herein specified.

3d, The count wheel, N, having changeable pins, combined and arranged to operate relatively to the gage wheel, M, the graver carriage, C, and to the operating pawl, P, all substantially as and for the purpose herein specified.

4th, The spring, O, arranged and operating relatively to the count wheel, N, the gage wheel, M, and to the carriage, C, or equivalent part, and the motion of which is controlled by the gage wheel, all substantially as and for the purpose herein specified.

5th, The pin, d, on the eccentric strap, D, sliding in the hinged arm, C1, of the graver carriage, C, in combination with the gaging means, M, or its equivalent, adapted to allow the carriage to retreat different distances, all substantially as herein set forth.

6th, The levers, S, mounted and arranged as represented, adapted to support each other by direct contact both at the front and rear, and allowing the tool holders, T, to be adjusted laterally thereon, substantially as herein specified.

7th, The spring, X, pin, x, and hollow adjusting screw, Y, or its equivalent, arranged and operating relatively to the lever, S, and its connections, turning on the cylindrical rod, s, substantially in the manner and for the purpose herein set forth.

8th, Lifting and holding the rule in the path of the gravers by means of the short armed rock shaft, R3 R4 R5, and its connections, constructed, arranged and operating as and for the purpose herein set forth.

9th, The wedge headed bolt, W, operating as represented, relatively to the triangular graver, V, and with the tool holder, T, and its connections, mounted and arranged in the machine substantially as and for the purpose herein specified.

74,240.—CAR BRAKE.—Joseph H. Moore and Joseph E. Cary, Chicago, Ill.

We claim, 1st, The combination of the chain, I, wheel, K, and shaft, H, with the jointed arms, n o, and with an arm or arms, J, all operating substantially in the manner and for the purposes specified.

2d, The combination of the cord, N with the rock shaft, K, with its arms, L and b, and the arms, J, operating substantially in the manner and for the purposes specified.

3d, The combination of the cord, N', and prop, C, with the cord, N, and arm, L, operating substantially in the manner and for the purposes specified.

74,241.—SPRING PUNCH.—Albert U. Noble, Kalamazoo, Mich.

I claim the form and construction of the revolving head, and punches attached, as herein described, in combination with the spring side bars for holding and mounting the same, substantially as herein set forth.

74,242.—COTTON PICKER.—Charles Payne, Brandon, Vt., and Bennet Vandecar, Waterford, N. Y.

We claim, 1st, Removing cotton from the bolls by blowing it off away from the air pipes, in contradistinction to drawing it into the air pipes by suction, substantially as shown.

2d, The combination of a fan, or its equivalent, with elastic or flexible pipes or tubes, E, and a sliding frame, F, to raise or lower their nozzles, substantially as and for the purpose described.

3d, The combination of the rotating spindles, J, in the sliding frame, F, with the nozzles of the pipes, E, substantially as described.

4th, The extension, A', of the frame of the machine, in combination with the sliding frame, F, and the bag, N, substantially as described.

5th, The combination of the air pipes, E, of the bag, N, which receives the cotton blown off the stalks of the plants, substantially as described.

74,243.—WEDGE BUCKLE.—Martin W. Pond, Jr., and Alexander T. Ballantine, Titusville, Pa.

We claim as a new article of manufacture, a wedge buckle, consisting substantially of the body, a, wedge plate, b, eccentric clamp, c, and cross bar, d, or its equivalent, when said clamp, c, is so arranged as to compress and guide the wedge plate when closed, and release it when opened, and the wedge plate, b, so arranged as to move in a converging line with relation to the body, a, and to close upon and tighten its hold on the trace or strap as the draught is increased, substantially in the manner and for the purposes set forth.

74,244.—VENT FOR SHEET METAL CANS.—Robert Porter, Philadelphia, Pa.

I claim a sheet metal can provided with an attached vent plug, C, having stays, c' c', fixed to its lower end, so as to prevent the said plug from being detached or entirely withdrawn from its cylindrical tube, b', and at the same time allow of its being elevated sufficiently therein to vent the can, as occasion may require, as described and set forth.

74,245.—WRENCH.—Thomas Pratt, Valparaiso, Ind. Antedated Feb. 5, 1868.

I claim a wrench, in which the jaw, A, is formed by a solid extension of the handle, and the movable jaw, B, is connected therewith by the stem, C, passing through a mortise at the base of the jaw, A, being retained in place by the pressure of the eccentric cam lever and spring, D, upon the side thereof, substantially as set forth.

74,246.—CIGAR.—Charles Quartley, Baltimore, Md.

I claim as a new article of manufacture, the cigar or cigarette having the ends coated with the composition herein described, and providing it with a ruminating compound, as and for the purpose set forth.

74,247.—PRESERVING AND PACKING MEAT.—C. E. Richardson, Cambridge, Mass.

I claim the within described process of preserving animal matter, under high temperatures, from putrefaction.

74,248.—IMPLEMENT FOR CUTTING TOBACCO AND OTHER SUBSTANCES.—Daniel T. Robinson, Boston, Mass.

I claim the above described implement for cutting tobacco, consisting of the block or bed, A, post a, lever b, and knife d, the knife being constructed with the slot, e, and provided with the roller, f, or its equivalent, for actuating its movements, and supported within the guide, l, the whole being constructed and operating substantially as herein shown and described.

74,249.—CAP FOR PRESERVE JARS.—S. B. Rowley, Philadelphia, Pa.

I claim a cap for preserve jars consisting of a thin metal plate, formed and corrugated as specified.

74,250.—MEANS FOR STIFFENING ARTICLES OF WEARING APPAREL.—John Sloan (assignor to himself, John H. Jones, and John Given), Philadelphia, Pa.

I claim the stiffener, a b c and a' b' c' d' e', made out of india-rubber, gutta percha, or any equivalent elastic substance, constructed or molded in one piece, in the manner and for the purpose above set forth and described.

74,251.—TILTING WAGON.—Geo. R. Sneath and Charles H. Sneath, Wilmington, Del.

We claim, 1st, The pivots, a a, in combination with the sills, B B, and bent axle, D D D, constructed as described, for the purpose set forth.

2d, Also the lever, L, arranged and constructed as described, for the object already specified.

74,252.—FRUIT FRAME.—Chester Stone, Ravenna, Ohio.

I claim the braces, C D, in combination with the standards, A, and slats, B, when arranged and pivoted together as described, substantially as and for the purpose set forth.

74,253.—WAGON FOR LOADING LOGS, STONE, AND HAY.—James Sutherland, Morris, Ill.

I claim the construction and arrangement of the stationary grooved upright, B, sliding elongated ratchet, C, lever, E, and pawls, b and D, swinging lever, G, and grappling iron, H, in combination with a wagon, substantially in the manner and for the purpose as herein set forth.

74,254.—WATER METER.—John Taggart, Roxbury, assignor to himself and Daniel C. Holder, Dorchester, Mass.

I claim the improved meter consisting of the case, with its induction and eduction passages, and the wheel, arranged as specified, and the air chamber or vessel to open into the case, as set forth.

Also the arrangement of the air chamber or vessel between the wheel case and the case of the registering mechanism.

Also the combination for actuating each of the ratchets, the same consisting not only of a cam or stud applied to a rotary shaft or to a ratchet, but of a lever formed with an inflexible arm, and the other a flexible or bowed spring, to operate as set forth.

Also the combination and arrangement of the stellated indicator, F, with the case, C, and the series of ratchets or rotary measuring wheels, arranged within the case, and provided with mechanism for operating them, substantially as described.

74,255.—CAR FOR TRANSPORTING AND DRYING PEAT.—Daniel E. Teal, Norwich, N. Y.

I claim the carriage consisting of the car constructed as described, provided with wheels attached thereto, by means of the hooks, h, so formed as to embrace and support the cross pieces, a, arranged substantially in the manner set forth and described.

74,256.—ANIMAL TRAP.—A. C. Thomas, Camp Charlotte, O.

I claim the combination of the pitfall, A, and wicker, E, and spring, C, in the manner and for the purpose substantially set forth.

74,257.—PACKING EGGS, ETC.—Abner Thomas, Ulysses, N.Y.

I claim, 1st, The arrangement of coils of wire, so made as to embrace each egg separately, and the fixing the coils of wire, at close intervals to each other, to shelves or partitions, so as virtually to be as described.

2d, The combination with the said coils of wire and shelves or partitions, of cloth, felt, or other padding, on the sides of the shelves next the mouths of the coils of wire, as described.

3d, The combination of the box or case, A, the shelves, C, the coils, H, the padding, E, and cover, B, as described.

74,258.—SLEEVE FOR BRUSHES.—John S. Tilton, Philadelphia, Pa.

I claim a sleeve consisting of a tube or strip of canvas or equivalent material having at its lower edge an annular metal spring, n, as and for the purpose described.

74,259.—ICE CREAM FREEZER.—John Tingley, Philadelphia, Pa.

I claim, 1st, The vessel, E, its dasher spindle, G, and wheel, m, in combination with the outer revolving vessel, C, and the stationary disk or wheel, B, the whole being constructed and arranged for joint action substantially as and for the purpose herein set forth.

2d, The within described dasher, composed arms, p and p', adapted to the spindle, G, and elastic scrapers, s, on spindles hung to the said arms, all substantially as and for the purpose herein set forth.

74,260.—REMOVING INK AND COLORS FROM PRINTED PAPER.—Joseph A. Veazie, Boston, Mass.

I claim the within described saponaceous composition for removing ink or colors from printed paper, and dirt from rags, etc., without injury to the pulp, so that the same can be used repeatedly for the manufacture of white paper, substantially as described.

74,261.—HAND CARD.—R. H. Waite, Hubbardston, Mass.

I claim the combination with the back, A, of the handle, B, in the peculiar manner above described, and as shown in the accompanying drawings, for the purposes stated.

74,262.—BEDSTEAD SLAT.—Otis H. Weed, Charlestown, Mass.

I claim the combination of the spring B, of flat tempered steel, with the slat A, when the spring is constructed with a double curvature, the center resting against the slat, as shown, and arranged to operate substantially as and for the purpose described.

74,263.—BRANDING INSTRUMENT.—Nelson J. Wemmer and John P. Wemmer, Philadelphia, Pa.

We claim, 1st, An adjustable holder constructed for the reception and retention of a plate or other object to be branded, in combination with a stationary branding iron, heated by the apparatus described, or its equivalent, all substantially as set forth.

2d, The adjustable guides, L L, in combination with the plate, K, substantially as and for the purpose specified.

74,264.—ANIMAL TRAP.—Charles Zaiser, Newark, N. J.

I claim, 1st, The elastic or yielding fulcrum, D, in combination with the setting rod or detent, C, substantially as described.

2d, The arrangement of the setting rod, C, loosely in the staple, E, and also in the hole, F, of door, B, substantially as described.

74,265.—DEVICE FOR CONVERTING MOTION.—Wm. H. Abel, Greenville, R. I.

I claim, 1st, The cylinder, A, constructed substantially as shown and described, viz., with annular grooves, m and n, and provided with slides, e, shipper, B, and pin, c, or a tumbling lever, y, or the equivalent thereof, said cylinder or pulley being applied to a central shaft, W, and arranged for operation substantially as and for the purpose or purposes set forth.

2d, The cord or chain, a, applied to the slides, e, and pulley, b, in the manner and for the purpose substantially as specified.

3d, The oscillating lever, C, constructed as shown and described, and arranged for operation substantially in the manner and for the purposes set forth.

4th, The supporting plate, I, and stud, h, made adjustable by means of the slot, K, and nut, g, as and for the purpose substantially as specified.

5th, The adjustable stops, S, secured to the plate, I, as and for the purpose specified.

6th, The combination of the cylinder, A, with the slides, e, and shipper, B, and the cord or chain, a, pulley, b, oscillating lever, C, plate, I, stud, h, and stops, S, all arranged substantially as and for the purpose set forth.

74,266.—KNITTING MACHINE.—Wm. H. Abel, Greenville, R.I.

I claim, 1st, The employment of the stationary bar, g, in the manner and for the purpose set forth.

2d, Liberating and depressing the comb bars, and replacing the same by means of the rod, h, and the spring, l, substantially as and for the purpose specified.

3d, Combining the needles, f, and the selvedge hooks with the jacks, e, in the manner and for the purpose specified.

4th, The combination of the cam, E, roller stud, n, rocking levers, G, pivoted shaft, S, clamp, T, arm, S, set screw, 9, with the vertical needles, all arranged to operate substantially as and for the purpose set forth.

5th, The combination of all the parts, arranged to operate substantially as and for the purpose set forth.

74,267.—COMBINED PLOW AND ROLLERS.—J. A. Alley, Clifty, Ind.

I claim, 1st, The combination and arrangement of the short rollers, C, frame, A, rigid plow standards, I, and pivoted plow standards, J, with each other, substantially as herein shown and described and for the purpose set forth.

2d, Operating the pivoted plow standards, J, to guide the plows, by means of a lever, O, pivoted to the upper end of one of the said standards, and to a support, P, attached to the frame, A, substantially as herein shown and described.

74,268.—SULKY PLOW.—A. Q. Allis, Dayton, Ohio.

I claim, 1st, The serrated link, B, or its equivalent, for the purposes and substantially as herein described.

2d, The lever and bar, D, or its equivalent, used for the purpose substantially as herein set forth.

3d, The combination and arrangement of the guide bars, F, and the catch and lever, G, for the purpose and substantially as herein set forth.

4th, The combination of the several parts, for the purpose and substantially as herein set forth.

74,269.—STEAM GENERATOR.—V. D. Anderson, Milton, Wis.

I claim the combination and arrangement of the fire box, B, having double walls, a, grate, G, and apertures, d, with the water jacket, J, automatic feeder, D N o m, reservoir, C, alarm, E P r, pipes, L p, water gage, S, and casing A, all constructed and operating substantially as and for the purpose set forth.

74,270.—HOT AIR FURNACE.—Henry Arden, Cincinnati, O.

I claim, 1st, The provision in an air heating furnace, of the annular fire chamber, F, constructed as described, and provided with fuel-feeding passages, L L', substantially as set forth.

2d, The ash pit, B, with sloping sides and central trench, formed and arranged as set forth.

3d, The arrangement of the air heating furnace, A B C D E, fire chamber, F, and imperforate central pier, K, for the purpose explained.

4th, In combination with the foregoing, the annular deflecting plate, H', with the air inlet, H, and hot air chamber, G, as and for the purpose set forth.

5th, The doors, N N, formed and arranged as shown, in combination with the grate, G, and imperforate pier, K, annular fire chamber, F, and draft tubes, Q, as set forth.

74,271.—LAMP.—Alonzo C. Arnold and Ebenezer Blackman, Norwalk, Conn.

We claim the glass chimney, A, formed as herein described, in combination with the arrangements of the vertical springs, D, flat perforated base, G, and cone, B, in the manner substantially as and for the purpose herein set forth.

74,272.—HARVESTER CUTTER.—Jearum Atkins, Mokena, Ill.

I claim, 1st, The U-shaped metal back or knife bar, A, in combination with and for the purpose of holding adjustable or removable cutters for harvesters, as described.

2d, The mode of constructing cutter blades in alternate sections, E and G, dovetailed in the manner described, so that the section, G, acts as a key to hold the adjoining sections, E and F, substantially as described and set forth.

3d, In combination with a U-shaped knife bar, the modes described for fastening the sections by the hook, b, either with or without a pin and screw, substantially as described and set forth.

74,273.—WHIFFLETREE.—Dinsmore Austin, Underhill, Vt., assignor to himself and Homer Rawson.

I claim, 1st, The movable pin, a, in combination with the spiral spring, c, when used as and for the purpose specified.

2d, The spring, C, provided with a flange, l, and shoulder, x, in combination with the spiral spring, c, when used as and for the purpose set forth.

74,274.—WHIFFLETREE TUG.—Dinsmore Austin, Underhill, assignor to himself and Homer Rawson, Jericho, Vt.

I claim, 1st, The lever, B, pivoted to an arm, D, attached to the end of a swingle tree, and provided with two prongs or hooks, b b, constructed substantially as and for the purposes specified.

2d, The combination of the two-pronged lever, B, with the hollow arm, D, the spring, f, and swingle tree, A, when used as and for the purpose set forth.

74,275.—SHAFT COUPLING.—Dinsmore Austin, Underhill, assignor to himself and Homer Rawson, Chittenden, Vt.

I claim the forked bar, C, in combination with the spiral spring, f, and clip, B, constructed substantially as and used for the purpose specified.

74,276.—BLACKING BOX HOLDER.—Charles R. Bacon, and George D. Clark, Newark, N. J.

We claim a holder for blacking boxes, consisting of the frame, R, legs, L, clamp or slide, C, and screw, M, when constructed substantially as herein set forth.

74,277.—SAW MILL.—John Baillie, Salem, Ohio.

I claim, 1st, The plane irons, E, bifurcated pitman, D, as arranged, in combination with the beam, C, in the manner and for the purpose substantially as set forth.

2d, The saw, M, as arranged in combination with the beam, C, and radial arm, J in the manner and for the purpose set forth.

3d, The arrangement and combination of the adjustable feed roller, P, link, V, pinions, J T, and stationary roller, P', constructed and operating in the manner substantially as set forth.

74,278.—MACHINE FOR CUTTING ICE.—John Baker, Philadelphia, Pa.

I claim, 1st, A traction engine, carrying and operating saws for cutting ice, substantially as described.

2d, So arranging the saws, E, in connection with the ice-cutting machine, that they may be adjusted vertically, for cutting to a greater or less depth, as may be desired, substantially as set forth.

3d, The swivelled lever-jack, a, located under the body of the machine, in such a position and manner that the machine may be raised and turned thereon, substantially as set forth.

74,279.—HANDLE FOR POCKET CUTLERY.—Stephen Barnes (assignor to self, W. S. Sanford, and John Gardiner), New Haven, Conn.

I claim, 1st, The arrangement of the tubes, b, or blocks, a, upon the plate, A, so as to receive the rivets which secure the blades and the two sides of the handle together, substantially as and for the purpose herein set forth.

2d, The introduction of a strengthening wire, d, within the composition of the handle, in the manner described.

74,280.—SKATE.—Philip G. Beckley (assignor to Frederick Stevens), Newark, N. J.

I claim the clamp levers, G G, and H H, in combination with the nuts, I I, and the right and left screw shaft, C, constructed and operating as and for the purpose set forth.

74,281.—APPARATUS FOR WASHING GOLD ORE.—Seth L. Beckwith, San Francisco, Cal.

I claim, 1st, The device for imparting to the pans, E F G, the peculiar swinging motion used for separating metals when only mechanically mixed by hanging them to rotating upright crank shafts, in manner substantially as and for the purposes above set forth and described.

2d, The pan, E, provided with a double bottom, whereof the upper one is arched and perforated, and the lower funnel shaped, in manner substantially as above set forth and described.

3d, The pan, F, divided into chambers, substantially as above described the walls whereof are crowned by the overhanging ridges, b, in manner substantially as above set forth and described.

74,282.—POTATO-BAKER.—Charles H. Beeman, 2d, North Fairfax, Vt.

I claim, as a new article of manufacture, a potato-baker, constructed as described, consisting of the upper and lower rims, B B', connected by inclined stands, C, the longitudinal grate bars, A, surrounded by the rim, B', all arranged and operating as described, for the purpose specified.

74,283.—DOOR LOCK.—Jacob Behel, Rockford, Ill.

I claim, 1st, The application of tumblers to the bolt of a lock in such manner that while the bolt can be operated from both sides of the lock case, this bolt can only be unlocked from that side of the case from which it was locked, substantially as described.

2d, Providing a lock with tumblers and an exposed latch lever, so arranged that the bolt can be locked and unlocked from both sides of the lock case and, when desired, so adjusted that it can be locked from either side of the case, but unlocked only from that side of the case from which it was locked substantially as described.

3d, The twin tumblers, D D, applied to a bolt, C, in combination with a latching device, which is so arranged that the tumblers can be connected together or disconnected from each other, at pleasure, substantially as described.

4th, The key guard, G, with its key-studs, l, arranged centrally with respect to the bolt, C, and its twin tumblers, D D, in conjunction with a device which will admit of said tumblers being connected together or disconnected, at pleasure, substantially as described.

5th, The combination of the spring, B1, lever, B', and hub, J, with the reversible latch, B, constructed and arranged substantially as described.

74,284.—CHILDREN'S CARRIAGE.—Julius Bein and William Ulrich, Newark, N. J.

We claim, 1st, In the children's carriage, the reversible seat and top, constructed substantially as herein specified.

2d, Pivoting the top, E, of a children's carriage, to bars, F F, which are pivoted to the sides of the carriage body, substantially as herein shown and described.

3d, Providing the L-shaped seat, D, of a children's carriage, with pins, c c, which fit into grooves, d, in the sides of the carriage body, substantially as described, so that the seat can be easily reversed, as set forth.

74,285.—CONSTRUCTION OF ICE PITCHER.—William Bellamy, Newark, N. J.

I claim, 1st, The fitting and securing of the bottom, a, to the inner case, B, by a vertical flange, b, fitted within the lower end of the case, and secured thereto by solder, in connection with the hoop, c, fitted on the exterior of the lower end of the case, and soldered thereto, substantially as and for the purpose specified.

2d, The two bases, C D, fitted one within the other, with a space between their upper parts, in combination with the bottom, a, of the inner case, B, resting on C, substantially as and for the purpose set forth.

3d, The combination of the external and internal cases, A B, with bases, f C D, and the bottom, a, of the internal case, B, and the hoop, c, around the lower part of the internal case, B, all constructed and arranged substantially in the manner as and for the purpose specified.

74,286.—FORMING BLOCKS FOR MUFFS.—Ernst W. L. Bellander, Jersey city, N. J.

I claim an expansible muff former, consisting of a series of blocks, arranged as described, and operated by the left and right hand screw and nuts, so as to expand both longitudinally and radially, or either way alone, at will, as set forth.

74,287.—WHIFFLETREE.—L. G. Binkly, Fairview, Ohio.

I claim a whiffletree, constructed of a single bar, A, sliding backward and forward in a socket or coupling, G, and operating against a spring, S, arranged in front of it, substantially as and for the purpose set forth.

74,288.—GREASE OR SIZING.—George Birtwistle, and Robert Birtwistle, Fall River, Mass.

We claim, 1st, The combination of soap and soda ash, in the proportions above described, for the purposes named.

2d, The use of soap alone, as an agent, when applied to any starch or sizing for the purpose above described.

74,289.—SEWING-MACHINE.—Lyman R. Blake, Boston, Mass. Antedated December 1, 1867.

I claim, in combination with the loop mechanism, containing the work-supporting arm and the feed and stitch-forming mechanism, the guide sleeve, h, arranged and operating substantially as set forth.

74,290.—MACHINE FOR SOLDERING TIN CANS.—John G. Borden, Brewster Station, N. Y.

I claim, 1st, The plate, A, provided with two recesses or reservoirs, a b, for holding the solder and block, C, respectively, substantially as herein shown and described.

2d, The block, C, when made to fit the recess, b, in the plate, A, and when provided with a recess or cavity, d, to receive the edge of the can to be soldered, substantially as herein shown and described.

3d, The arrangement of the recesses, o and e, whereby the cavity, f, in the

block, C, is connected with the solder reservoir, a, substantially as herein shown and described.

74,291.—RANGE.—D. K. Boswell, Columbus, Ohio.

I claim the herein-described stove, either bricked up in a chimney, or standing out in a room, provided with a portable or movable oven, G, water lining, F, and division plates, H f, all arranged in the manner as and for the purpose substantially as set forth.

74,292.—TOY.—Elijah C. Bracket (assignor to himself and Henry C. Genltzen), Dedham, Mass.

I claim the combination for effecting the motions of the automaton or dancer, the same consisting of the spring, the lever, and the prism, arranged together and with the dancer in manner and to operate as described.

Also, in combination with the spring, the lever, and the prism, arranged together, and with the automaton as explained, one or more wires or springs, I I, and a sonorous helix, K, arranged within the box, and so as to be operated by the prism, in manner and under circumstances as specified.

74,293.—BED BOTTOM.—F. Stanley Bradley, New Haven, Conn.

I claim the combination of the spiral springs with the two l ars, L and M, and the cord, K, when the whole is constructed and fitted for use, substantially as herein described and set forth.

74,294.—NECK TIE HOLDER.—Francis H. Brown, Stamford, Conn.

I claim, as a new article of manufacture, a gentleman's neck tie holder, A, constructed substantially as described and so arranged that it can be attached to the neck band or collar of the shirt, either by means of a button secured to the hook itself, or forming the hook without a button, and attaching it to a stud or button affixed to the collar or neck band of the shirt, or to the removeable collar as herein shown and described.

74,295.—MOTIVE POWER.—Isaac W. Brown (assignor to himself and George D. Nettleton), Fair Haven, Conn.

I claim the elastic band, B, in combination with the gearing, substantially as herein described, for the purpose specified.

74,296.—ROW LOCK.—George W. Browne, Brooklyn, N. Y.

I claim the plate, C, and eccentric, D, when combined and operated in the manner and for the purpose described.

74,297.—PATTERN SQUARE.—Nelson W. Burnett, South Hadley, Mass.

I claim the pieces, A and B, forming right angles, in combination with the pieces, a b c, and d, placed at right angles with A and B, and adjustable relatively with each other in slots, in such manner that mortises or tenons may be marked at one adjustment of the tool upon two sides of a right-angled timber, substantially as described.

74,298.—CORN PLANTER.—Edward M. Butz, Allegheny city, Pa.

I claim the combination of the wheels, C D, e, and f, when used in connection with the lever, h, spring, i, and slide, J, the whole being constructed, arranged, combined, and operating as herein described, and for the purpose set forth.

74,299.—SYSTEM OF INDEXING FOR RECORDS.—Abner Campbell (assignor to himself and James Whitehill), Frederick, Md.

I claim the combination of the key, constructed as described, with the index, arranged as specified, for the purpose above set forth.

74,300.—MACHINE FOR OILING WOOL.—Thomas A. Campbell, New York city.

I claim the adjustable plate, P, and rotary brush, B, in combination with each other, and with the hollow cylinder, F, operating substantially as described and for the purposes set forth.

74 301.—PAPER CLIPS.—C. E. Candee, Jersey City, N. J.

I claim the point, G, and the spring, B, in combination with the pin, F, substantially as described.

74,302.—FIELD MARKER.—John M. Canterbury, Mexico, Mo.

I claim the cast metal wheel, B, having a sharp-bevelled perimeter, with square shoulders upon each side, when adjusted upon the spindle, a, by means of the set screw, b, passing through the hub of said wheel, as herein shown and described.

74,303.—AUTOMATIC FAN, TABLE CASTER, AND LAMP STAND.—T. W. Carmichael, Indianapolis, Ind.

I claim the within-described device for operating the fans, N, automatically, in combination with the cruet stand, W, and candle stand, X, all arranged and operating substantially as set forth.

74,304.—STEAK CRUSHER.—A. Castellaw, Chester, Ill.

I claim the steak crusher, constructed as described, consisting of the smooth upper roller, F, and lower corrugated roller, D, operated by the gearing, f, in the frame, the end pieces, C, of which frame are secured together by the plate k, whose center projects downward to form a scraper for the upper roller, F, as herein shown and described.

74,305.—LOCK FOR BARREL HOOPS.—J. Chase, Orange, Mass.

I claim the clasp or plate, A, having the slots, a b, formed as herein described and operating to hold the overlapping ends of the band or hoop, substantially in the manner herein shown and set forth.

74,306.—CORN SHELLER.—P. C. Chipron, Highland, Ill.

I claim, 1st, The shields, O and P, set in the frame, A, in manner and for the purpose substantially as herein shown and described.

2d, The cradle, B, having the longitudinal bars, b, and sleve, D, and suspended in the frame, A, all as set forth, and operating substantially in manner as and for the purposes described.

74,307.—HAY RAKER AND LOADER.—L. Clarke, Candor, N.Y.

I claim, 1st, The hay-loading apparatus consisting of the belts, F, provided with the teeth, a, and the cylinders, B and C, provided with the arms, b and d, all mounted in a suitable frame, and arranged to operate substantially as described.

2d, In combination with the cylinders, B C, and belts, F, all provided with the arms, as above described, the spring teeth, arranged as set forth.

74,308.—CHILD'S TOY.—Elisha T. Colburn, Boston, Mass.

I claim a figure applied to a ring or hoop, and so constructed that while it will maintain a vertical position thereon, it shall be allowed to move about upon said ring, and at the same time rotate, substantially as described.

74,309.—MACHINE FOR DRESSING STAVES.—Wm. S. Colwell, Pittsburgh, Pa.

I claim, 1st, The arrangement of the arm, n, lever, n, spring, s, lever, C1, provided with arm, D1, and rod, f1, plumber block, P, wheel, A3, feed ram, A1, and weight, w, constructed, arranged, combined, and operating as herein described and for the purpose set forth.

2d, The plumber block, P, provided with the universal or socket joint, X1, said plumber block being used in connection with shaft, l, wheel, A3, and the rack, A2, of the feed ram, A1, as herein described and for the purpose set forth.

3d, Providing the feed ram, A1, with wings, 4, which are opened or spread out by rollers, 18, and contracted by the slides, B2, as herein described and set forth.

4th, Pivoting the dressing head of a stave machine on a line with the vertical plane of the cutting edges of the knives, the whole being constructed, arranged, and operating as herein described and for the purpose set forth.

74,310.—CAST-OFF FOR SEWING MACHINES.—E. M. Comery, Hudson, Mass.

I claim the pivoted collar, a, embracing the needle, in combination with the nose, c, and arm, d, whereby the thread is prevented from passing down between said nose and the needle, as herein shown and described.

74,311.—PHOTOGRAPHIC PRINTING FRAME.—S. F. Conant and H. A. Manley, Skowhegan, Me.

We claim the block, A, in combination with the two clamps, B B, all constructed and arranged substantially in the manner as and for the purpose herein set forth.

74,312.—METALLIC COLUMN.—J. B. Cornell, New York city.

I claim the construction and arrangement with each other of the interior flanged supporting portion, a, and the exterior protecting and ornamental casing, b, substantially in the manner herein set forth.

74,313.—GRAIN SIEVE.—Jacob Corson, Clinton, N. J.

I claim, 1st, A grain sieve consisting of the combination of the adjustable sieves, F G H, with the boards, I and J, all made and operating substantially as herein shown and described.

2d, The above combination with the slide, M, made as set forth.

3d, The arrangement of the arms, B, springs, E E, and lugs, a a, for connecting the box, A, containing the sieves, with the pedestal, C, so that a shaking motion can be easily imparted to the box, A, by hand or otherwise, as set forth.

74,314.—MANUFACTURE OF SHEET IRON.—I. E. Craig, Camden, Ohio. Antedated Jan. 30, 1868.

I claim softening of iron intended to be rolled into sheets by the alloying of iron therewith.

74,315.—BUTTONHOLE CUTTER.—John S. Crane, Lake Village, N. H.

I claim the combination of cutters, C and C', constructed and operating substantially in the manner and for the purpose set forth.

74,316.—HORSE YOKE.—D. K. Croffut, Birmingham, Conn.

I claim, 1st, A solid or continuous hame, constructed so as to slip on over the collar, substantially as and for the purpose specified.

2d, The combination of the yoke, E, with bows, C, provided with the slots, F, substantially as and for the purpose set forth.

74,317.—COMPOUND FOR DESTROYING INSECTS IN TREES.—David Daniels, Fitchburg, Mass.

I claim the compounding of the fish oil and sulphur, substantially as set forth, and the application of the same to the trunks and other parts of fruit and ornamental trees.

74,318.—CLOTHES DRYER.—I. N. Deal, Brooklyn, N. Y.

I claim a clothes dryer, constructed as described, and consisting of the central upright, A, supports, B, arms, a, and hinges or pivots, a1, when the arms, a, are pivoted to opposite sides of the supports, B, and when the hinges a1, connecting each of the said arms, a, to the central post, A, are not in the same vertical line as described and for the purpose specified.

74,319.—MACHINE FOR CROZING BARRELS.—H. De Bus and Geo. Johnson, Cincinnati, Ohio.

We claim, 1st, The cutter head, D, arranged in relation to the adjustable bench, A, raised and lowered by the slide, b, as herein described, for the purpose specified.

2d, The compound vertical slide, E, and horizontal slide, F, the connecting rod, n, the swivels, p p', in which the rod works, and the adjustable slide, H, in the standard, C, combined, arranged, and operating substantially as and for the purpose described.

74,320.—PLASTER AND SEED SOWER.—David Dick and Oliver Preston, Jr., Corning, N. Y. Antedated Feb. 8, 1868.

We claim, 1st, The shaking bar, b, when provided with, e e, and stirrers, i i, in combination with cam wheels, B B, as and for the purpose set forth.

2d, The slide, D, provided with rack, g, in combination with shaft, d, and pinion, s, substantially in the manner and for the purpose specified.

3d, Also, the peculiar gear arrangement, in combination with shaft, m, provided with brushes, shaft, d, pinion, s, and slide, D, substantially in the manner and for the purposes described.

74,321.—PUMP.—Joseph W. Douglas (assignor to W. Douglas and B. Douglas), Middletown, Conn.

I claim the combination of the pump, A, air chamber, C, screw pin, H thimble, F, revolving stand, D, and tubular screw, b, all arranged as described for purpose specified.

74,322.—TRUNK LABEL.—Stephen W. Downey, Piedmont, West Va.

I claim, 1st, Inserting in the body of a trunk, box, or can, a tablet case when the same is provided with a slate, and the whole is constructed and arranged substantially as described.

2d, The spring, H, in combination with a tablet case, when the same is constructed and arranged substantially as described.

3d, The combination of the tablet case and slate, when the former is provided with a sliding top, and the whole is constructed and arranged substantially as described.

74,323.—MARKING GAGE FOR SEWING MACHINES.—Mary A. Duffy, New York city.

I claim, 1st, The combination of tucking plate, A, marking lever, F, presser foot, P, and tucking gage, D, operating together substantially as and for the purposes described.

2d, The combination of plate holder, B, tucking plate, A, marking lever, F, presser foot, P, and tucking gage, D, operating together substantially as and for the purposes explained.

3d, The combination of marking spring lever, F, with tucking plate, A, when the two are constructed, arranged with, and operated by the presser foot, substantially as described.

74,324.—WINDOW-SASH STOP.—Anthony R. Dyett, New York city.

I claim the bolts, C C', in combination with the toggle levers, D D', substantially as and for the purposes specified.

2d, The said toggle levers, in combination with the wedges, E E, or their equivalents, substantially as and for the purposes above described.

3d, The said toggle levers, in combination with the springs, J J', substantially as described.

74,325.—RAILWAY CAR.—G. W. Eddy, Waterford, N. Y.

I claim the construction and arrangement of the extra wheel, C, in connection with the car truck, in such a manner as to admit of its being used as a support and brake, and also as a revolving wheel, in the manner and for the purpose herein described.

74,326.—CORN PLANTER.—Philip Eidmann, Pekin, Ill.

I claim the arrangement of shaft, B, clutches, D D, and cams, I I, with the levers for operating the clutches with the shaft, G, arms, H H, block, H', and arms, L L, which operate the seed slides, as and for the purpose set forth.

74,327.—PLOW.—Wm. P. Everdon, Leavenworth, Ind.

I claim, 1st, The hollow plowshare adapted to excavate, elevate, and scatter the subsoil without material disturbance of the surface, substantially as set forth.

2d, The provision, upon the outside of a tubular plow, A, of the deflecting plate or guard, E, for the purpose explained.

3d, The provision of the adjustable scoop or excavator, C, at the rear lower portion of the tubular share, A, for the object stated.

74,328.—MACHINE FOR SEWING CARPET LINING.—J. Fales, Walpole, Mass.

I claim, 1st, The combination of the guide rolls, B B2, smoothing plate, H, a sewing mechanism, and feed rolls, C C', all arranged and operating substantially as set forth.

2d, The arrangement of the spring, u, adjusting screw, m, and feed roller, D', as herein described, for the purpose specified.

3d, In combination with a carpet-lining machine, constructed as described, the sewing device, smoothing plate, H, wheels, F F, hammer, d, spring, u, and set screw, m, all arranged and operating as described, for the purpose specified.

74,329.—DUST CUP FOR WATCHES.—Wesley Fenimore, Philadelphia, Pa.

I claim, 1st, A ring, E, rendered adjustable on the ring, D, of the plate, A, in respect to the cap, B, of a watch, substantially as and for the purpose herein set forth.

2d, The ring, E, reduced in diameter so as to penetrate and fit snugly in the opening of the cap, B, and having a shoulder for the said cap to bear against all as set forth.

74,330.—THRASHING MACHINE.—Felix A. Finn, Salt Point, N. Y. Antedated Feb. 6, 1868.

I claim, 1st, The inclined bottom, a, in combination with one or more cylinders, B, provided with jointed flails, all arranged substantially as and for the purpose specified.

2d, The screen, D, operated by the crank pulley, G and connecting rod, F, from one of the thrashing cylinders, substantially as and for the purpose set forth.

74,331.—CORNETS, ETC.—Isaac Fiske, Worcester, Mass.

I claim so constructing and arranging the passages through the valves, g, and the sections of pipe connected therewith, that a continuous uniform passage is secured through the pipes and valves for both the open and valve tones, said valve and pipe passages being not only uniform in diameter, but free from angles, substantially as shown and described.

Also in combination with the main pipes, r s, the valve cylinder, q, having the two pipes, t u, branching therefrom, and having its valve so arranged that connection may be made through either of said branches, thereby enabling the key of the instrument to the changed without increasing the crooks or detracting from the tone of the instrument.

74,332.—SEPARATING FIBERS FROM WOOD, AND OTHER SUBSTANCES.—Moore R. Fletcher, Cambridgeport, Mass. Antedated Feb. 5, 1868.

I claim, 1st, The process above described for preparing the fiber of wood, or that of any vegetable fibrous substance, for the manufacture of paper, or any textile material, substantially as specified.

2d, Also subjecting the fibers of wood, or other fibrous vegetable matter, when mixed with a weak solution of alkali, or lime and water, to a degree of heat not above the boiling point or below 33° Fah., as specified.

4th, Also subjecting the fibers of wood, or other vegetable fibrous substances, after the same have been subjected to the action of a weak solution of alkali, or lime and water, at a low temperature, until the albuminous, resinous, or nitrogenous matter has been softened, to the action of a high degree of heat and steam pressure, as and for the purpose specified.

5th, Also bleaching vegetable fibrous substances by subjecting the same to the action of a solution of soda-ash and chloride of lime, in the manner substantially as above described.

74,333.—PLANING MACHINE.—Moore R. Fletcher, Cambridge, Mass.

I claim arranging on a revolving cylinder, and on an undeviating line around the surface of said cylinder, one or more series of inclined cutters, so that the cutting edges of said cutters in each series will, as said cylinder revolves, pass through the same space, and stand alternately in opposite directions from each other, but each of them at the same angle from a line parallel with the axis of said cylinder, substantially as described, for the purpose herein specified.

74,334.—COTTON SEED AND CORN PLANTER.—Newton Foster, Palmyra, N. Y.

I claim, 1st, The diaphragm, D, and the bar, G, when made and applied as and for the purpose set forth.

2d, Also the opener, X, when applied to the scraper, R, and used substantially as set forth.

3d, Also the extension of the iron of the scraper, R, by the ends of the roller, T, as and for the purpose set forth.

4th, Also the construction and arrangement of the parallel draft bars, N and N', the bar, O, and upright, P, when held and used substantially as specified.

5th, Also the distributer, K, and annular rim, L, when applied and used in combination with the spindle, F, and diaphragm, D, substantially as set forth.

74,335.—DIE FOR CLOSING BUCKLES.—Merwin Fowler, Wolcottville, Conn.

I claim the dies, constructed as herein described, for closing a three-part buckle, in the manner as set forth.

74,336.—APPARATUS FOR CUTTING AND PASTING PHOTOGRAPHS.—Julius Franke, Quincy, Ill.

I claim, 1st, the box, E, back springs, F, movable platform, H, and pasting frame, combined and operating substantially as and for the purpose described.

2d, The reciprocating card holders or catches, o o', slides, J J', and springs I I', in combination with the platform, H, operating with the board, v, and its strips, w, and the box, E, and springs, F, substantially as and for the purpose described.

3d, The board, v, and movable strip, w, for the purpose described, substantially as specified.

4th, The arrangement of the slides in three or more divisions, so as to hold three or more sets of cards and pictures, substantially in the manner represented and described.

5th, The pulleys, t, belt, u, treadle, t', block, u', and weight, u''', combined and operating as described, substantially in the manner represented as described, and adapted for the purpose specified.

6th, The pin and cutting board constructed of the removable guide board C, frame, B, removable block, D, and pins, b, substantially as described, for the purpose specified.

74,337.—DEVICE FOR TRANSMITTING MOTION.—Eugene Gallagher, Brooklyn, N. Y.

I claim the wheel furnished with radial friction rollers, in combination with the screw or spiral shaft, A, substantially as and for the purpose specified.

74,338.—DITCHING MACHINE.—Wm. Ganse, Greensboro, Ind.

I claim, 1st, The wheel, A, with its periphery, R, Fig. 1, pierced for spades, S S, etc., and working on fixed axle, c, and the wheel or disk, B, with its center to the one side of the center of wheel, A, the difference equal to the greatest projection of the spades, S S, etc., working on same shaft or axle with curved crank, substantially as and for the purposes set forth.

2d, Also the movable spades, S S, etc., arms, n n n, etc., connected with disk or wheel, B, Fig. 1, in such a manner that, as the two wheels, A and B, rotate in the same direction, on a fixed axis on different centers, the spades, S S, etc., recede from the front wheel, A, and project from bottom, top, and rear of said wheel, substantially as and for the purpose set forth.

3d, Also the wheels, H H', in combination with a ditching machine combined and arranged as herein described.

4th, Also the arrangement of the frame, 10, 11, 12, with cross beam, 10, sliding in grooves, 13, 13, in frame, Z W V, supported by axle, 2, and wheels, 1 1', giving a sliding motion to a machine, up or down, and vice versa, to Z W V, substantially as and for the purposes set forth.

5th, Also the hinged and adjustable guide, K K', Fig. 1, in combination with the wheel A.

6th, Also the movable and V-shaped cutter, F, Fig. 1, when combined with a ditching machine, constructed and arranged as herein described.

74,339.—FIRE ALARM.—John F. Gauweiler and Jost Stengel, Croton, Mich.

We claim, 1st, The indicators, b b, numbered or lettered, and operating substantially in the manner set forth.

2d, In combination therewith, loop, e, as and for the purpose described.

3d, The employment of spring lever, h, in combination with loop, e, substantially as specified.

4th, The tank, E, when suspended and operated substantially as described.

74,340.—STUFFING FOR MATTRESSES, SOFAS, AND SEATS.—John M. Gilbert, Troy, N. Y.

I claim stuffing mattresses, cushions, and seats of all descriptions, with hollow elastic blocks or globules, B B, substantially as herein shown and described.

74,341.—MACHINE FOR CUTTING TURF OR SODS.—William Gilbert, Catskill, N. Y.

I claim the knife, C, and shaft, D, with its rollers and knife, e, used with the frame, A, substantially as and for the purpose set forth.

74,342.—HARVESTER.—Alvaro B. Graham, Waukegan, Ill.

I claim the combination, as set forth in a harvester, of the finger beam with the gearing carriage by means of the vibratable link, the draft rod, and swivel joints, M and M1, so that the finger beam may both rise and fall at either end, and rock forward and backward.

Also the combination as set forth, in a harvester, of the finger beam, gearing carriage, vibratable link, draft rod, swivel joints, and arm by which the the rocking of the finger beam is controlled.

Also the combination as set forth, in a harvester, of the gearing carriage, rocking finger beam, vibratable link, reciprocating cutter, crank shaft on the gearing frame, connecting rod (connecting said crank shaft with the cutter on the rocking finger beam), and swivel joint at the cutter.

Also the combination in a harvester of the gearing carriage, finger beam, vibratable link, grain wheel, and lifting connection for the grain end of the finger beam, substantially as set forth.

Also the combination as set forth, in a harvester, of the gearing carriage, finger beam, vibratable link, grain wheel, lifting connection, and lifting connections for the inner or stubble end of the finger beam, so that each end of the finger beam may be raised or lowered relatively to the gearing carriage.

Also the combination of the reel arranged to move with the finger beam, the gearing carriage, radius bar, and two guide-belt pulleys for the driving and slack members of the reel belt, one of said guide pulleys being arranged upon the gearing carriage, and the other upon the radius bar, substantially as set forth.

Also the combination as set forth, of the finger beam, gearing carriage, swivel joint, M, between the finger beams and gearing carriage, raking platform, and hinge connections between the finger beam, and raking platform.

Also the combination of the raking platform, finger beam, hinge connections, gearing carriage, upright stay or link, substantially as set forth.

Also the combination as set forth, of the finger beam with the grain wheel and platform, through the intervention of a hinge connection.

Also the combination of the movable member of the clutch, for throwing the cutter crank out of or into gear with a clutch lever composed of two parts connected by notches, substantially as set forth.

74,343.—ROOFING COMPOSITION.—R. C. Graves, Barnesville, Ohio.

I claim a composition for covering roofs composed of the within described ingredients, substantially in the manner specified.

74,344.—CULTIVATOR.—Thomas Green and Jacob Sommer, Metamora, Ill.

We claim the combination of the adjustable pivoted draft rod, C, and adjustable draft chains, E, with the singletree, D, and with the plow beams, A, pivoted to each other at their forward ends, substantially as herein shown and described and for the purpose set forth.

74,345.—INJECTOR FOR BOILERS.—James Gresham, Manchester, Great Britain, assignor to Ira Dimock, Florence, Mass. Patented in England April 13, 1866.

I claim, 1st, The combination of the steam ram, a, carrying the steam nozzle, b, with a central spindle, d, whereby the steam and water can be adjusted by turning the one handle, d4, substantially as shown and described.

2d, The arrangement of the valve, d5, on the stem, d, in combination with the seat within the steam ram, a, substantially as described.

3d, The valve, f, moving in a cylinder, f2, for a portion of its travel, in combination with the valve, g, and spindle, f1, arranged and operating substantially as set forth.

74,346.—INJECTOR FOR BOILERS.—James Gresham, Manchester, Great Britain, assignor to Ira Dimock, Florence, Mass. Patented in England April 13, 1866.

I claim the arrangement of the rock shaft, g, and forked lever, g2, with relation to the cone piece, e e1 and case, d, all constructed and operating essentially as shown and described, for the purpose set forth.

74,347.—EQUALIZING DOUBLETREE.—Edwin Griswold, Joel B. Cramer, and William Blay, Helena, Montana Territory.

We claim, 1st, An improved doubletree, the end parts, a1, of which are hinged or jointed to the central part, a2, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the strap or straps, E, and pulleys, C, with the draft bar or doubletree, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the rigid or flexible straps, H, with the end parts of a jointed doubletree, and with the straps, E, substantially as herein shown and described and for the purpose set forth.

74,348.—HARROW.—M. W. Gunn, La Salle, Ill.

I claim, 1st, The combination of the adjustable cross bar, C, rocking cross bar, E, adjustable cross bar, D, pin, J, and hook, I, with the pivoted lever, G, and the side bars, A B, as herein described, for the purpose specified.

2d, Adjustably screwing or clamping the forward teeth of the side bars, A and B, in the slotted forward ends of said side bars, substantially as herein shown and described and for the purpose set forth.

74,349.—CLASP FOR HOOP SKIRTS.—James F. J. Gunning, New York City.

I claim a fastening for the ends of skirt hoops, consisting of a slip clasp composed of two sockets, C D, secured on the ends of the hoops, and provided respectively with a slip, a, and a hook or projection, b, all constructed and arranged substantially in the manner as herein shown and described.

74,350.—"TOBACCO HILL PREPARER."—Benjamin T. Hardesty, Sunderlandville, Md.

I claim the combination of the plow, rake, and roller, and the manner in which the roller is attached.

74,351.—HAND LOOM.—Geo. Harsin and T. M. Kirkpatrick, Kirkville, Iowa.

We claim, 1st, The combination and arrangement of the harness frames, H, attached to guide rods, H1, the treadles, F, cams, G, wheel, G', notched bar, E, oscillating arm, C, rod, B, and lathe, A, substantially as described.

2d, The take up mechanism, consisting of the wheel, G', and parts, K7, K6 K5, K4, K3 and K2, arranged substantially as described.

3d, The combination of the reciprocating bar, D, wheel, L, shaft, L', arms, M and N, and picker staff, O, substantially as described.

4th, The arrangement of the yarn roller, I, having a pulley on its end, and the cord, I1, one end being fastened to the frame, and the other to the lever, I2, adjustably held in position by the rack, I3, for the purpose of regulating the tension of the yarn roller, substantially as described.

74,352.—CARPET FASTENER.—Isaac W. Hart and Omer Norton, New Britain, Conn.

We claim the combination of the devices, A and B, for the purpose of a carpet fastener, substantially as herein specified.

74,353.—SPRING BED BOTTOM.—P. J. Harvey, Chicago, Ill.

I claim the combination of the clasps, F, straps, D, and metal plates, C, all constructed and arranged substantially as and for the purpose set forth.

74,354.—CLASP FOR BELT.—E. Hatch, Charlestown, Mass.

I claim my improved belt clasp, composed of the plate, A, (formed with the slots, a a', and the teeth or serrations, e e, &c.,) and the plate or part, B, (provided with the chamber, f, the spring catches, g g,' and stud 11,) the said parts being arranged, constructed, and applied together in manner as set forth, and so as to operate as explained.

74,355.—COLLAR AND BOSOM COMBINED.—E. Hatch, Charlestown, Mass.

I claim the combined collar and bosom, cut or stamped from a single sheet of suitable material, the said bosom being made whole, and the collar being formed and connected therewith, substantially as herein set forth.

74,356.—COMBINED SQUARE AND GAGE.—Thos. C. Hendry, Union Point, Ga.

I claim the combination of gage points, i and i, with an arm of a common square, by means of a slot, d, and plates, a a, or other equivalent device, substantially as shown and described, and for the purpose specified.

74,357.—CORN PLANTER.—Curran W. Henkle, Washington Court House, Ohio.

I claim, 1st, The metallic box, C, and bottom, c, for the hopper, fitted in the beam, A, the box and bottom being both cast in one piece, and all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The distributing wheel, D, provided with the seed cell, g, and slot or opening, h, all arranged to operate substantially in the manner as and for the purpose set forth.

3d, The cut off brush, d, applied or secured within the metal bottom, c, to operate in the manner substantially as and for the purpose specified.

74,358.—HORSE RAKE.—Tyson Himmelberger, Heidelberg Township, Pa.

I claim the arrangement of the rake head, A, with the axle, B, connecting rod, M, wheel, J, and its pinion, and the wheel, I, with its handle, the whole operating as and for the purpose herein set forth.

74,359.—LINK JOINT FOR CAR SEAT.—Robert Hitchcock, (assignor to himself, George C. Fisk and Levi O. Hanson,) Springfield, Mass.

I claim a link joint for car seats, in which the end of the link, B, is pinned in a socket, G, the latter having its top and bottom edges tapered each way from a central point in line with the pin, E, substantially as herein shown and described.

74,360.—CHUCK FOR PLANING MACHINE.—John S. Hoar, (assignor to himself, Nathaniel E. Cutler and Charles Hastings,) West Acton, Mass.

I claim the combination of the ledges, m m, and screws, n n, of the plate, B, with such plate and the plate, A, applied together by means, and so as to render one plate capable of being revolved on and clamped to the other, substantially as specified.

Also, the combination, as well as the arrangement, of the adjustable eccentric, D, (or its equivalent,) and the auxiliary clamp plate, C, (having ledges and screws, as set forth,) with the plates, B and A, arranged and applied together, and provided with clamp screws, substantially as hereinbefore explained.

Also, the combination of the ledges, m m, and their screws, with the clamp plate, B, the plate, A, the eccentric, D, and the auxiliary clamp plate, C, the whole being arranged and applied together in manner and so as to operate substantially as hereinbefore described.

74,361.—FRUIT MILL AND PRESS.—Henry Abraham Holderman, North Manchester, Ind.

I claim the two cylinders, D E, fitted one within the other, and the inner cylinder, E, perforated, as shown, in connection with the cap, G, grating cylinder, Gx, and the strainer, I, all arranged to operate in the manner substantially as and for the purpose set forth.

74,362.—BEE HIVE.—Isaiah Honeywell, Toledo, Iowa.

I claim the combination of the boxes, A, metallic partition, B, caps, C, cover E, and honey board, D, respectively, constructed and arranged for use, substantially as set forth.

74,363.—WAGON SPRING.—Elijah Horton, Okee, Wis.

I claim, 1st, The stirrup, C, constructed and applied substantially as shown and described, for the purposes set forth.

2d, In combination with the stirrup, C, the rubber spring, D, the cross bars, E, the ties, a and the cups, b, arranged substantially as shown and described, for the purposes specified.

74,364.—CORN SHELLER.—Michael Housman and Simeon Housman, Huntington, Ind.

We claim the shields, A A, in combination with the jaws, B B, and the claws, D D, constructed and operating substantially as and for the purpose herein described.

74,365.—FRUIT MILL.—George S. Hull, Washington, Iowa.

I claim the combination and arrangement of the concave plate, B, the cylinder, A, and the adjustable stirrup, c, substantially as and for the purposes described and set forth.

74,366.—LUBRICATING COMPOUND.—Thomas Hull and Alexander H. Vail, Poughkeepsie, N. Y., assignors to themselves and E. Wright Vail, New York City.

We claim, 1st, The use of white clay with oily matter or materials, to form a lubricating compound, substantially as specified.

2d The combination with white clay, to produce a lubricating compound, of petroleum tar, paraffine, and plumbago, essentially as herein set forth.

74,367.—BUCKLE.—Asa Hurd, Yonkers, N. Y.

I claim, 1st, The combination of the spring, c', with the extension, c', of the clamping tongue, D, substantially as and for the purpose specified.

2d, The frame, A, constructed with its end, a', turned at right angles to its flat portion, a, slotted as shown at a" b', and provided with arms, b, substantially as and for the purpose specified.

74,368.—GAME.—H. Jackson, New York city.

I claim a game, consisting of a box divided into compartments, representing the different departments of the Government, in connection with counters, B, and a pack of cards composed of two kinds, one kind being simply numbered, and the other numbered and named, as designated, in accordance with the compartments in the box, all arranged or devised substantially as herein shown and described.

74,369.—BEE HIVE.—James A. Jackson, Macon, Mich.

I claim the supplemental tops, j, fitted in the spare honey boxes, substantially in the manner as and for the purpose set forth.

74,370.—COMBINED FODDER CUTTER AND CORN HUSKING MACHINE.—Milton C. Jeffers, New York City.

I claim, 1st, The cylinder of knives, C, mounted so as to be reversible, in combination with the roller, B, sliding board, G, gearing, I, and husking rollers, H H, as set forth, so that the husking mechanism is disconnected by reversing the cylinder, C, and the hopper covered by the board, G, when the machine is used as a fodder cutter, as specified.

2d, The springs, K, applied to the cap, J, in combination with the inclined husking rollers, H, and pins, b, to facilitate the separation of the husks from the ear, as set forth.

74,371.—WEEDING IMPLEMENT.—C. S. Jewell, Black's Mills, N. J.

I claim, as a new article of manufacture, a weeding implement constructed as described, and consisting of the plate, A, one end, B, of which is curved and flattened, and the opposite extremity, C, forming a chisel, provision being made for the attachment of a strap, D, all set forth.

74,372.—SMOOTHING IRON.—John Jones, Newark, N. J.

I claim one or more screws, in combination with a handle and movable handle frame, as described in this specification, or its equivalent, for the purpose specified.

Also, the smoothing iron with mortises, or its equivalent, in combination with a movable handle, when operated on by one or more screws, as described, and for the purpose specified.

74,373.—REIN HOLDER.—Phineas Jones, Newark, N. J.

I claim the adjustable rein holder or clamp, A B C, adapted to gripe the rein with a lever pressure, when drawn by the hand of the driver, substantially as and for the purposes set forth.

74,374.—PUDDLING FURNACE.—Thos. J. Jones, Scranton, Pa.

I claim the combination of the brick and bosh, as herein described, and used with a furnace, substantially as and for the purposes specified.

74,375.—BURGLAR ALARM.—Albert Kazenmayer and Louis Valois, Newark, N. J.

We claim the combination of the box, L, with its hinged cover, K, and the lever, H, with bolt, A, and spring, all as and for the purpose specified.

74,376.—APPARATUS FOR BORING LINKS.—Charles Kellogg, Detroit, Mich.

I claim the plate, A, bearing a standard stud, D, and provided with an adjustable end rest, B, or its equivalent, and hole, n, all substantially as shown and described, and for the purpose specified.

74,377—MACHINE FOR FORMING EYES ON METAL RODS.—Charles Kellogg, Detroit, Mich.

I claim, 1st, The lever, L, and stud, E, or their equivalents, substantially as shown and described, in combination with the plates, A B C, or their equivalents, and the adjustable guide plate, D, or its equivalent, all constructed, arranged, and operating substantially as and for the purpose set forth.

2d, The lever, M, collar, h, flange roller, N, and the stud, E, or other equivalent device, substantially as shown and described, and for the purpose specified.

3d, The subject matter of the first claim, in combination with the catch, l or its equivalent, substantially as shown and described, and for the purpose set forth.

4th, The improved bending apparatus herein described, operating in the manner and for the purpose substantially as set forth.

74,378.—METHOD OF PRESERVING BAIT FOR FISHING.—Theodore D. Kellogg, New York City.

I claim a bait preserver, made and operating substantially as herein shown and described.

74,379.—FENCE.—Michael Kelly, New York city.

I claim, 1st, The thorns, E, produced by dies or otherwise, in the form substantially as represented, and adapted to be secured in place upon a wire by compression laterally both of the thorn and wire, as and for the purposes herein set forth.

2d, Also, the thorns E, and wire, D, combined in the manner represented, and adapted for use in a fence, as herein set forth.

3d, Also, the within-described fence, formed by the combination of the thorny parts, D and E, with suitable posts, C, and with the addition of the large rope, G, adapted for joint operation, as and for the purpose herein specified.

74,380.—CROSS STRAP FOR CARRIAGE.—Henry Killam, New Haven, Conn.

I claim constructing the cross straps for carriages, wholly or in part, of rubber or other elastic material, substantially as and for the purpose described.

74,381.—WORKMEN'S TIME REGISTER.—William A. L. Kirk, Hamilton, Ohio.

I claim, 1st, The cylinder, A, divided into two sets of time compartments, circumferentially and segmentally as described, routed by the spring, c, from time to time, and provided with a catch lever connected with a clock movement, and working in a ratchet, as and for the purposes specified.

2d, The combination of the cylinder, A, marked with sets of figures corresponding to the hours and to the time compartments within the cylinder, as described, and the movable covers, h k, provided with stop springs, s, and port holes, m m, for indicating the time of a workman's commencing and quitting work, as herein shown and set forth.

74,382.—AXLE FOR VEHICLES.—William Knoch, Allegheny city, Pa.

I claim the tapering spindle, B, constructed as described, fitting eccentrically upon the square shank of the axle, the hole in the front end of said spindle being in its center, and the hole in the inner end placed near the lower edge, in such a manner that the under side of the axle lies parallel with the lower perforated side of the spindle, and an inclined lubricating chamber formed above the axle, as herein described, for the purpose specified.

74,383.—HAND SEED PLANTER.—Hermann Koeller, and Wilhelm Uecke, Camp Point, Ill.

We claim, 1st, The oscillating disk, E, when provided with two or more holes, g h, of different diameters, and when adjustable on the plate, B, having the drop hole, a, so that any desired hole of the disk may be employed for measuring and conveying the charge of grain to the drop hole, substantially as and for the purpose herein shown and described.

2d, The oscillating disk, E, when provided with two or more holes, g h, of different diameters, in combination with the shaft, C, and cranks, c c, hooked rods, f, and oscillating levers, D D, all made and operating substantially as and for the purpose herein shown and described, and in combination with the shovels, G G, made as set forth.

74,384.—DOOR HINGE.—George Lane, New York city.

I claim, 1st, The knuckles, C C', and grooves, D D', when arranged on the door, and its frame, substantially as described, so as to allow the same to be swung open to both sides, as set forth.

2d, The above, in combination with the weight or weights, F F', or their equivalents, made and operating substantially as and for the purpose herein shown and described.

74,385.—TUBE HOLE CUTTER.—Charles H. Lavis (assignor to Philip Farley), Philadelphia, Pa.

I claim the tool, as a whole, when its several parts are combined, constructed, and arranged as set forth.

74,386.—HEATING AND VENTILATING RAILROAD CARS.—Samuel Lloyd, Washington city, D. C.

I claim, 1st, The valve, x, in combination with the heating pipe, b, and the ventilating pipe, c, in the manner set forth.

2d, Heating and ventilating a train of cars by means of a fire proof heating car, containing furnaces, caloric engine, blower agitator, receiver, and pipes arranged and operating substantially as and for the purpose herein set forth.

3d, A flexible connecting pipe, forming a continued hot air flue between cars, and attached to the heating or ventilating pipes, by means of a screw cap at one end, and a sliding tube at the other, in manner and for purpose set forth.

74,387.—BREECH-LOADING FIRE-ARM.—Horace Lord, Hartford, Conn.

I claim, 1st, The employment, in combination with an altered gun barrel (having its rear portion cut out to accommodate a movable breech block), of a reinforce or strengthening band, or external tube, substantially in the manner and for the purpose described.

2d, Also, so arranging the reinforce as to protect the extractor, and lock down the forward end of the breech piece, as specified.

3d, Also forming the reinforce with projecting ears for a leaf-sight, substantially as described.

74,388.—SPRING BED BOTTOM.—Robert O. Lowrey, Saratoga Springs, N. Y.

I claim a bed bottom, c, consisting of a series of independent slats, D, suspended on the stiff springs, B, at the head, and the weaker springs, C, at the bottom, substantially as shown and described.

74,389.—WATER INDICATOR FOR BOILERS.—John D. Lynde, Philadelphia, Pa.

I claim the arrangement of the lever, G, valve stem, F, spring, H, valve, M, pipe, N, with reference to the float, B, whistle, L, and case, A, whereby to sound an alarm when the water is too low in the boiler, and to ascertain the condition of the water at other times, substantially as set forth.

74,390.—MANUFACTURING HARNESS PADS.—John Maclure, Newark, N. J.

I claim, 1st, The revolving table, A, with the adjustable shaft, B, and the projecting jaw, B', substantially as and for the purposes herein shown and described.

2d, The thin middle piece of leather, c', in combination with the pad-plate, F, leather, a', substantially as and for the purposes described.

3d, The former, G, with the groove, h, whereby I am able to stuff the pad by pressure, and cut the leather evenly, for binding, substantially as specified and shown.

4th, Stuffing pads by pressure, whereby I am enabled to obtain an even surface and uniform density in the pad, substantially as described.

5th, In combination with the grooved former, G, the tool, J, substantially as and for the purposes set forth.

6th, Lining the clies, E, either in whole or in part, with india rubber, substantially as described.

74,391.—HARNESS TRIMMING.—Thomas J. Magruder, Marion, Ohio.

I claim, 1st, The rein hook, B, fig. 3, in combination with the center bar, burr plate, B', and screw, a1, or its equivalent, substantially as shown and described, and for the purposes set forth.

2d, The loop, center bar, burr plate, B', in combination with the center bar, a, substantially as shown and described, and for the purposes set forth.

3d, The rein hook, B, fig. 6, in combination with the projection, c, and center bar, a, substantially as shown and described, and for the purposes set forth.

4th, The rein hook, B, fig. 9, in combination with the loop, c, and cross bar, a, and shoulder, s, substantially as shown and described, and for the purposes set forth.

5th, The center bar, burr plate, d', fig. 1, in combination with the terret, D, substantially as shown and described, and for the purposes set forth.

74,392.—HAT.—George Mallory Bridgeport, Conn.

I claim the combination of the brim of a hat with a drooping hoop, so that the brim is caused to droop at the front and the rear, and to rise at the sides substantially as set forth.

74,393.—RAILROAD RAIL COUPLING.—William S. Mallory, Batavia, N. Y.

I claim, 1st, The arrangement and combination of the keys, k, slotted bolts, h and m, and splice pieces, d, in their relation to the rails of a railroad, in the manner and for the purposes herein described.

2d, Also, the combination of the central splice piece, b, with its plate, n, in combination with the rails, a a, the same being held in place and position by means of screws, g, and keys and bolts, in the manner and for the purpose herein described.

74,394.—MACHINE FOR MAKING SEWING-MACHINE NEEDLES.—Eli J. Manville, Waterbury, assignor to himself and E. M. Judd, Wolcottville, Conn.

I claim, 1st, The sliding stock, s, having a hole corresponding to the size of the needle blank, with an adjustable cutter outside said stock, in combination with the revolving spindles, g, arranged as shown, and moved progressively, so as to present the needle blanks successively to the operation of said cutter, while the blank is being revolved as set forth.

2d, The spindle, g, rim, 11, wheel, p, and sliding bevel gears, o, in combination with the springs, 8, and grooved cam, 7, (or equivalent mechanism for moving the gears, o,) all arranged in such a manner that the needle blank will be revolved while being turned, and will be held in a fixed position while being grooved and punched, substantially as set forth.

3d, The holding jaws, i, and heads, n, upon the spindles, g, in combination with the sliding blank supplier, q, substantially as and for the purposes set forth.

4th, The general arrangement and combination of the blank supplying slide, q, the spindles, g, the jaws, f, the turning mechanism, the grooving and punching devices, and the means for revolving and for holding the spindles during the respective operations, substantially as set forth.

74,395.—PACKING TOBACCO.—Louis H. Marburg (assignor to himself and C. L. Marburg), Baltimore, Md.

I claim the method of packing tobacco, above described, consisting of the circular elastic band, B, attached to a bag, A, in the manner shown, and operating to close it automatically, substantially as and for the purposes specified.

74,396.—CHURN DASHER.—J. L. Marsh, Richmond, Ind.

I claim a rotary churn-dasher, constructed with the shaft, A, arms, C, teeth, D, and blocks, E, attached thereto by cords, E', said parts being arranged to operate substantially as described.

74,397.—THE REDUCTION OF REFRACTORY IRON ORE.—Chas. Martin, Chancery Lane, England.

I claim the method of reducing refractory iron ores, and of constructing furnaces for such operations, as substantially hereinbefore described and set forth, or any mere modifications thereof.

74,398.—ATTACHMENT FOR PLOW.—William J. Martin, Catawissa, Pa.

I claim, 1st, The sweep or bar, C, attached to the beam, A, and arranged in relation with the mold board, D, substantially as and for the purpose specified.

2d, The adjusting links, c d, and tightening bolt, f, in combination with the sweep or bar, C, and the beam, A, substantially as and for the purpose specified.

3d, The chain or brace, D, arranged in relation with the sweep or bar, C, and the beam, A, substantially as and for the purpose specified.

74,399.—WINDOW AND DOOR BLIND AND AWNING.—G. M. McMahan, Mount Sterling, Ky.

I claim, 1st, The metallic awning herein described, composed of the strips, A A, provided with overlapping flanges and grooves, a a', and hinged to the building, so as to be capable of being lowered and fastened down, so as to form a metallic shutter or blind, for the protection of the doors or windows of the building, substantially as described.

2d, In combination with the foregoing, the catches or locks, m m, cords, I I, roller, D, and crank, E, substantially as and for the purpose specified.

74,400.—MOP WRINGER.—John H. Mears, Oshkosh, Wis.

I claim, 1st, The hinging of the rectangular standards, B B, to the horizontal frame, A A, the hooks, s s, the hinged arms, C C, and the detachable connection at d", when arranged substantially as described, for the purposes set forth.

2d, Also, the hinged arms, C C, the spring lever, D, and the bail, g, when arranged relatively to each other, and to the rollers, E E, standards, B B, frame A A, and treadle, F, as and for the purposes set forth.

74,401.—IMPLEMENT FOR EXTRACTING NAILS.—David Morris Bartlett, Ohio.

I claim the implement herein described, consisting of the jaws, J J', handle, A B, jaws, c c, claws, e e, and the head, H, provided with face, f, the whole constructed and arranged as described, as an article of manufacture.

74,402.—BOBBIN FOR SPINNING.—C. B. Morse, Rhinebeck, N. Y.

I claim packing bobbins by boring holes through them obliquely to the line of their axis, in such a manner that the holes shall intersect the plane of a transverse section of a bobbin at points equidistant from its center, and inserting therein twine, rubber, or other equivalent packing, substantially as and for the purpose herein shown and described.

74,403.—LAMP.—Wm. Mullally, Boston, Mass.

I claim the chimney expansive and elastic base supporter, constructed substantially in manner and so as to operate substantially as described.

Also, the combination as well as arrangement, as explained, of the chimney expansive and elastic base support, and its air passages, with the foraminous or perforated burner body and wick tube.

Also, the combination as well as arrangement of the chimney expansive and elastic base supporter, with the cone or air deflector, the wick tube, and the perforated or foraminous burner body, arranged as represented.

74,404.—STEAM GENERATOR.—J. S. Mullin, Port Monmouth, N. J.

I clcim, 1st, The inclined fire tubes, B, and inclined tube sheets, a a, in combination with a steam boiler, substantially as shown and described.

2d, The extension of the smoke stack, or chimney, of a steam boiler, near the bottom of the smoke chamber, substantially as shown and described.

3d, The double deflector, F, whereby the sparks are conducted into the channel, H, substantially as described.

74,405.—HORSE HAY FORK.—Jos. H. Mullin, Schellsburg, Pa.

I claim the combination, substantially as described, of the shank, the loop, E, the slotted sliding bar, and the spring latch, for the purposes set forth.

74,406.—LIGHTNING ROD.—David Munson, Indianapolis, Ind.

I claim, 1st, The lightning conductor, made of sheet copper, tinned on one surface, and formed in flutes or folds, substantially as and for the purpose set forth.

2d, Fastening the sections, A, together, by means of the strap, B, in the manner substantially as set forth.

74,407.—MACHINE FOR BUNDLING KINDLING WOOD.—Frederick Myers, New York city.

I claim, 1st, The grooved, semicircular clamps, G G', constructed as described, pivoted together and to the standards g" at n, and provided with projections, g, pivoted lifter, n', spring, c, and points, b", all operating as described, for the purpose specified.

2d, The grooved semicircular clamps, G G', in combination with the spring cams, E E', substantially as described, for the purpose specified.

3d, The boxes, D, upon the endless belts, B, constructed as described, having the hinged bottoms, d', operated by the catch, a", and arm, b, to permit the fagots to fall between the jaws, G G', constructed and operating substantially as described, for the purpose specified.

4th, The guide, c, having the annular slot, e', in combination with the chute g"', sliding bottom, e" e"', angular slotted plate, j, and spring, o, substantially as described, for the purpose specified.

5th, The combination of the rollers, h h, hollow shaft, p, bevelled gears, O X, bevel gears, O' W, the latter upon shaft, w, slotted spindle, m, shaft, t, segmental gear wheel, S, and the wire cutter, f, substantially as described, for the purpose specified.

6th, The plunging disk, l, supported centrally upon the arm, V"', by means of the right angular arm, V" V, and operated through the plate, l, by means of the pivoted spring lever, V', and arm, R, upon shaft, F, constructed to operate as herein described, for the purpose specified.

7th, The door, l"', hinged to the vertical plate, l", and operated by means of the fagot passing between the clamps, G G', under the impulse of the plunger, l, substantially as shown and described.

8th, The lifting lever, n', for lifting the severed end of the fagot wire, n, substantially as shown and described.

9th, The spring, M"", for closing the bottom, d', of the fagot boxes, substantially as shown and described.

74,408.—PORTABLE RAILWAY ELEVATOR.—W. T. Nichols, Rutland, Vt.

I claim, 1st, The construction of the sections, G, of the frame or gang plank, with railway tracks, and with beveled and hinged or jointed ends, as and for the purposes set forth.

2d, The construction of the endless chain, a, of metallic plates with flanges bent at right angles to the upper surface, upon which the platform, F, is fastened, when said links are connected by transverse bolts, which bolts carry wheels upon the outside of the flanges, and gear into the driving wheel, as shown and described.

3d, A portable railway elevator, constructed in sections as described, carrying an endless platform, when the same may be hinged or jointed together and each section operated at a different inclination or plane, or separated, so as to carry a section of said endless platform independently.

4th, The arrangement of separated sections of the elevator, by means of their driving band wheels, C C, pulleys, D D, and rope, E, so as to operate at an angle with each other, as shown and described, and for the purposes set forth.

74,409.—MEAT CUTTER.—Jacob Nacher (assignor to himself and A. Renggly and J. Ulrich), La Crosse, Wis.

I claim, 1st, An automatic machine for cutting or chopping, composed of a block, A, moving backward and forward under the reciprocating knives, I, in combination with the guard, o, and pawls, n, and wheels, a2, by means of which the motion of the same is reversed, substantially as shown and described, and for the purposes set forth.

2d, The pawls, n, in combination with the cross head, H, and wheels, a2, and shaft, L, and pinion, e2, and rack, e, and block, K, substantially as shown and described, and for the purposes set forth.

3d, The lever, s, in combination with the guard, o, and starts, e1, substantially as shown and described, and for the purposes set forth.

4th, The plates, J, in combination with the uprights, B, and knives, I, substantially as shown and described, and for the purposes set forth.

5th, The pawls, n, in combination with the reversible guard, o, and wheels, a2, substantially as shown and described, and for the purposes set forth.

74,410.—STEAM GENERATOR.—William H. Nobles, St. Paul, Minn., and Milton V. Nobles, Elmira, N. Y.

We claim, 1st, The combination of the fan-wheel case, K, and the water chamber, L, as herein described and set forth.

2d, The combination of the water chamber, E, and wheel, G, as herein described and set forth.

3d, The arrangement of the inner and outer cases, K and L, wheel, G, discharge opening, H, flue, F, and chamber, D, whereby to conduct the heat and smoke from the fireplace and back, in one continuous rotating course, substantially as herein set forth.

74,411.—COMBINED SHEEP RACK AND SHELTER.—Omar P. Norris, Fostoria, Ohio.

I claim, 1st, The herein described sheep shed, when constructed in sections, so that it may be taken apart, in the manner as and for the purpose set forth.

2d, The arrangement of the racks, C, and troughs, D, in combination with the shed, A, for the purpose and in the manner substantially as set forth.

74,412.—WINDOW SHADE FIXTURE.—W. A. C. Oaks (assignor to Harbster, Brothers and Company), Reading, Pa.

I claim the combination of the recessed guide plate, A, the zigzag spring, c, and the slide, B, substantially as and for the purpose specified.

74,413.—HANGING WINDOW SASH.—Charles H. Palmer (assignor to himself, Newton Palmer and Joseph Heinrich), New York city.

I claim the combination and arrangement of the flanged sashes, B, the disks, packings, b b, flanged sliding bars, C, weather strips and pivots, a, all constructed and operating as described for the purpose specified.

74,414.—BUGGY-TOP ROLLER.—John Palmer, Mechanicsburg, Pa.

I claim the combination of a gum elastic cylinder, A, and its strap, and buckle, B and C, with the screw bolt, F, and top bows, D, of a falling-top buggy as herein described and for the purposes set forth.

74,415.—BEEHIVE.—Josiah M. Patton, Tipton, Iowa.

I claim the corner posts, b, when grooved their entire length upon two sides, to receive the walls, c c', with a space, a, between them, the outer wall, c, having an external covering, d, secured to it, as herein shown and described.

74,416.—SPINNING THROSTLE.—Oliver Pearl, Lawrence, Mass.

I claim an inverted flyer, provided with a ring, a whirl, and an elongated tubular extension, substantially as described, combined with the spindle and the elongated tubular bearing, as shown, and for the purpose set forth.

74,417.—MODE OF CULTIVATING GRAPE VINES.—Geo. Perry, Georgetown, Conn.

I claim the herein described mode or system of cultivating vines and removing the oldest roots, so as to preserve a vigorous and healthy growth, with new roots, for an indefinite period of time.

74,418.—FIRE AND BUGLAR ALARM.—O. E. Pickett, North Auburn, and R. S. Luce, Lawsville Centre, Pa.

We claim, 1st, The set, h, the lever trigger, g, and the trip rod, e, combined with the escapement, c, the hammer, d, the bell, B, the wheel, b, and the spring, o, when arranged and operating as and for the purpose described.

2d, In combination with the alarm device, the pawl, m, the igniting plate, C, the spring, s, and the match holder, n, provided with the spring, p, arranged and operating as and for the purpose set forth.

74,419.—CULINARY BOILER.—O. Poole, Detroit, Mich.

I claim, in combination with the boiler, A, perforated baskets, D, E and F, and removable partitions, C and G, the spout, H, constructed and arranged substantially as herein described and for the purpose set forth.

74,420.—POTATO WASHER.—E. N. Porter and P. P. Roberts, Morrisville, Vt.

We claim the vertical potato washer, E, rotating in a pail with flanges, B, on the inside, when constructed and combined as herein described and for the purposes set forth.

74,421.—SKATE.—John W. Post, Castile, N. Y.

I claim, 1st, The heel fastening, consisting of the lever, pivoted on a sleeve, d, and made adjustable by means of the set screw, F, substantially as described.

2d, The pivoted lever, G, having a serrated rear face, and secured to the foot plate, H, substantially as set forth.

3d, The device for adjusting the pivoted lever, G', consisting of the sleeve, d, moved by the set screw, F, provided with a shoulder, f, which has its bearings in the cross slot of the slot, e, in the bracket, E, substantially as described.

4th, The clamps, L, provided with spurs, k, in combination with the partly serrated slots, K, substantially as and for the purposes described.

5th, The V-shaped cut, i, in the standard, C, and the correspondingly shaped bracket, I, substantially as and for the purposes set forth.

74,422.—FIFTH WHEEL FOR CARRIAGES.—Hiram W. Ransom, Lawrenceburg, Ind.

I claim the block, H, which forms a bearing for the fifth wheel, F, and which is provided with a wing on each side, whereby the rubber, D, is held in the safety guard, G, as and for the purposes set forth.

74,423.—CURRY COMB.—B. W. Remington, Providence, R. I.

I claim the plate, A, as applied to a curry comb, and forming a dirt receiver, substantially as described, and for the purpose set forth.

Also, the plate, B, in connection with A, for preventing the dirt from falling back after passing through the slot into the receiver, all substantially as described and for the purpose specified.

74,424.—SPRING FOR VEHICLES.—C. L. Rice, Dunmore, Pa.

I claim the combination of the side springs, E, whose lower ends are hinged at a to each side of the reach, and whose upper curved ends are hinged to the sides of the wagon body, and the spring, F, whose inner end is secured to reach between the springs, E, and whose forward end passes through the springs, D, and is bent over and hinged to the forward edge of the upper part of said spring, all arranged and operating as described, to prevent the longitudinal and lateral movements of the body, as herein set forth.

74,425.—MACHINE FOR BUNDLING KINDLING WOOD.—John Richardson, New York city.

I claim, 1st, The carrier belt, A, in combination with the belt, B, mounted in the hinged or pivoted frame, when arranged to operate substantially as described, for the purpose of feeding the wood to the receiver, E, as set forth.

2d, The plates, 1, 2, 3, so arranged within the receiver, E, to receive the wood, said plates being arranged to yield as the wood is fed in, substantially as described.

3d, The sliding section or slide, a, arranged to close the aperture through which the wood is fed into the receiver, E, and automatically to open the same, as the plunger is drawn back, when constructed substantially as herein shown and described.

74,426.—SNAP HOOK.—I. C. Richmond (assignor to H. C. Hull), West Meriden, Conn.

I claim the combination of the two parts, A and B, pivoted and joined together in the manner described, and so as to open by turning one part from the other, to the right or left, as the case may be, as set forth and specified.

74,427.—STRAP RING FOR FIRE-ARMS.—J. Rider, Newark, Ohio, assignor to himself and E. Remington & Sons, Ilion, N. Y.

I claim uniting a swivel bow to the guard strap or band, by means of the lug and pin, substantially as described.

74,428.—BREECH-LOADING FIRE-ARM.—J. Rider, Newark, Ohio assignor to himself and E. Remington & Sons, Ilion, N. Y.

I claim, 1st, In combination with the spring, f, the groove and abutment, 5, across the groove, so that, when the breech block is replaced, after having been taken out of the arm, said spring will find its place in connection with the breech block, and go into action with it, without any care or attention on the part of the user, substantially as described.

2d, Also, hanging the hammer on the two centers, h and i, so that it can move at times on one, and at times, on the other, as and for the purpose described.

3d, Also, the arranging of the pivot, i, in a line in rear of a vertical line drawn through the pivot bolt, h, so that the hammer can cause the brace to follow it in moving back without being rigidly connected to it, substantially as described.

4th, Also, in combination with the hammer and the brace, the dog, n, connected and acting therewith, substantially in the manner described.

5th, Also, the button, t, made and operating in connection with the pivot bolt heads, as and for the purpose described.

74,429.—PINEAPPLE BEER.—Geronimo Rivera, Cambridgeport, Mass.

I claim the beverage, made and prepared essentially as above described, and which I term pineapple beer.

74,430.—CEMENT ROOFING.—Leander Rodney, New York city. Antedated Jan. 31, 1868.

I claim, 1st, The application of strips of wood, or other suitable material, placed edgeways on the rafters or other support on which the roof rests, these strips, of any desired thickness, being properly secured and fastened together, and this foundation serves as a body on which to apply water-proof cement, or other suitable material, substantially as and for the purpose herein specified.

2d, The application of cement, or other suitable material, to two or more sheets of paper, or other suitable material, to be used in connection with the foundation, as above described, or any other suitable foundation, or separately, substantially as and for the purpose herein specified.

74,431.—PUMP.—Chas. Rogers, Allegheny City, Pa.

I claim the levers, A A, pivoted to a brake, S, of a hand pump, said levers being supported at their outside ends, each by a vibrating link, L, the whole being combined and arranged to operate with respect to the pump box and its attachments, substantially as described.

74,432.—SAWING MACHINE.—Clark Root and Bishop Bennett, De Ruyter, N. Y.

We claim the three-armed lever, B, swinging fulcrum, f, and driving devices, K I I I H, all constructed and arranged as herein described and for the purpose set forth.

74,433.—SCHOOL DESK AND SEAT.—J. P. Scott and S. H. La Rue, Lewisburg, Pa.

We claim, 1st, The combination of the grooved support, A, slotted guides, B, desk, C, hinged leg, G, brace, J, vertically sliding support, K, seat, L, brace, M, and crank, N, all constructed and arranged as described for the purpose specified.

2d, The jointed seat brace, M N, formed by the combination of the pivoted bar, M, and pivoted bar or crank, N, in combination with the seat, L, and seat uprights, K, substantially as herein shown and described, and for the purpose set forth.

3d, The pivoted and sliding self-locking jointed brace, J, in combination with the leaf, G, and book box, C, substantially as herein shown and described and for the purpose set forth.

74,434.—PIVOTED STUMP JOINT.—Anson Searls, New York city.

I claim an improved stump joint, substantially as described, and for the purposes set forth.

74,435.—WHIP TIP.—C. R. Shelton, New Haven, Conn.

I claim a whip tip provided with a socket, B, so as to be attached to the stock proper, in the manner herein set forth.

74,436.—NECK TIE.—Jacob Silbermann and Gustav Unger (assignors to themselves and Jacob Heinemann), New York city.

We claim a neck tie formed in one piece by weaving with the end portion diverging from and wider than the middle portion of the article, as set forth.

74,437.—HAND TURNING TOOL.—Amos B. Simonds, Youngstown, Ohio.

I claim the screw bolt, C, provided with a projection, s, in combination with the socket, B, collar, F, cutter, E, and handle, A, all constructed, arranged, and operating substantially as described and for the purpose specified.

74,438.—POTATO DIGGER.—E. Smith, West Milton, N. Y.

I claim the revolving riddle, r, in combination with the endless platform, l, and scoop, f, the whole constructed and operating as and for the purposes specified.

74,439.—CLOTH RACK.—H. C. Smith, D. A. Kelly and James E. Murdoch, Jr., Clarksville, Ohio.

We claim the cloth rack constructed of frame posts, A, and horns, c, in combination with the spindles, a, casters, b, and step, m, all substantially as shown and described and for the purposes set forth.

74,440.—AUTOMATIC CUT-OFF GAS BURNER.—John B. Smith, Pittston, Pa.

I claim, 1st, The rod, f, so arranged as to automatically cut off the flow of gas, substantially in the manner herein set forth.

2d, In combination with the above, lever, K, substantially as and for the purpose set forth.

3d, Stem, s, in combination with lever, K, substantially in the manner specified.

4th, Also, pipe, A, provided with bulb, B, or any equivalent device, in combination with stem, d, lever, K, and rod, f, substantially as and for the purpose described.

74,441.—CULTIVATOR.—Joseph Snyder, Rock Lick, W. Va.

I claim the cultivator constructed with the curved main beam, A, and curved supplemental beam, B, shares, c d, handles, C, and braces, f g and m, the whole arranged substantially as and for the purpose specified.

74,442.—HIGH AND LOW WATER ALARM FOR STEAM GENERATORS.—Joseph H. Springer, Philadelphia, Pa.

I claim, 1st, The employment of two unequal weights suspended by cords or rods of unequal lengths to a lever with its fulcrum at its center arranged inside of a cylinder attached to the outside of a steam boiler said weights being subject to the action of high and low water, substantially as and for the purpose set forth.

2d, In combination with the above the levers, g g', arranged within a cylinder outside of the boiler, substantially as and for the purpose specified.

3d, Arranging the safety valve within the hollow cap, D, substantially as and for the purpose specified.

4to, The glass gage, G, when used in combination with cylinder, A, and weights, B B, substantially as set forth.

74,443.—GIG FOR CLOTH.—O. M. Stillman, Westerly, R. I.

I claim, 1st, The combination and arrangement of the cross bands, o o', reverse driving pulleys, p p1, counter pulleys, p2 p3, adjusting board, w, shaft, q, tubular shaft, s, bevel wheels, t t', as herein described for the purpose specified.

2d, The arrangement of the cylinder, A, rollers, c, racks, l, pinions, j, shaft, z, worm wheels, x, rollers, m n n', reversible cloth beams, b b', and gear wheels, d d1 d2 d3, as herein described for the purpose specified.

74,444.—STOVE FLUE SUPPORTER.—Andrew J. Stover, Sandyville, Iowa.

I claim the plate, A, the segments, b b, the bolts, d, and washer plates, g, the whole combined and operating as and for the purpose herein described.

74,445.—HOISTING DRUM.—Henry Strickler, Carlisle, Pa.

I claim the combination with the vertical shaft, A, the loose drum, D, working thereon, the pawl, a, and brake, z, both pivoted to lever within guide, k, the sweep bar, C, and the cord, B, all arranged substantially as shown and described and for the purpose specified.

74,446.—SASH STOP.—W. H. Sutherland, Seven Mile, Ohio.

I claim, 1st, The arrangement of the rack, l l, in Fig. 2, with inclined cogs in connection with an inclined tongue, z, in Fig. 3.

2d, The combination and arrangement of the locker, as seen at Fig. 3, viz., the eccentric, P P, with its pin, v, its arm, x, its square mortise, s s, and its groove for the reception of band, j, the band, j, with its slot, u v, and combination of said band with plate, w, the tongue, z, and its combination with arm, x, and plate, w, through mortise, y.

3d, The peculiar arrangement of the four-square section, r, of shaft, o o, in connection with its circular ends, as seen at Fig. 3.

74,447.—CORN HARVESTER.—J. B. Sweetland, Pontiac, Mich.

I claim, 1st, The lever, J, constructed as described and used in combination with the inclined platform and the wheel, I, and having a sickle knife upon its lower end, substantially as represented.

2d, The hook, M, in combination with lever, J, and knife, L, as and for the purpose set forth.

3d, The concave bed, S, pivoted in the frame and used with the shield, K, and rack, T, as and for the purpose set forth.

4th, The rack, T, when used as and for the purpose specified.

74,448.—MACHINE FOR DISTRIBUTING GUANO, ETC.—John Franklin Thomas, Adamstown, Md.

I claim, 1st, The agitating apparatus above described consisting of pole, F, pins, f f1 f', and movable bottom, F', substantially as described.

2d, The combination of the agitating apparatus with the rod, k, lever, K, arm, L, arm or lever, M, and cam wheel, C, substantially as herein set forth.

3d, The combination of the arm, L, with the rod, N, eccentric shaft, O, and rod, P, substantially as herein shown and described.

74,449.—BELT COUPLING.—J. L. Thomas, Newburg, Ohio.

I claim the belt coupling constructed as described consisting of the rectangular metal band, a, formed in one piece having bevelled ends, the plate, b, provided with the projecting ends, c, working upon the bevelled ends within the band, a, and operated by the set screws, d, as herein described for the purpose specified.

74,450.—SLEIGH.—Bjarne Thompson, Chicago, Ill.

I claim connecting the body of the sleigh with the front or runners by means of the slots, a, and irons, d, constructed and operating substantially as specified.

74,451.—ANIMAL TRAP.—J. S. Thompson, Sycamore, Ill.

I claim an animal trap with a sinking platform, M, and revolving gate, c, secured by latches, J a, constructed and operating as described.

74,452.—APPARATUS FOR BOILING SAP AND OTHER LIQUIDS.—James S. Thompson, Lyndon, Vt.

I claim the arrangement of the chambers, B C and opening, O, in the furnace, A, and flue, F, the tube, E, short pipes, G, pan, P, passage, a, and right-angular damper, D, as herein described for the purpose specified.

74,453.—SODA WATER BOTTLE.—William W. Timmons (assignor to Alonzo White), Rahway, N. J.

I claim, 1st, A separate chamber, D, attached to and forming part of a bottle or similar vessel for containing beverage fluids, substantially as shown and described, for the purpose of causing the contents of the said chamber to commingle with the outflowing contents of the bottle, all as set forth.

2d, A screw cap, a, or its equivalent, substantially as shown, and when used for closing a chamber, D, and attached to a beverage bottle, all as set forth.

3d, The flange, l, or its equivalent, substantially as shown and described and for the purpose specified in combination with the chamber, D, and stopper, B, all as set forth.

74,454.—STEAM GOVERNOR.—John Tremper, Wilmington, Del.

I claim, 1st, The combination of one or more sliding thimbles or sleeves, K, with the radial or guiding arms, E, springs, J, and balls, F, substantially as and for the purpose specified.

2d, The arrangement of the springs, J, within the balls, F, and their extensions, c, encircling the radial or guiding arms, E, essentially as shown and described.

3d, The auxiliary removable springs, I, for operation in combination with the balls, F, and springs, J, whereby the the velocity may be increased or decreased at pleasure, substantially as specified.

74,455.—WATER WHEEL.—J. C. Trullinger, Oswego, Oregon.

I claim, 1st, The buckets above described, each having the bridge, O, and the curves, L O N, and L M N, when constructed and applied to a water wheel, substantially in the manner and for the purpose set forth.

2d, Also, the hoop and hub, K, in combination with the water wheel, A, substantially as and for the purpose set forth.

3d, Also, the combination of the gates, C C, the guide plates, D D, the levers, G G, the ring, F, provided with bases, F', when the several parts are constructed and arranged in the manner and for the purposes specified.

4th, Also, the combination of the wheel, gates, C C, guide plates, D D, levers, G G, and cases, E E, all constructed substantially as and for the purposes indicated.

74,456.—FRUIT BASKET.—P. B. Viele, Rochester, N. Y.

I claim, 1st, In combination with the cross-pieces, A A', provided with the slitted strips, a a, as above described, the encircling band, d, to which the said strips are secured by eyeleting or sewing, the whole arranged as herein specified.

2d, Also, retaining the packed baskets one within another for, for storage and transportation, by means of the eyelets, or equivalent openings, c, in the bottom of the baskets, and the cord, f, passing through said openings, the whole as hereinabove set forth.

74,457.—WATCH.—Arthur Wadsworth, Newark, N. J., assignor to himself and Robert Schell, New York city.

I claim, 1st, A main-spring barrel, for watch and other time movements, in which the body is confined upon the outside by either one or both of its heads, substantially as and for the purpose described.

2d, In combination with the above, a main-spring barrel, when the body and toothed head, with the latter confining the former upon its outside, are so secured together that the former can turn in the latter upon the breakage of the spring, substantially as and for the purpose specified.

74,458.—DECOY BIRD.—Nathaniel Wales, Boston, Mass.

I claim a decoy having wings hinged thereto, arranged to be operated by manipulation of a sportsman, substantially as and for the purpose described.

74,459.—WASHING MACHINE.—Josiah Webb, Spartansburg, Pa.

I claim, 1st, The combination of the crank-shaft, I, pitmen, H H, levers, F F, and corrugated blocks, E E, when used in connection with a box, A, having a corrugated bottom, D, in the manner and for the purpose specified.

2d, The combination of the step keys, L L, with the forked posts, K K, supporting the rod, G, and rendering the rubber blocks, E E, adjustable in hight, substantially as and for the purpose specified.

3d, The combination of the hinged blocks, E E, with the hooks, m m, and levers, F F, by which the blocks, E E, can be lifted out of the way when necessary, substantially in the manner described.

4th, The arm, M, for the purpose of holding the clothes in place while the rubbing blocks are passing over them, substantially as described.

74,460.—KNITTING MACHINE.—Jonathan C. Welsch, Edgerton, Ohio.

I claim, 1st, The ratchet wheel, S, the racks, T and U, arranged on the sliding frame, C, in combination with the eccentric stops for changing the needle operating cams, as set forth.

2d, The arrangement of the crank, D, with its shaft wheels, K L and M, and eccentric stops, N N, all constructed and operating in the manner and for the purpose set forth.

3d, The combination and arrangement of the bed, B, frame, C, crank, D, with its shaft, wheels and cams, N N, ratchet, S, racks, T and U, latch openers, J J, dog, I, and yarn supporter, H, all constructed and operating as and for the purpose specified.

74,461.—RAILWAY FROG.—William Wharton, Jr., Philadelphia, Pa.

I claim the frog, D, having a shoulder against which the side of the main rail bears, and to which it is confined by bolts, e, or their equivalents, substantially as and for the purpose described.

74,462.—WAGON BRAKE.—Benj. F. Wheeler, Calais, Vt.

I claim, 1st, The movable handle of the brake, in combination with the slotted central reach metal loop and strap, B b, forward slotted rocker and the king bolt, and slotted rocker plate, substantially as described, for the purpose specified.

2d, In combination with the above, the sliding key, C c C, substantially as described, for the purpose specified.

3d, In combination with a wagon brake, the rag wheel, D, dog, E, and coiled spring, F, substantially as described, for the purpose specified.

74,463.—PITMAN CONNECTION FOR HARVESTER.—Cyrenus Wheeler, Jr., Auburn, N. Y.

I claim, in combination with a crank or pitman-head that can turn on or around the pitman, a wrist-box that turns in said head by means of its curved surfaces, c c, moving against the concave bearings in the plates, b e, substantially as and for the purpose herein described.

74,464.—HARVESTER RAKE.—William N. Whiteley, Springfield, Ohio.

I claim, 1st, The rake head, R, provided with the arm, S, curved as described, and mounted in bearings on the swinging block, Q, and the pivot post, F, all constructed and combined as set forth and described.

2d, The combination of the rocking rake head, R, swinging block, Q, moving upon the pivot, G, gearing, I Y, shafting, W', and pulleys, V and U, all arranged on a two wheeled jointed bar machine, so as to move in unison with the cutter bar and platform, as set forth.

3d, The combination, in a single jointed harvesting machine, of the cutting apparatus, the reciprocating sweep rake, R, and the overhung horizontal reel, r, when said rake and reel are both mounted upon the inner shoe of said cutting apparatus, and constructed and operated in the manner shown and described.

4th, The rake head, R, with the arm, S, curved in the form shown and described, in combination with the stud, O, on the gear wheel, I, and block, Q, provided with the slot, P, to give a vibrating motion to said block, Q, and rake, R, as set forth and described.

5th, The tumbling shaft, W', in combination with the vibrating coupling arm, e, as and for the purpose set forth.

6th, The swinging block, Q, constructed with horizontal bearings for the rake, R, a slot, P, for the actuating stud, O, and pivoted upon a vertical axis, G, all as set forth and described.

7th, The arrangement of the arm S, arm L, block, Q, and guide frame, J, all constructed as described, and for the purpose set forth.

8th, The coupling arm, e, mounted upon the outer end of the main axle by means of the gimbal ring, y, and attached to the rear of the main frame by means of the arm, f, as and for the purpose set forth.

9th, The combination and arrangement of the plate, E, pivot post, F, gear wheel, I, block, Q, guide frame, J, and pinion, Y, when constructed as and for the purpose set forth.

10th, The arrangement of the driving pulley, v, the reel pulley, n, and tightening or guide pulley, u, so that the reel belt will form a triangle in passing around said pulleys, as and for the purpose set forth.

74,465.—HARVESTER RAKE.—William N. Whiteley and Jerome Fassler, Springfield, Ohio.

We claim, 1st, The pivoted brace, d, one of its ends moving on a center, which is coincident with the axis of the main pinion shaft, and its other end moving on the axis of the main driving wheel, as and for the purpose set forth.

2d, In combination with the guide frame, X, the guide switch, a', constructed to open automatically when released from its stop, e', and to be closed again by the passage of the traveller on the rake or reel arm next succeeding, substantially as and for the purpose described.

3d, In combination with the guide switch, a', pin, h', and the stop latch, e', constructed and operated substantially as described.

4th, In combination with the guide switch, a', and stop latch, e', the spiral spring, d', arranged as shown and described, so that the same spring acts against both the switch, a', and latch, e', as set forth.

5th, The rake head, o, constructed so that the upper ends of the shanks of the teeth are exposed, and provided with the curved rim or flange, s, as and for the purpose described.

6th, The adjustable guard, w, placed upon the rake head, substantially as shown and for the purpose set forth.

7th, The guard, y, placed upon the finger bar, substantially as and for the purpose set forth, in combination with the forked pitman, p, provided with conical or conoidal journals, as described, the spiral spring, c'', for the purpose set forth.

8th, The seat slide, S, constructed with the offset, so that the seat may be placed over the center of the platform, or may be placed at one side of the same to counterbalance the weight of the rake, as set forth and described.

74,466.—GAGE FOR AUGERS.—W. E. Whiting, Providence, R. I.

I claim the tubes, A and C, in combination with the ring, D, and flange, E, when constructed and arranged substantially as set forth and for the purpose specified.

74,467.—CHURN.—C. B. Williams, Bourbon, Ind.

I claim the shaft, G, with its angular dashers, I I, and wings, H H, adjustable upon the shaft for gathering the the butter, when used within the box, F, as constructed and secured, and operating in the manner and for the purposes set forth.

74,468.—SELF-ACTING WAGON BRAKE.—J. A. Williams and W. W. Williams, Mattoon, Ill.

We claim the combination of the brake bar, b, the spring, g, the connecting rod, and chains, and the singletrees, p p, constructed, arranged, and operating as a self-acting wagon brake, substantially as herein described.

74,469.—STEAM HEATER FOR BREWERS AND OTHERS.—Thos. Williams and Joseph J. Yates, New York city. Antedated Jan. 31, 1868.

We claim, 1st, The heating apparatus consisting of the main pipe, B, and branch pipes, C, which are provided with self-closing valves, E, substantially as and for the purpose herein shown and described.

2d, The valve, E, when constructed as herein shown and described, so that by lengthening or shortening the stem the amount of steam discharged during a given time may be increased or diminished at will.

3d, Providing the steam pipes of a heating apparatus with self-closing valves, substantially as and for the purpose herein shown and described.

4th, The annular horizontal flange, E, when arranged around the lower part of the conical valve, D, substantially as herein shown and described.

74,470.—DRAFT EQUALIZER FOR DOUBLETREES.—M. V. B. Williamson, Jamesport, N. Y.

I claim, 1st, Hanging the pulley, B, forward of the doubletree, substantially as and for the purpose set forth.

2d, So constructing and attaching the arms or clevis, b, as to allow them and the pulley, B, to have free lateral vibratory motion from the bolt, a, as a center, substantially as hereinabove specified.

74,471.—DOUBLETREE.—M. V. B. Williamson, Jamesport, N. Y.

I claim the combination with a doubletree, A, of a short singletree or center bar, B, capable of swinging on its center, and attached to the doubletree by means of a clevis, or its equivalent, substantially as and for the purpose set forth.

Also the combination of the doubletree, A, with the singletree, B, substantially as set forth.

74,472.—STAGING FRAME.—Horace Wood, Leverett, Mass.

I claim, 1st, A staging frame composed of a series of frames, A, connected by planks or slats, d, and provided with windlasses, B, and cords or chains, e, all arranged substantially in the manner as and for the purpose set forth.

2d, The windlasses, D, applied to two or more frames, A, operated by the screw and worm-wheel gear, and provided with ropes, F, which pass through pulleys, k, attached to fixed ropes, l, substantially as and for the purpose specified.

74,473.—ROOFING SHOE.—James M. Wood, Lowville, N. Y.

I claim the combination of the perforated plates, A D E, when made in separate pieces and secured to the sole of the boot or shoe, in the manner and by the means herein described.

74,474.—PLOW.—William B. Young, Chicago, Ill.

I claim, 1st, The combination of the round, b, and rod, d, with or without either or all the rounds, a and c, and rod, e, substantially as described and for the purpose set forth.

2d, The combination of rounds, a b and c, and rods, d e and f, with the handles and beam of a plow, substantially as described and for the purpose set forth.

74,475.—PORTABLE ANIMAL TETHER.—Andrew Ralston, West Middletown, Pa.

I claim, 1st, A portable stock-feeding hitching frame consisting of upright posts, A A', mounted upon carriages and provided with a hitching rope or chain, E, and also with means for keeping this rope or chain under proper tension, substantially as described.

2d, In combination with uprights, A A', and a hitching rope or chain, E, a swivel frame, G, and a loaded tether, h 1, substantially as described.

REISSUES.

2,858.—LATH MACHINE.—Jonathan C. Brown, Brooklyn, N. Y., assignee of Henry C. Smith, Dated Sept. 28, 1852. Extended seven years.

I claim, 1st, Turning the log to be cut by driving the mandrels at each end thereof by gearing them directly with the driving shaft, substantially as and for the purposes set forth.

2d, The dog, A, and its appurtenances for connecting the log with the mandrels and disconnecting it therefrom, as specified.

3d, The combination of the cylinder cutter, K, and the stripping knife moved up simultaneously and automatically, all substantially as and for the purposes set forth.

2,859.—TOBACCO PIPE.—Gustav Lautenschlager, Cincinnati, Ohio, and George L. Gott, New York city. Dated Jan. 30, 1866. Antedated Jan. 17, 1866.

We claim a bowl or a nicotine receptacle of a tobacco pipe made of coal dust mixed with pitch or other suitable cement, and formed substantially as and for the purposes described.

2,860.—INDEX DOOR PLATE.—E. M. Montague, Boston, assignee of Nathan Ames, Saugus Centre, Mass. Dated July 31, 1860.

I claim, 1st, The use in a door plate of a tablet or slate and an adjustable plate or disk having figures or readable signs or characters, for the purposes specified and set forth.

2d, In combination with the above door plate a rotating disk, C, marked with the hours and parts of an hour, as shown in Fig. 2, said disk being confined in the center to a spindle, D, which passes through the door, substantially as and for the purpose described.

3d, The spring, S, arranged, combined and operating substantially as described.

2,861.—LANTERN.—Francis Morandi, Boston, Mass. Dated Feb. 5, 1856.

I claim the funnel, D, applied to the lantern, in the manner and for the purpose substantially as herein set forth.

2,862.—SLEEPING CAR.—George M. Pullman, Chicago, Ill., for himself and assignee of Ben Field, Albion, N. Y. Dated Sept. 19, 1865.

We claim, 1st, The construction and arrangement of the berth, A, hinged to the car at B, and supported by the jointed suspenders, C, or other analogous devices, the whole so adapted to the car that it forms a recess to receive the same when turned up, substantially as described.

2d, In combination with the berth, A, the sliding partition, I, substantially as described.

3d, In combination with the berth, A, the movable head board, J, substantially as described.

4th, The construction and arrangement of a car seat with the back and seat cushions hinged together and disconnected from the seat frame so that the back cushion may be placed on the seat frame and the seat cushion extended to meet the seat cushion of the opposite chair, substantially as described.

2,863.—SEED PLANTER.—Adam R. Reese, Phillipsburg, N. J., assignee of George W. Lee. Patented November 21, 1854.

I claim, 1st, The cast iron ends of the seed box of a grain drill, provided with flanges formed thereon, fitting and supporting the ends of the front and rear boards, and with legs or feet for supporting the box on the main frame, as described.

2d, The scores, o o, or their equivalent, at the extremities of the holes, c, in the disks, M, in combination with the gradual narrowing of the holes towards their extremities, so as to save the grain from being cut, substantially as described.

2,864.—SEEDING MACHINE.—Adam R. Reese, Phillipsburg, N. J., assignee of George W. Lee and Adam R. Reese. Patented January 15, 1861.

I claim, 1st, The lifter handle that raises the seed tubes out of the ground, in combination with a mechanism or device that throws the feed out of gear, before the seed tubes are out of the ground, by the one movement of said lifter handle.

2d, In combination with a grain drill tube and draw bar, a brace to support the tube, fastened at its lower end to the tube, and at its upper end embracing the draw bar, and a wooden pin, which holds the upper end in proper position, and which will allow the brace to slide back on the bar when the tube strikes an obstruction, for the purpose set forth.

3d, The feed slide of a grain drill made of two bars, the one sliding in recesses of the grain stirrups, while the other is adjustable in relation thereto, in such manner as to maintain the parallelism of said bars, for the purpose set forth.

2,865.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Patented November 6, 1866. Division A.

I claim, 1st, The joint, composed of the nave, C', and axle, B', constructed and operating substantially as set forth.

2d, The arrangement and combination of the arms, C, nave, C', and axle, B', with the seat, D, and standard, A, substantially as specified.

3d, The double acting stop, k, constructed and operating substantially as specified.

4th, So locating and arranging the stop, k, and axle, B', on the head, B, that, with the nave, C', a covered and compact joint is provided, substantially as and for the purposes specified.

5th, The double acting stop, k, in combination with the shoulder, l, operating in the slot or space, substantially as specified.

2,866.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Dated Nov. 6, 1866. Div. B.

I claim, 1st, The jointed braces, F, when provided with lips, a, and ledges, b, substantially as and for the purposes specified.

2d, The combination and arrangement of the ledges, b, lips, a, and pins, d, with the braces, F, and hinged shelf, K, substantially as specified.

3d, The arrangement and combination of the hinged arms H, jointed braces F, and hinged arms G, with the standards, A, and desk top, I J, substantially as and for the purposes specified.

2,867.—SELF MOUSING HOOK.—The Middletown Wool Company, Middletown, Ct., assignees by mesne assignments of J. R. Henshaw. Dated Oct, 26, 1858. Reissue 2,166 dated Feb. 6, 1866.

I claim the combination and arrangement of the hooks proper, eye, spring bar, spring, and checks to protect the spring, substantially as before set forth.

2,868.—CRANK PIN AND BOX FOR HARVESTER.—Thomas Welch, Churchville, N. Y. Dated Aug. 1, 1865.

I claim, 1st, The crank pin box of a harvester, with an oil reservoir, G, for the purpose set forth.

2d, A crank pin box or head, D H, of a harvester, so constructed with reference to the crank pin, C, that the outer end of said pin will be enveloped by the head, D H, for the purposes set forth.

3d, In combination with a crank pin box, provided with an oil reservoir, a screw cap, G, or its equivalent, for the purpose of allowing the reservoir to be filled with, and prevent the escape of unnecessary oil therefrom.

4th, The pitman, E, and knife head, F, connected by the taper screw head, g, and socket, f, or their equivalents, and the bolt which passes into or through the parts, as set forth.

5th, In combination with the connecting parts, g f, and bolt, as specified, a washer, in the manner and for the purposes set forth.

DESIGNS.

2,929.—TRADE MARK.—J. H. Armbruster, Philadelphia, Pa.

2,930.—GLASS BOTTLE.—Neail N. Brown, Philadelphia, Pa.

2,931.—TRADE MARK.—Sampson Hainemann, Simon Hainemann, and David Steiner, New York city.

2,932.—PRINTERS' BORDER.—Wm. H. Page (assignor to Wm. H. Page & Co.), Norwich, Ct.

2,933.—SKATE RUNNER.—Abel C. Tallman, Philadelphia, Pa.

2,934.—TRADE MARK.—Willis C. Walker, St. Louis, Mo.

NOTE.—SIXTY-NINE patents in the above list were solicited through the office of this paper.—[EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 *Park Row, N. Y.*

55,979.—HAY RAKER AND LOADER.—Horace Baker, Cortland, N. Y. Dated July 3, 1866. Application for reissue received and filed Dec. 26, 1867.

1st, I claim the two positively actuated endless aprons revolving in opposite directions in combination with the toothed wheels, R2, or their equivalents, upon the shafts, I and L, and so placed relatively that the hay may be picked up and directed between said aprons and by them elevated, substantially as and for the purpose set forth.

2d, I claim the standards, T T, when so constructed that by their elasticity they shall maintain the upper portions of said aprons face to face and permit variations in the quantity of hay carried between them, as set forth.

3d, In combination with said endless aprons I claim the guide, S2, so constructed as to pass the hay over the forward apron and on to the wagon.

4th, In combination with said endless aprons, I claim the spur wheels, F and H, and the shaft, I, operating in the slot, I', and so constructed as to allow of a forward and backward movement of such shaft (and forward apron by such shaft), substantially as and for the purpose set forth.

5th, I claim the driving wheel, B, and cup-shaped wheel, C, constructed as described in combination with the spur wheels, F H and K, substantially as and for the purpose set forth.

72,905.—ATTACHING ORNAMENTAL HEADS TO NAILS, SCREWS, ETC.—Thomas C. Richards, New York city. Dated Dec. 31, 1867. Application for reissue received and filed Feb. 1, 1868.

I claim the attaching of ornamental heads to nails and screws by means of a recess or groove formed on or attached to the inner side of the ornamental head to receive the head proper of the nail or screw, substantially as shown and described.

25,635.—ACCOUNTANT LABELS FOR PERIODICALS, ETC.—Robert Dick, Buffalo, N. Y. Dated Oct. 4, 1859. Antedated July 26, 1858. Reissue No. 1,679. Dated May 31, 1864. Application for reissue received and filed Feb. 3, 1868. Div. A.

1st, I claim keeping accounts current in a standing form or forms of type, or their equivalents, by the method of type posting, substantially as set forth.

2d, I claim a ledger or record composed of impressions taken from said form or forms, substantially as set forth.

3d, I claim the use of all such impressions for rendering or transmitting accounts or for addressing or directing newspapers or other periodicals to subscribers or others whether applied to the papers directly from the type or intermediately from impressions previously taken or otherwise, substantially as herein described.

25,635.—ACCOUNTANT LABELS FOR PERIODICALS, ETC.—Robert Dick, Buffalo, N. Y. Dated Oct. 4, 1859. Antedated July 26, 1858. Reissue No. 1,679. Dated May 31, 1864. Application for reissue received and filed Feb. 3, 1868. Div. B.

1st, I claim a combined cutter and platen, operating as and for the purpose set forth.

2d, A feeding mechanism as described, or its equivalent, for advancing the web of names in combination with the cutter platen, substantially as set forth.

3d, The described or equivalent mechanism for coating the web with an adhesive mixture substantially as set forth.

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The value of the SCIENTIFIC AMERICAN *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

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9 tf Seneca Falls, N. Y.

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Manufacturers of the latest improved Patent Daniels' and Woodworth Planing Machines, Matching, Sash and Molding, Tenoning, Mortising, Boring, Shaping, Vertical and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip Saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st., New York. 9 tf

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9 tf No. 10 Market Square, Providence, R. I.

Cheap, Useful, Elegant.

IMPROVED BRONZE ALUMINUM
HUNTING CASED WATCHES,

(the qualities and resemblance of this new metal are such, compared to Gold, that even judges are deceived), and

ROSKOPF'S PAT'D PEOPLE'S WATCH.

The Improved Bronze Aluminum of which my watches are made, is a metal differing entirely from any ever offered to the public. It has seriously occupied the attention of scientific men, and has not only called forth the eulogium of the press, in consequence of its peculiar properties, but has also obtained a Gold Medal at the Paris Exposition, and even been favorably noticed by rescript of his holiness, Pius IX., authorizing its use in the manufacturing of church goods. The rich color it always retains is more pleasant to the eye than that of gold; it is therefore better adapted to the manufacture of watch cases than any composition ever found. The qualities of this metal are such that it is surpassed by none, if we except gold itself, and that only on account of the intrinsic value of the latter. Further details will be found in my circular, which will be sent, postpaid, on demand. My Watches are made of three sizes, all hunting cases, one small, for Ladies or Lads, and two for Gents. The movements are well finished and carefully put together by skillful workmen, and perfectly regulated. I can, therefore, warrant them excellent time-keepers. These goods being manufactured in my own factory, I am enabled to sell any of the above sizes at the extremely low price of $16. None genuine unless bearing my Trade Mark as above. A full assortment of all kinds of Chains always on hand. Goods sent by Express, C. O. D., with charges. Not responsible for money sent inclosed in letters. Address JULES D. FUGUENIN VUILLEMIN,
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8 4* tf J. B. RAND, Box, 569, Concord, N. H.

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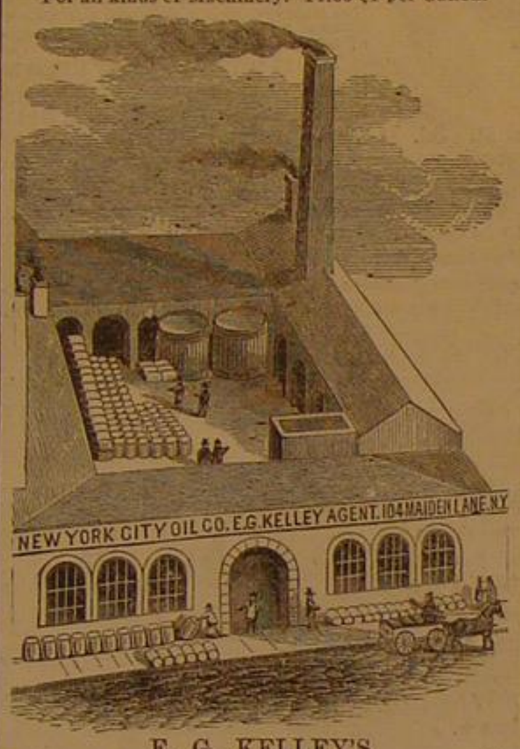

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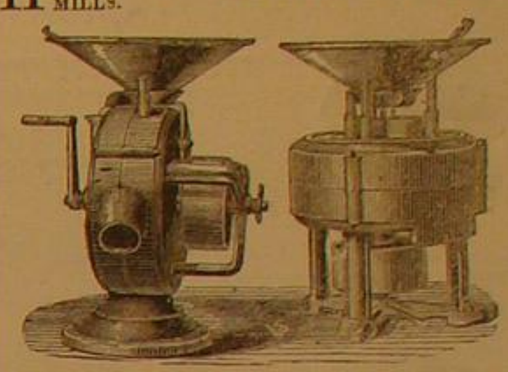

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See that our

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PORTABLE Foot Lathes, with Slide Rest and fittings. Elegant, accurate, and cheap. Address S. K. BALDWIN, Laconia, N. H. 5 3 eow*

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Which can be sharpened by grinding without changing their form. Send for a price list.

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TURBINE WATER WHEELS,

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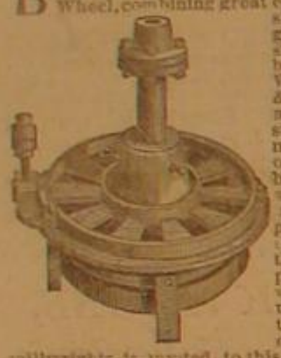

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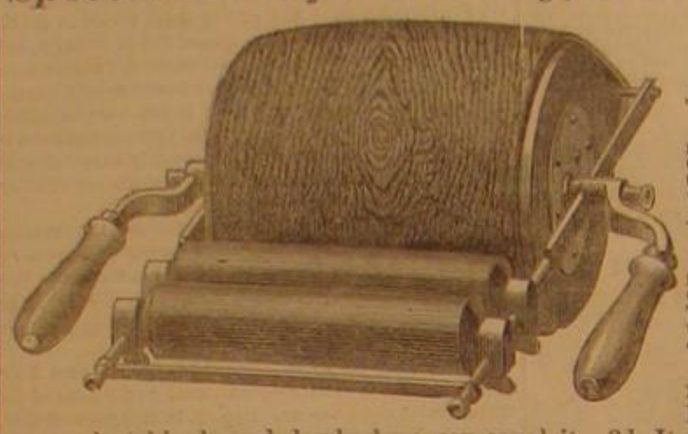

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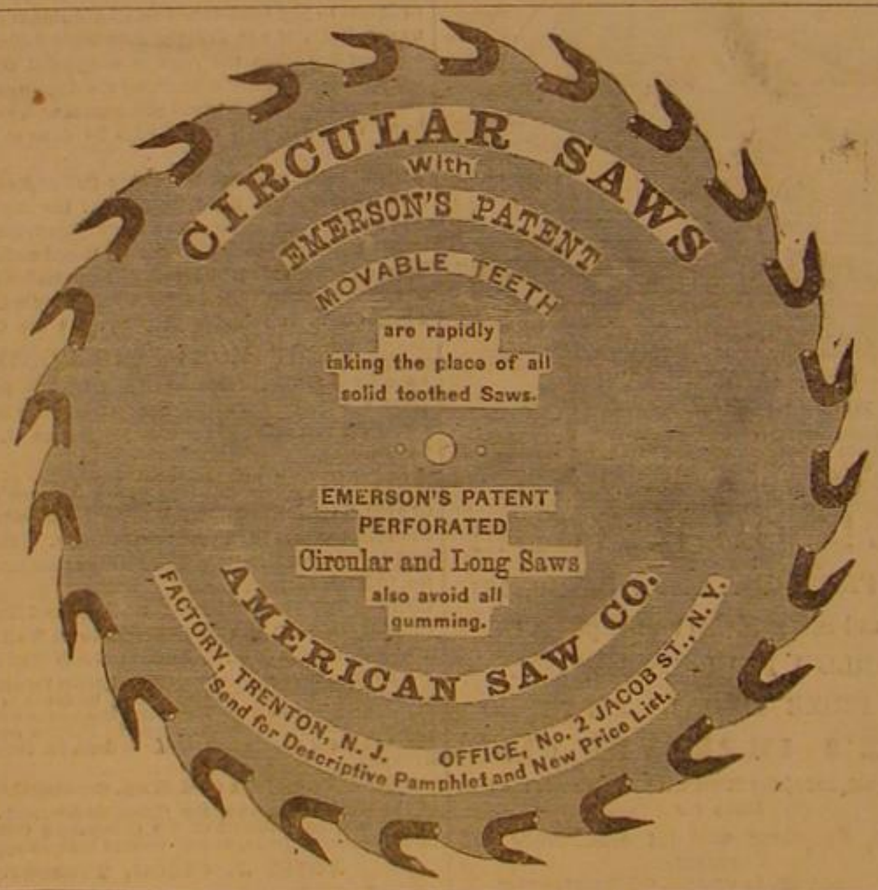
☞ This machine has taken the First Premium at the American Institute Fair, this year. See Report of Committee. Also, see Scientific American, August 3, 1867. Samples of the work done on exhibition at the office. For circulars and further particulars address,

9 6os eow HEATH, SMITH & CO., 44 Murray street, New York.



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FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 1 9*tf

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SCIENTIFIC AMERICAN

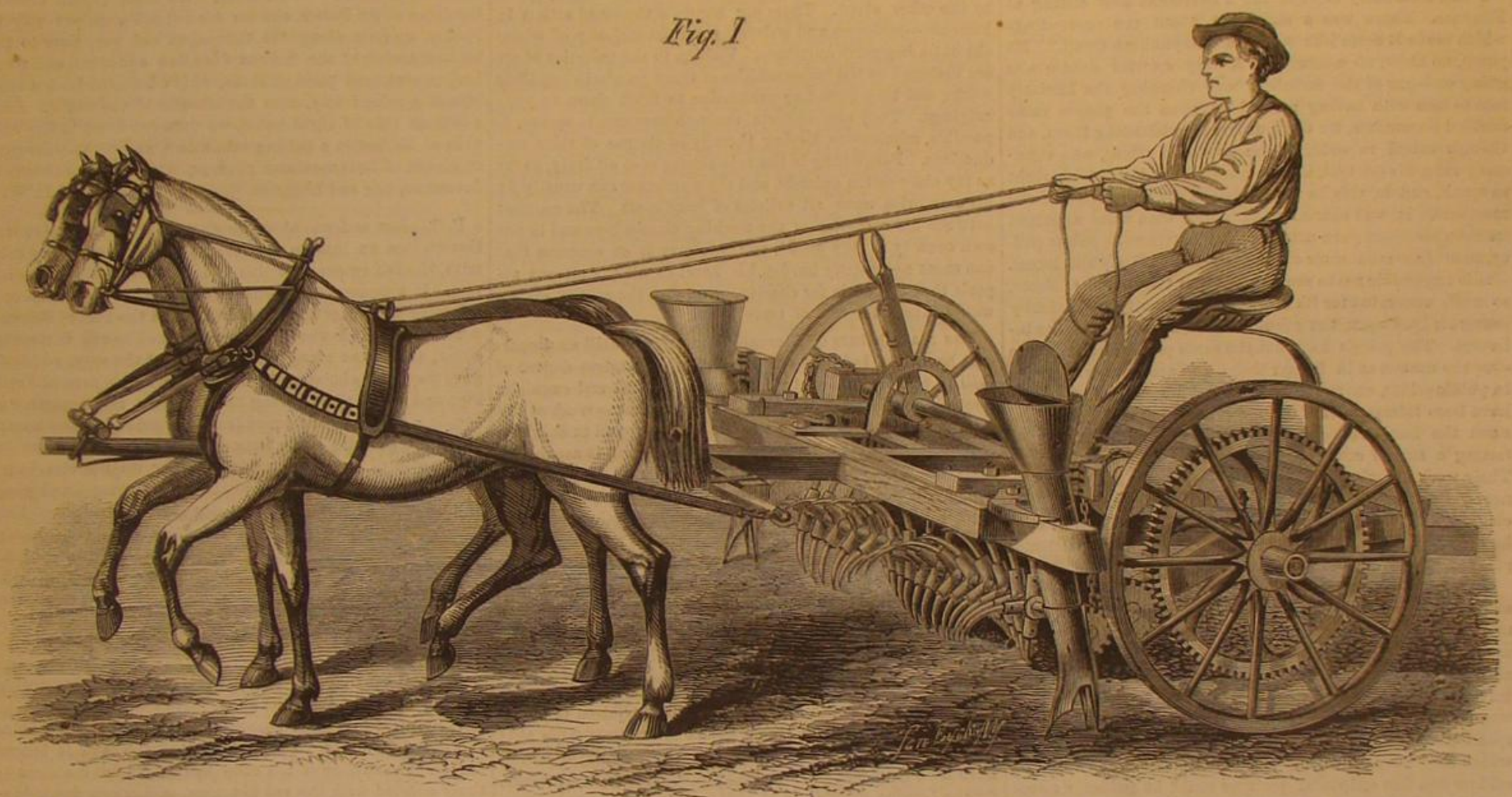
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XVIII.—No. 10. [NEW SERIES.] NEW YORK, MARCH 7, 1868. $3 per Annum [IN ADVANCE.]

Improved Device for Loosening and Pulverizing Soil.

It is well known to farmers—those at least who endeavor to understand the science of their business—that although the soil holds a certain proportion of the nutritious elements which form the constituents of plants, their roots as well as their leaves and blossoms, depend greatly upon the elements of the atmosphere for growth and development. Consequently the exposure of the soil to the atmosphere is a necessity in agriculture. But often its exposure is simply a reversal of the position of the soil, what was at the surface being placed at the bottom of a furrow from four to ten inches deep, that bottom being compressed hard by the weight and friction of the plow sole. Pulverizing, not breaking into masses, is what the soil needs to enable it to receive from the atmosphere and return to the agriculturist the greatest amount of good.

Fig. 1



STELLE'S COMBINED CULTIVATOR AND PLANTER.

The object of the machine seen in the engravings is to save labor and time while it pulverizes the soil better than any other device. It will cultivate a space four feet wide, plowing and harrowing it ready for the reception of the seed, while the ordinary plow simply turns the soil upside down in a furrow of about nine inches in width. This machine pulverizes the soil to a depth of from one to ten or more inches. The teeth of the cylinder are placed in a spiral around the shaft, so that only four or five of them are in the same degree of contact with the soil at one time, making the draft very light, especially as the cylinder revolves in the direction of the draft.

The teeth may be made of any required form, harpoon-shaped, diverging from the hub, enlarged at the end with square or round edges, etc., to suit the work required and the nature of the soil.

Attached to the sides of the machine are two receptacles for corn or other seed placed directly in front of the wheels, which may have attached to their peripheries broad pieces to compress the soil above each hill, or the tread of the wheels may be made broad enough to act to the same purpose. Cut-offs similar to those used on a common shot pouch are actuated by a double cam on the main or driving shaft. The upper cut-offs may be adjusted so as to permit few or many kernels to fall at one time. The driving wheels being about four feet in diameter, describe a distance in traveling one revolution, of about twelve feet, and by the double cams operating the seed-feeding cut-offs, deposit three hills to one revolution of the driving wheels. The operation of the seed planter may be suspended at will, so that the machine may be used only as a plow, cultivator, or pulverizer of the soil. When it is required to loosen the soil only to the depth of three or four inches, the gear may be used, the cultivating cylinder in that case making nearly three revolutions to one of the driving shaft; but when it is necessary to open the soil to a depth of from ten to fifteen inches the cylinder may be thrown out of gear.

A lever and quadrant in front of the driver's seat is used either to regulate the depth of action of the cultivator teeth, or to raise them from the ground a distance of from six to eight inches for driving over common roads to and from the place of labor. The lever operates the cylinder by means of chains and cams on the lever shaft at each end of the machine.

Fig. 2 represents a corn or other cultivator composed of two separate cylinders, with flanges at the inner ends, intended to protect the plant from dirt and to enable the operator to guide the implement. The action of this machine leaves the soil in better condition for drainage and better suited for the growth of crops than the ordinary plow and harrow. It was patented through the Scientific American Patent Agency, July 16, 1867, by D. D. Stelle, assignor to himself and Thomas

Fig. 2

E. McDonald, of New Brunswick, N. J. Patents have also been secured through this office in England and France. Applications for the purchase of rights etc., may be made to Johnson Letson, New Brunswick, N. J.

Process for Preserving Wood.

A recent patent granted to Sigismund Beer, of New York city, is as follows:

"Wood freshly cut is full of sap, composed of hygroscopic and very perishable organic substances. Heretofore, the idea has been, in seasoning and preserving wood, to wash out these substances, or to chemically combine and convert them into more durable compounds. Washing by steam only removes matter having great affinity for water, and soluble therein, leaving those that coagulate by the action of steam to fill the pores and stop further action. The chemical conversion of these substances is commonly produced by metallic salts, which combine with them, forming insoluble compounds of more durability. But this action is necessarily limited to the exterior, as deep impregnation is stopped by the newly formed products. Moreover, the cost is high, and the salts more or less injuriously affect the wood substance.

"My discovery consists in simply treating the wood with a boiling solution of borax in water, which easily and effectually dissolves and removes all those perishable substances, without injuriously affecting the wood fiber, which, on the contrary, becomes harder, impregnable to water, vermin proof, perfectly indifferent to the moisture or dryness of the atmosphere, and almost incombustible.

"The process and operation are as follows: In a tank, of wood or iron, I prepare a saturated or nearly saturated solution of borax in water, sufficient to cover the wood. I then raise the temperature, by steam or otherwise, to the boiling point, and keep it there from two to twelve hours, according to the porosity and thickness of the wood. I then repeat this operation in a freshly-concentrated solution of borax in water, but immersing the wood only half as long as before. The wood is then taken out, and, as soon as dry, it is ready for use, if its hardness and discolor are not objectionable, or it may be several times washed in boiling water, which will extract the absorbed borax in connection with the colored matter, and restore its former color and appearance, more or less, at will.

"It is not necessary to use a very strong solution, but I prefer it on account of the facility for re-using it.

"Simple as my process is, it may be advantageously altered in some cases. When thick lumbers are to be treated, it is well to steam them thoroughly in the ordinary way, and place them in the tank while still warm and wet. The denser and heavier liquid of borax solution will more quickly penetrate the pores of the wood, and shorten the operation considerably.

"If it be desirable to impregnate the wood with tar, coal-oil, or like substances, they are easily applied, after the wood has been thoroughly dried.

"If it be desirable to make the wood perfectly water-tight, shellac, or other gum, or resin, or substance soluble in a boiling solution of borax, and insoluble, after drying, in cold water, may be added to the liquid of the second operation."

THE DUROMETER.—At the Paris Exposition an instrument was exhibited designed for testing the relative hardness of steel rails. This "durometer," as it is styled, is virtually a small drilling machine, working by hand or machine power, which registers the number of revolutions of the drill spindle and also the amount of feed, the latter being given by the application of a known weight to the back of the drill spindle. The friction of the machine and the state of the cutting edges are supposed to be constant quantities and as such are thrown out of the calculation. The hardness of any rail is considered to be inversely proportionate to the depth of feed obtained with a given number of revolutions.

EDITORIAL CORRESPONDENCE.

Affairs in Italy—Priests and Monks—Rich Monasteries and Churches—Artists—Machinery—Mosaics—Laurentian Library—Trip to Naples via Rome.

Naples, Jan. 28, 1868.

The recent troubles in Italy that so much agitated the whole surface of European politics have pretty much subsided, but the calm has in it a portent of evil, and it is impossible to feel any degree of security for the future of this people, who seem determined to carry forward the work of uniting Italy under one government. Nine years ago the French Emperor at Magenta, Solferino, and Montibello gave powerful aid toward the unity of Italy, and the work has since been going forward with the slow healing process of a fractured limb, and might have been complete at this moment but for the intermeddling of this same French Emperor. So long as he thrusts himself in the way, to check the wishes of the Italians, so long will Italy be afflicted with political and social upheavals.

There are still great apprehensions of trouble in Italy. The people are fretting impatiently under the check which has been put upon their hopes, and it is with the utmost difficulty that Victor Emanuel, who is much more of a bluff soldier than a shrewd politician, has been able to keep his crown. He is now unpopular in Italy simply, I believe, for the reason that he has not been able to lead the people to a full realization of their wishes.

I had a curiosity to visit the Parliament now sitting at Florence. There was a simplicity about the proceedings which made it seem like our own "Republican Court." No pomp, no show, no ceremony. A very spirited debate was going on—one of the members was charging the Ministry face to face with having palmed off upon the people some falsified documents, for the purpose of misleading them, and though called to order by the presiding officer, who vigorously rang his tea bell, the member insisted upon his right to speak, and in this he was sustained by a majority of the members. It was charming to notice with what apparent freedom members gave utterance to their views of public policy, an evidence that some of the fire of ancient Italy still burns.

It is impossible not to see and feel that the church of Rome, so much venerated for its history and antiquity, is gradually losing its hold upon the affections of a large class of its believers. The priests have not the same power and influence over the masses as in former times, and are even caricatured in public prints, an irreverence which I am assured would not have been tolerated until quite recently, and no one can look upon the horde of monks that traverse the streets without feeling a sort of commiseration for their unhappy situation. Their work in Italy and elsewhere in Europe appears to be nearly finished, their extensive monasteries, cloisters, and elegant chapels are almost deserted, and they seem now to be wandering about the streets and solitary places, destitute, afflicted, and tormented.

Some of the magnificent church edifices in Italy, as in Spain and elsewhere, with their rich marbles, decorations, and master works in sculpture, painting, and fresco, are monuments of the skill and refined taste of these monks, and will always constitute one of the chief objects of interest to all travelers. Some persons seem to delight in abusing these wandering children of the church, but they are glad to spend time and money to see and admire the wonders of art which they have collected. If the ecclesiastical and monastic edifices and fine scriptural pictures could be suddenly swept away from Italy, much of the interest which now clings to it would disappear, for with rare exceptions a mere, shapeless mass of ruins and the associations of ancient history, are of comparatively little interest except to antiquarians, scholars, and minds well instructed in historical reading.

The people of Italy at this moment are reduced to the straits of a paper currency, and even individual shinplasters, for the want of small change, pass current in the cities. Gold now commands a premium of fifteen per cent, and coppers six per cent, yet with the exception of the necessaries of life, which are now higher than at any former period, the price of labor and merchandize remain about the same. The business of the country is heavily depressed, but the Italian who wishes to pass for a gentleman upon the Lung Arno or the Corso must contrive in some way to sport his fine stovepipe hat, also a seat at the opera where his "bravos" can be energetically rendered, and if possible a fine equipage, even though he must needs go without his dinner and live at his home in squalid discomfort.

The Italian always has his house, however humble, but he spends a good deal of his time in loitering about the promenades and cafés, though he never frequents the hotel; therefore spacious bar-rooms are never seen in them, and when rents are high the hotel, even with plenty of rooms at three and five francs per day, may remain empty. The hotels are for travelers, not for residents. Bar room tippling, the curse of our own country, is a thing almost unknown in Italy. I was informed by a resident that there was but one establishment in Florence where a gentleman could go up to the bar and obtain a prepared drink, such as are furnished at every bar-room in New York. Drunkenness, as we so well understand it, is also a thing unknown, and the records of crime and immorality indicate a better state of society than is found in either English or American cities.

The charitable institutions of Florence are numerous and well cared for. One of the most ancient is the *Misericordia*, founded many centuries ago by the aid of a fund collected as fines for profane swearing, imposed upon themselves by workmen employed in the extensive cloth factories which at one time were quite numerous in Florence. Forty men are on duty all the time, and at the monotonous toll of the great cathedral bell they go forth on their mission of mercy, masked and clothed in a black monastic dress, and bring to the institution the sick poor, or those who have been wounded to afford them succor, or when killed, a Christian burial. They understand the language of the tolling bell as well as our firemen do when summoned to their duty. I noticed when a procession of the *misericordia* passed through the streets that citizens lifted their hats and soldiers presented arms, in token of respect to the society, which has a long and humane history of noble deeds.

Artists in Italy are poorly paid, and works of art can be purchased very cheaply. I noticed in one of the public galleries an artist at work, skillfully copying some exquisite little pictures. I had the curiosity to learn how much he was paid for his labor. He gave me the price of the picture and the time required to finish it, and I found that he was earning about five francs per day, out of which he had himself to support. Noticing upon the walls of the gallery an elaborate picture of the "Adoration of the Wise Men," painted by one of Italy's old masters, I inquired of the artist his charge for making a copy of it; he replied, twelve hundred francs, which meant paper money, and moreover he assured me that to do it well would occupy his time the best part of a year. With a view to verify the correctness of the estimate, I took the trouble to make the same inquiry of another artist of considerable reputation, and he informed me that he could not undertake to complete the copy short of nine months time and at five times the price previously given by the other artist. There are nearly a thousand artists in Florence—sculptors and painters—a great majority of whom eke out a beggarly existence. Visitors to the galleries of art are besieged by the importunities of these people to buy their works, and they even beg permission to fetch them to your lodgings. They also operate through servants to secure, if possible, admittance, hoping thereby to dispose of their productions. Bargaining is the rule throughout all Italy, so far as my observation extends, and the purchaser can usually fix his own price upon all articles of handicraft. The contrast between the condition of the working classes here and in our own country is very great, and beggary is so common that one must necessarily harden his heart to all the piteous appeals that are made for charity, otherwise the cost of giving would exceed the cost of traveling.

The manufacture of Florentine mosaics is still an important branch of industry and requires the greatest degree of skill to work the pieces into so many fanciful and exquisite forms. The slab usually employed for the frame work of the mosaic is known as the "paragon stone," found in Belgium and Scotland. It is black and very dense, and is capable of receiving a brilliant polish. The holes are all sawed by the use of a small steel wire, strung upon a bow, and which lasts but from three to five minutes, when another length is required. The pieces to be inserted are of various natural colors, selected with great care, and are all cut in the same way to an exact measurement, the process being exceedingly slow and tedious. After the sawing, the small pieces are fitted into the matrices according to a design previously prepared, and are then secured to their places by a tough cement, the whole resting upon an under slab of slate. The mosaic is finished by polishing the surface by hand, by means of porphyry. A month's time is frequently required to polish a fine table top. In the king's palace is a mosaic table that cost the labor of fourteen years, and the expense is said to have been $200,000. It was made at the government works, for the London Exhibition of 1851. A costly toy, to be sure, but foreign governments don't mind the expense, so long as they can wring the money from the people. There still exists in Italy a strong prejudice against the introduction of labor saving machinery. Mechanics here cherish the crude old notion that machinery would destroy the value of their labor instead of enhancing its dignity and increasing its demands; therefore they are content to plod on day after day, through weary manipulations, which could be performed much more profitably by a machine. I was informed by an American residing in Florence, that it would not be safe for any one to introduce a circular saw, therefore boards and all other pieces of lumber are ripped by an old fashioned slitting saw, worked by two men. Of modern agricultural machinery little or none is employed, and all attempts to improve the quality of the silk-worm have failed mainly through the opposition of those who insist upon carrying on the operations of the worm in their own houses. I cannot conceive of a better and more humane service to be done for the advancement of the working classes of Italy, than to instruct them in the proper use of improved tools and processes, and to convince them that by their use great benefits would result therefrom. People in Italy have no fires in their places of business, and it is often considered a luxury to have a fire in their houses; beside, the fireplaces are constructed so deep that the heat all goes up chimney, and very little comfort is derived from it. The people warm themselves by the use of an earthern jar or pot, with a few embers in it, which they carry about by a fixed bail or handle. The jar, often highly ornamented, is about the size of a small flower pot, and it is amusing to see the people huddling over them trying to keep their fingers warm.

In my last letter, I spoke of the many fine church edifices of Florence, but neglected to state that although elegantly fitted up few of them have finished fronts—a serious defect that was explained to me as resulting from the circumstance that in earlier times a heavy tax was laid upon all finished churches, therefore to avoid this tax the front was left in a rough state. Some of the most splendid churches in the city present this singular contrast—externally, a rough stone wall, or a plain stuccoed front; the interior finely painted, gilded, and otherwise adorned.

The Laurentian Library, connected with the church and old monastery of San Lorenzo, contains one of the richest collections of rare manuscripts to be found in the world. They are solidly bound, and each volume is fastened to the desk by a heavy iron chain. Here are to be seen the Pandects of Justinian, captured at Amalfi seven hundred years ago, also manuscripts of Tacitus, Virgil, Horace, Petrarch, Dante, Cicero's Epistles, and many other classical works; also, a copy of the famous Decameron of Boccacio, dated 1381, a book that greatly interested me, because of a statement I noticed in an English paper to the effect that in 1812 a copy of the Decameron was purchased at an auction sale in London, by the Marquis of Blandford, for the sum of £2,250, and that upon his death it was bought by his early rival for the book, Lord Spencer, for £918. The journal furthermore declared that only two other copies were known to exist, one in the Ambrosian Library at Milan, the other in the Imperial Library at Paris. It seems, however, that there is a Decameron at Florence, and if I remember rightly, it bears an earlier date than that purchased by the Marquis.

But I must not linger in Florence; the eruption of Vesuvius demands our presence at Naples. We took our departure on a dark, rainy night, with the expectation of getting an outside view of Rome at an early hour in the morning. About an hour before we reached the "Eternal City," a pontifical officer took our passports, in return for which we were handed a receipt, with the assurance that before leaving the state the passports would be returned. We had a distant view of the dome of St. Peters, and for several miles on our way to Naples, we rode along the Campagna and very near to the broken arches of the famous Claudian aqueduct, and numberless scattered piles of stone, which brought back a faint idea of a ruined city, once the mistress of the world. After a tedious ride of eight hours, we were set down in the suburbs of Naples, in a pelting rain storm, and became the prey of a pack of hackmen and runners, who seemed anxious to devour us, bag and baggage.

S. H. W.

P. S.—Just as I was about to close this letter, Naples was thrown into an intense excitement by a very shocking calamity, the full extent of which it is now impossible to ascertain. It appears, that, about six o'clock this evening, a considerable portion of an abrupt hill, called the Piazzo Falcone, which rises high above a principal and much frequented street, that runs along the bay side of the city, suddenly gave way, overwhelming a public-house, beside several dwellings and shops, also burying in its ruins a large number of people. I have just returned from the scene of the disaster, about five minutes' walk from the hotel, and found an immense pile of earth and rubbish filling up the street for a long distance. A force of soldiers were on guard, and gangs of men were at work trying to dig out the bodies of those unfortunates who were buried under the ruin.

I understand that Bayard Taylor resided in one of the houses which was destroyed, but, fortunately, he with his family were temporarily absent when the catastrophe occurred.

During the past ten days Naples has been visited by two severe rain storms; and, one night, the shock of an earthquake was sensibly felt throughout the city, which will no doubt account for this land slide.

Vesuvius, to-night, is more splendid than at any time since this eruption began. The discharge of the lava is increasing, and the surface of the cone toward Naples is almost entirely covered with the red hot mass, which now flows down through seven distinct streams.

W.

Anthracite Gunpowder.

Ehrhardt, of London, has lately obtained as above. "The powder is composed of nitrate of potash and chlorate of potash mixed in proper proportions with mineral carbon. Powder thus compounded is less liable to accidental explosion, inasmuch as it does not explode when ignited in the open air, but burns slowly, something like common gunpowder when wet. But when confined, as in a gun, or in a blasting hole in a rock, it explodes with even greater force than ordinary gunpowder. It is not much affected by dampness, and generates but little smoke in burning.

"To make this powder, the several ingredients must be finely pulverized and then intimately mixed together. The more finely they are pulverized the better. They require no other preparation. When the ingredients are well mixed the powder is ready for use. The proportions of the ingredients may be varied for different kinds of work. For use in coal mines, I prefer to take one part by bulk of chlorate of potash, four parts of nitrate of potash, and five parts of mineral coal. For blasting granite or other hard rocks, I prefer to take one part of chlorate of potash, two parts of nitrate of potash, and three parts of mineral carbon.

"The mineral carbon may be either bituminous coal or anthracite, but I prefer to use the anthracite known as "red ash." Wood charcoal may be used instead of mineral coal, but it is not so good. Nitrate of soda may also be used in place of the nitrate of potash."

Improvement in Generating Illuminating Gas.

Ferdinand King, of Richmond, Va., who has lately obtained a patent, says:—"I take of the oil that runs from the gas tar produced at gas or coke works about two parts, and crude petroleum about one part, and mix them together, forming a compound oil. From this compound oil I generate gas by treating it in any oil-gas generator, in the same way that other oils are treated for the same purpose. It makes a superior illuminating gas, at a very small expense, and will be found of great value for lighting private houses and single buildings or establishments which cannot be supplied by public gas works."

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Spiders--Their Habits and Peculiarities.

MESSRS. EDITORS:—Spiders find their way into the tidiest places, an axiom verified by their having found a nook in your columns; before you brush them down, however, allow us to tell "all we know about them." I think a study of the habits and peculiarities of the spider an interesting one, proving both useful and instructive. We find its web counterfeited in the fisherman's seine, its spinerets have mechanical counterparts in our threadworks, and we mimic it in bridging rivers and chasms with our suspension bridges—first one frail wire, then another, and so on until the fairy-like structure is completed. To those who fail to see how observations of the habits of these and other insects can prove useful, I will cite the case of the French commander before Utrecht, who, discouraged by the incessant rain and drizzle, was upon the point of abandoning the siege of that city, when Disjonval dissuaded him, saying that he had noticed more than ordinary activity on the part of a spider, which led him to expect a change soon. It turned out as Disjonval predicted, and Utrecht fell! How important an event dangled on the thread of that spider! Mr. Eades, in your third February number, gives an account, in his observations, of a species of flying spiders. I find that Darwin terms them "gossamer spiders," and mentions that while on a ship that was sixty miles from shore, in the direction of a steady though light breeze, vast numbers of these spiders covered the rigging of the ship. Dallas, in his "Animal Kingdom," says of spiders, "that many of them have the faculty of emitting long threads, one end of which floats freely in the air until it meets with some object to which it adheres. By this means spiders form natural bridges by which they pass over brooks and ditches. Some species avail themselves of this power to take flights in the air, where they attain great altitudes." The most casual observer must have noticed how easily the ordinary or geometric spider crosses areas and alleys by means of a single thread having a bunch of a filmy, adhesive nature at its end, to buoy it up until it reaches an opposing object to which it adheres.

Several years ago, while on the "look-out" of one of our large elevators, I noticed a plump spider fall upon the metal roof beneath me, and a wasp darting after it, immediately secured it in a sort of basket formed by its legs, and then flew off with its prize. The question now was, what use has the wasp for the spider? The next season following gave me an opportunity of solving it. Noticing several wasps about some dingy windows in an area, I concluded to watch them, and soon had the satisfaction of seeing a few depart with their game. I traced their destination, and found it to be a number of clay structures under the eaves of a neighboring dwelling. These formations had numerous perforations, about which the wasps busied themselves. Some time after they had abandoned the neighborhood, I gained admittance to the house and removed several of these adobe nests. I opened one of them and found a cell containing an egg or larvæ; the cell beside it was filled with spiders in a torpid state, both great and small, packed closely, with their front legs turned over their backs. The same order of arrangement was observed in the balance of the nest. I came to the conclusion that the spiders were placed there to keep a necessary temperature for the larvæ. I was not satisfied, however, and began a search among various authors, until Darwin, in his "Researches," set me right, by describing "certain wasp-like insects which construct in the corners of verandahs, clay cells for their larvæ. These cells they stuff full of half-dead spiders and caterpillers, which they seem wonderfully to know how to sting to that degree as to leave them paralyzed until their eggs are hatched, and the larvæ feed on this horrid mass of powerless, half-killed victims." I might go on and relate instances of the courage and ingenuity of the garden spider, but a fear that I am encroaching on your valuable space forbids it. I will close by giving another instance of the usefulness of observations of insect life. A Scotch mathematician, in measuring the angles of a bee cell, discovered an error in a table of logarithms "sufficiently great to have occasioned the loss of a ship at sea, whose captain happened to use a copy of the same logarithmic tables for calculating his longitude." H. W. BLEYER.

Buffalo, N. Y.

More about Suction Pumps.

MESSRS. EDITORS:—On page 67, Vol. XVIII., your correspondent endeavors to place some strictures upon my statements in a former communication. He says, that "the pressure on any valve is just the same when in the pump at work as when out of the pump—that is, equal on all sides. If this were so, the valve would never move at all; for, as in the case of any other body, there being an equilibrium of the forces acting upon it, it would necessarily remain at rest. But I maintain that it is pressed downward with just the force required to raise it, and that the pressure is proportional to the area of the valve (or piston, if that be considered), multiplied by its perpendicular hight above the surface of the water in the well. As to the water being sustained, he cannot note my language very carefully, or else he would perceive that I do not say what force sustains the water in the "feed pipe," but only that there is pressure on the valves, and that the water is sustained. But I will now say that the water is both sustained and raised through the agency of the valves, for without them neither would be done. I will endeavor also to show the amount of pressure on any valve. First, the pressure on the surface of water exposed to the atmosphere is the weight of the atmosphere, an amount varying slightly with atmospheric changes, and considerably with the hight or distance of such surface from the center of the earth and ascertained to be fifteen pounds per square inch at the level of the sea.

Suppose a straight tube of sufficient length, open at both ends, fixed perpendicularly in a well, with its lower end below the surface of the water, and that a piston within it, and movable through its whole length, be placed exactly at the surface of the water, and then moved upward. As the piston is raised, it carries with it, and above it, the weight of the atmosphere on its upper surface, which weight would otherwise rest on the surface of the water inside the tube; and this weight being removed, the pressure of the atmosphere on the water outside the tube forces it to follow the piston upwards. Now, suppose the area of the piston to be one square inch, and the hight to which water can be raised in this way to be 33 feet, or 396 inches, then it is plain, that, in the beginning, or when the lower surface of the piston is level with the surface of the water outside the tube, the upward pressure of the water upon the piston is just 15 pounds. When the piston is 33 feet above the surface, the atmospheric pressure sustains a column of water at the same high, or 396 cubic inches of water, while it imparts no pressure to the lower surface of the piston, inasmuch as the water will follow it no further. From this it will also be seen, that, for every inch the piston rises, the pressure on its lower surface is diminished by $\frac{1}{396}$ of 15 pounds. Hence, the aggregate pressure on the piston, at any point, may be found by taking the constant downward pressure of 15 pounds (15 pounds to every square inch of surface in any other case), and subtracting therefrom such a fractional part of 15 pounds as its hight lacks of 33 feet; in other words, the sum of these two opposite effects of atmospheric pressure is a downward pressure, varying exactly as its hight. The same is true of the valves, valve-boxes, and pistons of suction pumps, applicable to the upper valve when ascending, and to the lower one when the upper one is descending, or to either when closed; and the amount of pressure obtained by this rule, plus the force necessary to overcome the inertia of the mass to be moved, together with the friction of the water, and that of the piston against the sides of the tube, will be the force to be applied to the piston in order to move it upwards and raise the water to its own hight.

As to your correspondent's criticism on the word "generally," I would say that the word was used as the word *general* is, when we speak of a general rule, meaning one of general application, or true in all cases to which it is applicable.

Now for the friction question. The friction of the water, other things being equal, will be in proportion to the surface of the containing solids passed over by it. Suppose two tubes, one having an area of cross section of one square inch and the other of four square inches, with equal pumps attached. If the water in the larger tube must move five inches to deliver a certain quantity of water, that in the smaller must move four times as far, or twenty inches, to deliver an equal quantity. The surface passed over in the first case is the inside of a tube 5 inches in length, whose area of cross section is four square inches. The surface passed over in the second case is the inside of a tube 20 inches long, with an area of cross section of one square inch. The first is $\sqrt{.\frac{4}{07958}} \times 5 = \sqrt{.\frac{100}{07958}}$ square inches for the larger tube. The second is $\sqrt{.\frac{1}{07958}} \times 20 = \sqrt{.\frac{400}{07958}}$ square inches for the smaller tube.

These, it will be seen, are to each other as $\sqrt{1}$ to $\sqrt{4}$, or 1:2, thus proving the amount of friction from passing over a larger surface, to be twice as great in the smaller as in the larger tube. It will be seen further, from the above, that the amount of friction from the cause named varies inversely as the square roots of the areas of the cross sections of the tubes. Hence, it is easy to see that the relative size of pumps and feed pipes is a question of considerable importance on account of the friction of the water, especially where it is to be carried over long distances, and raised to considerable hights.

Oneida, N. Y. M. N. HORTON.

Carbonic Acid Gas in Wells.

MESSRS. EDITORS:—To relieve wells or other vertical excavations of damp, or carbonic acid gas, or the smoke of gunpowder in blasting, make a hoop of any flexible material of sufficient weight (a grape vine answers well), nearly the size of the excavation. With a coarse blanket or any other strong cloth make a bag five or six feet long; sew the hoop in the open end, so as to keep the bag distended. Tie a rope across the hoop, and attach to the center of it a long rope, which will reach to the bottom of the well. Hold the bag so that the distended or open end will descend first. Let it drop, and it immediately becomes inflated with air, which is carried to the bottom, and displaces the impure air. A few repetitions of the fall of the bag render the air at the bottom entirely pure. J. M. W.

Seguin, Texas.

Ships' Pumps Done Away With.

MESSRS. EDITORS:—I saw in your issue of Feb. 15th an article headed "Ships' Pumps Done Away With." I used something like it in 1862, on the lower Ohio, by boring a hole in the bottom of a flatboat and inserting a gooseneck pipe. As long as the boat was under headway the water would run out, but as soon as the headway stopped the water would come back. I thought at the time that a boat in a four or five mile current would be kept free of water in this way. It was no invention of mine, as I heard it spoken of fifteen years, ago, and it is an old story to flatboat and steamboat men of the West. A STEAMBOAT MAN.

Transmission of Power for Long Distances.

MESSRS. EDITORS:—On pages 98 and 99 of Vol. XVII, there is an article from your special correspondent giving a description of a method used at Schaffhausen, for transmitting water power for a very long distance, and, as he remarks, it is a matter of great importance. The article has doubtless been read by thousands with as much interest as I felt in perusing it. The plan he describes has, however, been tried in this country with but indifferent success. In attempting to convey power two hundred feet, I first tried a hemp rope one and one-eighth inches diameter, then a manilla rope, and lastly a hide rope, all with the same success; they all three wore out in about a year, when they wore off the strands on the inside of the rope. The continual working and bending seemed to cut the inside strands when the outside seemed to be comparatively perfect. An attempt to splice them entirely failed.

Now will wire rope be any more durable? In my experiment the pulleys used were six feet in diameter making one hundred revolutions. It is not always practical to support a shaft for a long distance. I have had many years' experience in manufacturing, using both water and steam as power, yet I have not been able to arrive at a fixed conclusion which is the best means of conveying power for long distances—shafting or belts—and I find a great diversity of opinion among mechanics on this subject. M. J. W.

Champlain, N. Y.

Polygons.

MESSRS. EDITORS:—One of your correspondents, page 410, Vol. XVII., wants a theoretical demonstration that the side of the regular heptagon inscribed in a circle is equal to half the side of the inscribed equilateral triangle. This demonstration cannot be given, as it is not strictly true. For the radius=1, the side of the heptagon is equal to twice the sine of one fourteenth of 360°, or twice the sine of 25° 42′ 51″, which is equal to 0·4339; half the side of the triangle is equal to $\frac{1}{2}\sqrt{3}$, or 0·4335; the difference of these two numbers is so small that in common practice one can be used for the other, but they are not absolutely equal, and hence the impossibility of demonstrating this equality. Only in cases where the equality is absolute, demonstrations are possible. There are many other rules for constructing polygons of an odd number of sides, but as they are only approximate, no demonstration can be given. So is one-third of the diameter only a little smaller than the polygon of nine sides; seven twelfths of the radius very little larger than that of eleven sides; one-quarter of the radius nearly equal to that of twenty-five sides, etc. P. H. VANDER WEYDE, M. D.

Hardening Mill Picks.

MESSRS. EDITORS:—On page 103, current volume, in publishing my reply to "L. D. M.," on hardening mill picks, you make me say, "cool the picks in the bath, and drawn to temper." It should be "draw no temper." The salt gives hardness, and the other ingredients toughness to the steel; and they will not break, if they are left without drawing the temper. S. H. B.

A Formidable Prussian Iron-Clad.

About three years ago the Turkish Government contracted with Mr. Reed, of the Thames Iron Works, in London, to build an iron-clad, larger, stronger, faster, and more powerful, than any vessel of her kind. The work was begun, but after a while the Turkish remittances failed, and Mr. Reed was obliged to look about for another purchaser of his vessel. The Prussian Government quickly accepted the offer, and the work went on to completion.

The vessel has just been finished at London. She is called the *King William*, is of 6,000 tuns burden, draws 26 feet of water, and carries 8-inch armor, with a battery of 26 300-pounders, all of Krupp's steel, all breech-loaders, and capable, it is said, of being fired with 75-pound charges as often as twice in a minute. Her engines can be worked up to 7,000-horse power, and she can make fourteen knots an hour.

She is constructed on what is called the longitudinal system, that is, a series of most powerful wrought-iron girders, or frames, laid at a distance of seven feet apart, and passing along her completely from stem to stern. Between these the wrought-iron ribs are bolted, below the water line, at intervals of four feet apart, but above it, and behind the armor they are bolted as close as to within two feet of each other. Within both frames and ribs comes another iron skin an inch thick, so as to literally make a double ship, the inner one being four and a half feet apart from the outer.

Side passages, or wings as they are called, running the whole length of the structure, continue this double form up to the main deck. The inner side of these wings form the sides of the coal bunkers, so that even were it possible for a shot to pass through the armored sides of the *King William*, it would still have to penetrate the iron coal bunkers and pass through eight feet of coal before it could do any mischief to the fighting crew of the ship. She is ship rigged and will carry a crew of 700 men. She cost $2,000,000.

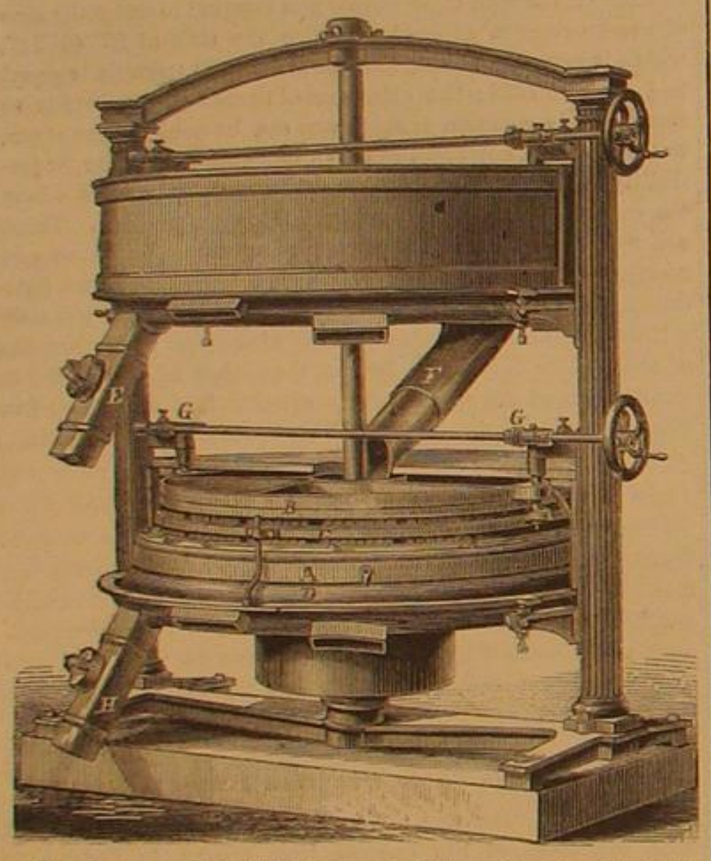
PEACHES WITHOUT STONES.—An agriculturist has, it is said, tried with success the following method of making peaches grow without stones: "Turn the tops of the trees down, cut off the ends, stick them into the ground, and fasten them so with stakes; in a year or two those tops will take root, and when well rooted cut off the branches connecting these reversed and rooted branches with the tree proper, and this reversed peach tree will produce fine peaches without stones." The same experiment may be tried with plums, cherries, and currants.

CLARK & ELTING'S "EXCELSIOR" BOLT AND DUSTER.

This machine, of which the engraving is a representation, is designed by the inventors to supply a want long felt by the milling fraternity, viz., a machine which will extract the flour from middlings as well as bran, and at the same time allow the flour so extracted, or at least a large portion of it, to pass into the best grade of flour; in other words, a machine, which will increase the yield without injuring in the least the quality.

That the Clark & Elting machine accomplishes this result, the testimony of such mills as the celebrated "Passaic," of Newark, N. J., the "Pearl," of Pittsburgh, the "Star and Crescent," of Chicago, the "Plants," of St. Louis, the "Boston City," of Boston, and many others of equal reputation, bear ample witness. In the accompanying engraving half of the lower casing or curb is removed, in order that the working of the machine may be more fully shown.

The machine is constructed with revolving horizontal disks, A, covered with wire cloth, varying from 36 to 44 inches in diameter, and having two or three disks as may be deemed advisable, with a view to the work to be done. Above these revolving disks are stationary ones, B, filled with long bristles of the very best description. Surrounding these bristles, and among the openings or furrows of the stationary disks, is what is termed a tempering wheel, C, the object of which is to virtually shorten or lengthen the bristles, as the work to be performed may require. Attached to the under side of the revolving disk are fans, which run in an air chamber, D. These fans form a suction, whereby the flour is drawn through the revolving disk, and conducted into the air chamber, where it passes off through the spout, E, and is carried to its proper place to be rebolted.



The brace and middlings pass off between the disks, by centrifugal force at the periphery, and so are reconducted by the spout, F, to the eye of the lower disk, that the same operation may be repeated. The disks are arranged in such a manner that by means of worms and screws, G, they may be adjusted at will while the machine is in motion. Thus the machine is under the control of the miller to just the same extent as the millstone.

The meal is taken from the return reel at the point where it begins to show specks (the main object being not to return any specks to the superfine reel), and is carried into the eye of the first disk, which is so set as to clean the stuff all it will bear, to run into the best flour.

The tailings of this disk are then returned to the next disk, by the spout, F, and the same operation repeated, and so on to the third disk, if a three-disk machine is used, and the tailings from the last disk are carried to a separating reel, by the spout, H, where the division of middlings, shorts, and bran, is made. By this operation, it will be discovered, that not only the quantity of the best flour will be increased, the color improved, greater clearness obtained, but that the amount of middlings to be reground will be materially lessened.

The middlings to be reground will be sharper, rounder, and cleaner, than it is possible to make them with bolting cloth. And it will be discovered that the same number of bolting reels will do more work than by the previous method; since the removal at once of the middlings frees the cloth, and prevents the particles which before were being worked over and over, from being returned to accumulate.

The machine was patented through the Scientific American Patent Agency, February 12, 1861, and is now in successful operation in over three hundred of the principal flour mills of the country. It was brought to its present perfected condition by the Elting Bolt & Duster Company, of Cincinnati, the sole manufacturers of the machines and owners of the patent, to whom all communications should be addressed.

A CORRESPONDENT recently returned from the East says:—"In Turkey, in Asia, the only mode of measuring distances is by the walking gait of a horse, and the traveler is told, when he inquires the distance to a given village or city, that it is so many caravan *days* or *hours*, which of course is not uniformly the same. This to a stranger is a great annoyance."

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture IV.

In our last lecture I intended, if time permitted, to explain the action of the geyser of Iceland, but at the end of the lecture I found that the time was insufficient for the purpose; and I promised then to explain this wonderful spring in the lecture of to-day; but when I came to look at the other matter before me, I found that it was so abundant that I really could not get the subject of the geyser into it.

"The surface of Iceland slopes gradually from the coast toward the center, where the general level is about 2,000 feet above the surface of the sea. On this, as a pedestal, are planted the Jökull, or icy mountains of the region, which extend both ways in a northeasterly direction. Along this chain the active volcanoes of the island are encountered, and in the same general direction the thermal springs occur, thus suggesting a common origin for them and the volcanoes. From the ridges and chasms which diverge from the mountains, mighty masses of steam are observed to issue at intervals, and where the escape takes place at the mouth of a cavern, and the resonance of the cave lends its aid, the sound of the steam is like that of thunder. Lower down in the more porous strata, we have smoking mud pools, where a repulsive, blue-black, aluminous paste is boiled, rising at times into huge bladders, which on bursting scatter their slimy spray to a hight of fifteen or twenty feet. From the base of the hills upward extend the glaciers, and on their shoulders are placed the immense snow fields which crown the summits. From the arches and fissures of the glaciers, vast masses of water issue, falling at times in cascades over walls of ice, and spreading for miles and miles over the country before they find definite outlet. Extensive morasses are thus formed, which add to the monotony of the dismal landscape. Intercepted by the cracks and fissures of the land, a portion of these waters is conducted to the hot rocks underneath; here meeting with the volcanic gases which traverse these underground regions, both travel together, to issue at the first convenient opportunity, either as an eruption of steam or as a boiling spring.

"In the Great Geyser, we have a tube ten feet wide and seventy feet deep; it expands at its summit into a basin, which from north to south measures fifty-two feet across, and in the perpendicular direction sixty feet. The interior of the tube and basin is coated with a beautiful smooth plaster, so hard as to resist the blows of a hammer. The first question that presents itself is, how was this wonderful tube constructed? How was this perfect plaster laid on? A glance at the constitution of the Geyser water will, perhaps, furnish the first surmise. In 1,000 parts of the water the following constituents are found:

Silica	0·5097
Carbonate of Soda	0·1939
Carbonate of Ammonia	0·0083
Sulphate of Soda	0·1070
Sulphate of Potash	0·0475
Sulphate of Magnesia	0·0042
Chloride of Sodium	0·2521
Sulphide of Sodium	0·0088
Carbonic Acid	0·0557

"The lining of the tube is silica, evidently derived from the water; and hence the conjecture may arise that the water deposited the substance against the sides of the tube and basin. But the water deposits no sediment, even when cooled down to the freezing point. It may be bottled up and kept for years as clear as crystal, and without the slightest precipitate. A specimen brought from Iceland and analyzed in this institution, was found perfectly free from sediment. Further, an attempt to answer the question in this way would imply that we took it for granted that the shaft was made by some foreign agency, and that the spring merely lined it. A painting of the Geyser, the property of Sir Henry Holland, himself an eye witness of these wonderful phenomena, was exhibited. The painting, from a sketch taken on the spot, might be relied on. We find here that the basin rests upon the summit of a mound; this mound is about forty feet in hight, and a glance at it is sufficient to show that it has been deposited by the Geyser. But in building the mound, *the spring must also have formed the tube which perforates the mound;* and thus we learn that the Geyser is the architect of its own tube. If we place a quantity of the Geyser water in an evaporating basin, the following takes place: in the center the fluid deposits nothing, but at the edges where it is drawn up the sides of the basin by capillary attraction, and thus subjected to a quick evaporation, we find silica deposited; round the edge we find a ring of silica thus laid on, and not until the evaporation has continued for a considerable time, do we find the slightest turpidity in the central portions of the water. This experiment is the microscopic representant, if the term be permitted, of nature's operations in Iceland. Imagine the case of a simple thermal spring, whose waters trickle over its side down a gentle incline; the water thus exposed evaporates speedily, and silica is deposited. This deposit gradually elevates the side over which the water passes, until finally the stream has to choose another course; here the ground becomes elevated by the deposit, as before, and the stream has to move forward; thus it is compelled to move round and round, discharging its silica and deepening the shaft in which it dwells, until finally, in the course of centuries, the simple spring has produced that wonderful apparatus which has so long puzzled and astonished both the traveler and philosopher.

"Before an eruption, the water fills both the tube and basin, detonations are heard at intervals, and after the detonation a violent ebullition in the basin is observed; the column of water in the pipe appears to be lifted up, thus forming an eminence in the center of the basin, causing the water to flow over its rim. The detonations are evidently due to the production of steam in the subterranean depth, which, rising into the cooler water of the tube, becomes suddenly condensed and produces explosions. Between the interval of two eruptions, the temperature of the water in the tube gradually increases, but even immediately before an eruption, at no part of the tube is the water at its boiling temperature. How then is an eruption possible? Bunsen succeeded in determining the temperature of the water a few minutes before a great eruption, and his observations furnish the key of the entire enigma. A little below the center he found the water within two degrees of its boiling point, that is, within two degrees of the point at which water boils under the pressure of the atmosphere, *plus the pressure of the superincumbent column of water.* The actual temperature at thirty feet above the bottom of the Geyser, was 122° Centigrade, its boiling point 124°. We have just alluded to the detonations and the lifting of the Geyser column by the entrance of steam from beneath. These detonations and the accompanying elevation of the column are, as before stated, heard and observed at various intervals before an eruption. Imagine, then, the section of water at thirty feet above the bottom to be raised six feet by the entrance of a mass of vapor below. The liquid spreads out in the basin, overflows its rim, and thus the elevated section has six feet less of water pressure upon it; its boiling point under this diminished pressure is 121°; hence, in its new position, its actual temperature (122°) is a degree above the boiling point. This excess is at once applied to the generation of steam; the column is lifted higher, and its pressure further lessened; more steam is developed underneath; and thus, after a few convulsive efforts, the upper part of the column of water, through the sudden boiling up from the middle downward, is ejected with immense velocity, and we have the Geyser eruption in all its grandeur. By its contact with the atmosphere the water is cooled, falls back into the basin, sinks into the tube through which it gradually rises again, and finally fills the basin. The detonations are heard at intervals, and ebullitions observed; but not until the temperature of the water in the tube has once more *nearly* attained its boiling point is the lifting of the column able to produce an eruption.

"In the regularly formed tube the water no where quite attains the boiling point. In the canals which feed the tube, the steam which causes the detonation and lifting of the column must therefore be formed. These canals are in fact nothing more than the irregular continuation of the tube itself. The tube is therefore the sole and sufficient cause of the eruptions. Its sufficiency was experimentally shown during the lecture. A tube of galvanized iron six feet long was surrounded by a basin; a fire was placed underneath and one near its center to imitate the lateral heating of the Geyser tube. At intervals of five or six minutes throughout the lecture eruptions took place; the water was discharged into the atmosphere, fell back into the basin, filled the tube, became heated again, and was discharged as before.

"Sir George Mackenzie, it is well know, was the first to introduce the idea of a subterranean cavern to account for the phenomena of the Geyser. His hypothesis met with general acceptance, and was even adopted undoubtingly by some of those who accompanied Bunsen to Iceland. It is unnecessary to introduce the solid objections which might be urged against this hypothesis, for the tube being proved sufficient, the hypothetical cavern disappears with the necessity which gave it birth.

"A moment's reflection will suggest to us that there must be a limit to the operations of the Geyser. When the tube has reached such an altitude that the water in the depths below, owing to the increased pressure, cannot attain its boiling point, the eruptions of necessity cease. The spring, however, continues to deposit its silica, and forms a *laug* or cistern. Some of these in Iceland are of a depth of thirty or forty feet. Their beauty is indescribable; over the surface a light vapor curls, in the depths the water is of the purest azure, and tints with its own hue the fantastic incrustations on the cistern walls; while at the bottom is observed the mouth of the once mighty Geyser. There are in Iceland traces of vast but now extinct Geyser operations. Mounds are observed whose shafts are filled with rubbish, the water having forced a way underneath and retired to other scenes of action. We have, in fact, the Geyser in its youth, manhood, and old age, and death, here presented to us: in its youth, as a simple thermal spring; in its manhood, as the eruptive spring; in its old age, as the tranquil *laug;* while its death is recorded by the ruined shaft and mound, which testify the fact of its once active existence.

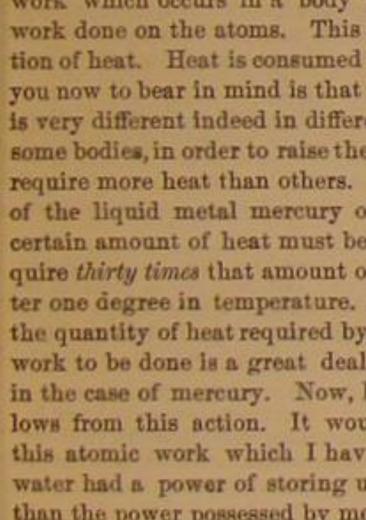
"Next to the Great Geyser, the Strokkur is the most famous eruptive spring of Iceland. The depth of its tube is forty-four feet. It is not, however, cylindrical, like that of the Geyser, but funnel-shaped. At the mouth it is eight feet in diameter, but it diminishes gradually, until near the center the diameter is only ten inches. By casting stones and peat into the tube, and thus stopping it, eruptions can be forced, which in point of hight often exceed those of the Great Geyser. Its action was illustrated experimentally in the lecture, by stopping the galvanized iron tube before alluded to loosely with a cork. After some time the cork was forced up, and the pent-up heat converting itself suddenly into steam, the water was ejected to a considerable hight; thus demonstrating that in this case the tube alone is the sufficient cause of the phenomenon."

Thoughout the lectures that have been hitherto given I have had occasion to admire the attention and patience of my younger hearers. My hearers are of different ages, but al-

though I have been obliged to mention certain things that could not possibly be understood by the very young boys, and to mention some elementary facts which were, perhaps, very well understood by the older boys yet the young boys have been patient when I spoke to the elder ones, and the elder ones have been patient when I spoke to the younger boys; and for this I feel very thankful. With reference to the present lecture I have to address all the boys, especially the elder ones, for I have to explain a term or two very much used at the present time in connection with the subject of heat.

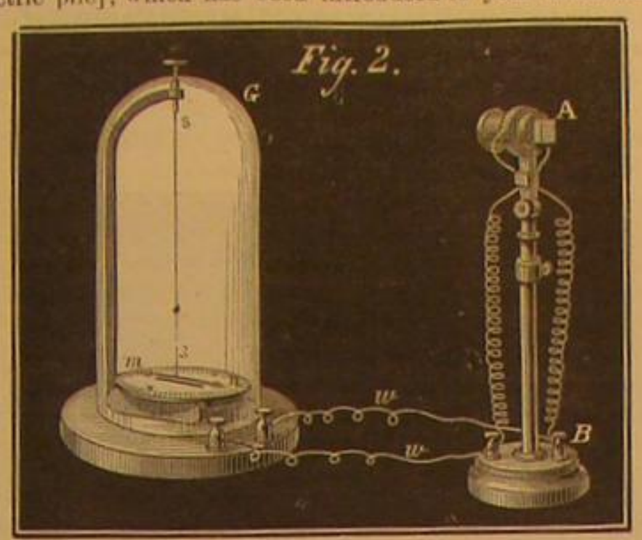
If you carry a pound of any substance whatever to a hight of 772 feet above the earth's surface, and allow it to drop down upon the earth from that hight, you always get the same amount of heat generated, and that amount of heat would be just sufficient—I mean neither more nor less than sufficient—to raise the temperature of one pound of water one degree Fahrenheit. Thus, if you conceive a pound weight falling from this great hight, 772 feet, and conceive all the heat generated by its collision with the earth collected together and put into a pound of water, that pound of water would have its temperature elevated one degree. Now, by proper means we can reverse this process, and by means of heat we can lift the pound weight. If we lift the pound weight to a hight of 772 feet, of course we should then be pulling it, as it were, away from the earth which attracts it; and in order to lift this pound weight to that hight we should consume—in fact, annihilate, destroy—an amount of heat equal to that which would raise a pound of water one degree in temperature; so that the amount of heat consumed in lifting the weight 772 feet is exactly equal to what is generated when the weight falls from a hight of 772 feet. Now, if we lift one pound of matter one foot from the ground, a certain term is employed. It is called "*the foot-pound*;" and if you lift a pound weight to 772 feet it is 772 foot-pounds; or if you lift 772 pounds to the hight of a foot you have 772 foot-pounds. Now, this quantity of 772 foot-pounds, which would raise the temperature of a pound of water one degree, is termed "*the mechanical equivalent of heat.*"

In lifting a weight from the earth we are overcoming attraction of the earth, and in doing this we consume heat, if heat be the agent which lifts the weight. Now, I have asked you over and over again to figure the atoms of solid bodies such as this I hold in my hand. As a general rule, when heat is communicated to a body the atoms are forced asunder. You know the enormous power and force with which these atoms may attract each other, for I showed you that when an iron bar was cooled the contractible force pulling together its atoms—the mutual attraction of its atoms on cooling—was sufficient to smash the steel bar which you saw broken in front of the table. Now, we have among the atoms of bodies pulling each other together an action substantially the same as that which occurs when we separate the weight from the earth. To this action we may give a name. Let us call this work which occurs in a body "atomic work" if you like—work done on the atoms. This work necessitates a consumption of heat. Heat is consumed in this way; and what I want you now to bear in mind is that the amount of heat consumed is very different indeed in different bodies; and consequently some bodies, in order to raise them one degree in temperature, require more heat than others. In order to raise one pound of the liquid metal mercury one degree in temperature a certain amount of heat must be imparted to it. It would require *thirty times* that amount of heat to raise a pound of water one degree in temperature. Water requires thirty times the quantity of heat required by mercury, simply because the work to be done is a great deal more than that necessitated in the case of mercury. Now, I want to show you what follows from this action. It would appear, in consequence of this atomic work which I have been speaking of, as if the water had a power of storing up heat thirty times greater than the power possessed by mercury; and, indeed, formally people thought that heat *was* something stored up, and they called the amount of heat which it was needful to impart as a body to raise its temperature one degree its "capacity for heat." They looked at a body as a kind of vessel for heat, and hence they used this term "capacity for heat." It was found by experiment that the capacity for heat (as the term went) was very different in different bodies; and the amount of heat which a body had stored up was determined by what the body could do—by the amount of ice or wax which it could melt.

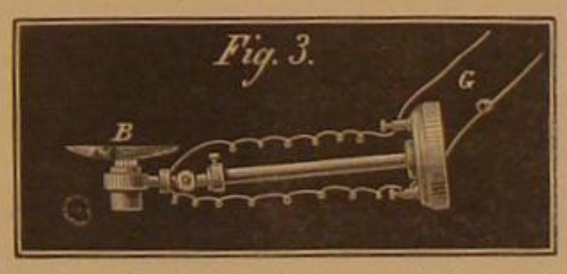


I have here a vessel of hot oil, and in it I have spheres of metal of different kinds. They are all equally hot at thep resent time; but you will find that these spheres of metal have very different powers in melting bodies. They will be placed on a flat piece of wax, D (Fig. 1), and their heat will act upon that piece of wax. Some will force their way through, and others will not. This ball of copper will go through the wax first. The tin will go partly through. The bismuth certainly will not go through, although it is just as hot as the copper. Here, too, we have a ball of lead which is not competent to melt its way through the wax. The ball of iron will go through. Here is a ball of zinc; I think that will go through; but I am sure that the lead and tin and bismuth will not do so. [The balls of copper, iron, and zinc melted their passage through the slab of wax, and fell to the ground one after the other. The three other balls did not perforate the wax.] This illustrates the different amounts of heat possessed by these bodies, although they are all at the same temperature.

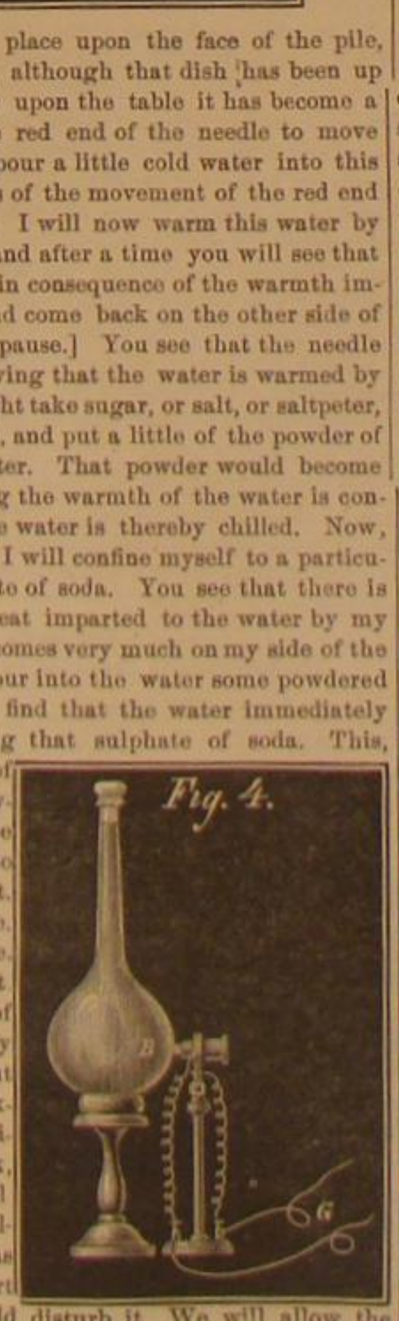
We must now go on considering the heat consumed; and I must rapidly make a few experiments illustrative of the consumption of heat in this work of forcing the particles of bodies asunder or changing their position. One of the most remarkable cases of the consumption of heat occurs when a body is caused to pass from the solid state to the liquid. Here, A B (Fig. 2), I have a beautiful instrument [the thermo-electric pile], which has been introduced to your attention



before. It is a kind of thermometer, and I want to show you how we can make use of this instrument for the purpose of ascertaining whether we have cold or heat. I cannot go into the full explanation of the thing; but if you observe the needle, *m n*, of the galvano-meter, G, to which it is connected by the wires, *w w*, you will see how wonderfully delicate the instrument is. It is more delicate than any thermometer whatever. I will turn the face of that instrument towards me, or I will breathe against it, or I might allow any young philosopher present to breathe against it. The warmth of his breath would at once make itself evident by causing that magnetic needle to move. Now, as I breathe against this pile, you observe that the red end of the needle comes towards me. When the needle returns to its former position and comes to rest, I will try the effect of cold upon the instrument, which, you will remember, is called a thermo-electric pile. (You see I can stop the needle by this other one.) I will now put a piece of this ice in a spoon, and on the cold spoon coming in contact with the face of the pile you will see that the red end of the needle will move towards you, and away from me. Thus, in this instrument we have the means of telling whether heat or cold has been imparted. We now again bring the needle to rest. And now we have made the acquaintance of this beautiful instrument, I will proceed to experiment with it. Here is a

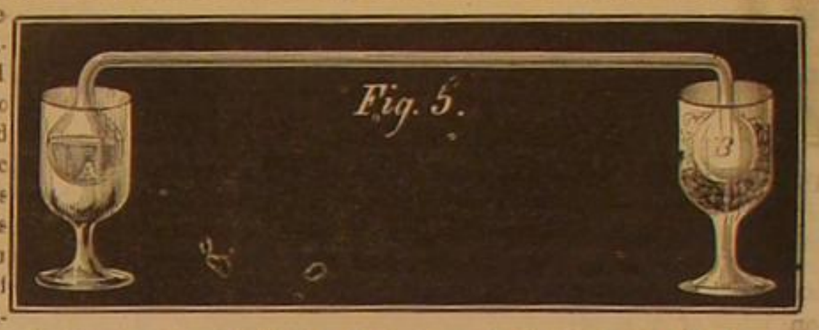


little flat basin, B, which I place upon the face of the pile, thus; and you observe that although that dish has been up to the present time resting upon the table it has become a little warm, and causes the red end of the needle to move towards me. But when I pour a little cold water into this dish you see the suddenness of the movement of the red end of the needle towards you. I will now warm this water by dipping my finger into it, and after a time you will see that the needle will come down in consequence of the warmth imparted to it by my hand, and come back on the other side of the middle line. [After a pause.] You see that the needle now comes to my side, showing that the water is warmed by my finger. And now I might take sugar, or salt, or saltpeter, which would be still better, and put a little of the powder of that saltpeter into the water. That powder would become liquefied; and on its melting the warmth of the water is consumed—is used up, and the water is thereby chilled. Now, in making this experiment I will confine myself to a particular substance called sulphate of soda. You see that there is now a very great deal of heat imparted to the water by my finger and that the needle comes very much on my side of the middle line. I will now pour into the water some powdered sulphate of soda, and you find that the water immediately becomes chilled by melting that sulphate of soda. This, then, is a consumption of heat by the act of liquefying or melting the sulphate of soda. I want now to make another experiment. It is a very instructive one. I want to show you the reverse of the last experiment. When dissolved sulphate of soda is permitted to solidify—become solid—you get out of it the heat that was expended in rendering it liquid. I have in this flask, B Fig. 4, some dissolved sulphate of soda. It was carefully melted last night, and has been carefully kept apart from any thing which could disturb it. We will allow the



face of the pile to rest against the bottle; and now I want to cause that body to solidify before your eyes. I can cause it to become crystallized sulphate of soda, like that which was dissolved in that dish a moment ago. You will see the liquid in the flask become more and more opaque, and when it begins to solidify opposite the face of the pile it will give out heat—the heat that was expended in melting it, and you will then see the red end of the needle come towards me. I will now open the neck of the flask, and throw a crystal of sulphate of soda into the solution. [This was done, and the contents of the flask began to solidify from the top downwards.] You now see the compound crystallizing; and the moment that portion opposite the face of the pile becomes solid, heat will be communicated to the face of the pile, and we shall get a deflection (as it is called) of the red end of the needle in the direction in which I stand. [After a pause]—What I predicted was quite right. There we get out of the sulphate of soda the heat that was expended in melting it. There is the movement of the needle caused by the heat.

I might go on in this way, and show you that when a body is evaporated you also get a very large amount of heat consumed—used up—in order to evaporate it. In order to convert a pound of water at 212° Fahrenheit into steam at 212° Fahrenheit, an enormous amount of heat is required. It requires as much heat as would raise 967 pounds of water 1° Fahrenheit; and this heat is insensible to the thermometer, although it is so great. The reason that I employed a mixture of ice and salt as a freezing mixture in a former experiment, was that the action of the salt produces a liquefaction of the ice, and on that liquefaction taking place a large quantity of heat is consumed—so much that the temperature of the liquid is reduced far below the temperature of the ice itself. I am going to illustrate this point by the development of cold by vaporization; and if things go fairly I should



not wonder if I could freeze water before your eyes by means of its own evaporation. An experiment has been arranged there for the purpose. Here are two bulbs, A and B, in this apparatus (Fig. 5), and the water which was in one of them has been frozen in this room since the lecture began. One end of this has been placed in a freezing mixture far away from the bulb where the water is frozen. This instrument is called a "cryophorus," or ice carrier. Water was placed in one bulb, and the air was taken from the interior of the instrument. The other bulb was placed in a freezing mixture, and as the vapor came over from the water it was condensed by the freezing mixture, and the vaporization which took place has been sufficient to freeze the water.

So much, then, for the heat consumed in causing a body to pass from the liquid state to the state of vapor. I have on the table various substances which would enable me to illustrate this in a very satisfactory manner. For instance I will take a little alcohol, and warm it by placing my finger in it, thus. I see there is a great amount of heat in the face of the pile. I have no doubt that the evaporization will very soon cause the end of the needle to come down; or if I take a substance that can vaporize more rapidly than alcohol—this substance, ether—it would not take an instant in order to overcome the heat which is the cause of that deflection. I will cause evaporation to go on a little more quickly, and if the needle be not held fast by some accident we shall soon find the heat which causes the present large amount of deflection entirely abolished, and the needle will move down, now you see the needle comes back. We get an enormous amount of cold by the evaporation of ether, so much that we can easily freeze water by it.

Improved Electrical Process of Generating Gases.

John T. Rich, of Philadelphia, Pa., has lately patented the following:—

A gas retort heated by a furnace is employed. This retort is intended to be filled with fluid hydrocarbon. The fluids are caused to flow toward the center of the retort through the spaces formed by a volute partition, and being thus exposed to the action of the heat, they are evaporated. The vapor rises through a pipe, which terminates in a cone. A steampipe terminates in said cone, as does also an atmospheric air pipe.

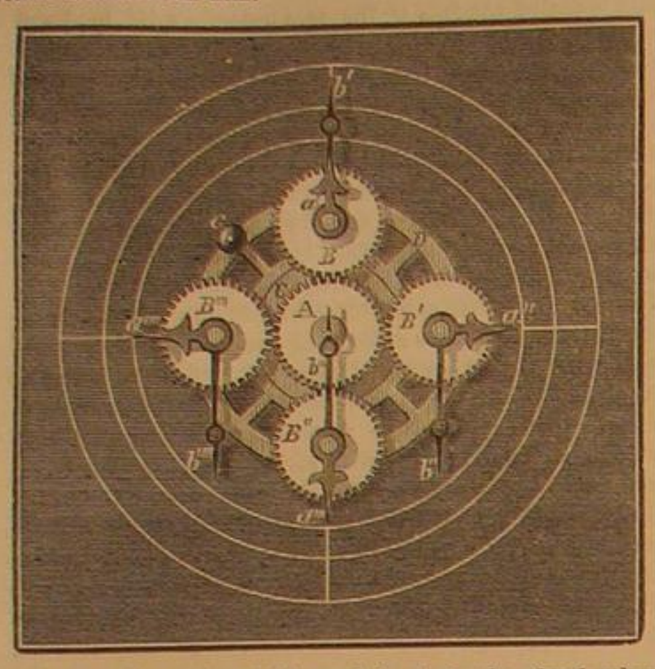
The operation of the apparatus is as follows: By the action of particles of steam mingled with globules of water, commonly called wet steam, upon the sides of the cone, electricity is generated, the amount of which may be increased, according to well known principles, by making the cone of hard wood, and also by causing the jet of steam to impinge upon a brush of points or by using a cone of ground glass. This jet of steam, passing through the apex of the cone, carries with it the gas or vapors from the retort, and the electricity generated by the jet of steam acts upon the atmospheric air admitted through the pipe, setting free a portion of the oxygen, the nitrogen, uniting with part of the oxygen, forming nitric acid. After the gases or vapors passing from the retort are thus mingled with the oxygen, they are carried through water, which takes up the steam which has not been decomposed, and the nitric acid, thus forming a permanent gas not subject to condensation.

The use of a retort may be dispensed with, and oxygen

gas be generated alone, which may be employed for chemical distillation, for the desulphurization of ores, and other suitable purposes.

THE WHEEL QUESTION.

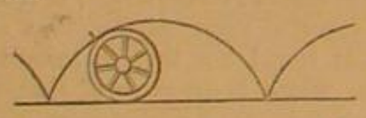
W. E. H. was one of the earliest to send us a model illustrative of the views of the two revolution philosophers; but when the engraving of the model was ready we found that we had mislaid his letter. We have therefore been obliged to delay the publication of the engraving until we could communicate with him.



Above is the view of his model. A is the fixed wheel, set on a fixed disk, C; B the movable wheel, carried on a movable disk, D, which is turned by button, *c*. A long pointer, *b'* is attached to the center of the movable wheel, B. The axial line of the movable wheel we have for the convenience of the eye, enlarged into the form of the short pointer, *a'*: instead of a pointer, a dot or other figure might be used. This short pointer our correspondent wishes us to say, is not on the model. B' B" B"' are the several positions of the movable wheel in passing around the fixed wheel. The following is the letter of W. E. H:

Messrs. Editors:—A wheel may properly be said to revolve on its axis, when each point in the circumference of the wheel is successively in every direction from that axis; i.e., if the wheel is vertical each point of the circumference in succession is above, on one side, below the axis, on the other side, and again above: if the wheel is horizontal each point is successively east, south, west, north of the axis or in reverse order. In the case before us, the spokes of the wheel or an index placed upon it would point in order to all the figures on a large clock dial surrounding it. That this is the true and only idea of a revolution, seems to me evident from a simple illustration.

A wagon wheel is said by every one to revolve on its axis (or axle if you choose) when the wagon is drawn forward. This was your illustration on page 67 of the last volume. Why "revolve?" Because each point of the tire in succession is above the axis on one side of it, below it, etc. The actual path described by such point is a cycloid never returning into itself. I give a diagram which will make this clear to unscientific readers.



I refer, also, to Watt's sun-and-planet wheels, designed by him to take the place of a crank and in the use of which he mentions as an advantage, the fact "that one stroke of the engine produces two strokes of the wheel, while with a crank, one stroke of the engine gives but one revolution to the wheel." I regard this device of Watt's as the converse, so to speak, of the question under consideration.

Referring to the engraving I take this ground: 1st. That the long index shows clearly that the movable wheel makes two revolutions while rolling round the fixed wheel. 2d. That the short index, if it shows anything, shows that the bearing (not axis) of the movable wheel makes one revolution. 3d. That the two revolutions of the movable wheel are made on the bearing, the central line of which is the axis. I add also the suggestion prompted by the addition of the second index that the question is not how many more revolutions the wheel makes than its axis, but how many it makes on the axis.

W. E. H.

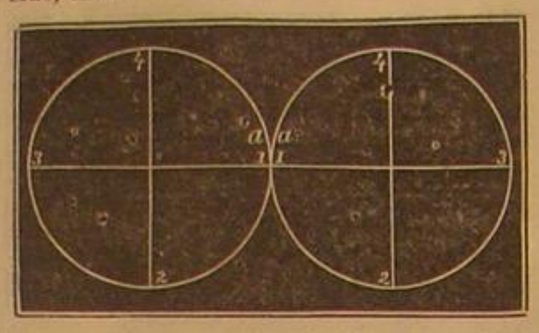
We have understood W. E. H. to be among those who maintain that a movable wheel makes two revolutions on its own axis in rolling once around a fixed wheel of the same diameter. But he does not positively state so in the above explanation. He says, 1st. that the movable wheel makes two revolutions. Does he mean on its own axis, or around the axis of the fixed wheel, or what? 2d. He says that the *bearing* (not axis) of the movable wheel makes one revolution. 3d. He says that two revolutions of the movable wheel are made on the *bearing*, (not axis.) Our correspondent has not clearly answered the question which he correctly propounds in the concluding sentence of his letter.

Whether the axis of B rotates or not, its position is changed by the passage of B around A. One position of the axis is indicated at *a'*, another at *a"*, another at *a"'*, and another at *a""*. By observing these positions, and the movement of the wheel, B, in respect to them, as indicated by the long pointer, it will be seen that the wheel, B in passing once around A, makes one revolution on its own axis. The other movements made by B—*i. e.*, those not made on its own axis—need not be here noticed.

Messrs. Editors:—I submit another style of proof from any yet advanced in support of the "dual theory." It has been effective among the "*one*ists" of my acquaintance, and I hope it will answer as well with you.

A wheel, say three feet in circumference, rolled three feet on a plain surface, will make exactly one revolution; but if (as in the problem) it is also required *to make the circuit of another wheel*, it must necessarily make another revolution to do it, otherwise there is no difference between a plane and a circle.

Again, I have two movable wheels of the same size hung side by side, thus—



I find, in turning them toward each other at equal speed, that it takes just *one* revolution of *each wheel* to bring the points, 1, 1, again together; *consequently*, if one was stationary, it would take just *two* revolutions of the other around it to bring about the same result. Be kind enough to show the fallacy of these two propositions, or surrender at once to the victorious "dualists." F. L. B.

Boston, Mass.

We think there may be a difference between a plane and a curve, whether the wheel makes a second revolution or not. Because two wheels of the same size each revolve once in returning to a given point, it does not consequently follow that if one wheel were fixed, the other wheel would have to revolve twice around the fixed wheel in order to reach the starting point.

We have received a model which shows two revolutions of a shaft produced by one revolution of the movable wheel. Also a model which shows one revolution of a shaft by one revolution of the movable wheel. Also a model which the senders think shows two revolutions of the movable wheel when a rod is set in a particular way, and one revolution when set in another way. We have also received a variety of novel diagrams upon the subject, one of which shows how four revolutions of a shaft attached to the axis of a movable wheel may be produced by one revolution of the wheel upon its axis. We shall shortly present diagrams of some of these devices.

Composition Fuel.

The mixture of tar, coal dust, sawdust, tan bark, peat, and other inflammable refuse stuff, and the pressing of the same into blocks, for the purposes of fuel, is very common, and several patents have been issued for variations of such mixtures. Washington Stickney, and Nathan B. Chase, of Lockport, N. Y., have lately obtained one of these patents, and they say:

"The coal consists of screenings and other fine portions, which accumulate in great abundance in coal yards, and hitherto have been considered comparatively valueless. The tan bark used (commonly called spent tan bark) is also comparatively useless and very abundant. These, with other ingredients, hitherto considered of little or no value, are so combined as to form a cheap and convenient fuel, and may be compressed, by mechanical power, into blocks convenient for use. The coal tar cements the whole, making a solid mass, which may be readily ignited, and is well adapted for common fuel, especially for summer use.

"The above ingredients are combined in the following proportions, to wit: Coal, 3 parts; tan bark, 2 parts; sawdust, 2 parts; peat, or other fine woody or vegetable matter, 1 part, coal tar or pitch, 1 part, or sufficient to cement the whole; or they may be combined in a greater or less proportion of either, securing substantially the same result. The whole mass may be easily ignited with shavings or paper, or more readily by the application of a small quantity of benzine and a match."

Richardson's Process for Making Steel.

Many of the puddling furnaces of Great Britain have lately been improved by the addition of an apparatus for blowing air into them, resembling that used by Bessemer in making steel directly from the ore. The application of the improvement requires no alteration in the form of the common puddling furnace, for it does not essentially change the old method of puddling; but by introducing air through the iron rake or rabble used to stir the metal it reduces in quality or duration one particular stage of the process. Instead of numerous small holes in the blast pipe or tubular rabble, to subdivide the current of air, there is one broad slit or rectangular opening about half an inch wide, and three or four inches long, which is more easily kept free from slag. Two or three tubular rabbles are fitted to each furnace, to be used alternately, in order to prevent over-heating. Each one is connected to the air receiver by long flexible tubes of india-rubber. The air is turned on before the rabble is introduced, and remains on until it is withdrawn, in order to prevent the narrow aperture from being choked by cinders. By means of the blast rabble the time occupied in bringing the molten iron to a "boil" has been reduced from 30 or 40 minutes to 10. At the beginning of the operation the sparks thrown off indicate that silica is being separated from the mass, and as soon as the flame is clear the tubular rabble is withdrawn and the common rabble is substituted. A number of experiments have demonstrated that the whole process from the time an ordinary furnace is first charged until the mass is finished does not consume more than one hour and a quarter. The quality of the material produced is said to be superior, and in no case thus far has there been any failure to produce the desired results.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

From a recent report of the Commissioner of the General Land Office, it appears that the construction of railroads in this country, since their first introduction, has been at the rate of a thousand miles a year; that there are now completed no less than 37,000 miles, and in course of construction 17,950 miles additional, or more than one third the length of all the railroads in the world. To assist this wonderful development, Government has contributed over $184,000,000, and 800,000 acres of land.

South Pass City, the headquarters of the last mining sensation, the Sweetwater gold field, was first laid out in October, 1867. It has now eighty houses and eight places of business. Its population at present is but 700, but it is confidently expected that next summer will witness the advent of from twenty to thirty thousand eager searchers for wealth, and that South Pass City will experience a much more rapid and substantial growth than even Cheyenne City.

There is now in course of manufacture at a leather belting factory in this city, what is said to be the largest leather belt ever made. The width is 47 inches; length, 100 feet; weight, 18,000 pounds; and cost, $2,000. It is composed of triplicate layers of leather, making a thickness of three quarters of an inch, and cemented and pressed so firmly together that it has the appearance of one solid piece.

A bed of hematite iron ore has been discovered at Sinking Spring, some four miles from Reading, Pa. Parties have already sunk a shaft, which passes through a solid bed of ore twenty-six feet in diameter.

From this city, via Philadelphia and Pittsburg, to Cheyenne City, at the base of the Rocky Mountains, a distance of 1,917 miles, but three changes of cars are made, and five companies control the whole distance. Between New York and New Orleans, 1,500 miles, there are ten different roads, while between New York and Charleston, only 788 miles, there are also ten.

A railroad project to unite the capital of Mexico with the United States, by a line along the Gulf coast, has been referred to a committee of the Mexican Congress.

About four miles from the newly opened Japanese port of Hiogo, is quite an extensive deposit of coal. The methods of working the mines are of the most primitive description. Wherever the coal or shale has been seen cropping out from the hillside, a horizontal passage, never more than twenty-five feet long, has been run in. The miners, crouched to the ground in these burrows, with pointed hammers pick away at the sides, and very carefully assort with their hands each little piece of coal obtained, according to its quality. The Japanese Government is not insensible to the advantages of an impoved mode of working the coal of Hiogo, and it is not impossible that before long some more systematic plan will be introduced.

Scarcely inferior in interest to Krupp's mammoth establishment, are the great iron and steel works of Hoerde, employing 4,500 people. Here the iron is produced from the ore, and converted into castings of various kinds, into iron and steel rails, and into puddled steel sheets suited for a variety of purposes, ship-building among others. Most of the vessels built by one of the largest firms in Liverpool are constructed entirely from steel plates made at Horde.

The *Memphis Bulletin* says that the gold discoveries in the counties of Polk and Sevier, Arkansas, are still proceeding, while the indications have proved so encouraging, and so exciting has been the degree of success already achieved, that the winter's snow and cold has not been able to suspend operations now in progress.

There are now about 12,000 miles of railway open to travel in France. Every line is remunerative, some paying original stockholders from 20 to 25 per cent, and it is claimed that passengers are conveyed by them with more regularity, safety, and comfort than elsewhere in Europe. Within eighty years, at the farthest, all these lines will have reverted to the Government and become practically public property.

M. Gondin, some years ago, made exceedingly hard iron by combining it with a small quantity of boron. It is now said that he has produced an equally hard material by combining fused cast iron with phosphate of iron and peroxyde of manganese. The mixture cannot be forged, but is easily cast.

The Boston and Providence railroad are constructing a bridge from India Point, over the Seekonk river, on a plan which embraces some new features. The whole length of the bridge is 876 feet, and the supports in the river are iron cylinders filled with wooden piles and concrete. Six of these cylinders are six feet in diameter, and contain twelve piles, which were driven into the mud forty feet, the cylinders being sunk ten feet. Iron cylinders filled with concrete have been used before, but driving piles within them, and the combining of wood and concrete is a new experiment.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Cotton and Hay Press.—William Russell, Atlanta, Ga.—This invention relates to that class of presses in which the power is applied to the follow block by revolving the press box. The improvement consists in working the follow block upon two screw rods, in a device for causing the follow block to adjust itself, and in a device which enables the apparatus to be used as a stationary or portable press, and to be worked either by rotating the press box, upon a fixed wheel, or rotating the wheel while the box is stationary.

Extension Coal Shute.—Jacob Heatherington, Bellaire, Ohio.—This invention relates to coal shutes which are used on the banks of rivers and at wharves, for discharging coal from cars into steamboats and other vessels, and consists in making them extensible in order that they may be adjusted to vessels in different positions, and at different distances from the shore.

Combined Steam Engine and Cane Mill.—John Moore, Madison, Ind.—This invention relates to a cane mill, the frame of which is so constructed as to be susceptible of receiving such parts of a steam engine, as would be necessary to drive the rollers of the mill; and also in so constructing the said frame that the rollers of the mill can be readily removed therefrom, and placed therein, to enable the steam engine, which is arranged in connection with such cane mill, to be used for threshing wheat, driving a circular or a drag saw, a shingle or a lath machine, a straw or hay cutter, a grinding-mill for corn, and for many other purposes.

Combined Screw Wrench and Claw Hammer.—Ellis R. Meeker, Elizabeth, N. J.—This invention consists in combining a screw wrench with a claw hammer in such a manner that the device may be used either in the capacity of a claw hammer or a wrench with as great facility as if it were made for either purpose alone.

Beehive.—W. Y. Singleton, Springfield, Ill.—This invention relates to an improvement in the construction of beehives, and has for its object the wintering of the bees in a perfect manner, keeping them warm and dry, to which end a thorough ventilation of the hive is obtained, and due provision made for the absorption of all moisture.

Pump.—Jas. Vaughn, and John Magee, Galena, Ill.—This invention consists in a novel construction and arrangement of the various parts composing the pump, whereby great effectivness and many advantages are secured.

ATTACHING HUBS TO AXLES.—Levi Adams, Amherst, Mass.—This invention relates to the manner of attaching hubs to axles. The object of this invention is to obtain a good bearing for the hub on the arm, effectually prevent the escape of lubricating material from the arm, prevent the advent of dust between the box and arm, and admit of the wheel being readily attached to and detached from its axle.

COMBINED STAMP AND CANCELING DEVICE.—Joseph H. Berret, New York city.—This invention relates to a device by which revenue stamps may be marked or printed, and canceled, at the same time. The invention consists in applying a cutting device to the ordinary hand stamp, in such a manner that, when the face of the stamp is forced down upon the revenue stamp, and the latter printed with the name of the party or firm canceling the stamp, the cutters applied to the hand stamp will perforate the revenue stamp, and effectually cancel the same.

LATHE REST.—H. K. Smith, Norwich, Conn.—This invention consists in so constructing the nut (through which the screw shaft works), for carrying the frame on which the block holding the lathe cutting is arranged, as to move the tool toward or away from the article on which it is to act, and that such nut, should the screw work loose, or play from side to side, can be tightened up therein. Also, in so hanging the block, holding the cutting or lathe tool, to a frame—arranged to be moved forward to or backward from the work on which the tool is to operate—that such block can be inclined either more or less in a direction toward the work, as may be desired.

LOADING FIRE-ARMS, AND CARTRIDGES FOR THE SAME.—S. S. Rembert, Memphis, Tenn.—This invention relates to double-barrelled breech-loading fire-arms, more particularly, and to cartridges for the same. It consists in a projection at the breech end of the barrels, between the two, of such a shape in combination with a correspondingly shaped recess or notch in the upper portion of the stock or butt, that when such projection fits in the said recess, the barrels will be held securely in position while being discharged. Also, in a novel connection between the trigger and guard, and the barrels, in combination with hinging the barrels to the butt or frame, whereby, by properly swinging such trigger guard, the barrels can be thrown up and out of place for removing or inserting a cartridge, and brought back into position, as may be desired. Also, in a cartridge case, provided with a nipple in a novel and peculiar manner, and a novel constructed nipple for the cartridge case. Also, in a simple attachment to the gun barrels for extracting the cartridge cases therefrom.

ANIMAL TETHER.—Martin Leonard and Stephen C. Leonard, Oberlin, Ohio.—This invention relates to a method of constructing tethers, whereby the same are rendered more durable and horses more effectually prevented from jumping or breaking down fences.

INNER SOLE.—R. A. Webster, Sandisfield, Mass.—This invention relates to a method of constructing inner soles for boots or shoes, whereby the same are more cheaply made and more durable, and are rendered impervious to water. It consists of one or more pieces of wood or veneers, a thin piece of wood, and a piece of felting or cloth, between which is a thin layer of gutta percha or rubber, by the warming of which all the several layers are firmly cemented together.

STEAM GENERATOR.—W. H. Thomas, Sacramento, Cal.—This invention relates to an apparatus for heating water and generating steam for various purposes.

APPARATUS FOR WORKING WINDLASSES.—Porter Evarts, Madison, Conn.—This invention has for its object to so improve the construction of the apparatus for working a ship's or other windlass, that the operator can instantaneously adjust it to obtain increased power or increased speed, as he may desire.

BURIAL CASE.—J. R. Hathaway, Westfield, N. Y.—This invention consists in forming the burial case of cast-iron plates, which are dovetailed and grooved together, the joints of which are secured and rendered air and water tight by melted lead or other equivalent metal.

FANNING MILL.—Stewart McMillan, Fletcher, Ohio.—This invention relates to an improvement in the construction and arrangement of fanning mills for cleaning small grain and seeds, and consists in building the main side frame of cross bars, making it very cheap, light, and strong, and in combining the rotary fan and the sieves in such a manner that they work with great facility by means of a crank movement connection.

PORTABLE CHAMBER CLOSET.—Wm. J. Lyman, East Hampton, Mass.—This invention relates to a new arrangement whereby most of the advantages of the real water closet are obtained, in the sick chamber as well as in chambers and dwellings generally.

CHURN.—Daniel H. Carpenter, Hector, N. Y., and Hiram L. Slaght, Lodi, N. Y.—This invention relates to the method of constructing and operating churns for dairy purposes, whereby the ordinary single or double dasher barrel churn is operated with much less labor or exertion of strength than in the ordinary manner.

FAN VENTILYTOR.—H. B. Worth, Chicago, Ill.—This invention has for its object to improve the construction of the ventilator known as Griffith's patent ventilator, so as to make it more effective and satisfactory in operation.

ANIMAL TRAP.—James A. Sinclair, Woodsfield, Ohio.—The object of this invention is to furnish an improved trap, so constructed and arranged that the rat, in seeking to reach the bait, shall cage himself, and in seeking to escape, will operate mechanism by the action of which he will be killed and thrown from the trap, leaving it set for the next rat.

MACHINE FOR MAKING PEARL BARLEY, ETC.—W. Rickard, Chicago, Ill.—This invention has for its object to furnish an improved machine for making pearl barley, pearl wheat, splitting peas, removing a part of the bran from wheat before making it into flour or farina, and other similar purposes, which will do its work quickly and well, and which will not be liable to get out of order.

SEPARATOR SIEVE.—Joseph Barker, Amboy, Ill.—This invention relates to a method of constructing the sieves of fanning mills, whereby one kind of seeds is more perfectly separated from another, and more easily free themselves from chaff and refuse. It consists of a frame covered with wire gauze on both sides, a portion of the wire gauze on one end of the frame being removed, also, in the frame being inclined at the back end of the same, whereby the same cleans itself from chaff or refuse.

COTTON CULTIVATOR AND CHOPPER.—Zina Doolittle and A. M. Crowder, Houston Factory, Ga.—This invention relates to a device for cultivating cotton, scratching the earth from the hills of the plants, removing weeds, etc., thinning out the plants and throwing fresh earth up to the same, all being done simultaneously, or at one operation.

HARNESSES.—John J. Smokey, Natchez, Miss.—This invention relates to the driving-reins of harnesses, and consists in so arranging the driving-rein as to give great leverage to the driver over the animal, and thus enable him to easily control it, without irritation, but leaving it free to use its utmost speed, and in fact to encourage it so to do, while at the same time the animal can be readily checked by the driver.

BEEHIVE.—Daniel S. Bear, Toledo, Iowa.—In this invention a beehive is constructed in two parts, and so that they may be readily separated whenever required, and the filled half of an occupied hive united to the empty half of an unoccupied hive, and colonies of bees multiplied without the natural process of swarming, and therefore without the trouble, risk, and annoyance of hiving.

GRAIN THRESHER.—A. S. Whittemore, Willimantic, Conn.—This invention relates to a method of constructing machines for the threshing of grain by hand or power, whereby the same is more effectually done without unbinding the bundles, and the straw left in better condition. It consists of a box frame through which are longitudinal parallel wires, on which the grain is placed to be threshed, and also of arms attached to an axle rotating in suitable bearings on said frame, between each pair of which are pivoted any convenient number of flails.

SILK CLEANER.—W. G. Watson, Paterson, N. J.—This invention relates to a device for cleaning silk while the same is being wound on bobbins, and consists in the use of horizontal instead of vertical guides, whereby the lateral motion of the thread as it is being wound spirally around the bobbin is accommodated.

SCROLL SAW.—B. J. Camp, Marion, Ohio.—This invention relates to a new manner of fastening, straining, and guiding reciprocating scroll saws, so that the same will work with great ease, and can be operated with the greatest speed without jarring or getting out of order.

STEAM VALVE.—Wm. Ord, Brooklyn, Ohio.—This invention relates to a method of constructing steam engine valves, whereby they operate without sticking from the unequal expansion of the parts, and are more easily adjusted, and the wear from friction more economically provided against. It consists of the combination of a valve stem with cylindrical segments, or valves, and two wedges with an intermediate key, so arranged in connection with a set screw that by forcing the key between the wedges, the segments or valves are drawn together, and the pressure against the valve casing relieved.

SHACKLE FOR THE PLATFORM SPRINGS OF WAGONS.—John Price, New York city.—This invention relates to a shackle or joint by which the ends of the several parts comprising what are generally termed platform springs are connected together. The parts of these springs are at present connected by shackles or joints which do not admit of any horizontal play of the latter and the springs are consequently subjected to considerable strain and injury, the leaves of each part being frequently disengaged from the nibs which keep them in place. This invention is designed to obviate this difficulty by constructing a more flexible joint than hitherto used.

DEVICE FOR CHANGING FEED.—R. L. Nelson, Mexico, N. Y.—This invention relates to a device for changing the feed of saw mills or other suitable machines and consists in the general combination of the devices by which the desired result is obtained, also in a new manner of arranging the gear wheels and in a new method of moving the shifting gear and of throwing in gear with the driving and driven gears.

CAR VENTILATOR.—M. T. Hitchcock, Springfield, Mass.—This invention relates to a car ventilator in which a sliding valve is employed which is moved by the wind to the rear end of its case or shell in whatever direction the car may advance.

HEAT DEFLECTOR.—Lewis Dowe and Aruna C. Colton, Sycamore, Ill.—This invention consists in arranging a series of adjustable slats within the drum or tube by which the current of heated air and gases from the fire or air chamber may be deflected and retarded in their course, and thereby compelled to part with their contained caloric.

PROTECTING HEELS OF BOOTS AND SHOES.—John Fearn, Tompkinsville, N. Y.—This invention relates to an improved mode of applying a screw to the heels of boots and shoes for the purpose of preventing them from wearing away unevenly, or more on one side than the other, and also to prevent slipping on ice where liable.

PUMP.—Taylor Chamberlin and T. Ellwood Garrett, Philadelphia, Pa.—This invention relates to a method of constructing pumps whereby they are greatly simplified in their parts and rendered more durable than those of ordinary construction, and the invention consists in a hollow shaft and piston, and in the manner in which the cylinder is constructed and the water discharged therefrom.

WELL-TUBING APPARATUS.—N. C. Clark, Low Moor, Iowa.—This invention has for its object to improve the construction of well tubing, and the manner in which it is inserted in the ground so as to make it more reliable and convenient in use.

CARRIAGE JACK.—Adam Myers, Van Wert, Ohio.—This invention has for its object to improve the construction of carriage jacks so as to make them more convenient and effective in operation.

CAR COUPLING.—John C. Heaton, Fitchburgh, Mich.—This invention has for its object to furnish a simple, strong, and reliable car coupling which shall be self-coupling, and shall have no springs to get out of order.

CORN PLANTER, SOWER, REVOLVING HARROW, AND CULTIVATOR.—W. P. Brier, Leavenworth, Kansas.—This invention has for its object to furnish an improved machine for planting and cultivating corn, harrowing ground, and sowing and putting in grain, which shall be simple in construction, effective in operation, and easily and quickly adjusted for one or the other of said uses.

SULKY PLOW.—Elias Levee.—This invention has for its object to furnish an improved sulky plow, so constructed and arranged that it may be easily raised from and lowered into the ground, which will not be raised out of the ground by the wheels passing over obstructions or rough places, and which shall be simple in construction and easily adjusted to run at any required depth.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

C. W. Y., of N. Y.—See reply to "G. W. E.," in No. 8, current volume, SCIENTIFIC AMERICAN, as to the estimating of horse-power of engines.

J. W. B., of N. Y.—"What are the lightest liquids known and the process of manufacture? Can water be made lighter by chemical means, and if so by what process?" The light products of petroleum are the lightest liquids known. They are separated from the heavier portions by distillation. Water can be made lighter in the same way—that is by boiling. It then becomes steam which is the vapor of water, commonly called, but not properly, water. The addition of any chemicals could only increase its weight.

J. B. R., of N. Y.—"Will you, or some of your readers inform me the method of clearing cinder from the fire brick of a hard-coal stove? How can I loosen the tops of lamps fastened with plaster of Paris?" Oyster shells burned in the stove fire, or chalk, or limestone will assist in detaching clinker. We know of no solvent for dried plaster of Paris. Kerosene or benzine will sometimes soften it sufficiently to facilitate its removal.

W. J. H., of Mo.—"If the air be extracted from a case or box and an inclined plane four feet in length, having a grade of one inch to the foot, be constructed within the box, will a ball run down the incline with greater velocity than if the box contained air?" A ball will roll or fall faster in a vacuum, as air offers a resistance.

E. K. P., of N. Y.—"Is there any form of glass prism that will decompose a ray of light into a perfect circle or rainbow of the seven colors instead of the ordinary oblong spectrum?" Yes, let the prism be bent or curved. For a perfect circle use convex lens.

J. B. S., of Wis., asks for the philosophy of the common observation that "it is too cold to snow." We all know that the weather moderates on the fall of snow, and that our coldest days succeed the fall. It is a natural law that bodies in passing from the liquid to the solid state always give out an amount of latent heat. Now snow is frozen vapor, and in its change in the air from the liquid to the solid form, heat is imparted to the atmosphere and its temperature is increased. Similarly, when the snow begins to melt, it draws from the air its latent heat necessary in order to turn from the solid to the liquid state.

J. A., of Me.—The origin of amber is assigned to a resin which flowed from the trunk of certain trees which flourished in the tertiary period. We would refer you to an article on amber and meerschaum published on page 161, Vol. XV.

G. J. L., of Conn.—Bituminous and anthracite coal differ in that the former contains a large amount of pitchy volatile substances which readily ignites and burn with smoke and flame. In the latter these substances by some means have been driven out, and the remainder being a purer variety of carbon burns without smoke or flame.

A. A. L., of Ind., calls attention to a prevalent notion among millers that a water wheel under the same head runs with a greater velocity in the night than in the daytime. "If any explanation is attempted by the workmen, they assert that the air becomes heavier after sunset." We have before us the observations on this very subject made by Prof. Cleveland and published in the *Journal of Science*. He selected one fine day in August, and at two o'clock, P. M., the barometer standing at 29·19 inches, the number of revolutions of the wheel was ninety-six in a minute. At midnight the pressure of the atmosphere had increased seven-hundredths of an inch the temperature of the water being the same, the wheel was found to revolve precisely ninety-six times in a minute, showing the same velocity as on the preceding noon. The workmen admitted the truth of the result but seemed to believe that it would have been different on a cloudy night. This matter has been fully discussed in previous volumes of this paper.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For Steam and Gas Fitters Tools, Machines for Hand or Power to Screw and Cut-off Gas pipe; stocks, dies, pipe, vises, Peace's adjustable pipe tongs, address Camden Tool and Tube Works Co., Camden, N. J.

Incrustations removed by Winans' Boiler Powder (11 Wall st., N. Y.); 12 years' use proves it reliable and uninjurious.

Inventors and Patentees wishing to get small, light articles manufactured for them in German Silver or Brass, address Schofield Brothers, Plainville, Mass.

Manufacturers of Ditching Machines of from three to four feet wide by same depth, address M. White, Jr., New Orleans.

County Rights to the Pew Hat Rack for sale. Address E. S. Blake, Pittsburgh, Pa

For Bosom and Collar Plating Machines, Address W. H. Tolhurst, Troy, N. Y.

For Sale—A Valuable Patent Right for the State of New York. For particulars call on or address H. T. Smith, 183 Fulton street, Brooklyn.

Two Valuable Rubber Patents, in the Stationery line, for sale cheap. Address Wm. Burnet, P. O. Box 2,937, New York city.

Parties wishing to contract for first-class Brass and Composition Castings, please address Ridlon & Bond, P.O. Box 723, Biddeford, Me.

For best Post-Boring machines, or anything relating thereto, address B. F. Mohr, Mifflinburgh, Pa. N. B.—The whole Right for sale very low.

Wanted—A good 2d-hand Engine for a side-wheel boat, 18 to 22-inch bore by 42 to 48 inch stroke. An upright with side connections preferred. Apply to Box 670, Sandusky, Ohio, stating particulars. Also, a fire box boiler to match.

EXTENSION NOTICES.

Frederick G. Schaum, administrator of Frederick Schaum, deceased, of Baltimore, Md., having petitioned for the extension of a patent granted to him the 25th day of April, 1854, for an improvement in glass furnaces, for seven years from the expiration of said patent, which takes place on the 25th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of April next.

William Baker, of Attica, N. Y., having petitioned for the extension of a patent granted to him the 16th day of May, 1854, and reissued the 22d day of September, 1863, for an improvement in clap board joints, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of April next.

Albert Fink, of Louisville, Ky., having petitioned for the extension of a patent granted to him the 9th day of May, 1854, for an improvement in bridges, for seven years from the expiration of said patent, which takes place on the 9th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of April next.

Wm. H. Mitchel, of New York city, having petitioned for the extension of a patent granted to him the 16th day of May, 1854, for an improvement in machinery for composing type, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of April next.

Edward Brown, of Waterbury, Conn., having petitioned for the extension of a patent granted to him the 16th day of May, 1854, for an improvement in machines for making hinges, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of April next.

Ward Eaton, of New York city, having petitioned for the extension of a patent granted to him the 16th day of May, 1854, for an improvement in machines for cutting glaziers' points, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of April next.

B. J. La Mothe, of New York city, having petitioned for the extension of a patent granted to him the 4th day of April, 1854, for an improvement in railroad cars, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

Benj. A. Lavender, of Halifax, N. C., and Kate Lowe, administratrix of the estate of Henry Lowe, deceased, of Baltimore, Md., having petitioned for the extension of a patent granted to the said Benj. A. Lavender and Henry Lowe the 4th day of April, 1854, for an improvement in treating cane fiber for paper and other purposes, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of March next.

Warren Gale, of Peekskill, N. Y., having petitioned for the extension of a patent granted to him the 12th day of September, 1854, for an improvement in straw cutters, for seven years from the expiraton of said patent, which takes place on the 12th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of June next.

Elias Ingraham, of Bristol, Conn., having petitioned for the extension of a patent granted to him the 3d day of December, 1861, for an improvement in design for a clock case, for seven years from the expiration of said patent which takes place 3d day of December, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 26th day of October next.

NEW PUBLICATIONS.

LITTLE DORRIT AND OUR MUTUAL FRIEND.

Two more of Peterson's cheap edition of Dickens' works just out. Price of the former 35 cents, of the latter 40 cents. An edition of the Waverley novels in the same cheap style as Dickens' works has been commenced by the same publishers. T. B. Peterson & Brothers, 306 Chestnut st., Philadelphia Pa.

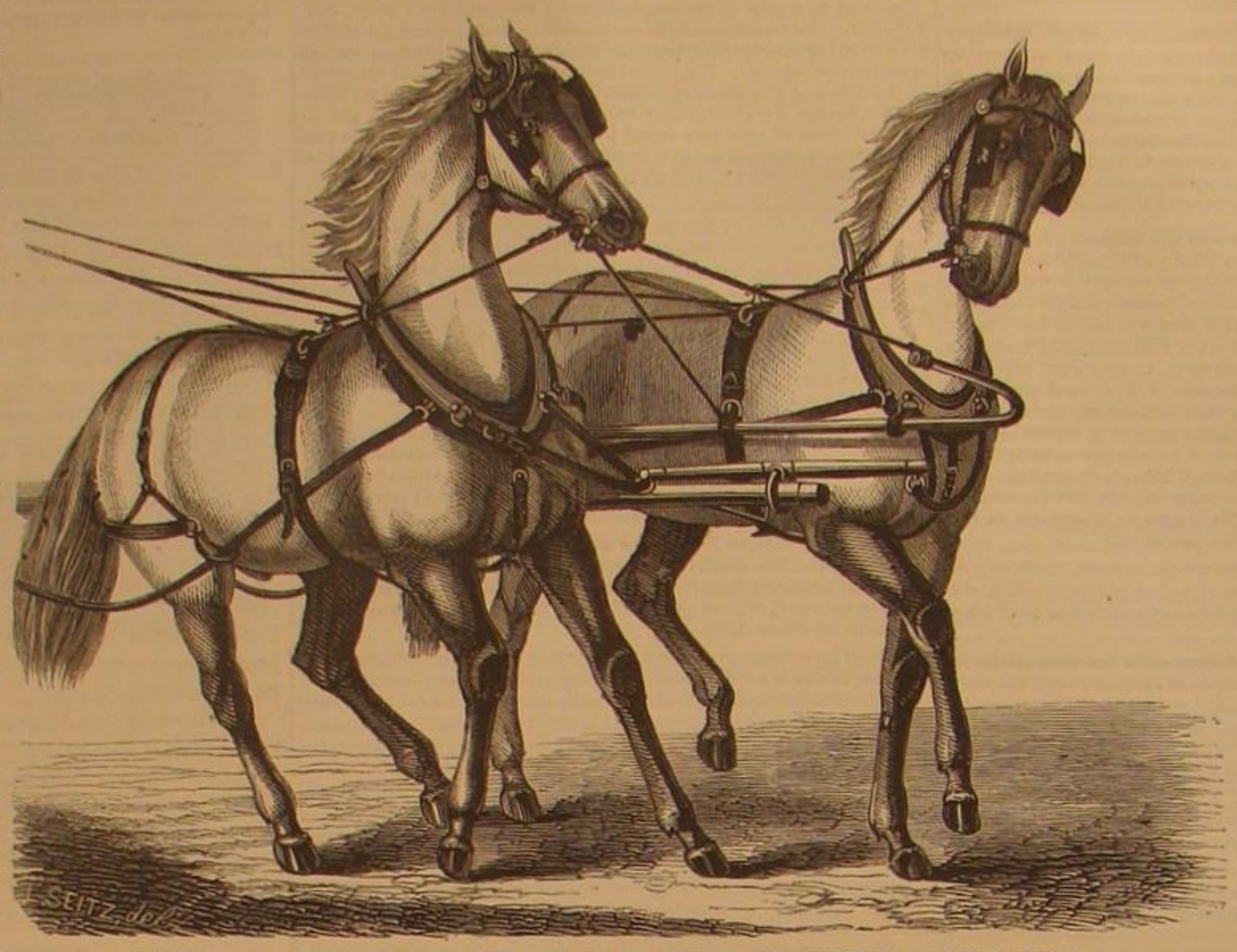
ORATORY.

A handsome 12mo. volume, 230 pages, tinted paper, price $1.50. A clear and succinct exposition of the rules and methods of practice by which readiness in the expression of thought may be acquired, and an acceptable style both in composition and gesture. S. R. Wells, 389 Broadway N. Y.

Method for the Cure of Balky Horses.

In the ordinary harness where two horses are connected as a span, or side by side, it is well known that the horse inclined to balk, as horses are ordinarily harnessed, has really an advantage over the willing horse. He can refuse to draw and not only keeps his breeching tight by his weight, but compels his willing mate to pull the load and himself too. In many cases the balky horse is not maliciously inclined, but is discouraged, and needs only an evidence of sympathy or an exhibition of kindness, or perhaps is ignorant and requires instruction. All of these requisites for the correction of obstinate horses or the education of unlearned animals appear to be furnished by the device shown in the engraving accompanying this article.

It is simply a rod or pole of wood curved at the front end and secured to that side of the harness of the true horse next to the balky horse. The rod is fastened to the thill strap, side buckle, and hames of the true horse in such a manner that the curved end shall project in front of the head of the balky horse. A stout strap with snap hook or buckle at one end is passed through the first bit ring of the balky horse, under his jaw through the opposite bit ring, then back and fastened to the first bit ring, thus securing the horse's under jaw. The slack of the strap is then fastened securely to the curved end of the rod leaving a length of from nine to fifteen inches, more or less, from the bit to end of the stick. A common hitching strap is now tied to the bit of the balky horse and to the side buckle of the true horse, leaving a foot or more play to the former to prevent his plunging too far forward when the attachment is ready. The action of the fast and loose bit and strap on the under jaw of the balky horse soon reduces him to the condition necessary for driving him.



BEEBEE'S PATENT FOR CURING BALKINESS IN HORSES AND MULES.

When the attachment is to be used for a single horse it is made longer and lighter than when for two horses, and is flattened to fit snugly the upper side of the right shaft of the buggy, with two staples attached to the rod, one near the back end and one just forward of the usual hold-back iron on the under side of the shaft. Corresponding staples are affixed to the under side of the shaft and by these and straps the rod is firmly secured to the shaft bringing the curved end to a point about one foot before the horse's head. In this end is set a little pulley and a line from the horse's bridle, attached as in the two-horse plan, passes through the instrument and around the pulley, back through the rings or terrets, thence to the buggy, where it is so attached to the dasher, or forward piece below the dasher, that by means of a little lever with a pulley in it, one third the distance from the bottom end of the lever, it shall shorten the rein double the distance the lever is drawn at that point.

Patented through the Scientific American Patent Agency January 14, 1868, by W. W. Beebee, whom address for further information at Dubuque, Iowa.

Improved Window Blinds and Shades.

The Venitian blind has been so extensively adopted in this country that it might almost claim to be American. Whether used on the inside or outside of the window, in comb ination with shades or curtains, it fulfills the object of precluding the sun's rays and at the same time admitting the air. It is not, however, always convenient to swing an outside blind from the interior, and an inside one as usually constructed is cumbersome.

The object of this invention is to simplify the blind or to combine it and the shade in one device. It can be applied to cars and steamboats as well as houses, and being entirely on the inside can be readily operated. The frame containing the device is of two parts, a fixed and a movable one, seated in the window casing, the uprights of both parts being recessed or grooved to receive the webbing which connects the slats and by which they are suspended. Their ends are connected to the webbing by cords or wires passing through holes in the edges of the slats and through the webbing. A lifting cord runs through central holes in the ends of the slats, one end being fastened under the lower slat and the other passing over rollers at the top of the frame. For convenience the two lines, one at each end, are combined and connected to a tassel at one side, the combined cords passing over a grooved truck seated in the top of one side of the movable frame, as seen in Fig. 1, where the passage of the lines over the top of the frame and their connection with the tassel are plainly shown.

Fig. 1 is the blind partially raised as a shade, and Fig. 2 the blind entirely closed. This closing is effected, when the blind is down, by a lifting up of the inner or movable frame, which is hinged by pivoted bars, seen in Fig. 2, to the stationary frame. Small spring catches on the sides of the movable frame may be made to lock into suitable recesses in the window casing to retain it in place at any hight desired.

It is evident that this blind may be adjusted readily to any required position, opened, closed, or held partially closed. It will suit any form or size of window, and does not interfere with the use of draped curtains. It was patented through the Scientific American Patent Agency Dec. 17, 1867, by S. W. Shorey, who will reply to all communications in reference to territorial rights, etc, if addressed at Galesburg, Ill.

Fig. 1

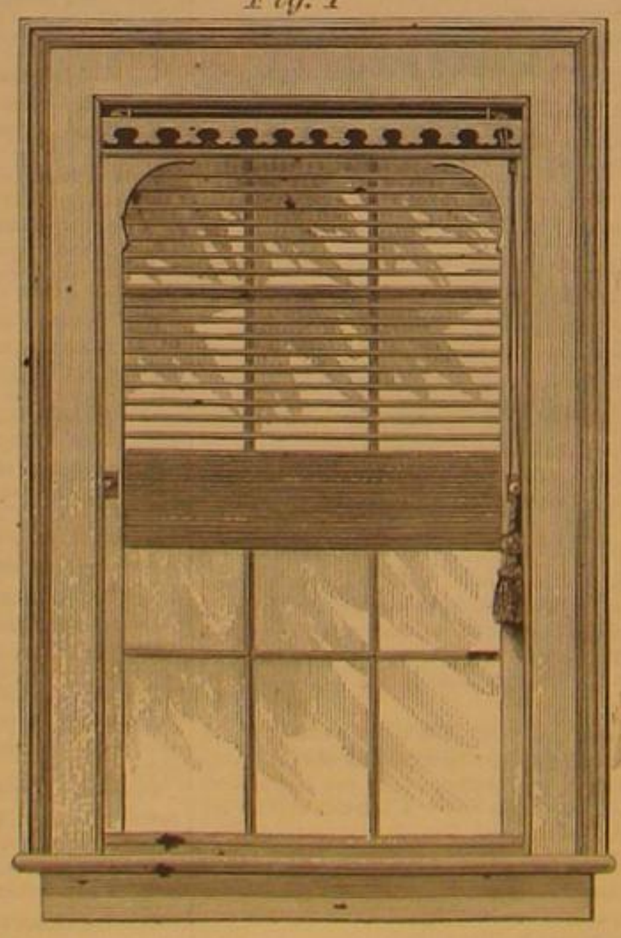
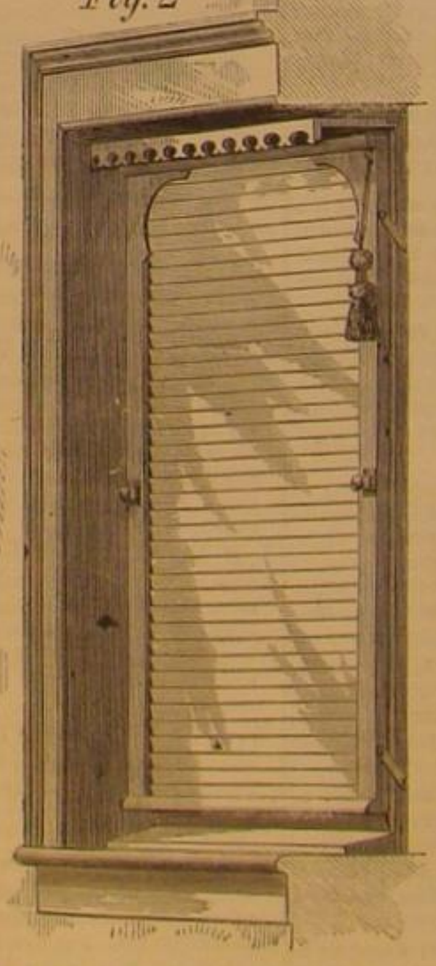


Fig. 2



SHOREY'S PATENT INSIDE WINDOW BLINDS.

Preparation of Potash Dyes.

"I take yellow prussiate of potash, or the first crystallization, and dissolve in hot water and make the solution to 20 deg. by Baumé's hydrometer, then pass a stream of chlorine gas through the solution, but not more to be introduced than will prevent precipitation, as may be tested by persulphate of iron, when it is ready to be barreled for shipment or use. In this mode of preparation a larger amount of chlorine is retained which, in the preparation of red prussiate of potash, is dissipated in the process of evaporation and exposure. This loss is by the present new process avoided and by that means a great reduction in labor and cost is effected, and a superior article produced being in value, as yellow prussiate of potash, a saving of nearly seventy-five per cent, in red prussiate of potash, fifty per cent. One hundred pounds of yellow prussiate of potash, or first crystillization, make four hundred pounds of the improved solution." Patented by John Reynolds, San Francisco, Cal.

Manufacturing Steel by the Use of Oxidizing Salts.

The latest of the many improvements in the steel manufacture consequent upon the discovery of the Bessemer process, is the following invention of Mr. James Hargreaves, which we find described and commented upon in the columns of *The Engineer*:

"Several attempts have been made to use nitrates in converting iron into steel by placing the substances below the level of the bath of molten metal, and thereby causing the oxygen of the other gases evolved by the decomposition under heat to pass up through the metal. Experience, however, showed that the reactions took place so rapidly and with such force as to throw about the metal. But Mr. Hargreaves has fully comprehended the necessity for finding a remedy for the too rapid decomposition of the salts. The salt taken by Mr. Hargreveas is the nitrate of soda, on account of its cheapness and high percentage or oxygen. The most important function of the nitrate of soda would not, however, so much consist in its decarbonizing powers, as in its being an agent 'in removing the metalloids, silicum, sulphur and phosphorous, and the semi-metal arsenic, by forming with them compounds of sodium:' the materials are placed below the fused cast iron, and the products of the decomposition rise up through the fused metal. By taking the nitrate of soda, the quantity of carbon to be removed can be regulated at will by the quantity of nitrate used, and the alkaline residue would 'give rise to the formation of silicate of soda, sulphide of sodium, and phosphide of sodium.'

The first experiments were instituted at the Widnes Foundery. On finding that the oxygen from the nitrate of soda and the chlorates of potash and soda are evolved so rapidly that it was dangerous at once to pour the molten iron upon them, the use of clay as a diluent, and a retarder of the action of the chemicals occurred to Mr. Hargreaves. Its successful action in this way, in its turn suggested the substitution for it of hematite ore. A cheap oxide of iron would thus, while diluting the action of that other chemical, offer an additional supply of oxygen and an increased yield of metal. The nitrate of soda is therefore mixed with a portion of hematite in order to retard its action, and the slightly moist paste thus composed is pressed into the bottom of a vessel lined with fire brick. This paste is then dried into a solid block, either by means of the heat left in the vessel after the last operation, or specially produced. When dry, the molten iron is poured into the vessel, and the layers of the composition scraped up. The high ferrostatic pressure soon carries portions into the mass of molten metal, and the reactions take place between them. The molten metal appears to boil, and a frothy slag, said to contain 'the impurities extracted from the iron,' rises to the top in company with some oxide of iron and compounds of soda. The metal can then be tapped out. In order to be enabled to apply the process of the puddling furnace, and thus employ established plant, he got over the difficulty of the bottom of the puddling furnace being too hot, and hence at once uselessly decomposing the salt, by making the converting materials into hard dry blocks. Several such blocks are successively pushed to the bottom of the molten metal in furnace, the products, of course, rising up as in the fixed vessel. By this means it is said that the puddling operation is shortened, with an attending saving of labor and fuel: and, above all, that the yield is better, from 'the soda forming a base which readily combines with the silicic and phosphoric acids eliminated from the iron.' Mr. Hargreaves states that he can make refined iron for puddling by the use of about three per cent of nitrate and six per cent of peroxide of iron; steel, by eight to ten per cent of nitrate and an equal weight of binoxide of manganese; and malleable iron by eight per cent of nitrate and twenty per cent of peroxide of iron, in each case iron with five per cent of carbon being used. The bulk of the slag produced is materially increased by the presence of the silicate of soda.

Neglect of belts, in oiling, "taking up," and their general management, is a prolific source of expense in manufactories and shops. The eye of the manager should often be directed to the belts, their running, condition, etc. It will save time, expense, and trouble.

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CANDLES FOR CARS—THE KEROSENE SCARE.

For the same reason, we presume, that "misfortunes never come singly," and a striking exemplification of that old adage, is the fact noticed by journalists and observing newspaper readers, that certain months of the year are particularly prolific of railroad casualties. The periodic return of this smash-up season, as it may be termed, is even predicted by enterprising journalists, and it must, so they affirm, like the dog days, run through a certain course before it finally dies out. If, for causes beyond our ken, certain months of the year are peculiarly favored in this respect, it is evident that such a season is now upon us, for the record of the past few months shows a long list of railway casualties of all kinds and of all degrees of horror. Many of these accidents have been the destruction of passenger cars by fire, and in some way the public have become possessed with the idea that kerosene oil lamps have in the majority of cases been the cause of these disasters. The papers have been instrumental in disseminating this belief, and behold, as the result, news reaches us from all points that the managers of the leading railroads of the land have caused the removal of the lamps from all their cars, the popular substitute therefore, being the more primitive source of illumination—candles. Even Legislative action has been taken in some States requiring, under a heavy penalty, all companies running roads through these States to do likewise. We know that several railway-supply establishments in this vicinity are overwhelmed with orders for car-candle burners. Now, if the oil lamps are really so dangerous as represented, and no better substitute can be found, then the sooner a return is made to the era of tallow dips—or any improvement thereof—the better.

In the first accounts received of the Angola tragedy, appeared a statement to the effect that the horrors of the disaster were much increased, if not mostly caused, by the oil from the broken lamps being ignited and scattered over the victims. When the actual facts in the case were made known, it appeared that no kerosene was used in the cars, but candles were employed in lighting them. Again: the lamp which lately exploded in a car on the Erie road, an exchange assures us, was not filled with kerosene, but with a mixed oil requiring a special construction of lamp for burning it. Last week we referred to the burning of the Pullman palace car, "City of Chicago," on the Chicago, Burlington and Quincy railroad. Since that brief account was written, additional particulars have been received, from which it appears that the affirmed cause of the fire was a merely suppositious one, the more probable explanation attributing its origin to the over-heating of a stovepipe near the roof. The officers of the road now feel confident that the latter was the true cause, yet they seem to have become affected by the anti-kerosene movement, and with a remarkable but uncalled for display of prudence, they have ordered all their passenger cars to be provided with candles. Although kerosene oil in this case was not the cause of the conflagration, yet, as it might have been, the remaining palace cars are to be refitted, and all new ones will hereafter be furnished with candles.

It cannot be denied that the light furnished by kerosene oil is superior in its illuminating power to any other equally convenient source of artificial illumination, and it is equally true that with the exercise of a little care, inexplosive oils can be procured. If the roads would confine their purchases to such oils as will stand the commercial fire test of 110°, not only the best, but, under ordinary circumstances, an entirely safe light for railroad cars would be obtainable. As far as our own experience extends, passenger cars are not sufficiently illuminated. The tediousness of a railroad journey is greatly relieved by a cheerfully lighted car, but while under the present arrangement this consolation is rarely afforded the weary traveler, the return to the use of sperm or whale oil, or even worse still, candles, is a retrogade step, which should not be taken until it can be shown that some superior means of illumination, equally safe, is not practicable.

OBITUARY.—SIR DAVID BREWSTER.

This distinguished *savant* was born at Jedburgh, Scotland, Dec. 11, 1781, and, at the time of his death, had reached the advanced age of eighty-seven years. He was educated for the Church of Scotland, of which he became a licentiate, and in 1800 received from the University of Edinburgh the degree of M.A. Eight years later he entered upon his literary career as editor of the *Edinburgh Encyclopædia*, a work that occupied him wholly or mainly until 1830. His attention was first directed to the study of optics in 1808, and a work on "New Philosophical Instruments," was published by him five years subsequently. In 1819 he was instrumental in establishing the *Edinburgh Philosophical Journal*, and sometime after, the *Edinburgh Journal of Science*. During the later years of his life he was one of the editors of the *London and Edinburgh Philosophical Magazine*, and a voluminous contributor to the reviews, and to the transactions of various scientific bodies. His special works, besides the one already mentioned, were a "Treatise on Optics," one on "The Kaleidoscope," the "Letters on Natural Magic," and "Life of Sir Isaac Newton."

From his laborious investigations of the subject of Optics, the name of Sir David Brewster will always be peculiarly identified with this interesting branch of physical science. Many of the most brilliant of modern discoveries in Optics were made by him, and particularly are we indebted to his researches for a great part of our knowledge respecting that most curious phenomena in science, the polarization of light. One of his earliest practical inventions was an illuminator for lighthouses, the peculiarity of which was a lens constructed out of successive segments of glass. The well-known toy, the Kaleidoscope, one of the most original optical instruments ever constructed, was of his own devising. It is said that the sensation it excited throughout the community, when first brought out, was astonishing; and people were everywhere seen, even at the street corners, looking at the pleasing wonders it revealed. During the space of three months over 200,000 of these instruments were sold in Paris and London. The invention of the Stereoscope is an honor which he divided with Prof. Wheatstone, but while the latter devised the reflecting stereoscope, the common or lenticular form was originated by Sir David himself.

To the labors of deceased we also owe numerous valuable facts in thermotics and meteorology, resulting from his researches on the mean temperature of the earth and the determination of the isothermal lines. The philosopher had certainly no reason to complain of the ingratitude of the world to its men of science. In 1807 he was made a Doctor of Laws by the University of Aberdeen; the next year obtained his Fellowship in the Royal Society of Edinburgh; received the Copley Medal of the Royal Society in 1815, and soon after became a Fellow of that august body; in 1816 received a grand prize from the French Institute, of which body he became a Foreign Associate in 1849; in 1819 received the Rumford Medals from the Royal Society; in 1831 he received a decoration from the King of Hanover, and the next year was knighted by William IV. At the time of his death he was a correspondent of the Royal Academies of Russia, Prussia, Sweden, and other countries, and a member of every scientific society of any importance in Great Britain.

Not only for his great scientific attainments, but also for his excellent qualities as a man was Sir David esteemed, and his death, while it removes one from the foremost rank in science, will be alike keenly felt in social circles.

Chemistry of Paint.

Hitherto but very little attention has ever been given to the above subject by our leading chemists, but a work has recently appeared, published by the celebrated Dutch chemist, Mulder, in which a vast amount of useful information on this point is imparted, and much of the mystery connected with the chemical action of the different paints is satisfactorily explained. The starting point of his investigations was an inquiry as to the best material to protect iron from rust. The result has been his rejection of all oil paints as unlikely to answer the purpose, and his conclusion that coal tar contains the best materials for a protecting coat. The author very completely investigated the nature of paint, and the chemical changes involved in the drying of oils. As regards linseed oil, we are told that the essential constituent is "linolein," a compound of glycerin and linoleic acid. The latter body the author could not obtain quite pure, but he decides that its formula is HO, $C_{32}H_{27}O_3$. When exposed to air linoleic acid rapidly oxidizes, first to "linoxic acid," a sticky body resembling turpentine. On longer exposure, "linoxyn" is produced. This is a tough leathery substance, sharing, we may say, many of the properties of caoutchouc. It is soluble in the same menstrua, and can be vulcanized like india-rubber. It is manufactured in considerable quantities in this country, and is the binding material used to consolidate emery wheels. It forms also the surface of linoleum cloth. According to Mulder, there are two linoxyns, the white and red; the white modifications become red on exposure to 80° Centigrade, and the red again turns white on exposure to sunlight. The browning of white paint in dark places the author ascribes to the gradual change of white linoxyn into red. Oxidation does not end with the production of linoxyn. It still proceeds to the complete decay of the material, as is seen in very old paint.

One useful result of Mulder's labor is a simple process for preparing a good colorless drying oil. For this purpose it is only necessary to boil linseed oil for two hours with three per cent of red lead, filter it, and then expose it to sunlight in large shallow vessels, frequently renewing the air above. Another result is a denial of the existence of albuminous and gummy matter in linseed oil, to which are ascribed the slowness of drying of unboiled oils. For these matters Mulder searched in vain, and at last came to the conclusion that they had no existence. Oxides and acetates of lead, he tells us, act as driers, not by precipitating albuminous matters, but by forming a little linoleate of lead, which rapidly oxidizes and communicates its activity to the oil.

Cast-steel Boilers.

The use of steel in the manufacture of steam boilers is of comparatively recent date, and the relative advantages, if any, over ordinary iron boilers, except on the score of their less weight, has hardly yet been satisfactorily determined. We have before us perhaps the latest information bearing on this subject, being the results of an important series of experiments made recently at the rolling mills of Messrs. Funk & Elbers, of Hagan, Prussia, for the purpose of ascertaining the respective evaporating power of the new compared with the old style of boiler.

The two boilers experimented with were each five feet in diameter, and thirty-four feet long, constructed to stand five atmospheres "over" pressure. One was made of wrought iron, and the other of soft cast steel. The thickness of the sides in the cylindrical portions of the iron boiler was 0·50 of an inch, and of the cast-steel boiler 0·33 of an inch. Each boiler had a heating surface of 293 square feet, and twelve square feet of surface. Both were new, and had never been before heated. They were set alike in brickwork, one above the other, but entirely separated by masonry; the gaseous products of combustion passed through a single flue underneath each boiler, and passed directly into the same chimney. At first both boilers were filled, and fires were kept under them for several days in order to dry the brickwork, after which the fires were extinguished and the boilers emptied and cleaned. Each boiler then received exactly 712 cubic feet of water at 95° Fah. temperature; the man-holes were closed, and the water was heated to the boiling point; again the fires were put out, and all the ashes and coals taken away. From this point the boilers were fired afresh, and fed with weighed fuel; the man-holes, hitherto kept closed, were now opened to let the steam escape; and the firing was so well regulated, by means of dampers, that the velocity of the escaping steam—measured by List's Velocimeter—was the same in each boiler. The temperature of the gases from the fire was measured, at a point six feet from the rear end of each boiler, by Gauntlett's Pyrometer, and found to vary from 644° to 734° Fah.

After consuming on each grate 3,150 pounds of coal of the same quality, the cinders of which were burned over and over again, the fires were put out, and the man-holes closed. On the following day the remaining water of the boilers, showing a temperature of 95°, was let out through the emptying tube, situated at the lowest part of the boiler, and measured by means of a hydrometer adapted to the tube. The iron boiler showed 387 cubic feet, and the steel boiler 331 cubic feet of the remaining feed water. Therefore the water evaporated in the iron boiler was 712—387—325 cubic feet, or 20,065 pounds; and that evaporated in the steel boiler was 712—331—381 cubic feet, or 23,523 pounds. Hence the evaporating capacity was proved to be 17·20 per cent in favor of the steel boiler. One pound of coal evaporated in the iron boiler 6,350 pounds of water, and the steel boiler 7,467 pounds of water at 212° Fah.

At the next trial the whole operation was performed in the same manner, only the velocity of the escaping steam was less. It resulted in showing 19·63 per cent in favor of the steel boiler. One pound of coal evaporated in the iron boiler 5,809 pounds, and in the steel boiler 7,008 pounds of water.

These two experiments were verified in the following manner: To an equal quantity of feed water in each boiler an equal volume of a strong solution of salt was added. After stirring the water for some time, by means of long poles, and boiling it with closed man-holes, samples were taken out for future analysis. In completing this experiment in which equal quantities of fuel and water were used, further samples were taken out. The analysis of the samples by Dr. List, of Hagan, showed that in the iron boiler one quart of water contained before evaporation 4,629 grammes of chloride of sodium, and after, 5,985; in the steel boiler one quart contained 4,371 grammes before, and 7,385 grammes of salt after evaporation; the iron boiler lost 33·76 quarts, and the steel boiler 40·81 quarts of water, showing 20·85 per cent in favor of the latter. The average percentage of these three experiments is 19·24 per cent in favor of the steel boiler, which it will be noted had a shell 33 per cent thinner than that of the wrought-iron boiler.

COLOR OF THE CLOUDS.—The varied colors which the clouds assume at various times especially at sunrise and sunset, are explained by Mr. Sorley on the principle that the clear transparent vapor of water absorbs more of the red rays of light than of any other, while the lower strata of the atmosphere offer more resistance to the passage of the blue rays. At sunrise and sunset the light of the sun has to pass through about 200 miles of atmosphere within a mile of the surface of the earth in order to illuminate a cloud a mile from the ground. In passing through this great thickness the blue rays are absorbed to a far greater extent than the red, and much of the yellow is also removed. Hence clouds thus illuminated are red. When the sun is higher above the horizon, the yellow light passes more readily and the clouds become orange, then yellow, and finally white. Clouds in different parts of the sky or at different elevations often show these various colors at the same time.

FIRST NEW ENGLAND IRON WORKS.

The first works for smelting iron ore in this country were erected in 1619, on a branch of the James river, Va., but were destroyed by hostile Indians in 1622. Bishop's "History of American Manufactures," says, that in November, 1637, the General Court of Massachusetts granted to Abraham Shaw one half the benefit of any "coles or yron stone which shall bee found in any comon ground which is in the countrye's disposing."

Discovery was early made at Saugus, or Lynn, of the Bog Iron ore, which is deposited in numerous peat bogs throughout Eastern Massachusetts, and supplied the early furnaces of that colony; considerable quantities of this were found in different places within a mile or two of Lynn, and the first attempt to manufacture iron in New England was made in that town. The great scarcity of iron ware and tools, and of iron for ship building and the erection of mills and dwelling houses; with a lessened intercourse between Great Britain and the Colonies, led Messrs. Thomas Dexter, Robert Bridges, and other enterprising persons, to form a plan for the introduction of the manufacture in the colony. With this view, Mr. Bridges, in 1643, took to London some specimens of ore from the ponds of Saugus. In connection with John Winthrop, Jr., who had preceded him thither two years before, a company was formed, called the "Company of Undertakers for the Iron Works." It consisted of the following gentlemen of wealth and enterprise, viz.: Lionel Copley, Esq., of York, England, Nicholas Bond, Thomas Pury, John Becx, W. Beauchamp, Thomas Foley, William Greenhull, Thomas Weld (minister), John Pococke, William Beck, William Hickocke. The sum of one thousand pounds was advanced for commencing the work, with which Mr. Winthrop, accompanied by a corps of workmen, returned to New England the same year. Preparations were immediately made for the manufacture of iron on a large scale, contemplating not only the smelting, but forging and refining of the metal. The General Court was applied to for encouragement and participation in the business. The design was approved of, but the state of the public treasury did not warrant the Assembly in taking stock in the company. Two or three private persons joined the enterprise, and the General Court granted them, March 7, 1643–4, nearly all their requests, including the exclusive privilege of making iron for twenty-one years, provided they made, after two years, sufficient iron for the country's use. They were allowed the use of any six places not already granted, on condition that they set up within ten years a furnace and forge in each place, "and not a bloomery onely." The undertakers and their agents were exempted from all public charges and taxation upon their stock, and themselves and workmen from trainings.

A grant had been previously made in town meeting, 19th of 11th mo., 1643, to Mr. Winthrop and his partners, and to their assigns forever, of about 3,000 acres of the common land at Braintree, "for the encouragement of an iron work to be set up about Monotcot river." This grant was not surveyed, however, and was not laid out till January, 1648. It was long a subject of doubt whether the first forge was at Braintree or at Lynn. Lewis, the historian of the latter town, however, asserts positively that the first works were erected at Lynn, on the west bank of the Saugus, upon land purchased of Thomas Hudson, near a chain of small lakes abounding in ore. The village was called Hammersmith, after the native town in England of several of the principal workmen. Large heaps of scoriæ point out the site of one of the most important, though for various reasons not very successful, undertakings of early colonial times. Operations were continued with variable success for over one hundred years. Mr. Winthrop was ever a benefactor of his adopted country, and several of the workmen whom he introduced in connection with these works were not only of eminent service in laying the foundation of New England enterprise and skill, but left a posterity which has been identified with the manufacturing prosperity of different States to the present day.

In response to several additional propositions from the undertakers, the Court, on 13th November, 1644, granted them three years for perfecting the work and furnishing the country with all sorts of bar iron, provided inhabitants might become proprietors by paying within twelve months £100 each, and an allowance to the adventurers for £1,000 already disbursed, and that they, "with all expedition, prosecute said works to good perfection, as well the finery and forge as the furnace, which is already set up, that so the country may be furnished with all sorts of barr iron for their use at £20 per tun." A grant of three square miles of land was at the same time made them in each of the six places they might occupy, etc. On the 14th May following, the records state that, "whereas it is now found by sufficient proof that the iron worke is very successful (both in the richness of the ore and the goodness of the iron), and like to be of great benefit to the whole country, especially if the inhabitants here should be interested therein in some good proportion (one half at the least)" etc. They were invited to take stock in the business. Twelve to fifteen hundred pounds had then been expended, the furnace built, a good stock of mine, coal, and wood provided, and some tuns of sow iron cast, and some preparations had been made for the forge. About £1,500 were required to finish the forge, which was to be paid to Mr. Henry Webb, of Boston, subject to the direction of the undertakers, John Winthrop, Jr., Major Sedgwick, Mr. Henry Webb, and Mr. Joshua Hewes. Colonists were about this time publicly notified that they could join the enterprise if they wished. The partners above named were probably of the number who united with the company in America. Mr. Webb came from Salisbury, England, in 1638, and afterward became a wealthy merchant of Boston. He was a large proprietor in the iron works, and was distinguished for enterprise and benevolence. In October of the same year, a charter with ample privileges, embodying the previous grants and conditions, was made out and delivered to the undertakers, under the public seal of the colony. It confirmed to the company the monopoly for twenty-one years of the sole privilege of making iron and managing all iron mines they might discover, and granted them all waste lands not appropriated, the use of all wood, timber, etc., to convert into coals and earth stones, clay, etc., for the use of the works, forges, mills, or houses built, or for making or molding any manner of guns, pots, and all other cast iron ware, and for converting wood into charcoal, etc., etc. They were allowed to export any surplus to any part of the world except to enemies.

On the 29th September, two days previous to this grant of privileges, the first purchase of lands, consisting of twenty acres, for a forge at Braintree, was made from George Ruggles by Mr. Thomas Leader, who came from England as general agent of the company. The precise date of the erection of the forge at Braintree we do not find stated, but it followed soon after the other. Mr. Winthrop, on 29th May, also received permission to make a plantation and lay out a site for iron works at Pequod (New London)—to which place he removed in 1646—provided he could find suitable persons to effect it within three years. The works both at Lynn and Braintree belonged to the same company.

Johnson, a contemporary, in allusion to the enterprise, speaks only of the latter place, and quaintly refers to some of the difficulties experienced at the outset. "The land affording very good iron stone, divers persons of good rank and quality in England were stirred up by the providential hand of the Lord to venture their estates upon an iron worke, which they began at Braintree, and profited the owners little, but rather wasted their stock, which caused some of them to sell away the remainder, the chief reason being the high price of labor, which ordinarily was as much more as in England, and in many things treble; the way of going on with such a work here was not suddainly to be discovered, although the steward had a very able eye, yet experience hath outstript learning here, and the most quick-sighted in the theory of things have been forced to pay pretty roundly to Lady Experience for filling their heads with a little of her active after-wit; much hope there is now (1651) that the owners may pick up their crumbs again if they be but made partakers of the gain in putting off England commodities at N. E. price; it will take off one third of the great price they gave for labor, and the price of their iron it is supposed another third is taken off; the abundance of wood had for little will surely take off the residue, besides land at easie rates, and common land free for their use." It was the desire of the rulers, he states, to protect the company from loss at any sacrifice. The court, however, in reply to a letter from the proprietors in 1646, acknowledge the importance of the manufacture to the country, both for domestic supply and for exportation, but as an axe at 12d. was none the cheaper to him who had not 12d. to buy it, "so if your iron," they add, "may not be had heere without ready money, what advantage will that be to us if wee have no money to purchase it." The scarcity of specie is said to have been a principal difficulty in its management, and caused the business a few years after to pass into other hands. In August, 1648, Gov. Winthrop wrote from Boston to his son at Pequod, in relation to it: "The iron work goeth on with more hope. It yields now about seven tuns per week, but it is most out of that brown earth which lies under the bog mine. They tried another mine, and after 24 hours they had a sum of about 500, which, when they brake, they conceived to be a fifth part silver. There is a grave man of good fashion now come over to see how things stand here. He is one who hath been exercised in iron works." On 30th September he again wrote, "Mr. Endicott hath found a copper mine in his own ground. Mr. Leader hath tried it. The furnace runs 8 tuns per week, and their bar iron is as good as Spanish. The adventurers in England sent over Mr. Dawes to oversee Mr. Leader, etc., but he is far short of Mr. Leader. They could not agree, so he is returned to Teneriffe."

The iron works at Lynn involved heavy outlays on the part of the company, the majority of whom were too distant to exercise a proper supervision. They consequently yielded but little profit. They were several times assessed for damages to neighboring property by overflow of the pond, and in 1671 the dam was cut away, after which they were conducted on a smaller scale. In the hands of the old company they were more than once attached for debt, and suits were frequent against the proprietors. In 1677 they became the property of Samuel Appleton, who sold them about ten years after to James Taylor, who, we believe, was the last proprietor. They were not finally abandoned until the lapse of over a century from their commencement.

Spontaneous Combustion in Theaters.

In No. 5, current volume, we published a few facts in regard to the circumstances under which spontaneous combustion may take place. A correspondent of the *Pall Mall Gazette* says:

"I was lately conversing with one of our most eminent scenic painters upon the late catastrophe at Her Majesty's Theater, and he gave his decided opinion that the accident proceeded from spontaneous combustion. He stated that large heaps of the debris and refuse of the painting and property rooms were often swept up together, and left to accumulate for years, and that he had often had reason to complain of this practice, and to point out the danger of it. He related one instance in which such a heap had stood in a theater for a long period, and after many complaints he induced the authorities to remove it, and the moment a spade was thrust into it it burst into flames. I see that in the *Times* a correspondent puts aside spontaneous combustion because scene painting is done with water color, which is not inflammable; but the danger, though sometimes existing even in the painting room, lies more particularly in the property room, where varnish and oil colors are largely used, and where scraps of oiled rag, tow, varnish, sawdust, and flue, or fluff, are swept up, together with other matters. This only requires to be damped, as is not an uncommon practice, for the purpose of laying the dust, to induce eventually spontaneous combustion. My informant also pointed to the case of Astley's Theater, which he stated was burnt down somewhat in this way, from the sweeping of the sawdust and stables; and from his experience, which is very great, he felt certain that many other theaters had been so burnt."

Ventilation.

The great importance of ventilation in our sitting and sleeping rooms, in our schools and public halls, is not sufficiently appreciated. It was well set forth in a recent lecture by a Cleveland professor. It is startling to learn the amount of carbonic acid emitted from the lungs of one person, or from a single gas burner; enough to poison the whole atmosphere of a good sized room in a very brief period of time. How many persons think that winter temperature demands the exclusion of fresh air to make their apartments warm and comfortable, when the fact that in the cold season we consume more oxygen, and consequently exhale a greater quantity of the poisonous carbonic acid gas, should lead to a directly opposite course. A bed room in winter requires more ventilation than in summer, and the non-observance of this fact will readily account for the awful diseases to which frail humanity is subject.

We wonder if many of our readers are aware of the poisonous exhalations incident to a congregation of their "fellow citizens," in ball rooms, churches, and lecture halls. If they have not fully considered the vast importance of thorough ventilation, let them take these undeniable facts home to their serious thoughts. A person in health has eighteen breathings per minute, and thirty-five hogsheads of air pass through the lungs in twenty-four hours. Of this, from three to five per cent, or about two and a half hogsheads, is exhaled as carbonic acid gas, and thus one person would render two or three hogsheads of air unfit for breathing again. Let every person anxious for the preservation of his health take care that the windows of the dormitories are dropped a little, even during the winter nights. There is far less danger of taking cold than there is of inhaling the noxious atmosphere, which saps the health, undermines the constitution, and embitters life with suffering and disease that might have been avoided. —*Exchange.*

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 18, 1868.

Reported Officially for the Scientific American.

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74,476.—Lubricators for Axles, and Mode of Attaching Them to Axles.—Levi Adams, Amherst, Mass.

I claim, 1st, The two jaws, E E, fitted or secured to the axle, as shown, in combination with the collar, C, at the inner end of the arm, B, and the flange a, at the inner end of the box, D, all being constructed and arranged substantially in the manner as and for the purpose set forth.

2d, The packing, i, and the oil cup, F, in combination with the jaws, E E, the collar, C, on the axle, and the flange, a, on the box, D, all arranged substantially as and for the purpose specified.

3d, The button consisting of metal plate, d, rod, e, pivoted in lug, f, and the nut, g, when used in combination with the jaws, E E, and all arranged substantially in the manner as and for the purpose set forth.

74,477.—High and Low Water Alarm for Steam Generators.—Thomas P. Akers, New York city.

I claim, 1st, The employment of two weights, of greater specific gravity than water, inside of a boiler, said weights being arranged so as to be subject to the action of high and low water within the boiler, substantially as described.

2d, A combined high and low water indicator which is controlled by weights of greater specific gravity than water, applied upon the unequal arms, of a lever which is hung within the boiler, in such a manner that, while the weight upon the longer arm shall so far preponderate as to open a valve at certain points of either high or low water, such preponderance will be counteracted by the water when at any intermediate point, substantially as described.

3d, The combination of the steam whistle, F, alarm valve, d, vibrating lever, G, and weights, J J', of greater specific gravity than water, arranged within a boiler, substantially as and for the purpose described.

4th, The combination of the slide step, b, valve rod, D, with its valve, and the projection, i, of the lever, G, substantially as and for the purpose described.

5th, The combination of the slide step block, b, valve rod, D, and the adjusting device at the top of said rod, substantially as and for the purpose described.

6th, The devices, L T R, or their equivalents, constructed substantially as described, in combination with the safety valve and the steam whistle, for the purpose set forth.

74,478.—Muzzle Loading Ordnance.—Frederick W. Alexander, Baltimore, Md. Antedated Feb. 6, 1868.

I claim the apparatus termed a caliber diminisher, for the purpose of diminishing the caliber of smooth bore or rifled guns after they have been loaded, thus preventing any windage of the ball, and capable of being withdrawn after firing, for a fresh load, and of reinsertion, etc., as heretofore described.

74,479.—Spring Cup Toy.—Horace B. Ames, Great Barrington, Mass., assignor to John S. Stone, Housatonic, Mass.

I claim the toy ball and elastic spring cup, formed as specified, as a new article of manufacture.

74,480.—Safety Valve.—Horatio Anderson, Chicago, Ill.

I claim, 1st, The case, U H, arranged with holes, o x, lugs, B B, dome, L, flange, K, and stop, f, substantially as and for the purpose herein described.

2d, The holes, o, in combination with the plate, M, substantially as and for the purpose set forth.

3d, The combination of lever, t, pivot top, E F, and stop f, substantially as set forth.

4th, The combination of the nuts, G J, spindle, P, valve, R, and spring, S, as and for the purpose set forth.

74,481.—TINNERS' DIE.—P. W. Armstrong, Logan, Ohio.

I claim, 1st, Adjustable annular dies, F and G, in combination with the fixed dies, D and E, of a tinner's swaging machine, substantially as and for the purpose herein set forth.

2d, A folding device, H, in combination with the dies, F and G, and constructed and operating substantially in the manner and for the purpose herein set forth.

74,482.—PESSARY.—Benjamin Atkinson, Davenport, Iowa.

I claim a pessary consisting of the hinged leaves, g, arms, c, with the stem, e, attached to the leaves, g, by the rubber strip, l, and operated by the screw stem, b, all constructed and arranged substantially as described.

74,483.—SEPARATOR SIEVE.—Joseph Barker (assignor to himself and Alonzo Kinyon), Amboy, Ill.

I claim a double sieve for separating seeds, of coarser and finer netting, having the sides of the same so shaped as to incline the sieve to the shoe, in fanning mills, said sides being provided with the strips, a, or their equivalent, substantially as shown and described and for the purposes set forth.

74,484.—PADLOCK.—Ashbel P. Barlow, Claremont, N. H.

I claim the method of applying the springs, d d d d, in combination with the shell or drum, f, and key, l, in Fig. 2, substantially as herein set forth.

74,485.—CHURN DASHER.—J. W. Barton, Clifton Springs, N. Y.

I claim the arrangement, as a whole, of the jointed cross piece, B, standard, A, ways, c c, open and closed dasher wings, E G, rods, D D, and lever, C, the several parts being so combined as to form one connected working apparatus, as and for the purpose herein set forth.

74,486.—HEAD BLOCK FOR SAW MILLS.—Herrick Batchelder, Reading, Mass.

I claim securing the inner end of one of the dogs, D, to a movable block E, as and for the purpose set forth.

Also the wedge, H, in combination with the block, E, and its dog, D, operating substantially as and for the purpose described.

74,487.—BEEHIVE.—Daniel S. Bear, Toledo, Iowa.

I claim the open bottomed boxes, B B, constructed as described, having their inner and upper sides formed of slats, c c, said boxes fitting over the double inclined bottom, A, and adapted to be removed separately, from opposite sides of the hive, as herein described, for the purpose specified.

2d, The boxes, B B, constructed and operating as described, in combination with the double inclined bottom, A, slotted honey board, E, cap, C, and surplus honey boxes, D, when the sides of said boxes, B B, are adapted to fit over the edges of the inclined bottom upon the projecting sleepers, b, as herein described for the purpose specified.

74,488.—GEARING.—Asa M. Beard, Hillsboro, N. H.

I claim for the purpose specified, in the construction and arrangement of a pair of meshing gears, dividing one gear in a plane square to its axis, and fixing one part on its shaft, while the other part is attached to said shaft by a spring, which operates to turn said part or its shaft with reference to each other.

74,489.—WOOD SCREW.—Jason A. Bidwell, East Boston, Mass.

I claim as a new and improved article of manufacture, a wood screw having its core tapering from its shank to its entering point, and provided with a thread of uniform diameter, as herein described.

74,490.—SCREW DRIVER AND BORING TOOL.—Jason A. Bidwell, East Boston, Mass.

I claim, 1st, The construction of a screw driver which is adapted for driving perforated head screws, with cutting edges formed on a pyramidal point, in combination with scores or grooves, e, for conducting out of the hole the chips or dust, while in the act of boring, substantially as described.

2d, As a new and improved article of manufacture, a tool having a rectangular tapering point, c, a rectangular straight shank, a, and an adjustable countersink, b, said tool being adapted to serve the threefold purpose of a screw driver, a boring tool, and a countersink, as herein set forth.

74,491.—WAGON JACK.—Michael Biglin and Daniel W. Bennett, Wilkesbarre, Pa.

We claim the entire form of the "wagon jack," and more particularly the faced lifting block or follower, marked D, and lever, C, as constructed and operating substantially as described.

74,492.—SEWING MACHINE.—Thomas M. Bradley, Chesnut Level, Pa.

I claim, 1st, The arrangement and combination of the upright lever, D, with its curved arm, C, the plate, H, the needle bar, J, and the wheel, A, as herein described and for the purposes set forth.

2d, Also the movable hammer, W, inclined lever, Z, and pivoted shuttle box, a, as combined and operated by the upright lever D, as herein described and for the purposes set forth.

74,493.—SKID FOR ELEVATING AND LOWERING BARRELS, ETC.—Clarence Broslus, Hancock, Md.

I claim the skid, slide, and stays, as described and set forth.

74,494.—FOLDING BEDSTEAD.—S. S. Burr, Dedham, Mass.

I claim the combination with the upright case or false cabinet, of a folding bedstead, hinged to the rear of the same, and constructed as herein described, so that when folded up its head board shall constitute the cap or cornice of the cabinet, substantially in the manner shown and set forth.

74,495.—CORKSCREW.—John Bussey (assignor to himself and John F. Gunkel), Cincinnati, Ohio.

I claim the arrangement of the lever, K, catch, G, and spiral spring, J, within the handle, E, for the purpose of detaining and releasing the spiral shank, B, of the corkscrew, A, and enabling the said catch to be actuated by the thumb of the hand by which the instrument is worked, substantially as described and represented.

74,496.—COMBINED CORN PLANTER, SOWER, REVOLVING HARROW, AND CULTIVATOR.—W. P. Byler, Leavenworth, Kansas.

I claim, 1st, The revolving harrows, E, made adjustable, so as to be contracted and expanded, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the harrows, E, vertical shafts F, bevel gear wheels D and I, axles, B, and wheels, A, with each other, substantially as herein shown and described and for the purpose set forth.

3d, The combination and arrangement of the vertical shaft, F, slide bar, L, chain, P, pulley, Q, lever pawl, O, curved rack, N, and slide or guide bars M, with each other, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the adjustable support, J, and spring catch, K, with the vertical shaft, F, bevel gear wheel, I, and frame, C, substantially as herein shown and described and for the purpose set forth.

5th, The combination and arrangement of the slide, S, lever, T, spring, X, connecting rod, U, and bent or foot lever, V, with each other and with the seed box, R, and frame, C, substantially as herein shown and described and for the purpose set forth.

6th, The combination of the bent lever, H', and curved rack, I', with the slotted end of the pivoted tongue, G,' and with the frame, C, substantially as herein shown and described and for the purpose set forth.

74,497.—SCROLL SAW.—B. J. Camp, Marion, Ohio.

I claim the up-and-down adjustable guide bar, G, carrying the bent spring, H, constructed and arranged to operate as herein set forth.

74,498.—CHURN.—Daniel H. Carpenter, Hector, and Hiram L. Slaght, Lodi, N. Y.

We claim, 1st, The stationary frame, A, the swinging frame composed of the parts, C E J and D, arranged substantially as described, for the purpose set forth.

2d, The fulcrum pin, i, slot, k, connecting rod, I, shaft, H, with the friction rolls, f, in combination with the swinging frame, the whole arranged and operating substantially as and for the purpose described.

74,499.—CARRIAGE SPRING BRACE.—Joseph H. Chadwick, Wheaton, Ill.

I claim the combination and arrangement of the spring, A, the sill, C, or its equivalent, the braces, c d, and jointed arm, f, in the manner and for the purposes set forth and shown.

74,500.—PUMP.—Taylor Chamberlin and T. Elwood Garrett, Philadelphia, Pa.

We claim, 1st, The hollow shaft and piston, C D, arranged and operating substantially as shown and described.

2d, The combination of the hollow piston and shaft, C D, the discharge chamber, B, and the cylinder, A, substantially as and for the purposes specified.

74,501.—SPIKE.—J. Henry Champlin, Essex, Conn.

I claim the spike, A, constructed with slots or notches, a a a a, cut into the body of the same at its several angles, substantially as described and as and for the purposes set forth.

74,502.—WASHING MACHINE.—Alvin B. Clark and Charles Davis, Richmond, Ind.

We claim, 1st, In combination with wash board, C, or other suitable surface, the roller, a, rotating and sliding at each alternate stroke, substantially as described and for the purpose set forth.

2d, Also the combination of the reciprocating rods, d and d, hangers, b and b', springs, V and V, ratchets, e, and pawls, i, with roller, a, and board, C, all operating substantially as described and for the purpose set forth.

74,503.—WELL BORING APPARATUS.—N. C. Clark, Low Moor, Iowa.

I claim the combination of the hollow perforated stem, F, and a detachable point, G, with the extensible rod or stem, J, auger, E, valves, H, and shell or casing, I, all constructed and arranged to operate in the manner and for the purpose set forth.

74,504.—SCHOOL DESK AND SEAT.—Milton B. Cochran, Davenport, Iowa.

I claim the continuous desk board, b, provided with the rail, g, and shelves or pockets, f, in combination with chairs, a, and iron braces, e e' e'', when constructed and arranged for use as herein described and for the purpose set forth.

74,505.—CHURN.—John T. Coe (assignor to himself and Edward F. Coe), Chambersburg, Pa.

I claim, 1st, A churn dasher consisting of two wings set at any desired angle with each other, said wings being made with sides inclined in opposite directions, as and for the purpose set forth.

2d, The dasher, b, in combination with the band, c, hook, d', and staple, e, substantially as described.

74,506.—MACHINE FOR CUTTING RAGS.—John Collins, Jr., Detroit, Mich.

I claim, 1st, The spring guard, I, feed roller, H, and cutter, E, combined and operating together substantially as described and for the purpose set forth.

2d, The combination of the cutter, E, spring guard, I, and feed roller, H, with the table, A, the driving wheel, B, shaft, C, pulley, D, and wheel, G, all constructed and operating substantially as and for the purpose described.

74,507.—COW MILKING MACHINERY.—L. O. Colvin, N. Y. city.

I claim, 1st, So operating the "milker" that the same may have a vertical or "bunting" movement, substantially as and for the purpose specified.

2d, The pulley, n, and cord, k, in combination with the tube, F, of the milker, and the bent lever, I, substantially as and for the purpose specified.

3d, The bent lever, I, in combination with the pump, D, operating the milker substantially as and for the purpose specified.

4th, The gates or stanchions, B, so constructed and operating as to secure the cow while being milked, and to admit of her passage between them when liberated, substantially as set forth.

5th, An escape valve arranged in relation with the pump, D, and the tube F, of the milker, substantially as and for the purpose specified.

6th, The universal joint, b, arranged in combination with the milker, and the tube, F, thereof, substantially as and for the purpose specified.

74,508.—CURTAIN FIXTURE.—J. M. Corns, Black Rock, N. Y.

I claim the radially corrugated disk, g, in combination with the similarly corrugated bearing, f, spiral spring, h, nut, l, and roller, B, arranged and operating substantially in the manner and for the purpose set forth.

74,509.—CARD SAFE.—Charles S. Crane, Selma, Ala.

I claim the album or card case with an exterior as a picture frame having an interior receptable, the joints, hinges, and entrance concealed from appearance by the moldings, substantially as specified and shown.

74,510.—SEAT ARM FOR RAILROAD CHAIR.—William G. Creamer, Brooklyn, N. Y.

I claim the construction of the pivot plate with its nipple, M, and screw, Q, in connection with the car seat arm, the arm being either plain or recessed to receive the head of the screw or washer, all substantially as described and for the purposes set forth.

74,511.—THREE-WHEELED FARM WAGON.—E. T. Crockett, Guilford, Me.

I claim the hinged draft plate, G, with side arms, J, hound, K, and coupling, C, when constructed, combined and operating with the third wheel, L, as herein described and for the purposes set forth.

74,512.—LIFTING JACK.—A. M. Culver, Bedford, Ohio.

I claim the adjustable legs, B, lever, A, and rod, C, constructed, combined and arranged to operate in the manner as and for the purpose set forth.

74,513.—SYSTEM OF FLAMBEAU-LIKE LIGHTING APPARATUS.—Edmond Armand Louis D'Argy, Paris, France.

I claim, 1st, The combination of the removable reservoir, a, base, d, and cup, f, said reservoir adapted to be inverted for feeding the oil to the cup, as herein shown and described.

2d, The pressure spiral tube, m for the purpose of preventing the oil inside from being spilt out when the flambeau is turned upside down.

3d, The wooden or equivalent washer, i, in combination with the reservoir, and socket, b, as herein described for the purpose specified.

4th, The combination of the pastil, e, with the base, d, of the flambeau and the pin, c, substantially as described for the purpose specified.

74,514.—BLOWER HOLDER.—J. B. F. Davidge, N. Y. city.

I claim an implement or apparatus composed of two sets of griping jaws and suitable hand pieces, the whole constructed to operate substantially in the manner described for the purposes set forth.

Also the shield, g, in combination with the pivoted griping jaws and hand pieces, the whole arranged to operate as described for the purpose set forth.

74,515.—GRAIN DRILL.—Charles F. Davis, Auburn, N. Y.

I claim, 1st, So attaching the shoes or hoes of a seed planter to the main frame as that by means of a lever, or its equivalent, said shoes may be shifted from a straight to a zig-zag line, or *vice versa*, at pleasure substantially as described.

3d, In combination with a series of shoes or hoes that are capable of being changed from a straight to a zig-zag line, or *vice versa*, the so connecting of said shoes by independent levers to the lifting bar as that they may be raised by the operator individually or as a whole, substantially as described.

3d, Hinging the shoe to both its drag bar and to his individual lever so that the shoe may be raised and lowered in either of its changed positions by a lever that is permanently located, substantially as described.

74,516.—MODE OF SETTING ARTIFICIAL TEETH.—George Lewis Derr, Mifflintown, Pa.

I claim the mode herein described of securing teeth to a metallic plate by straps, B, and pins, c, connected by fusible metal run between and around them, substantially as described.

74,517.—BAG CLASP.—Edmund L. Dickey, Chicago, Ill.

I claim a metallic bag clasp for fastening bags, when constructed and operating substantially as and for the purpose specified.

74,518.—COTTON SEED PLANTER.—Zina Doolittle and A. M. Crowder, Houston Factory, Ga.

We claim, 1st, The adjustable rods, B B, in combination with the slots, a a, in the bottom of the hopper, A, substantially as and for the purpose specified.

2d, The oscillating rods, c c', in combination with the adjustable rods, B B, and the slots, a a, all arranged substantially as and for the purpose set forth.

3d, Operating the oscillating rods, c c', through the media of the arms, f, links, f', and lever, D, arranged substantially as herein shown and described.

74,519.—COTTON CULTIVATOR AND CHOPPER.—Zina Doolittle A. M. Crowder, Houston Factory, Ga.

We claim, 1st, The cutters, P, connected to vertical arbors, f, operated through the media of the levers, J J, link, L, lever arm, M, and pins, h, on the wheels, B, all constructed and arranged substantially as and for the purpose herein set forth.

2d, The scrapers, F F, and shares, G G, in combination with the cutters, P P, all constructed and arranged to operate in the manner substantially as and for the purpose specified.

3d, The adjustable draft rod, E, and semicircular bar, D, arranged as shown for the purpose of adapting the machine for one or two horses.

4th, The slide rod, Q, and lever, R, arranged and applied to the device, substantially as and for the purpose set forth.

74,520.—STOVEPIPE DRUM.—Lewis Dowe and Aruna C. Colton, Sycamore, Ill.

We claim, 1st, In a heat deflector, the pivoted slats, B B', in combination with a casing, A, when said slats are connected together and are combined with a device for securing them in position, substantially as described for the purpose set forth.

2d, In combination with a heat-deflecting drum the combination of the arm, C, the spring, a, and the segment, F, substantially as and for the purposes described.

74,521.—SAW.—James E. Emerson, Trenton, N. J.

I claim a planing tooth in which the cutting point, the recessed planing cutter and the gage or guide to prevent the cutters from running into the wood are all formed in or on one and the same piece of steel, substantially as and for the purpose described.

74,522.—SAW.—James E. Emerson, Trenton, N. J., and William S. Winsor, Jamestown, N. Y.

We claim, in combination with a saw plate that is thinner at its edge than at its central portion, the removable and replaceable teeth and planing cutters, substantially in the manner and for the purpose described.

74,523.—SAW.—James E. Emerson, Trenton, N. J., and William S. Winsor, Titusville, Pa.

We claim, in combination with sawing teeth and planing cutters separately attached to and removable on the same saw plate, the support, guide, or gage on the planing cutters to prevent them from running into or taking too rank a hold of the wood, substantially as described.

74,524.—WINDLASS.—Porter Evarts, Madison, Conn.

I claim the adjustably-connected bars, K, to the working lever, I J, by means of loops, k', formed upon the upper ends of said bars, K, and notches formed in the upper side of the working lever, I J, substantially as herein shown and described and for the purpose set forth.

74,525.—BOOT HEEL.—John Fearn, Tompkinsville, N. Y. Antedated February 12, 1868.

I claim the cylindrical screw, b, with or without points, applied from the inside of the heel, whereby the same can be screwed in or out from the inside to compensate for the wear of the heel, substantially as herein shown and described.

74,526.—GRATE BAR.—Addison C. Fletcher, New York city.

I claim the alternating conical recesses, n, in combination with the rounded points, c, substantially as shown and described for the purposes specified.

74,527.—SELF-FEEDING PIPE CUTTER.—Moses H. Freeman, Somerville, Mass.

I claim the combination of the bar, A, and the knife, C, constructed and combined as described with mechanism for holding the pipe against and rolling it on the knife while the latter may be turned about the pipe, substantially as specified.

Also the combination of the bar, A, the knife, C, the carriage, D, and the clamp or presser, E, and its adjusting screw, F, or the equivalent of such presser and screw, the whole being arranged and applied together substantially as set forth.

Also the combination of the stationary stop, c, and the spring stop, d, with the bar, A, the knife, C, the carriage, D, the presser, E, and its screw, F, the whole being as specified.

74,528.—SPRING MATTRESS.—August Gebhard, Indianapolis, Ind.

I claim the combination of the hinged frame, A, and its springs with the interior sacking, E, supported by the rods, F, and straps, G, to the side of the frame, as and for the purpose set forth.

74,529.—FARM GATE.—C. Eugene Goodwin, Portland, Mich.

I claim the construction of a gate as herein described with the posts, B and C, the projecting cap, D, the pivot post, E, the horizontal bars, F, the stiles, G and H, the brace, I, the pivot pins, K, the bolts, L, the rod or chain, M, and the revolving catch, N, when arranged and operating substantially as and for the purposes set forth.

74,530.—CARRIAGE FOR ADVERTISING.—William C. Harris, A. Robert Roseman, and Hubbil B. Hutchins, Philadelphia, Pa.

We claim a large skeleton frame having lamps enclosed therein and being supported on wheels or runners so that it can be drawn or driven like a carriage or car through the streets of a town, and having also a long semi-transparent advertising band or canvas curtain arranged around the outside of the said frame so that it can be moved by the driver as a panoramic curtain, the whole being constructed, arranged and operated as herein described and set forth for the purpose specified.

74,531.—BURIAL CASE.—Jasper R. Hathaway, Westfield, N. Y.

I claim as a new article of manufacture a burial case formed of cast-metal plates which are held together by dove-tail joints, substantially as and for the purpose described.

74,532.—CAR COUPLING.—John C. Heaton, Fitchburgh, assignor to himself and Nathaniel Earle, Henrietta, Mich.

I claim the combination of the arrow-headed coupling bar, B, lifting plate, C, and operating lever, D, with each other and with the bumper head, A, substantially as herein shown and described and for the purposes set forth.

74,533.—HEMMER, MARKER, ETC., FOR SEWING MACHINE.—W. D. Heyer, New Orleans, La. Antedated February 7, 1868.

I claim, 1st, The hemmer, p, formed with a concentric groove and provided with a roller placed obliquely for keeping the work in the groove, and constructed substantially as specified.

2d, The combination in a single machine of a sewing guide, hemming device, tucking and creasing device, cording device, and quilting guide, constructed and operating substantially as specified.

74,534.—CAR VENTILATOR.—M. T. Hitchcock, Springfield, Mass.

I claim, 1st, Providing a car ventilator with a sliding valve which is forced to the rear end of its case by the draft, substantially as herein shown and described.

2d, The hub, b, of the sliding valve, when constructed as described, so that both a sliding and an oscillating motion can be imparted to the valve, as set forth.

3d, Providing the case or shell, A, in which the sliding valve, D, moves, with elastic abutments, F F, which are so arranged that the valve when striking against one of the abutments will be brought into an inclined position, substantially as and for the purpose herein shown and described.

4th, The shell and case, A, when provided with elastic abutments, F F, in combination with the sliding oscillating valve, D, and with the channel, B, all made so that the lower edge of the valve does not come in contact with the bottom of the shell, and all operating substantially in the manner herein shown and described.

74,535.—CANOPY FOR TENT AND BED NETTING.—J. Burt Holmes, Cincinnati, Ohio.

I claim, 1st, The canopy, A, in combination with stretchers, H, and stretcher support, E, when the same are constructed and operate substantially in the manner as and for the purpose herein set forth and described.

2d, The caps, C C', pulley bolt, b, and nut and eye, D, when arranged substantially as specified and for the purpose set forth.

3d, The stretcher support, E, and stretchers, H, constructed as herein shown and specified and for the purpose set forth.

74,536.—FURNACE.—Marcus L. Horton, Worcester, Mass.

I claim the combination as well as the arrangement of the air chambers, D C, and the grate made hollow and with hollow journals to open into such chambers respectively, as set forth.

Also the arrangement of horizontal and vertical pipes or conduits of the fire-proof lining of the fireplace, such pipes being arranged within such lining and made to communicate with each other and the fireplace and with the external atmosphere so that air may flow into and through the pipes and lining and be discharged into the fireplace, as specified.

Also the combination of the system of pipes and air passages in the fire-proof lining with the air chamber, C, partially surrounding the ash chamber and grate and made with a perforated top, as set forth.

Also the arrangement of the hollow grate and its hollow journals, the induction and eduction air chambers, D C, the fire-proof lining, and a system of pipes or air conduits arranged in such lining and made to communicate with the chamber, C, and the fireplace, substantially as specified.

74,537.—LAMP SHADE.—William H. Horton (assignor to himself and Nathan P. Brown), Chelsea, Mass. Antedated December 27, 1867.

I claim the lamp-shade supporter and adjuster consisting of the friction arm, C, the bars, B and D, arranged and applied together and to the shade, as set forth.

Also the combination and arrangement of the fork, E, with the arms, C B D, arranged and applied together and to the shade, A, substantially as hereinbefore explained.

74,538.—HORSE HAY FORK.—David J. Howenstine, Marshallville, Ohio, assignor to himself and Patterson V. Wilkins.

I claim the spiral tines, 1 and 2, attached to revolving shaft, A, in combination with the spiral tines, 3 and 4, attached to the sleeve, B, in combination with latch, E, and rope, F, when arranged and operating substantially as herein described.

74,539.—HORSESHOE.—N. W. Hubbard New York city.

I claim, 1st, The removable toe calks, E, for horseshoes, substantially as shown and described, in combination with the toe plate, G, clamp screw, a, or its equivalent, all as and for the purpose set forth.

2d, The heel calks for horseshoes, substantially as shown and described, in combination with the plates, as shown at B or C, and screws, b or d, all as and for the purpose set forth.

74,540.—CONSTRUCTION OF TAN VAT.—Joseph Huber, Buffalo, N. Y.

I claim a tan vat constructed of strips of board or plank laid up with coal tar and felt packing between the strips and nailed together, in the manner and for the purpose substantially as described.

74,541.—SAW.—Eugene Humphrey, Boston, Mass.

I claim the fastening of a movable or insertable and self-adjusting saw tooth in its recess in the saw plate by means of a slide operating in combination with a recess extending into the plate and tooth, substantially as described, when said slide or recess or both are cut away or varied in width, for the purpose described.

74,542.—LAMP.—John Ingersoll, Cleveland, Ohio.

I claim extending the tube, E, from the top of the lamp down into the hollow stem or shank, D, and so arranged in relation to each other and the globe of the lamp as to form a passage for the oil between the said tube and shank in filling and in burning, substantially as set forth.

74,543.—PRESS FOR PACKING FRUIT.—Thomas J. Jones, Rochester, Mich.

I claim the combination and arrangement of the can-shaped projection, E, with lever, F, rock shaft, D, ratchet wheel, G, pawl, H, posts, C C', floor, A, inclined plane, B, axle, I, and wheels, J J, when operating as and for the purpose herein set forth.

74,544.—NECK YOKE.—Thomas J. Jones, Rochester, Mich., assignor to himself and Lorenzo D. Gillett.

I claim, 1st, The circle, E, and the bars, D D and F, when arranged substantially as and for the purpose set forth.

2d, The hinge bolt, G, when constructed and operating substantially as described.

3d, The combination of the above-named parts with the bar, A, the rings, B B H I I and J J, the guards, C C, all arranged and operating substantially as and for the purposes specified.

74,545.—PICKER FOR LOOMS.—Rufus Joslin, Pawtucket, R. I.

I claim the combination of the picker staff, screw, C, and reversible picker, constructed and arranged substantially as and for the purposes specified.

74,546.—BUTTER WORKER.—Samuel Keen, East Bridgewater, Mass.

I claim, 1st, The paddle or butter worker, H K, when working in the manner substantially as described and for the purpose set forth.

2d, Combining the pieces, D' D''', with the pieces, D D'', by the elastic strips, P P', substantially as described and for the purpose set forth.

74,547.—CONSTRUCTION OF SEA WALL.—John Kelly, San Francisco, Cal.

I claim the strips of metal or lead, A C, when placed between the joints of blocks of masonry, substantially as and for the purpose herein specified.

74,548.—EXTENSION LADDER.—John Kerns (assignor to D. M. Sluss and D. M. Slusser), Louisville, Ohio.

I claim the combination of the pawls, I I, pawl axle, H, arm, M, and cord, N, when used in connection with the ratchets, L L, in the part, B, which have irons, Q Q, inserted therein and when the ladder, A, has the slots, S S, all arranged in the manner and for the purposes specified.

74,549.—DITCHING MACHINE.—Jacob King (assignor to himself, James Hamilton and B. Stokely), Indianapolis, Ind.

I claim, 1st, The combination of the side cutters, C C, with the way boards, S S, when the former are constructed with circular recesses to receive the correspondingly rounded forward extremities of the way boards, so as to form a hinge joint, substantially as and for the purpose specified.

The yoke, Y, arranged to slide upon the frame, A, and adapted to change its position in conformity with the adjustment of the cutter beam, N, as and for the purpose specified.

74,550.—HARVESTER CUTTER.—Thomas Knowles, Robert Knowles and Samuel Knowles, Jersey City, N. J.

We claim the fixed knives, C, attached to the finger bar by means of the connecting bar, c, and supporting blocks, b', substantially as shown and described.

74,551.—SETTEE, BED AND TABLE.—Charles F. Kramer, Mondovia, Wis.

I claim the construction and arrangement of the settee, bed and table, when combined and adjusted by the pivoted side levers, K K, and side catches, G and L, as herein described and for the purpose set forth.

74,552.—HARVESTER.—Israel Lancaster, Baltimore, Md.

I claim, 1st, Placing the fulcrum of the reciprocating lever, H d, which is between the points at which the power and resistance are applied to the said lever, upon one side of a vertical line drawn through the driving wheel center and the knife bar upon the other side.

2d, The fulcrum plate, g, constructed and operated as described, and for the purpose mentioned.

3d, The lever, H d, and friction rollers, c c, acting in combination with the cam flange, b b.

4th, The combined spring and bearing, T, constructed and operating as described and for the purpose mentioned.

74,553.—ANIMAL TETHER.—Martin Leonard and Stephen C. Leonard, Oberlin, Ohio.

We claim 1st, An animal tether composed of the yoke A, and cross strip C, and picking points, c', and shield, D, and springs, a and a', substantially as shown and described and for the purposes set forth.

2d, The pin, B, in combination with the key, d, and the spring, d', substantially as shown and described and for the purposes set forth.

3d, The cross strip, C, and points, c', in combination with the yoke, A, and the perforated sliding shield, D, substantially as shown and described, and for the purposes set forth.

4th, The shield, D, in combination with the springs, a and a', and with the yoke, A, substantially as shown and described, and for the purposes set forth.

74,554.—SULKY PLOW.—Elias Levee, West Point, Ind.

I claim, 1st, The combination of the sliding guard or guide bars, J and K, with the plow beam, A, and with the tongue, F, or frame of the sulky, substantially as herein shown and described and for the purposes set forth.

2d, The combination of the adjustable bar, R, adjustable bent lever, S, and bar or handle, U, with each other, and with the plow beam, A, and support, T, attached to the tongue, F, or frame of the sulky, substantially as and for the purpose set forth.

3d, The combination of the crank journal, g1, slotted support, g2, wheel, I, and axle, substantially as described and for the purpose specified.

74,555.—SAFETY ATTACHMENT FOR UMBRELLAS.—John A. Lieb and E. W. Crane, Newark, N. J.

We claim, 1st, The notched rings, c, and jackets, f, in combination with the stops, e, and runner, B, of an umbrella, substantially as and for the purposes described.

2d, The scalloped edges and ridges, g, in combination with the jackets, f, rings, c, and runners, B, constructed and operating substantially as and for the purpose set forth.

74,556.—CAST IRON SLEIGH RUNNER.—E. W. Lockwood and B. T. Frederick, Marshalltown, Iowa.

We claim, 1st, The U-shaped metallic knees, B, provided upon their upper curved sides with the slotted horizontal supports, c, the runners, D, having the shoulder, g, for the reception of the end of the rave, all cast in one piece, substantially as described for the purpose specified.

2d, The metallic knees B, when made V-shaped in their transverse section, and curved vertically to form a brace for the runners, D, and supports, c, substantially as described for the purpose specified.

74,557.—BREACH LOADING ORDNANCE.—Lucius M. Lull and James T. Starr, Walnut Grove, Ill. Antedated Feb. 6, 1868.

We claim the breech block or cylinder, B, constructed as herein described and used in combination with a cannon provided with lever, D, chain, C, and bar, E, when constructed in the manner substantially as and for the purposes specified.

74,558.—PORTABLE CHAMBER CLOSET.—William J. Lyman, East Hampton, Mass.

I claim a portable chamber closet, constructed with the spring platform and funnel, substantially as and for the purpose described.

74,559.—BRAKE FOR VEHICLES.—Horace B. Marshall, Waldoboro, Me., assignor to himself and Samuel R. Bridgham, Hebron, Me.

I claim a brake attachment for four wheeled vehicles, composed of the shaft, D, levers, B, brakes, a, and connecting rod, E, and lever, F, substantially as shown and described and for the purposes set forth.

2d, The sliding main shaft, D, in combination with the bent levers, B, and brake blocks, a, and connecting rod, E, and lever or crank, F, or its equivalent, substantially as shown and described and for the purposes set forth.

74,560.—TOOTH BRUSH.—T. S. Maury, Washington, D. C.

I claim a tooth brush in which the ends of the bristles of which the brush is composed are ground or smoothed and polished, substantially in the manner and for the purposes herein described.

74,561.—EDGE PLANE.—Charles D. McAuley (assignor to himself and Geo. W. Kaylor), Carthage, Ohio.

I claim, 1st, The concave cutting blade, C, the edge being beveled or sharpened on the outside, and having the returned face, b, slotted for the purpose of securing it in any desirable position to the stock, B, substantially in the manner herein shown.

2d, The adjustable gage, D, provided with the slot, c, and guard, d', when secured to the stock, B, or its equivalent, for the purpose set forth.

3d, The stock, B, having the guard, d, and groove, c, in combination with the adjustable gage, D, cutting blade, C, and set scraps, c' and a, when the same are constructed and arranged in the manner and for the purpose herein described and set forth.

74,562.—NEWSPAPER FILE.—Louis P. McCarty, San Francisco, Cal.

I claim a newspaper file, constructed substantially as and for the purpose herein described.

74,563.—LAMP.—S. T. McDougall, Brooklyn, N. Y.

I claim, 1st, So constructing a wick tube that either round or flat wick can be employed, substantially in the manner as described.

2d, The construction and operation of a telescopic chimney, substantially as and for the purposes specified.

3d, Suspending the button to deflect the flame within the chimney, for the purposes fully described.

74,564.—QUARTZ CRUSHER.—S. T. McDougall, Brooklyn, N. Y.

I claim combining, constructing and operating the pounders and followers, substantially as shown for the purposes indicated.

74,565.—HORSE HAY FORK.—Edwin McKenzie, Watertown, N. Y.

I claim the locking device constructed as described, consisting of the bent lever, L, pivoted to the sleeve, C, and provided with the projection, b, fitting through the strip, B, into the sliding rod, A, and held in place by the spring, K, its upper end, l, slotted for the passage of the rod, A', and side strips, D, as herein shown and described.

74,566.—PAINT AND VARNISH BRUSH.—James McKittrick, Brooklyn, N. Y. Antedated Feb. 5, 1868.

I claim the tapering handle, A, of the paint brush, when made round at its lower end, and provided with two inclined pieces, B B, upon opposite sides, all constructed as described for the purpose specified.

74,567.—FANNING MILL.—Stewart McMillan, Fletcher, Ohio.

I claim, 1st, The inclined shoe, E, having the screens suspended from the cross frame, A, by means of the pivoted bars, h, and oscillated longitudinally from the crank, s, of the fan shaft, b, by means of the short pivoted bar, g, cross bar, e, and connecting rod, d, all constructed and described for the purpose specified.

2d, The construction and arrangement of the cross frame, A, hopper, C, oscillating pendent shoe, E, boxes, J J, drum, B, fan, D, pivoted lever, e, connecting rods, d, and crank, s, as herein described for the purpose specified.

74,568.—IMPLEMENT.—Ellis R. Meeker, Elizabeth, N. J.

I claim, 1st, The pendent extension, D, of the claw, C, of the hammer, in connection with the sliding jaw, H, all constructed and arranged substantially in the manner and for the purpose set forth.

2d, The detachable extension, E, with the guide rod, G, attached, and its upper end fitted in the pendent extension, D, in connection with the sliding jaw, H, and the screw, I, all arranged substantially in the manner and for the purpose specified.

74,569.—CORN SHELLER.—John A. Merriman, Chicago, Ill.

I claim, 1st, The shelling wheel, H, provided with one or more channels, d, having elastic or yielding bottoms, in combination with a shelling cone, K, arranged and operating substantially in the manner and for the purpose set forth.

2d, In combination with a corn shelling wheel and cone, an annular cob receiver, I, and cob conveyer, h, arranged and operating substantially in the manner and for the purposes described.

3d, In combination with the shelling devices and cob receiver, as above described, another corn receiver, L, and corn conveyer, i, arranged so as to operate substantially as specified.

4th, In combination with a shelling wheel, H, cob receiver, I, and corn receiver, L, the arrangement of the fan wings, j, operating as and for the purposes shown and set forth.

74,570.—PROCESS OF ROLLING HOES.—S. A. Millard, Clayville, N. Y.

I claim forming the head and blade portions of a hoe by rolling the stock out between rotary dies, in the manner substantially as described, that is to say, by rolling the stock alternately from near the center toward each edge, so as to "spread" the blank, and then alternately lengthwise in one direction, to form the ears, and lengthwise in the other direction to draw or plait out the blade toward its edge.

74,571.—HAY PRESS.—Moses R. Molleur, Chicago, Ill.

I claim the combination of the vertical box, A, provided with doors, B B, opening upward, the movable bottom, C, follower, D, cords, K, rollers, R, ratchets and pawls, H I, all arranged and operating as and for the purpose specified.

2d, In combination with a hay press having yielding sides, as described, the rod, M, and lever, P, arranged and operating substantially in the manner and for the purposes set forth.

74,572.—MACHINE FOR CORRUGATING SHEET METAL.—Geo. R. Moore, Lyons, Iowa.

I claim, 1st, The combination of the base plate, B, standard, A, arms, E and F, and arched braces, S, constructed and arranged substantially as described.

2d, The combination of the extension arm, G, with the arm, F, and hinged supports, C and D, constructed and arranged substantially as described.

3d, The combination of arms, F and G, roller bearings, H H, and corrugating rollers, I and J, constructed and arranged substantially as described.

4th, The combination of the rods, M M, gage, L, latch nut, O, and screw arbor, P, constructed and arranged substantially as described.

74,573.—BOXES FOR STREET STOP COCKS.—Harvey A. Moore, E. Otis Frink and Samuel C. Frink, Indianapolis, Ind.

We claim a street stop cock box for gas, water, or other purposes, provided with the flanges, e and f, and the inclined flanges, h, substantially as and for the purpose specified.

Also, the cover, provided with the lugs, L and k, substantially as described and for the purposes set forth.

74,574.—COMBINED CANE MILL AND STEAM ENGINE.—John Moore, Madison, Ind.

I claim the arrangement of the cylinder of a steam engine and the rollers of a cane mill upon the same frame, substantially as herein shown and described for the purpose specified.

74,575.—BOLT CUTTER.—Thos. W. Moore, Richmond, Ind.

I claim the combination of lever, A, provided with cutting edge, as set forth, and lever, B, provided with aperture, b, when operating substantially as and for the purpose described.

74,576.—CARRIAGE JACK.—Adam Meyers, Van Wert, Ohio.

I claim the combination of the adjustable spring catch or shoulder, E, with the long arm, A, of the jack, substantially in the manner herein shown and described and for the purpose set forth.

74,577.—HARVESTER.—Wm. Neff, Centre Hall, Pa.

I claim the arrangement of the rocker lever, i, on the shaft, f, and its connection to the main frame by a link, j, and to the lever, D, by a flexible connection, k, so that operating the lever, D, will raise and lower the finger-bar at both ends simultaneously, substantially as described.

Also, in combination with a hinged drag bar, B, that can roll to and from the main frame, the gag bar, d, connected thereto by the curved pivot, e, as and for the purpose substantially as described.

Also, the reel arms, working in the same circuit, but at different velocities, and independent of each other at different portions thereof, when driven through eccentrically-hung circular gears, substantially as described.

74,578.—DEVICE FOR CHANGING FEED.—R. L. Nelson, Mexico, N. Y.

I claim, 1st, So arranging the gear wheels, a b, on two parallel shafts, B C, which are to be connected, for changing the feed of certain mechanism that the line drawn over the faces of the wheels on either shaft will be a curved line, as set forth.

2d, Hinging the swinging frame, E, in which the shifting gear, d, is held, so that the shifting gear will first come in gear with the driving shaft, and then with the shaft that is to be driven, as set forth.

3d, The sliding frame, D, in which the shaft, F, that carries the shifting gear d, has its bearings, when connected, by means of jointed bars, e, with the rock shaft, G, substantially as and for the purpose herein shown and described.

4th, The arrangement and combination of the shafts, B C, carrying the gear wheels, a a, respectively, with the wheel, d, on the shaft, F, sliding frame, D, hinged frame, E, levers, c c, bars, e e, and rock shaft, G, all made and operating substantially as herein shown and described.

74,579.—CARRIAGE WHEEL.—T. Nevison, Jr., and J. Nevison, Morgan, Ohio.

We claim the herein-described wheel, when the spokes of the same are constructed and secured to each other and the felly or rim, in the manner substantially as set forth.

74,580.—SLIDE-BLOCK LAST.—P. A. Newhall, Lynn, Mass.

I claim, in combination with a slide block, fitted by tongue and groove to slide upon the last, the square face or point, g, to abut against the shoulder, f, in the last, to be thereby protected from slipping back, substantially as set forth.

74,581.—WAGON-POLE SUPPORT.—Don Carlos Newton, Batavia, Ill.

I claim, 1st, The combination of the steel spring, B, with the wooden lever, C 4

2d, The manner of attaching the wooden lever, C, to the draw bolt, E, by means of the chain, D.

74,582.—DEVICE TO PREVENT HOGS FROM ROOTING.—Geo. Nixon and Wm. L. Nixon, Sandyville, Ohio.

We claim the within-described device, consisting of the plate, A, arms, C C, with holes, D D, and wire, B, the several parts being arranged and used substantially in the manner and for the purpose herein specified.

74,583.—STEAM-ENGINE VALVE.—Wm. Ord, Brooklyn, Ohio.

I claim, 1st, The combination of the segments, A, having chambers, E, with the slotted stem, B, and heads, c, substantially as set forth.

2d, In combination with the above, the links, L, wedges, a, and key, D, substantially as specified.

3d, In combination with the above, the screw, H, and springs, S, substantially as described.

74,584.—SEWING MACHINE.—T. C. Page, Chicopee, Mass. Antedated Feb. 7, 1868.

I claim, 1s, A needle bar and needle, having a reciprocating rotary motion, in combination with a looping device, working beneath the bed plate of the machine, substantially as described.

2d, The combination of the spiral slot, b, and straight slot, l, formed in the needle bar, c, substantially as set forth.

74,585.—MULE FOR SPINNING.—John Paley and Thos. Rawsthorne, Preston, G. B. Patented in England, Nov. 23, 1864.

We claim the combination, with the driving band, b, of the fast and loose pulleys, d, of the cam shaft, the connected levers, e l, and the block, l, and weight, m, of lever, l, substantially as shown.

74,586.—MACHINE FOR CUTTING AND SEPARATING DYE WOODS.—G. W. Pearson, Billerica, and D. Coburn, Lowell, Mass.

We claim, 1st, The conducting spout, c', and aprons, a' a', or their equivalents, in combination with the cylinders, b b, for the purpose substantially as described.

2d, The application of the elevator and reel bolt, r, in combination with the conducting spout, c', and aprons, a' a', when arranged to operate substantially as described and for the purposes fully set forth.

3d, The combination and arrangement of the cylinders, b b, with the cutters, c c, conducting spout, c', aprons, a' a', reel bolt, r, cam, n, block, v, and elevator, all for the purposes herein described and fully set forth.

74,587.—COMPOSITION FOR MANUFACTURING STONE, AND FOR other purposes.—A. Pelletier, Washington, D. C.

I claim, 1st, The compound consisting of vegetable fiber, mineral asbestos, emery powder, soapstone, silicate of soda or (potassa), and litharge, substantially as described and set forth.

2d, The compound consisting of vegetable fiber, mineral asbestos, emery, soapstone, silicate of soda, or potash, litharge, when manufactured into stone (sand being used in addition), or when coated on wood, cloth, leather, brick, stone, metals, or other solid surfaces, and treated with chloride of zinc, oxide of zinc, sal-ammoniac, chloride and sulphate of iron, salts of lead, and manganese, sulphate of lime, substantially as described and for the purpose set forth.

3d, As a new article of manufacture, the composition, substantially as herein described and for the purposes set forth.

74,588.—HEAD BLOCK FOR SAW MILLS.—Benjamin P. Perry, Richmond, Ind.

I claim, 1st, Connecting the pawls, P and P', with the sleeve, a, on the same side of the latter, by which a simultaneous action of said pawls is produced, resulting in the alternate operation on the ratchet, substantially as set forth.

2d, The collet, H, having the projection, h, in combination with the eccentrics, n and n', for adjusting the feed, substantially as set forth.

74,589.—CARRIAGE STEP.—G. M. Plympton, New York city.

I claim a step for carriages, etc., formed of the two plates, F and A, in combination with the India-rubber ribs, D, or their equivalents, when the plate, A, is formed to receive such ribs, D, substantially as and for the purpose described.

74,590.—BRICK AND MORTAR ELEVATOR.—Anthony Pohl, Detroit, Mich.

I claim the endless chain or belt carrying pivoted open frames, supporting the removable shouldered, boxes, f, for the purpose substantially as described.

74,591.—SHACKLE FOR PLATFORM SPRINGS OF WAGONS.—J. Price, New York city.

I claim a shackle for connecting the ends of the parts of platform springs, composed of the cross tubes, a b, and bolts, c c e e, all constructed and applied substantially in the manner as and for the purpose herein specified.

74,592.—OX YOKE.—Homer Rawson (assignor to himself and O. H. Shaw), Jericho, Vt.

I claim the adjustable hinge, C, on the cap, A, and the movable or adjustable staple, E, in the center of the yoke, B, all for the purpose as herein set forth.

74,593.—VALVE FOR STEAM ENGINE.—Joseph Reichmann, Dubuque, Iowa.

I claim, 1st, The steam and exhaust ports, so arranged as to cause the motion of the valve piston, or its equivalent, and to check and stop said motion of said piston, or its equivalent, substantially as herein set forth.

2d, The stationary valve-plate, h, constructed as described.

3d, The combination of the valve, d, piston, f, cylinder, c, plate, h, and valve, i, constructed as described, and so arranged as to produce self-acting and self-checking motion, substantially as and in the manner herein set forth.

74,594.—BREECH-LOADING FIRE-ARM.—S. S. Rembert, Memphis, Tenn.

I claim, 1st, The retractors, O, pivoted to the sides of the stock, and operated by the trigger guard, whereby, as the barrels are raised by pushing forward the trigger guard, the upper ends of the retractors catch against the nipple, K, and withdraw the cartridge, as herein shown and described.

2d, The nipple, K, when inserted in the cartridge case, J, with its lower end resting upon the screw block, N, in the under side of said cartridge, as herein shown and described.

74,595.—PEARL BARLEY MACHINE.—W. Rickard, Chicago, Ill.

I claim, 1st, The cylinder, C, constructed substantially as herein shown and described, in combination with the perforated casing, D, and seat, B, as and for the purpose set forth.

2d, Forming the long holes or slots in the casing, D, with their lips inclined to the right and to the left, substantially as herein shown and described, so that the machine may work equally well whether run backward or forward.

3d, In combination with the cylinder, C, case, D, and shaft, B, as constructed, the fan chamber, G, and fan, H, as set forth, for the purpose specified.

74,596.—HITCHING POST CAP.—Richard N. Roberts, New Britain, Conn.

I claim an improved article of manufacture, viz: a metallic hitching-post cap, in combination with a cam strap-holder, constructed and arranged substantially as described.

74,597.—STEAM GLOBE VALVE.—Louis C. Rodier, Springfield, Mass.

I claim the metallic plug having one or more valve seats therein, and one or more valves attached thereto, in combination with the shell or case, A, of a globe valve, the aperture, B, being constructed therein so as to receive said plug, and the whole arranged substantially as herein described and set forth.

74,598.—PLATE LIFTER.—G. O. Roe, Conantsville, Conn. Antedated Feb. 6, 1868.

I claim the lifter composed of the hooked arms, b, shank, a, and sliding hook, c, the whole arranged and operating substantially as and for the purpose specified.

74,599.—BOOTS AND SHOES.—Evan T. Rogers, San Francisco, Cal.

I claim making the ridges on the markers by casting them in one piece with the plate, substantially as described.

74,600.—HARVESTER.—Wm. Rose, Lake, Ill.

I claim the combination of the cam wheel, J K, arm, P, rod, Q, block, L, arm, M, and arc, N, all constructed, arranged, and operating in the manner and for the purposes specified.

74,601.—PLIERS FOR BENDING SHEET METAL.—Maier Rothschild, Harrisburgh, Pa.

I claim the form, construction, and arrangement of the jaws, A and B, and their combination with the handles and spring, as herein described and for the purpose set forth.

74,602.—SLEIGH BRAKE.—William D. Rowlstone, Butternuts, N. Y.

I claim the above-named sleigh brake, arranged substantially as above described and for the purposes herein mentioned.

74,603.—COTTON AND HAY PRESS.—Wm. Russell (assignor to himself and Geo. Winship), Atlanta, Ga.

I claim, 1st, When used in a cotton and hay press, the combination of the stationary vertical screw rods, R R, with the movable nut, V, having the trunnions, v v, and the arms, H H, for the purpose of moving the follow block up and down, while allowing it to be turned aside from the top of the press box, all the parts referred to operating substantially in the manner and for the purposes specified.

2d, The bent arms, H H, attached to the follow block, and provided with ears, h h, which are supported by and pivoted upon a nut or other device, working up and down by the action of screw rods, R R, substantially as and for the purpose set forth.

3d, The gear wheel, G, provided with the inner rim, o o, and fixed to the wooden beams, d d, substantially as and for the purpose set forth.

4th, The combination of the screw rods, R R, with a follow block fixed to pivoted arms, so as to turn back away from the top of the press box when elevated above it, substantially as described.

5th, The combination of the press box, A, with the gear wheels, G g, screw rods, R R, arms, H H, and follow block, B, all the parts being constructed and operating together substantially in the manner and for the purposes specified.

74,604.—PHOTOGRAPHIC REST.—Napoleon Sarony, N. Y. city.

I claim, 1st, The head block, d, constructed in the manner specified, in combination with the stand or column, a, and rod, b, as and for the purposes set forth.

2d, The rest holder, g, or g', in combination with the head block, d, rod, b, column, a, and rest, h k, substantially as and for the purposes set forth.

3d, The extension cabinet front or panel, in combination with the table, p, substantially as specified.

4th, Two or more rests, supported from one column by means of the rest holder, g, substantially as set forth.

5th, The curved arm, n', and movable table, n, in combination with the column, a, and rod, b, as and for the purposes set forth.

6th, Attaching the column, a, removably to a base, a', that is permanently attached to the floor, in order that the rest may be a fixture when connected to such base, but removable to other bases, for the purposes set forth.

74,605.—MEASURING FAUCET.—Frank Saunders, Aberdeen, Miss.

I claim, 1st, The propeller, B, sliding rod, C, with its plug, D, and locking slide, I, in combination with a faucet, substantially as and for the purpose set forth.

2d, The combination of the lifter, G, locking slide, I, and screw, d, arranged to operate essentially as specified.

3d, The flexible, spiral, or twisted vanes, B B', arranged as described, in combination with the mechanism for operating the index or closing devices, substantially as specified.

74,606.—COMPOSITION FOR ROOFING.—Henry K. Schanck, Chicago, Ill. Antedated December 27, 1867.

I claim, 1st, A composition for roofing and other analagous uses, composed of coal tar, sulphur, plumbago, clay, and litharge, substantially as herein described.

2d, In combination with the above, the employment of the ingredient, india-rubber, substantially in the manner and for the purpose set forth.

74,607.—PROCESS OF PRESERVING DEAD BODIES.—Charles A. Seely, and Charles J. Eames, New York city.

We claim, 1st, The process for preserving dead bodies, substantially as described.

2d, The use of carbolic acid, and combinations of carbolic acid with other substances for the preservation and embalming of dead bodies.

74,608.—DISINFECTING COMPOUND.—Charles A. Seely, and Charles J. Eames, New York city.

We claim the disinfecting compound as above described.

74,609.—LATHE FOR TURNING IRON.—William Sellers, Philadelphia, Pa.

I claim, 1st, Attaching the fixed or live head to the shear or bed, by bolts passing through and straining upon the flanges on the cross girths in the bed, as described.

2d, Forming a hole in the side of the lathe beds, for the purpose of operating the bolts or other holding-down apparatus for the live heads, substantially as described.

3d, Casting a web across the bottom of lathe beds, between the two girths, under the head, for the purpose of stiffening the bed, when a hole is made in the side, and to form a secure tool receptacle in the same, substantially as described.

4th, Supporting the back journal of the spindle in a solid conical bearing, when this bearing is held in position by an oil box, substantially as described.

5th, Receiving the end thrust of the spindle upon collars placed inside of an oil box, at the rear of the back bearing, when this box is so arranged as to permit the spindle to pass through it, for the purpose specified.

6th, The block, N, substantially as described, and for the purpose specified.

7th, Placing the lead screw under cover, and in a bearing its whole length, substantially as described.

8th, Engaging or disengaging the saddle or slide rest with a feed screw, supported as described, by means of a segment of a nut moving horizontally, for the purpose specified.

9th, Operating the longitudinal and cross feed of the lathe by two clutches on the same shaft, in the manner substantially as and for the purpose specified.

10th, Engaging and disengaging both clutches by movements of the same handle in the same direction, substantially as described.

74,610.—SPITTOON FOR CARS.—J. H. Seymour, Hagerstown, Md.

I claim, 1st, The combination of the conical shell, B, with the spittoon, C, and the bottom, A A*, substantially as and for the purpose specified.

2d, The neck, a, made with its interior of conical form, and largest at its lower end, arranged at the bottom of the spittoon, C, and in relation with the valve b, substantially as and for the purpose specified.

74,611.—MANUFACTURE OF TIN-LINED LEAD PIPE.—William Anthony Shaw, New York city. Antedated February 6, 1868.

I claim, 1st, The combination of the mandrel, C, with the ram, A, said mandrel being rigidly connected to said ram in a deep cavity, as shown and described, so as to give said mandrel capacity to spring in said cavity, and to adjust itself in the center of the die.

2d, Connecting the mandrel to the ram by the interposition of a flexible link, substantially as described.

3d, In combination with the ram, A, the cup, B, for the purpose of facilitating the connection between the mandrel and the ram, substantially as described.

74,612.—MANUFACTURE OF TIN-LINED LEAD PIPE.—William Anthony Shaw, New York city. Antedated February 6, 1868.

I claim, 1st, The formation of a metallic pipe, by forcing two or more of the ductile metals together, in the form of tubes, over a mandrel or core, out of two or more cylinders, and through, on, or in two or more ties, substantially as described.

2d, The use of two or more cylinders, two or more rams, and two or more dies, or their equivalents, when combined with a mandrel or core, substantially as described, for the purpose of making laminated pipe, whether said pipe be made of metal or other material.

3d, The manufacture of a metallic pipe, consisting of three tubes of soft metal, such as a tube of lead pressed between two tubes of tin, by forming and forcing them together, through three dies, out of three cylinders, over one core or mandrel, in the manner described.

4th, In combination with a pipe press, a set of drawing or stretching rollers, for the purpose of drawing or stretching the pipe on the mandrel or core, as it issues from the press, substantially as described.

5th, The manufacture of a continuous metal pipe, whether of lead or of composition, from metal disposed in two or more retaining cylinders, by forcing it out of the same in the form of two or more tubes, over a mandrel or core, and in such proportion that the retaining cylinders shall not both or all be exhausted at the same time, so as to avoid the defect in the pipe resulting from the failure of the successive charges to thoroughly weld, as in the ordinary press, substantially as described.

74,613.—MANUFACTURE OF TIN-LINED LEAD PIPE.—William Anthony Shaw, New York city. Antedated February 6, 1868.

I claim, 1st, Making the charge of metal in three distinct parts as described, and uniting them either before or after they are put in the cylinder.

2d, Making the central ingot or charge of tin, in the form of a double frustrum of a cone, or its equivalent, for the purpose of securing a uniform thickness of tin in the lead tube or pipe.

3d, Making the intermediate lead or alloy ingot in the form of a frustrum of a cone, substantially as described.

4th, Making the cavities, D, in the upper end of the charge, substantially as described, for the purpose specified.

74,614.—METHOD OF MAKING TAPERING TUBES.—William Anthony Shaw, New York city.

I claim the manufacture of a pipe, funnel-shaped, along its interior diameter, and of equal diameter externally, by pressing the material of which the pipe is composed out of a retaining cylinder, through a die, over a taper mandrel, substantially as described.

74,615.—HAMMER.—Otis Shepard, Alton, Ill.

I claim a hammer, the head of which is made of two parts, A and C, connected by the handle, M, and spring, k, when the several parts are constructed and operate in relation to each other, substantially as shown and specified.

74,616.—DIE FOR MAKING SQUARE-HEADED BOLTS.—William Shields, Philadelphia, Pa.

I claim the combination of the jaws, with flanges, A A, and the plunger, B, constructed and arranged, and operating substantially as and for the purpose herein described.

74,617.—ANIMAL TRAP.—James A. Sinclair, Woodsfield, O.

I claim, 1st, The combination of the tramp wheel, J, shaft, L, cog wheel, M, and toothed bar, N, having a knife or spear, X, pivoted to its end, and spring, O, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the drop gate, K, bent lever, R, and spring, O, with each other, and with the tramp-wheel, S, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the trap door, S, lever, T, arm, U, and bar, N, with each other, substantially as herein shown and described, and for the purpose set forth.

4th, The combination of the arm, W, with the bar, N, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the arms, A', and guide plates, Z, with the bar, N, and frame of the trap, substantially as herein shown and described.

6th, The combination of the inclined guide, B', and spring, C', with the bar, N, and frame of the trap, substantially as herein shown and described, and for the purpose set forth.

74,618.—BEEHIVE.—W. Y. Singleton, Springfield, Ill.

I claim, 1st, The absorbent bottom, C, and lid or top, D, constructed and applied to the hive, substantially in the manner as and for the purpose set forth.

2d, The air chamber, B, with the air passage, E, attached, substantially as and for the purpose specified.

74,619.—MODE OF BELTING TOBACCO.—Reuben T. Sitterley, Callaway county, Mo.

I claim the construction and combination of the blades, as herein described.

74,620.—HORSESHOE.—George W. Skinner, Rockford, Ill.

I claim, 1st, Constructing a horseshoe with a bevelled projecting spur, a, at its front, and the toe calk with a corresponding recess, to receive the spur, a, and then securing the toe calk in place by means of the same, together with a screw, b, as shown and described.

2d, The detachable heel calks, fitted to a recess in the under side of the shoe, and held in place by means of the projection, E or E', and screw, a', as shown and described.

74,621.—LATHE REST.—H. K. Smith, Norwich, Conn.

I claim the nut, F, made in three parts, G H and I, arranged together with screws, L and E, for operation, substantially as and for the purpose described.

74,622.—MEDICAL COMPOUND.—Joseph Smith, Schodack Centre, N. Y.

I claim a medical compound, comprising the ingredients about in the proportions herein set forth.

74,623.—HARNESS.—John J. Smokey, Natchez, Miss.

I claim the driving reins, A, when arranged and combined with a harness, substantially as and for the purpose described.

74,624.—CALCULATING SCALE BEAM.—George A. Smythe, Reading, Pa.

I claim the arrangement and combination of the slide, B, clasping around the whole beam, marked and notched as represented in fig. 1 and fig. 2, together with the shape of the slide, and the ounce line, marked sixteen on slide, showing the fractional parts of a pound and an ounce on the beam, and the amount in money.

74,625.—BEER FAUCET.—J. Michael Stark, Buffalo, N. Y.

I claim the combined cylinder and valve, B C, provided with the feeding and discharging holes, F G, the plunger, F G, and ring, K, all constructed and arranged to operate within the body of the faucet, substantially as described.

74,626.—HARROW.—C. E. Steller, Chicago, Ill.

I claim, 1st, The combination of supports, J, and teeth, H, substantially as and for the purpose herein specified.

2d, The combination of teeth, H, collars, K, and caps, I, substantially as and for the purpose set forth.

3d, The round teeth, H, arranged to operate in enlarged holes, L, substantially as described.

4th, The rod, C, secured by staples, P P, in combination with joint, D, arranged substantially as and for the purpose set forth.

5th, The rods, E E, in combination with rod, C, and joint, D, arranged to operate as and for the purpose described.

74,627.—BEEHIVE.—H. A. Stidger, Carrollton, Ohio.

I claim, 1st, The combination of the ventilating openings, A E, with the sliding bottom board, F, and hinged cover, h, substantially as and for the purposes set forth.

2d, The movable glass frame, D, in combination with the doors, b b, and sliding bottom board, G, substantially as and for the purposes set forth.

3d, The strip of cloth, g2, on the under side of the lower end of the bottom board, G, in combination with the foot, g1, of the beehive, substantially as and for the purposes set forth.

74,628.—BUREAU BEDSTEAD.—Mirum Sulzbacher, New York city.

I claim a bureau bedstead containing three extension pieces, a b c, with grooves, dowels, and transverse slats, a' b' c', said extension pieces, when pushed in, being enclosed in a case, A, with folding and sliding doors, f, all as shown and described.

74,629.—DENTAL INSTRUMENT.—S. C. Taylor, Toledo, Ohio.

I claim, 1st, In combination with the mallet and the trip motion, a permanent and a hinged lever, so that the user may hold the instrument and operate the mallet at the same time, and by one and the same hand, substantially as described.

2d, In combination with a pivoted lever and toe piece, or "crotchet," a rod and hook for catching, drawing down and releasing said toe piece, substantially as described.

3d, In combination with the mallet and a spring, in a plugging instrument, the sliding dog, or catch, and the teeth, for the purpose of compressing, graduating, or regulating the action of the spring upon the mallet without changing the extent of the motion of the lever, E, substantially as described.

74,630.—WATER HEATER FOR BATH TUBS, ETC.—William H. Thomas, Sacremento, Cal.

I claim a steam coil heating furnace, submerged in water, and supplied with air from the top, and provided with a tank, E, and deflector, h, all constructed and arranged substantially as herein shown and described.

74,631.—CAR COUPLING.—Stillman Thorpe and Wesley Thorpe, Turner, Me.

We claim the combination and arrangement of the sliding back, d, slotted arm, y, and pin, x, with the coupling pin, k, in connection with the weighted bolt, g, and the link, u, as and for the purposes set forth.

74,632.—WINDMILL.—Isaac P. Tice, New York city.

I claim the combination with the many cranked driving shaft, G, or other suitable driving mechanism, of the reciprocating wind boards, A B C, differently pitched or set for successive action in like directions, intermediately to them and controlled by valves or shutters, substantially as specified.

74,633.—MILK RACK.—Isaac P. Tice, New York city.

I claim the arrangement of the collars or bearings, b, and collars, b', on the stationary shaft, B, with relation to and in combination with the revolving shelves or stands, C, substantially as shown and described for the purpose specified.

74,634.—MACHINE FOR BUNDLING KINDLING WOOD.—Leonard Tilton, Brooklyn, N. Y.

I claim, 1st, The feed wheel or rim, C, placed between the plate, A, and rim, B, constructed and arranged to operate in the manner substantially as and for the purpose set forth.

2d, The bundling tube and plunger, I, arranged in relation with the wood receptacle to operate substantially in the manner as and for the purpose specified.

3d, The clearer, L, arranged in relation with the bundling tube, J, and operated from the cross heads, F' F", in the manner substantially as and for the purposes set forth.

4th, The combination of the cam, Q, levers, R T', slide, S, with pawl, T, attached, and the counterpoise, U, all constructed and arranged to operate the feed wheel, substantially as set forth.

5th, The three cross heads, F F' F", arranged in connection with the hooks K K, and pins e', to operate and give the proper or desired movements to the bundling tube, plunger and clearer, substantially as shown and described.

74,635.—PEAT MACHINE.—Josiah Tisdale, South Dedham, Mass.

I claim the arrangement, as well as the combination of the curved blades or shares with the screw propeller and its box, the whole being to operate together, substantially as hereinbefore explained.

74,636.—FRAME FOR SUPPORTING AND MOVING CLOTH TO BE CREASED.—A. W. Todd, Chicago, Ill.

I claim the combination and arrangement of crank, O, ratchet wheel, P, pawl, R, end pieces, B B, bar, D, rollers, C and A, points, h h, and feather edge, g, for supporting and moving the material to be creased, as described.

74,637.—BOOT BLACKING APPARATUS.—John Vandecar, Brooklyn, N. Y., assignor to Thaddeus B. Beecher, New Haven, Conn.

I claim connecting the foot rest of a boot blacking apparatus or device to its standard legs or supports, by a ball socket joint, substantially as herein specified.

74,638.—PUMP.—Jas. Vaughn and John McGee, Galena, Ill.

We claim the arrangement of the movable cylinders A, pivoted at B, in the yokes D, at each end of the horizontal rocking beam C, and fitting over the pistons, G, immovably fixed in the framing at each end of the cylinders, all constructed as described, whereby the cylinders are operated by the rocking beam, C, and kept in vertical line upon said pistons by the pins, B, in the yoke, D, as herein set forth for the purpose specified.

74,639.—TILL ALARM AND LOCK.—James J. Wagenhorst (assignor to himself, C. H. Zink and W. R. Weand), Philadelphia, Pa.

I claim, 1st, The combination of the tumblers, D, and their projections, e, with levers, E, on each of which are cams, f and f', all substantially as specified.

2d, The spring slide, L, its striker, p, and adjustable block, q, in combination with the lug, t, the sliding frame, G, its projection, s, and the recess, r, in the case, A, all substantially as and for the purpose specified.

3d, The spring slide, L, and its striker, p, in combination with an alarm bell, M.

74,640.—WASHING MACHINE.—C.E. Wahlgren, Knoxville, Ill.

I claim, 1st, The reservoir, B, in combination with the fluted ribs or rollers, F, of a washing board or machine, substantially as herein described.

2d, The wheels, H A, or their equivalent, in combination with the reservoir, B, and fluted ribs or rollers, F, substantially as herein described.

74,641.—COMPUTING APPARATUS.—Thomas Walworth, Newton Heath, Great Britain. Antedated Feb. 14, 1868.

I claim a plate, b, with an opening, c, and with graduations at its edges and at the edges of the opening, in combination with a graduated revolving disk, having figures arranged in radial rows, and with a pointer secured to and turning with the disk, the whole being constructed, arranged and operating substantially as described.

74,642.—WAGON BRAKE.—Joseph Walton, Delevan, Wis.

I claim, 1st, The brake, m, hung to box, A, by hooks, V, in combination with reach, B, substantially as set forth.

2d, The combination of guides, S S, plate, H, pin, I, spring, J, and rollers, substantially as described.

74,643.—CORN SHELLER.—Joseph Warren, Lodi, Ohio.

I claim the hopper, D, as constructed with octagonal sides, D', spring, E, in combination with the case, A, for the purpose set forth.

74,644.—SILK CLEANER.—Wm. G. Watson, Paterson, N. J.

I claim, 1st, The horizontal frame, A, provided with a curved guide, A, post D, flange b, and stand a, all constructed and arranged substantially as and for the purpose set forth.

2d, In combination with the above the fixed knife, B, and adjustable knife, C, when said knives, B and C, are horizontally arranged and reversibles, substantially as and for the purpose set forth.

3d, In combination with the frame, A, and knife, C, the adjusting screws, d d, substantially as set forth.

4th, The silk cleaner constructed substantially as described, and consisting of the frame having curved guides A, post D, stand a, and flange b, fixed knife B, adjustable knife C, and screws d c, all arranged as set forth.

74,645.—INNER SOLE.—R. A. Webster, Sandisfield, Mass.

I claim as a new article of manufacture, an inner sole composed of two strips of wood, A C, secured together by means of the gutta percha strip, B, heated and placed between them, as herein shown and described for the purpose specified.

74,646.—GANG PUNCH.—Benj. G. Welch, Danville, Pa.

I claim the construction and arrangement of the dies, c' c', of a gang punch, disconnected or separated from each other by suitable spaces, c' c", in their bed plate, C D, substantially as described and set forth, for the purpose specified.

74,647.—CULINARY BOILER.—Isaac H. West and Tertius L. Camp, Evans, N. Y.

We claim the employment, in a closed steaming chamber, of an air passage near the bottom of said chamber, for admitting air beneath the body of steam, and a slide or register for gaging the flow of air, the whole arranged as described, and operating in the manner and for the purpose set forth.

Also, in combination with the central steaming chamber, A, arranged as above described, the enclosed end receptacles, B B, operating in the manner and for the purpose herein set forth.

74,648.—OIL BURNING APPARATUS.—A. J. White, Ballston Spa, N. Y.

I claim the combination of a wick tube, a, and pipe, b, with a movable reservoir, c, attached to a hollow stem cock, the whole arranged so as to operate substantially as set forth.

74,649.—CARRIAGE CURTAIN FASTENER.—E. P. Whitney, Stamford, Conn.

I claim a fastener for the aprons and curtains of carriages, composed of the parts, A and B, the former provided with the eyes, c c', and the latter with the head, d, and the offset, e, and both provided with loops, a, and otherwise constructed and operated, substantially as herein specified.

74,650.—GRAIN TRESHER.—A. S. Whittemere, Willimantic, Conn.

I claim, 1st, The longitudinal wires, a, forming the bottom of a frame of a threshing machine, when said wires are attached at each end to screws, a', whereby the tension of the wires may be regulated, substantially as described.

2d, In combination with the above, the shaft, B, bearing arms, e, and pivoted flails, e', the pulley, C, belt, c, and drive wheels, D d', all constructed, arranged and operating as set forth.

3d, The threshing machine, constructed as described, and consisting of a frame, A, having wire bottom, a, screws, a', shaft, B, arms, e, flails, e', pulley, C, drive wheels, D d', and belt, d, all arranged and operating as described.

74,651.—COMBINED SEED SOWER AND FIELD HARROW.—Daniel Wilber, Collins Centre, N. Y.

I claim, 1st, The slide, C, having notches or cavities, c1, c2, for the purpose and substantially as described.

2d, The combination with the slide, C, of the shaft, D, crank, d1, pitmas, d2, bevel gearing, E F, and field roller, A, all arranged and operating in the manner and for the purpose substantially as set forth.

3d, The combination of the bevel pinion, F, placed loose upon the shaft, D, the feather, f', and pin, g, or its equivalent, all arranged and operating substantially as and for the purpose described.

74,652.—CORNSTALK CUTTERS PREPARATORY TO PLOWING.—John Wilde, Daniel Wilde and John H. Wilde, Washington, Iowa.

We claim, 1st, The arrangement of the main frame with the cutter cylinder and tongue and the wheel frame, as herein recited.

2d, Combining with the main frame and the wheel frame the treadle frame as and for the purpose herein set forth.

74,653.—DITCHING MACHINE.—I. M. Williams, Blanchester, Ohio.

I claim, 1st, The provision in a ditching machine of the endless band, H h, and drum, I, operating substantially as herein described, for emptying the elevating wheel of the excavated earth.

2d, Constructing the dirt elevating wheel of a ditching machine in two sections, D D', and providing them with radial spades, G, whose bases, g, are dovetailed into the rims, E E', of the wheel, and the whole secured together by bolts, e, substantially as herein described.

3d, The screw, N n, winch, O, nut, o, stirrups, P p p', and yokes, R R', arranged and operating as and for the purpose specified.

4th, In combination with the elevating wheel, D D', constructed as described, the fixed and parallel cutters, C C', as and for the purpose specified.

5th, In combination with the elevating wheel, D D', endless band, H h, and drum, I, the shovel, S, for the object set forth.

6th, In combination with the elevating wheel, D D', endless band, H h, and drum, I, the slotted standard, J J', groove, j, box, i, and wedge, K, arranged and operating substantially as and for the object explained.

7th, In combination with the frame, A, and vibratory platform, B, the perforated clevis, Y, pin, e, and plate, A', for the object stated.

74,654.—APPARATUS FOR VIGNETING PHOTOGRAPHIC NEGATIVES.—F. Wolf, Philadelphia, Pa. Antedated Feb. 5, 1868.

I claim the screen, C, provided with a suitable hole, the edge of which is made of a suitable transparent or semi-transparent material, in combination with supporting arms, D, and with a photographic camera, A, substantially as and for the purpose set forth.

74,655.—VENTILATORS.—H. B. Worth, Chicago, Ill., assignor to himself, Wm. H. Chapin and A. L. Creamer.

I claim, 1st, The combination of the inverted cone, J, with the shaft, B, and revolving fan cap, G, substantially as shown and described and for the purpose set forth.

2d, In combination with the above, the propelling fans I, mounted on rods H, attached to the revolving fan cap G, and hub g2, on shaft B, substantially as and for the purpose set forth.

74,656.—SAFETY VALVES.—Jearum Atkins, Mokena, Ill.

I claim, 1st, The construction of the safety valve lever C, or its equivalent, with its outer portion curved, and its combination with the mortised spindle B, roller f, and spring catch h, substantially as specified.

2d, In combination with a spring balance D, the rocking bar k, screw l, and nut m, as described and set forth.

3d, The arrangement of the lever C, bent to form an angle with the link S, standard P, and pins n, t and u, substantially as described.

4th, The combination of the rolling fulcrum f, with the safety valve lever C, substantially as shown and described.

74,657.—HAND STAMP.—Joseph H. Berret, New York city.

I claim a stamp and cancelling device, constructed as described, consisting of the vertical arbor F, bearing the cutters G, working through the tubular arbor B, and annular stamp C, whereby the knob H, and its collar upon the arbor F, operate the arbor B and C, as herein shown and described.

71,658.—ANIMAL TRAP.—Wm. J. Biddle and Henry L. Biddle, New Madison, Ohio.

We claim the combination of the tilting platform D, with the pivoted bar g, arranged for holding the bait and latch e, fastened to the same, substantially as described and for the purpose set forth.

74,659.—BOILER FEEDER.—Edwin Brockway, Haverstraw, N. Y.

I claim, 1st, The arrangement of the connecting devices, a, b and E, as shown and described.

2d, The guard K, as shown and described, on pipe H, to keep scum from entering the steam pipe.

74,660.—BED BOTTOM.—J. W. Brown, Hudson, Wis.

I claim the construction of boxes B, of notched bars, a a, and a removable cover, b, in combination with separate removable pins, c, elastic suspension loops, g, and slats, C, all arranged substantially as described.

74,661.—CURTAIN FIXTURE.—Wm. Brown, West Cambridge, Mass. Antedated Feb. 6, 1868.

I claim, 1st, The split roller, a, with or without a tongue and groove, for securing the upper end of the shade, substantially as described, in combination with the case or shell, D, as and for the purpose specified.

2d, The combination of the split roller, a, the nuts or disks, c c', and the brackets, B B', arranged and operating substantially as described.

3d, The combination of the split roller, a, the shell, D, and the cornice, E, constructed, arranged, and operating substantially as described.

74,662.—ROTARY STEAM ENGINE.—H. T. Buff, Franklin, Ind.

I claim, 1st, The self-adjusting valves, V and V', with their grooves, arranged substantially as herein set forth.

2d, The arrangements of the rotary head, valves, and springs, as herein set forth.

3d, The arrangement of the steam and escape pipes, as herein described.

74,663.—SIRUP PITCHER.—Henry Bullard, Middletown, Conn.

I claim the arrangement of the slide or cut off, a, upon the spout, B, independent of the cover, and in combination with a lever and spring, as a means of operating the said slide, substantially as herein set forth.

74,664.—FLY NET.—C. K. Burkholder, York Springs, Pa.

I claim the ribs, constructed and perforated as shown, and laced, in the manner and for the purpose set forth.

74,665.—STAGING.—C. S. Burton, Seneca County, Ohio.

I claim the combination of the grooved standards, A A, platform, K, and bench, M, windlass and cords, H H, all constructed and operating as specified.

74,666.—DEVICE FOR TURNING DOWN AND BURYING STALKS, WEEDS, ETC.—Stephen Collins, Prescott, Wis.

I claim the arms, C C' C" and E, and brace, D, attached to the plow beam substantially as and for the purpose set forth.

74,667.—WATER WHEEL.—B. D. Compton, Dowagiac, Mich.

I claim, 1st, The disk, A, having a series of triangular or V-shaped hinged buckets, D, and secured to a disk, C, around a vertical shaft, B, by the braces d d, in the manner substantially as and for the purposes specified.

2d, In combination with the hinged buckets, D, and disk, A, beveled as described, the latch, f, constructed as specified, and used as and for the purposes set forth.

74,668.—WOOD BENDING MACHINE.—James Conner, Richmond, Ind.

I claim, 1st, The former, D, when provided with stirrup, S, and operating substantially as set forth and for the purpose described.

2d, The pivoted head block, G, arranged and operating substantially as set forth and for the purpose specified.

74,669.—HOSPITAL BED.—Hannah Conway, Dayton, Ohio.

I claim the combination of the fixed canvas frame, B, and bed, E, operated by the axle, G, underneath frame, B, and the movable pillow C, with the axle G', and the permanent frame under the bed, E, all as herein set forth.

74,670.—LAMP.—E. E. Dailey, Wm. H. Johnson, and C. C. Du Bois, Brooklyn, E. D., N. Y.

We claim the cooling chamber, a, air supply chamber, b, formed by the perforated flange, e, ring, g, transparent cylinder, h, and locking cap, i, all arranged, constructed, and combined as described.

74,671.—INKSTAND.—Otis Dean (assignor to Robt. W. Young), Richmond, Va.

I claim the rigid arm, D', attached to a dipper, C, which is connected to the lid by a rod, D, so as to operate in the manner and for the purpose set forth.

74,672.—SPRING FOR HOOPED SKIRT.—Thos. B. De Forest and Thos. S. Gilbert, Birmingham, Conn.

We claim a skirt loop formed by inclosing one or more wires within a covering which not only envelops and protects the wire, but forms and edge, A, or connection, B, substantially as and for the purpose specified.

74,673.—HARROW.—Daniel L. Dickson, Durham, Ill.

I claim the combination of the frame, with cylinder, J, with teeth, a a, and clearer, K, in front of said cylinder, the whole arranged and operating as specified.

74,674.—BLACKING BRUSH.—J. H. Doughty, New York city.

I claim, 1st, The double hold-fasts or handles a b, provided with a platform c, which is held horizontally away from the handle, b, by a prolongation of the same, arranged substantially as described.

2d, The arrangement of the dauber, f, and scraper, h, on the platform, c, by means of the bolt, i, and nut, j, substantially as and for the purposes described.

74,675.—SPRING BED BOTTOM.—Wm. I. Emens, Louisville, Ky.

I claim the combination of the forked hook, E, and the slat, F, the gum ring, D, the movable cross piece, A, and the parallel strips, B and C, when constructed, arranged, and operating in the manner set forth.

74,676.—HARVESTER.—George Esterly, Whitewater, Wis.

I claim, 1st, The combination of long fingers or teeth, d, which are not jointed, with a cutting apparatus consisting of a rolling finger beam, short fingers, and a sickle, and which is adjustable bodily, so as to raise and lower the bight of cut, and also adjustable in such a manner that the front ends of both sets of fingers can have their angle of presentation to the grain changed and fixed to work at a given bight, all substantially as described.

2d, The application to a hinged platform, E, of a dropper, F, which latter is supported at its rear end so that it can be tilted backward at pleasure, substantially as described.

3d, Connecting the beam, to the main draft frame, A, by means of flexible or hinged arms, m, or their equivalent, in combination with the draft chain, r, and forward truck, K, substantially as and for the purposes described.

4th, The combination of a hinged, slatted dropper, F, with a platform, E, whether the latter be hinged or fixed rigidly to the finger bar, such dropper being arranged substantially as described.

5th, The combination of the devices, f f', or their equivalents, for adjusting the grain end of the finger beam in the path of a vertical circle, with the device, d2, or its equivalent, for adjusting in like manner the inner or heel end of the finger beam, substantially as described.

6th, The arrangement of the belt tightener upon the hinged beam, J, said tightener and said beam operating together substantially as described.

74,677.—SHAFT AND POLE COUPLING.—Perry Finley, Memphis, Tenn.

I claim the coupling, E, with the groove, L, and staples, G G G, the square thimble, F, the slide, D, with the mortise, H, the strap, I, and buckle, M, the fixed bolt, arranged substantially for the purpose herein set forth.

74,678.—CULTIVATOR.—John Frank, Webster City, Iowa.

I claim, 1st, The adjustable blocks, C, constructed and operating substantially as described.

2d, The cultivator as it stands, with its various parts and devices, combined, arranged, and operating substantially as and for the purposes herein specified.

74,679.—PLOW MOLD BOARD.—Richard Gaines and Melchi Scott, Fairfield, Iowa.

We claim, 1st, The metallic plow mold board, A, provided with V-shaped groove along the edges, and studs or buttons, B B, on its concave surface, in combination with glass cast over said surface in its molten state, substantially as herein set forth and specified.

2d, The protuberances or knobs, C C, arranged as described, for the purpose of securing the mold board to the plow, substantially as set forth, in combination with the above described mold board.

74,680.—MEDICAL COMPOUND.—G. W. C. Gamble, Millersburg, Iowa.

I claim a cure for cancer composed of the ingredients set forth, when prepared in the manner substantially as described.

74,681.—APPARATUS FOR HANGING ANIMALS IN SLAUGHTERING.—Almeron Graves, Roscoe, Ill.

I claim the application of the lever, C D E, the upright, B, the revolving apparatus represented by H H H H H H, supports, I I I I I, and the revolving cans, E E, in apparatus for handling animals in slaughtering.

74,682.—BAIT AND VEGETABLE CUTTER.—Zebulon G. Greenleaf, Bath, Me.

I claim the combination of the cutting blades provided with screw shanks, with the hollow cylindrical case, B, and central shaft, D, arranged as and for the purposes herein described.

74,683.—EXERCISING APPARATUS.—Geo. W. S. Hall, Baltimore, Md.

I claim the combined arrangement of the horizontal bar, E, adjustable suspension rope, F, and spring, H, as and for the purposes set forth.

74,684.—RAZOR STROP.—J. P. Hall, Wallingford, Conn.

I claim the arrangement of the drawer, B, within the case, A, when the said case, A, is constructed for the reception of the strop, C, in a case within the principal case, A, substantially as herein set forth, as a new article of manufacture.

74,685.—HARVESTER.—B. G. H. Hathaway, Rock Stream, N. Y.

I claim, 1st, The arrangement of the sliding clutch G, yoke, G1, lever, G2, bell crank, G3, stem, G4, spring, G5, and spherical case, D, substantially as described.

2d, The combination a shoe so attached as to oscillate laterally, and a finger bar so hinged thereto that the shoe remaining stationary, the finger bar may be folded back in a horizontal plane, to stand parallel with the line of draft, substantially as described.

3d, The combination of the shoe, O, hinged finger bar, N, spring, P, or its equivalent, and lever, Q, substantially as set forth.

74,686.—EXTENSION COAL CHUTE.—Jacob Heatherington, Bellair, Ohio.

I claim the combination of the extension plank or rod, H, chute, G, rollers, b b c, and extension beam, J, the whole constructed and operating substantially as and for the purpose specified.

74,687.—WIND WHEEL.—John Hidden, Lawrence, Kansas.

I claim the combination of the adjustable deflector, I, with the vane, F, drum, E, wings and spindles, D and a, wheels, G G', and chains, c and d, substantially as described.

74,688.—SCHOOL DESK.—Geo. W. Hildreth, Lockport, N. Y.

I claim the joint, o, in combination with the ordinary joint, s, for the purpose of raising the central portion of the desk lid, to form a book rack of the desk top or lid, as herein specified and shown.

74,689.—CARRIAGE.—Edgar Hitt, Katonah, N. Y.

I claim, 1st, The clamp, C, provided with a socket, s, in combination with the spring bar, A, and body loop, substantially as and for the purpose set forth.

2d, The square head, d, at the end of the body loop, to fit into a corresponding socket in the clamp, C, substantially as and for the purpose described.

3d, The projections or lips, c, on the inner surfaces of the clamp, to fit into notches, d, on the the spring bar, A, substantially as and for the purpose set forth.

74,690.—FENCE FOR COLLECTING RAIN WATER FOR STOCK.—Luther Howe, Alamo, Mich.

I claim the rain collecting boards, A, and rain gutters, B, in connection and combination with a farm fence, for collecting and conveying rain water to artificial or natural reservoir, substantially as and for the purpose herein specified.

74,691.—HARNESS PAD.—John Hughes, Newark, N. J.

I claim, 1st, In combination with the iron frame, A, the socket for the nut, H, the strips, B B, and flexible piece, F, constructed as herein described and for the purpose set forth.

2d, The braces, K K, or their equivalents, for the purpose specified.

3d, The binding, N, stitched to the bottom, C, before it is put to the frame, A, and the form, P, in the binding, and the mode of securing the bottom and form to the frame.

4th, The frame, A, with the slots, E E, and grooves for the strips, B B, and holes, V V, in the manner and for the purposes specified.

74,692.—PICTURE KNOB.—E. D. Ives, New Haven, Conn.

I claim, 1st, Forming and attaching knobs of glass or similar material to screws or nails, substantially in the manner herein set forth.

2d, The combination of the threaded nail, B, and socket, C, when the said socket has formed thereon a knob or head of glass or similar material, and when the said glass or similar material is formed and attached thereon in the process herein set forth.

74,693.—MACHINE FOR CUTTING GLAZIERS' POINTS.—James M. Jay, Canton, Ohio.

I claim, 1st, The arrangement and combination of the rotary cutters, M N M N, on the shafts, D and H, when operating in connection with each other through the gear wheels, F, G, for the purpose of cutting glaziers' points, or any brads or nails which may be cut from sheet metal, substantially in the manner herein specified.

2d, The arrangement and combination of the cam, I, feed lever, U, with pawl, V, ratchet wheel, T, catch, c, and feed rollers, r' Q, when used in combination with the rotary cutters, M N M N, substantially in the manner and for the purpose herein specified.

74,694.—SEWING MACHINE.—Geo. L. Jencks, Florence, Mass., assignor to the Florence Sewing Machine Company.

I claim, 1st, The manner of combining and arranging both the interlacing hook and shuttle, constructed as described, upon the concave side of the curved needle, so that the loop of the needle thread will be presented to the hook and shuttle from the curved side of the needle, and carried thence directly to the rear of the needle, and around the shuttle, substantially as shown and described.

2d, So combining and arranging the said hook and shuttle, and the eye-pointed needle, as described, with the independent mechanism set forth for taking up the loop of the needle thread after it has been carried around the shuttle, as described, that the said loop may be taken up and the stitch completed at one and the same cycle of operation of the machine, substantially as described.

3d, The take-up mechanism, substantially as described, in combination with the sewing mechanism, constructed and operating substantially as set forth.

4th, The circular shuttle, constructed substantially as described, with a beveled edge, and in combination therewith a delivery notch and a spring presser, arranged substantially as described, for the purpose of producing the requisite tension of the shuttle thread as it is delivered, substantially as described.

5th, Mounting or holding the shuttle upon a stationary pedestal or its equivalent, as described, and controling the operation of the shuttle by means of a tilting bar or finger, or its equivalent, arranged to operate therewith, substantially as and for the purpose specified.

6th, The interlacing hook, in combination with the beveled-edged shuttle, constructed and operating as described, to catch and carry the loop of needle thread around said shuttle, substantially in the manner described.

7th, So combining the recess, c, in which the needle vibrates, and the bridge ring, and the interlacing hook, and shuttle, constructed and arranged substantially as described, that the lower thread of the loop will be caught by the hook and carried in a direct line beneath the shuttle, while the upper thread of said loop is carried against the beveled shuttle edge, and over the shuttle, substantially in the manner and for the purpose specified.

8th, The construction and mode of hanging and adjusting the needle-arm and the presser-arm, by means of the screw stud and screw sleeve, in combination, substantially as described.

9th, The mode of securing the needle, n, at the end of the needle-arm, by means of the screw bolt and washer, constructed substantially as described.

74,695.—TRAIN FOR LAMPS.—Geo. A. Jones, New York city.

I claim, 1st, In a train or mechanism designed for use in lamps, the application and use of the open or lantern pinion and its arbor, constructed substantially as and for the purposes set forth.

2d, In such mechanism the combination of a single thread, flat top, solid cut screw, with a square-toothed wheel, arranged and operating substantially as described.

3d, The air tube, constructed from a single piece of metal, substantially as and for the purposes set forth.

4th, In combination with the endless screw, d, attaching its lower support or bridge, c', to the side plate of the mechanism, substantially as and for the purposes set forth.

5th, The construction of the jewel plates, having a concave conical jewel seat, and confined to the supporting plates by a single screw, substantially as and for the purposes set forth.

6th, A mechanical movement for lamps, its several parts constructed and arranged and operating substantially as described.

74,696.—PLATFORM SCALE.—Joel F. Keeler, Pittsburg, Pa.

I claim constructing long platform scales with a series of diagonal main or platform levers, when such levers are connected with a series of four or more secondary levers, which secondary levers rest nearly or quite on the same horizontal plane with each other, substantially in the manner and for the purposes described.

74,697.—PIPE TONGS.—Wm. Kenyon, Jr., Steubenville, Ohio, assignor to himself and Henry K. Kenyon.

I claim the combination of the bifurcated movable jaw, d, with the eccentric cam head, a, at the end of the handle of a pipe wrench, constructed and arranged substantially as hereinbefore described.

74,698.—FILTERING BURNING FLUID.—John D. Kirkpatrick, Urbana, Ohio.

I claim, 1st, Filtering burning fluids consecutively through separate layers of lime and wood ashes, elm bark, charcoal, and sand, each ingredient being placed on flannel, in the bottom of the filtering vessels, substantially as and for the purposes set forth.

2d, The filtering apparatus, consisting of the bottom, A, frame, B, vessels, a b c d, with perforated bottoms, a' b' c' d', and false bottom, F, and reservoir, G, provided with stop-cock, E, substantially as and for the purposes described.

74,699.—POTATO DIGGER.—Gottlieb Koenig and Geo. Otto, Plymouth, Mich.

We claim the combination of the traction wheels, A A, the gear wheels, B B, the pinions, C C, the shaft, D, the crank axle, E, the revolving teeth, F F F F F, the rack, G, the arms, H H, the roller, I, the seat, J, the lever, K, the catch, L, the spring, M, with a suitable frame, when arranged substantially as and for the purpose described.

74,700.—PUNCHING APPARATUS.—Isaac Lamplugh, Peoria, Ill.

I claim the improved punching apparatus, consisting of the several devices constructed, combined, and arranged in the manner and for the purposes herein set forth.

74,701.—MACHINE FOR GRINDING CUTTERS OF MOWING MACHINES, ETC.—Wm. H. Laubach, Philadelphia, Pa., assignor to himself and Geo. H. Mellen, Alexandria, Va.

I claim, 1st, The adjustable bed piece, B, constructed as described, and applied to a grinding machine as and for the purpose specified.

2d, The bed piece, B, provided with slot, m, and screw, m', in combination with the clamp, r, and screws, r' r', as and for the purpose set forth.

3d, The post, d, provided with the slot, k', and arm, d2, in combination

with the set screws, k and c, and the rotating shaft, b, substantially as described.

4th, The grindstone, I, in combination with the rotating and sliding shaft, b, as and for the purpose described.

5th, The adjustable bed piece, B, in combination with the clamp, r, post, d, grindstone, I, and rotating and sliding shaft, b, as and for the purpose specified.

74,702.—BUNG.—James B. Lefferson, New York city.

I claim the shaft, B, provided with cog teeth, e e, in combination with the knives, D D, provided with recesses, as described, said knives being arranged to operate between the bung, A, and case, a', as and for the purposes specified.

74,703.—HAY AND COTTON PRESS.—C. Lent, Washington, D. C.

I claim the arrangement of the press box, as constructed with the shaft, G, provided with follow block, H, and cross head, J, nut, E, cross tie, D, plate, a, and guide pieces, I I, the several parts being connected and used substantially as and for the purpose set forth.

74,704.—COMBINED CLOCK AND ADVERTISER.—G. M. Levette, Indianapolis, Ind.

I claim, 1st, The disk, M, and pins, N, on the shaft of the escapement wheel of the time-keeping movement, for controlling and regulating the action of the advertising mechanism, substantially as and for the purpose set forth.

2d, The pawl, O, on any suitable part of the advertising mechanism, in combination with the disk, M, and pins, N, as and for the purpose set forth.

3d, The rods, L, or their equivalents, attached to the advertising band, B, as and for the purpose set forth.

4th, The catch, S, and flexible arm, l, attached to the reciprocating rod, F, arranged and operating as and for the purpose set forth.

5th, The rods, L, in combination with spring-catch, P, and catch, K, arranged and operating substantially as set forth.

74,705.—BLACKING CASE AND CLOSET.—Jas. Macferran (assignor to himself and Samuel Macferran), Philadelphia, Pa.

I claim, 1st, The sectional folding lid, C, provided with a foot-rest and combined with the stationary part, B, of the cover of the box, substantially in the manner above described, and for the purpose specified.

2d, The slide, D, when combined with the stationary and folding parts, B and C, of the cover of the box, substantially as and for the purpose set forth.

3d, The combination of the hinged part, A, containing the boot-blacking apparatus, with the lower part, A', composing the water closet, furnished with the perforated division, F, and door, J, substantially as described and for the purpose set forth.

74,706.—LOW-WATER DETECTOR FOR STEAM GENERATOR.—G. B. Massey, New York city.

I claim, 1st, The movable vessel, G, connected with a steam boiler or other vessel in which steam is generated, and with the oscillating lever or sway bar, E, substantially as and for the purposes shown and described.

2d, The lever or sway bar, E, supported from a variable fulcrum or center, and connected with and operating upon the vessel, G, substantially as set forth for the purposes specified.

74,707.—SHOE.—D. S. McNamara, Troy, N. Y.

I claim a shoe provided with the elastic strips, d d and c, as herein specified and for the purpose set forth.

74,708.—SODA FOUNTAIN.—J. W. Milroy, J. Vaughn, and J. Turley, Galveston, Ind.

We claim the construction and arrangement of the fountain, A, lid, G, cylinder C, in combination with the pump cylinder, D, as arranged with the valve box, c, and discharge tube, C, and valves, d d, substantially in the manner and for the purpose as herein described and shown.

74,709.—BEEHIVE.—N. C. Mitchell, Caledonia, Ohio.

I claim, 1st, Hinging the frames, K K, to the moth box, and over the screen, I, in such a manner that the offal will pass into said box, and the frames may be drawn out of the hive, substantially as and for the purpose set forth.

2d, The moth-box, D, constructed in the manner described, with three openings, one for bees, and two for millers, when used with the movable comb-frames and the hive, A, as and for the purpose set forth.

74,710.—CORN PLANTER.—Josephus Moore, Bushnell, Ill.

I claim, 1st, The arrangement of the shaft, D, with the seed hoppers, F F, covers, G G, valve, N, discharge spout, O, and runners, P, constructed and operating in the manner and for the purpose set forth.

2d, The arrangement of the plate, W, shaft, M, wheel, L, collar, J, and bevel wheel, K, with the shaft, D, as and for the purpose set forth.

74,711.—CORN PLANTER.—William H. Moore, Blooming Grove, Ind.

I claim, 1st, The arrangement in a corn planter of the seed-dropping device consisting of the elements O o P Q q R and S, substantially as and for the purpose set forth.

2d, The pivoted frame, H I I' I" I'" K K' K" K'" k, arranged to be raised from the ground by means of chain, V, lever, l, and ratchet, 3, substantially as stated.

74,712.—BREECH-LOADING FIRE-ARM.—Wm. Morganstern, Philadelphia, Pa., assignor to E. Von Jeinsen, New York city.

I claim, 1st, The angular point, o, in the interior of the breech block, in combination with the hammer, d, substantially as described.

2d, The spring block, q, in combination with the hammer, d, substantially as described.

3d, The hollow curves, m n, before and behind the angular point, o, substantially as described.

4th, The hooked arm, g, forming part of the screw, and operated by it, said arm being arranged to work in a recess formed in the receiver, b, and by means of its hook to engage the breech block on its rear side, substantially as described.

5th, Locking the breech block before firing by the combined action of the hammer and the projector, O, and also locking it after firing by the combined action of the hammer and the straight side of said block forward of the hollowed part, m, substantially as described.

74,713.—CLOTHESLINE CLAMP.—G. R. Nebinger, Lewisberry, Pa., assignor to himself and Wm. A. Middleton.

I claim the block, B, having a horizontal groove in its center, whereby two flanges are formed, which have each a vertical slot, x, on their inner sides, when used in combination with the wedge-shaped block, C, provided with trunnions, e e, which work in said slots, as and for the purposes specified.

74,714.—SPINNING JACK.—Thos. Netherwood and J. P. Babcock, Westerly, R. I.

We claim, 1st, The arrangement of the shaft, I, with pendant arm, f and curved cam, E, weight, F, rod, g, and spring rod, i, for operating the shipper-board, G, in the manner substantially as specified.

2d, The arrangement of the rods, d1 d2, pin, d, and knee board, B, on the car, A, in combination with the latch, a, and rod, D, in the manner and for the purposes set forth.

74715.—CLOTHES DRYER.—W. B. Noyes, Dorchester, N. H.

I claim, 1st, The wheel, A, furnished with slot, c, and opening, e, in the manner and for the purpose substantially as set forth.

2d, The wheel, A, in combination with wheel, g, when constructed and arranged substantially as described.

3d, The wheels, A and g, and arms, f f, in combination with slide, m, the whole constructed and operating as described.

74,716.—GATE.—Oliver Perry and Clark Perry, Ortonville, Mich.

We claim the combination of the gate, as constructed, stationary arms, C D and E, and cords, K L, all operating as set forth.

74,717.—APPARATUS FOR CONVEYING SCREW BLANKS.—E. S. Pierce, Hartford, Conn.

I claim, 1st, The swinging arm, B, in combination with the griping lever, C, when the same are constructed, operated, and governed in the manner described.

2d, The combination of the slide, I, the arm, B, and the spring, H, or its equivalent, when used in the manner and for the purpose herein specified.

3d, The subject matter of the first claim, in combination with the freeding trough, A, substantially as described.

4th, The combination of the feeding trough, A, the slide, I, and the conveying arms, B, substantially as described.

5th, The combination of the feeding trough, A, the conveying arm, B, the griping lever, C, and the pawl, E, substantially as described.

6th, I claim the combination of the feeding trough, the slide, I, the arm, B, the lever, C, and the pawl, E, substantially as described.

74,718.—WINDOWSASH FASTENER.—Isaac Pierson, Hartford, Conn.

I claim a window fastener consisting of one piece of metal, of such a form that one part enters the upper sash and secures the sashes from being slipped past each other, and the other part turns over to one side and hooks into the lower sash, substantially as described, to prevent the first-mentioned part from being withdrawn.

74,719.—GRAIN WEIGHING MACHINE.—Henry Pooley, Henry Pooley, Jr., Thomas Roberts and Louis Luc, Liverpool, England.

We claim, 1st, The construction and use of twin scales placed side by side, when operated by devices substantially in the manner and for the purpose hereinbefore described and set forth.

2d, The combination of the swivelling inclined spout into which the grain or other material to be weighed falls from the store or hopper and the stationary double spout which guides the grain or material to be weighed into the scales, substantially as shown and described.

3d, The alternative mode of accomplishing the same purposes by means of the rocking double-throated feed spout fitted underneath a hopper, substantially in the manner and for the purposes hereinbefore set forth.

4th, The inverted T-lever and its balanced catches on the end of the rocking shaft, which directs and controls the momentum of the apparatus originated by the loaded scales, in the manner and for the purposes hereinbefore described and set forth.

5th, The construction and use of the rocking shaft and its appendages as the means of distributing the continuous flow of grain or other material to the scales, and for the other purposes hereinbefore described and set forth.

6th, The construction and use of the double-actian tumbling hammer for disengaging each scale alternately after it has received the full load and also the peculiar locking apparatus connected therewith and the mode of tilting the scales, as hereinbefore described and set forth.

Lastly, the arrangement and combination of the several parts forming together the double self-acting and self-registering apparatus for weighing a continuous flow of grain or other material, all as hereinbefore described and set forth.

74,720.—PEN.—E. L. Pratt, Boston, Mass.

I claim, as a new article of manufacture, a fountain or reservoir designed for use in combination with a pen when made with a perforation, c, a band, a, and corrugations, 1 2 3, all arranged substantially as and for the purpose described.

74,721.—SHOVEL PLOW AND CULTIVATOR.—B. F. Ream, Ada, Ohio.

I claim the gage beam, E, constructed substantially as described in combination with the beams, A and a, guide bar, G, shovels or plows, C C', or any of them, and colter, D, substantially as and for the purposes set forth.

74,722.—BUTTER DISH.—Ira A. Richards, Brookfield, Mass.

I claim the cap, E, hinged at a point, d, above the center of the bearing and the said cap provided with a nose, g, so as to spring down over the point, f, and secure the trunnion of the cover in its bearing, substantially as set forth.

74,723.—TRUNK.—Edward Semple, Chicago, Ill.

I claim the angle pieces, A, provided with the loops, a, in combination with the angle pieces, C, provided with the lugs, b, when arranged for operation in connection with a trunk or similar article, substantially as described.

74,724.—SPACING AND BORING MACHINE.—James M. Seymour, Newark, N. J.

I claim, 1st, The combination of the bell crank, s, for moving the slide, x, and the adjustable stops, n n and l, so arranged that the action of said crank shall move the slide as soon as the bit is raised out of the wood, when operated substantially in the manner set forth.

2d, The arrangement of the fence, y, slide, x, and removable notched stick, p, and reciprocating pawl, u, constructed and operated substantially as and for the purpose set forth.

74,725.—CLAMP FOR TRUSSING CYLINDERS OF STAVES.—Walter Shepperman, Pittsburg, Pa.

I claim the crosshead, A, provided with rollers, e e, in combination with screw, C, block, D, and cord, g, substantially in the manner herein set forth and described.

74,726.—CORN SHELLER.—E. F. Sherman, Chicopee, Mass.

I claim, 1st, The combination of a shelling cylinder having ridges placed obliquely as described with the adjustable toothed bonnet, the whole arranged and operating substantially as set forth.

2d, The flanges, k k, in combination with the obliquely-placed ridges of a corn sheller, substantially as and for the purpose set forth.

3d, Reversing the position of each alternate lay of ridges on the cylinder of a corn sheller, substantially as and for the purposes set forth.

4th, The V-shaped ridges, placed on the cylinder of a corn sheller in such a manner that in each separate lay their V points shall approach the center of the periphery of the cylinder while the V arms diverge from the center in opposite directions, substantially as and for the purposes described.

74,727.—BINDING GUIDE FOR SEWING MACHINES.—Lyman C. Session, Neenah, Wis.

I claim a binding guide consisting of the pieces, A B C, and set screw, E, all constructed, arranged and operating as and for the purpose set forth.

74,728.—PENCIL SHARPENER.—O. C. Squyer, Penn Yan, N. Y.

I claim the screw, C, in combination with the pencil sharpener, substantially as and for the purpose set forth.

74,729.—PLOW.—Stephen W. Standart, Bellevue, Ohio.

I claim the arrangement of the land-side bar, D, movable mold board, E provided with metal knife at its bottom, bars, F, bar, H, and roller, operated by the lever, I, the whole combined and used with the plow beam, in the manner and for the purpose set forth.

74,730.—MACHINE FOR GRINDING THE CUTTERS OF HARVESTING MACHINES.—William H. Stevenson, Auburn, N. Y.

I claim, 1st, The combination, substantially as described, of the U-shaped frame, A, and the V-shaped bearings, D D', with the grindstone mounted on the overhanging shaft, for the purposes set forth.

2d, The oscillating clamping frame or holding rack, H, operating substantially as described.

3d, The combination substantially as described with the oscillating clamp bar of the adjustable supports, L l, for the purpose set forth.

4th, The combination, substantially as described, of a grindstone mounted on one end of an overhanging shaft with a vertically, laterally and longitudinally adjustable swinging clamping bar, for the purposes set forth.

5th, The combination, substantially as described, of the clamping bar, H, adjustable clamps, K, radius bars and set screws, l, for the purpose set forth.

6th, The U-shaped frame, A, constructed as described.

74,731.—MACHINE FOR GRINDING THE CUTTERS OF HARVESTING MACHINES.—William H. Stevenson, Auburn, N. Y.

I claim, 1st, The grindstone, constructed as described, with one part of its periphery bevelled and the other part parallel to the axis of rotation and having an annular groove in that side next the parallel surface, for the purposes set forth.

2d, The combination, substantially as described, of the bench, A, the overhanging detachable frame or bed, B, the stone and the spindle, E, for the purposes set forth.

3d, The combination, substantially as described, of the stone, the spindle, and the oscillating rack bar or clamp frame, whereby I am enabled to grind the knives with their points down.

74,732.—VIBRATING LEVER POWER.—Nicholas Tripp, Niagara Falls, N. Y.

I claim the duplicate sets of pendulum levers, C C, weighted at a, the duplicate fly plates, I I, armed with balls, h h, and connected by arms l l, and boxes, i i, with the double crank shaft, K, the adjusting ball, s, and the double-acting levers, D D, receiving motion by cog segments, b c, and transmitting motion to the one crank shaft, F, the whole constructed and arranged as described and operating in the manner and for the purpose herein set forth.

74,733.—PRESERVING EGGS.—Aaron Van Camp, Washington, D. C.

I claim, 1st, The process herein described for preserving eggs.

2d, The use of chloride of calcium, or its equivalent, for the purpose of preserving eggs.

3d, Phosphoric acid as material for preserving eggs.

4th, The combination of the ingredients herein mentioned for preserving eggs.

74,734.—LEATHER SPLITTING MACHINE.—Francis J. Vittum, Newburyport, Mass., assignor to W. N. Ely, Stratford, Conn.

I claim, 1st, The long belt knife cutting either way, substantially as described.

2d, The knife coiled on drums and operating either way, substantially as described.

3d, The compound roller with spindle, spiral spring and sectional rings, substantially as described.

4th, The compound roller, as described, in combination with a rubber roller, substantially as described.

5th, The compound roller, as described, in combination with a splitting knife, substantially as described.

6th, The cam or projection on the back of the knife, substantially as and for the purpose described.

7th, Arranging and operating the knife by means substantially as described.

74,735.—FEED WATER HEATER OF STEAM GENERATORS.—Horatio N. Waters (assignor to himself and Newton Case), Hartford, Ct.

I claim, 1st, The device, I J, for the purpose of preventing the water in the reservoir from being drawn down to the level of the orifice of the feed pipe, substantially as herein specified.

2d, I claim the combination of the devices, A B C D E F G H I and J, for the purposes of a heater for steam boilers, substantially as specified.

3d, I claim the combination of the devices, C D E and F, substantially as herein described.

74,736.—PREPARING HEMP AND FLAX FIBER FOR THE MANUFACTURE OF DUSTERS, ETC.—Edmund G. Wayman (assignor to Robert V. Snodgrass), Louisville, Ky.

I claim the preparation and application of hemp and flax fiber in the production of a duster, the preparation and manufacture to take place as herein described, or any other substantially the same, and which will produce the intended effect or the same results.

74,737.—BREECH-LOADING FIRE-ARM.—Josef Werndl, Steyer, Austria.

I claim, 1st, The oscillating cylindrical breech block provided with a recess or groove for admitting the cartridge into the chamber of the barrel and moved forward by an oolique or spiral shoulder on its base pin, when constructed and operating substantially as described.

2d, The combination of the barrel, a, the hollow cylinder, b, the locking cylinder, c, the firing pin, f, the groove, g, the ejecting lever, h p, the axis, k, with its squared end, the spring, s, and the sliding breech block, l, with its inclined surface, m, the whole being constructed and arranged substantially as described, for the purpose of a breech loading fire-arm.

74,738.—PUMP FOR DEEP WELLS.—James T. Whipple, Chicago, Ill.

I claim cylinder, B, provided with valves, e and e", when so constructed as to be capable of being adjusted to any given point within the main pipe, in combination with ring, D, disk, C, and provided with packing, L, whereby a water-tight joint may be obtained between the cylinder and the sides of the main pipe, substantially as and for the purpose set forth.

74,739.—MORTISING MACHINE.—L. W. Wolfe, Jacksonville, Ill.

I claim the sliding saw frame, K, having arms, I I, as specified, whereby motion is communicated to the mortiser, N, through the connecting rod, P, and lever, O, all constructed and operating as specified.

74,740.—DEVICE FOR TEACHING COMMERCIAL TRANSACTIONS.—C. A. Walworth, Utica, N. Y.

I claim the drawer or apparatus, substantially such as herein described, for the purpose of teaching and practically illustrating commercial transactions as described.

74,741.—COLORED PRINTING PRESS.—George W. Wood (assignor to himself and James W. Slater), Richmond, Ind.

I claim, 1st, The adjustable segmental plates, A, for transferring the ink from the distributing to the type rollers, attached to a center, B, and used in combination with intermediate adjustable reglets, or their equivalents, substantially in the manner set forth.

2d, The combination of the distributing rollers, the segmental plates, A, and the type rollers, substantially as set forth.

3d, The combination of the rollers, I and K, and their adjustable boxes, F F', substantially as set forth.

4th, So arranging the rollers, I and K, and the plates, A, that while the work of distribution on the rollers goes on continuously, the roller, I, shall, by the oscillation of its bearings be brought in contact only with its appropriate set of transferring plates, and be removed while the other sets are passing, substantially as set forth.

REISSUES.

2,859.—MANUFACTURE OF METALLIC SQUARE.—Samuel Darling, Bangor, Me. Patented Oct. 6, 1857.

I claim, 1st, A hardened-edged tongue, united by soldering to a beam, constructed substantially as described.

2d, A tongue for squares, which is hardened at the edges and soft in the center, substantially as described.

3d, The mode or process described of hardening the edges of the tongue by pressure between plates of cold iron.

4th, The mode or process described of hardening the edges of the tongue by confining it between pieces of iron, and then heating and tempering, as described.

2,870.—MACHINE FOR WEIGHING AND BAGGING GRAIN.—Harriet M. Fish, New York city, assignee of L. K. Plimpton, and William Foot, executors of James M. Fish, deceased. Patented June 5, 1860.

I claim, 1st, The hopper, A A, fitted with a sloping bottom, and with a bagging spout or spouts, and gate or gates, on the side or sides of said hopper, to regulate the flow of grain, substantially as described.

2d, The use of said hopper, so fitted with sloping bottom, spouts and gates, in combination with a weighing scale, substantially as described.

2,871.—RAKE FOR HARVESTER.—Andrew J. Holman, Philadelphia, Pa., assignee by mesne assignments, of Isaac Van Doren. Patented Sept. 22, 1857.

I claim, 1st, The combination of the platform of a hinged bar harvester with a rake mounted thereon, and discharging the grain automatically upon the ground, out of the way of the machine and horses on the next round.

2d, The combination of an automatic rake, discharging upon the ground, with the platform of a hinged bar harvester, which is suspended from the main frame.

3d, The combination of an automatic rake, with the platform of a harvester, having an adjustable, suspended, hinged finger beam.

2,872.—HEAD BLOCK FOR SAW MILL.—Dennis Lane, Montpelier, Vt. Patented July 9, 1861.

I claim, 1st, The employment or use of the ratchets, H I J K having teeth at different distances apart, in connection with the adjustable dog, P, placed on the rod, O, which is provided with retaining pins, h, the ratchets being placed on the shaft, F, having pinions, G G, at its ends, which gear into racks D D, attached to bar, C, all being arranged as and for the purpose set forth.

2d, The bar, C, provided with supports, A2, dogs, I I, on fixed posts, k k dogs, e e, and lever cams, f, when the parts are constructed and arranged relatively with each other, and operated in the manner and for the purposes substantially as described.

2,873.—CONSTRUCTION OF BOATS.—Abram Van Order, Ithaca, N. Y. Patented Sept. 10, 1861.

I claim, 1st, The construction of the described layers of wood, placed one above the other, making the shell or sides and ends of the boat, the described method of spiking or bolting the said layers together, and the cross rod bracing, connecting the bilge timbers with the gunwale timbers, when arranged in relation to each other substantially as and for the purposes described.

2d, Constructing the sides and ends of boats wholly of horizontal layers of timbers, bolted or spiked one upon the other, substantially in the manner and for the purposes set forth.

3d, The construction of a bilge or bottom frame, of solid timber, in whole or in part, about the bottom of a boat, when the floor timbers are attached thereunto, as described, and for the purposes specified.

4th, The arrangement and construction of the bottom planking on the floor timbers within, and protected by the bilge frame, as set forth.

5th, The floor timbers, dovetailed to the bilge timbers, on their inner side and top, and held in place by the horizontal layers on their ends, for strength and security against accidents, as set forth.

6th, Constructing the sides and ends of boats of layers of horizontal timbers, bolted or spiked one upon the other, and upon the bilge frame, and upwards from it, substantially as and for the purposes described.

DESIGNS.

2,935.—HAT RACK.—H. P. Conant, Boston, Mass.

2,936.—FRUIT JAR.—Thomas Houghton, Philadelphia, Pa.

2,937.—INKSTAND, SPONGE CUP, AND PEN RACK.—Thomas S. Hudson, East Cambridge, Mass.

2,938.—FLOOR OIL CLOTH PATTERN.—Albert E. Powers, Lansingburg, N. Y., assignor to D. Powers & Sons.

2,939.—FLOOR CLOTH PATTERN.—Albert E. Powers (assignor to D. Powers & Sons), Lansingburg, N. Y.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., *37 Park Row, N. Y.*

70,806.—SILENT BOLT FEEDER.—Jacob Cornwell (assignor to himself, D. B. Merrill and Wm. H. McCourtie), Kalamazoo, Mich. Dated Nov. 12, 1867. Application for reissue received and filed Feb. 4, 1868.

1st, I claim, in combination with the hoop, H, or its equivalent, for holding the flour, the revolving platform, m, operating substantially as and for the purpose set forth.

2d, I claim providing the revolving platform, M, with the strip or float, f, or its equivalent, for the purpose of sweeping the flour into the spout, I, substantially as described.

3d, I claim the sleeve, S, in combination with the hoop, H, and revolving platform, m, when constructed and operating substantially as herein described.

43,376.—SUGAR MOLD.—Theodore A. Havemeyer, J. Lawrence Elder and Charles K. Loosey, New York city, assignees of Carl Kronig, Vienna, Austria. Dated June 28, 1864. Application for reissue received and filed Feb. 6, 1868.

I claim the process substantially as herein described for making vessels and other articles which process consists in saturating with linseed, or equivalent oil, vessels or articles made of paper, or equivalent substance, in manner substantially as described.

And I also claim coating articles which have been made as herein described and which have been saturated with oil with a paste of red lead and oil and then varnishing the same, substantially as described.

69,151.—JUG TOP.—Homer Wright, Henry H. Collins and Benjamin F. Collins, Pittsburgh, Pa., assignees of Homer Wright, aforesaid. Dated Sept. 24, 1867. Application for reissue received and filed Jan. 28, 1868.

1st, I claim the flange, S, when made as and for the purpose shown.

2d, The hinge and knob combined in one piece, as specified.

3d, The lid when made to cover entirely the top rim of the body, as set forth.

4th, The opening, H, in the lid when used in combination with the hinge and knob piece, as described.

5th, The convex bulge, P, or its equivalent, when used for the purpose indicated.

6th, Hinging the lid so as to rotate from the inside of the body, as described.

70,523.—APPARATUS FOR RAISING AND SECURING THE LEGS OF HORSES TO SHOE THEM.—J. P. Champion, Phelps, N. Y. Dated Nov. 5, 1867. Application for reissue received and filed Jan. 29, 1868.

I claim the lever apparatus for raising and securing horses' legs employed in connection with a suitable frame, arranged and applied substantially as herein shown and described.

10,068.—MACHINE FOR GRINDING PLOW CASTINGS.—Joshua Gibbs, Canton, Ohio, Dated Oct. 4, 1853. Extended Sept. 27, 1867. Application for reissue received and filed Jan. 28, 1868.

1st, I claim a frame or carriage which is capable of a lateral, longitudinal and oscillating adjustment in combination with a grindstone or polishing wheel for grinding and polishing plane and irregular surfaces, substantially as set forth.

2d, The table or stand, H, or its equivalent, in combination with a frame or carriage having a lateral, longitudinal and oscillating adjustment and with a grindstone or polishing wheel, as and for the purpose set forth.

3d, The rope, g, provided with a weight, or its equivalent, at one end in combination with an adjustable carriage for holding work to a grindstone or polishing wheel, substantially as set forth.

62,724.—DUSTING BRUSH.—J. O. Adams and E. A. Warfield (assignees of Robert H. Aldrich), Northampton, Mass. Dated March 12, 1867. Application for reissue received and filed Jan. 30, 1868.

I claim a brush made of sheepskin with the wool on, cut into strips and fastened over one or more central cores, substantially as herein shown.

36,017.—HARVESTER.—Cyrus Newhall, Hinsdale, N. H. Dated July 29, 1862. Application for reissue received and filed January 24, 1868.

5th, I claim the combination in a harvester of a laterally projecting finger beam, with cutters driven by a pitman passing through the driving wheel

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

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2.—FIRE AND BURGLAR PROOF SAFE.—Benj. Sherwood and Daniel Fitzgerald, New York city. Jan. 1, 1868.

18.—CHURN.—Milton A. Hamilton, Detroit, Mich. Jan. 2, 1868.

31.—CONVERTING POWER AND SPEED, AND MULTIPLYING AND TRANSMITTING MOTION.—Wm. F. Goodwin, East New York, N. Y. Jan. 4, 1868.

59.—COMBINING WROUGHT AND CAST IRON, ETC.—Wm. M. Arnold, New York city. Jan. 7, 1868.

48.—PROCESS FOR REMOVING SULPHUR, PHOSPHORUS, ETC., FROM IRON STEEL, AND OTHER METALS.—John F. Bennett, Pittsburg, Pa. Jan. 7, 1868.

52.—CONNECTING THE ENDS OF METALLIC COTTON BALE TIES.—James Maury, New Orleans, La. Jan. 7, 1868.

56.—CONNECTING THE ENDS OF METALLIC COTTON BALE TIES.—Joseph B. Dunn, Petersburg, Va. Jan. 7, 1868.

79.—MODE OF PROPELLING VESSELS.—Charles M. O'Hara, New York city. Jan. 8, 1868.

84.—CUTTERS FOR FORMING WOOD MOLDINGS, ETC.—John Whitworth, William Whitworth, and Alexander B. Halliwell, Cleveland, O. Jan. 8, 1868.

98.—APPARATUS FOR SEWING BOOKS FOR BINDING.—Henry G. Thompson, New York city. Jan. 10, 1868.

109.—MACHINERY FOR SIZING THE BACKS OF CARPETS, ETC.—Henry G. Thompson, New York city. Jan. 11, 1868.

123.—SPIRIT LEVEL.—H. G. Julian, New York city. Jan. 14, 1868.

131.—COMPOSITION FOR FURNACE LININGS, FIRE BRICKS, ETC.—George Nimmo, Jersey City, N. J. Jan. 15, 1868.

151.—FRUIT BASKET.—Welcome Hitchcock, New York city. Jan. 16, 1868.

158.—NAIL AND TACK MACHINERY.—John H. Geary, Fairhaven, Mass. Jan. 17, 1868.

169.—TREATING WOOD VENEER AND FORMING THEREFROM SHEETS AND CARDS.—Dawson Miles, Boston, Mass. Jan. 17, 1868.

170.—HAY CUTTER.—Geo. S. Fisher, Buffalo, N. Y. Jan. 17, 1868.

172.—MACHINERY FOR PROPELLING VESSELS.—Andrew J. Reynolds, Sturgis, Mich. Jan. 18, 1868.

187.—LINKS OR COUPLINGS FOR HARNESSES, ETC.—Geo. S. Fisher, Buffalo, N. Y. Jan. 18, 1868.

200.—SHIPS FOR TRANSPORTING OILS, ETC., ALSO SUPPLYING THE SAME AS FUEL TO FURNACES OF STEAMSHIPS, ALSO BALLASTING SHIPS WITH WATER. John H. Smith, Allegheny City, and Elbridge G. Benedict, Southwest, Pa. Jan. 20, 1868.

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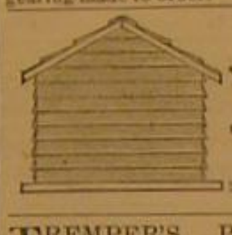

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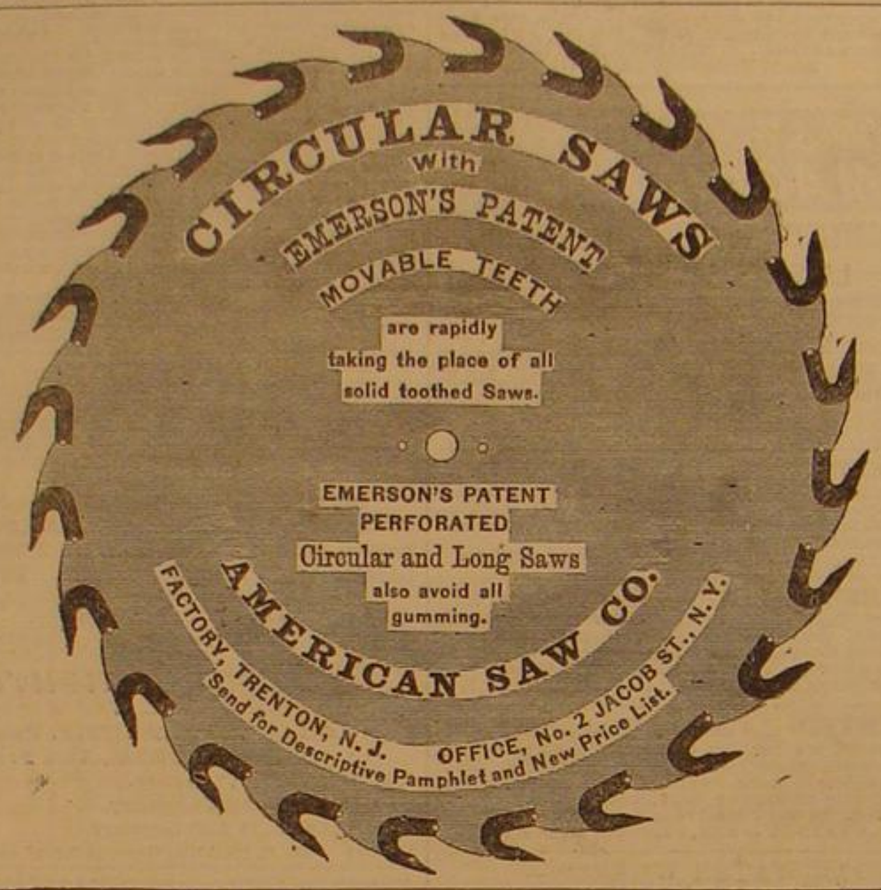

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Vol. XVIII.—No. 11. [NEW SERIES.] NEW YORK, MARCH 14, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Machines for Molding and Pressing Brick.

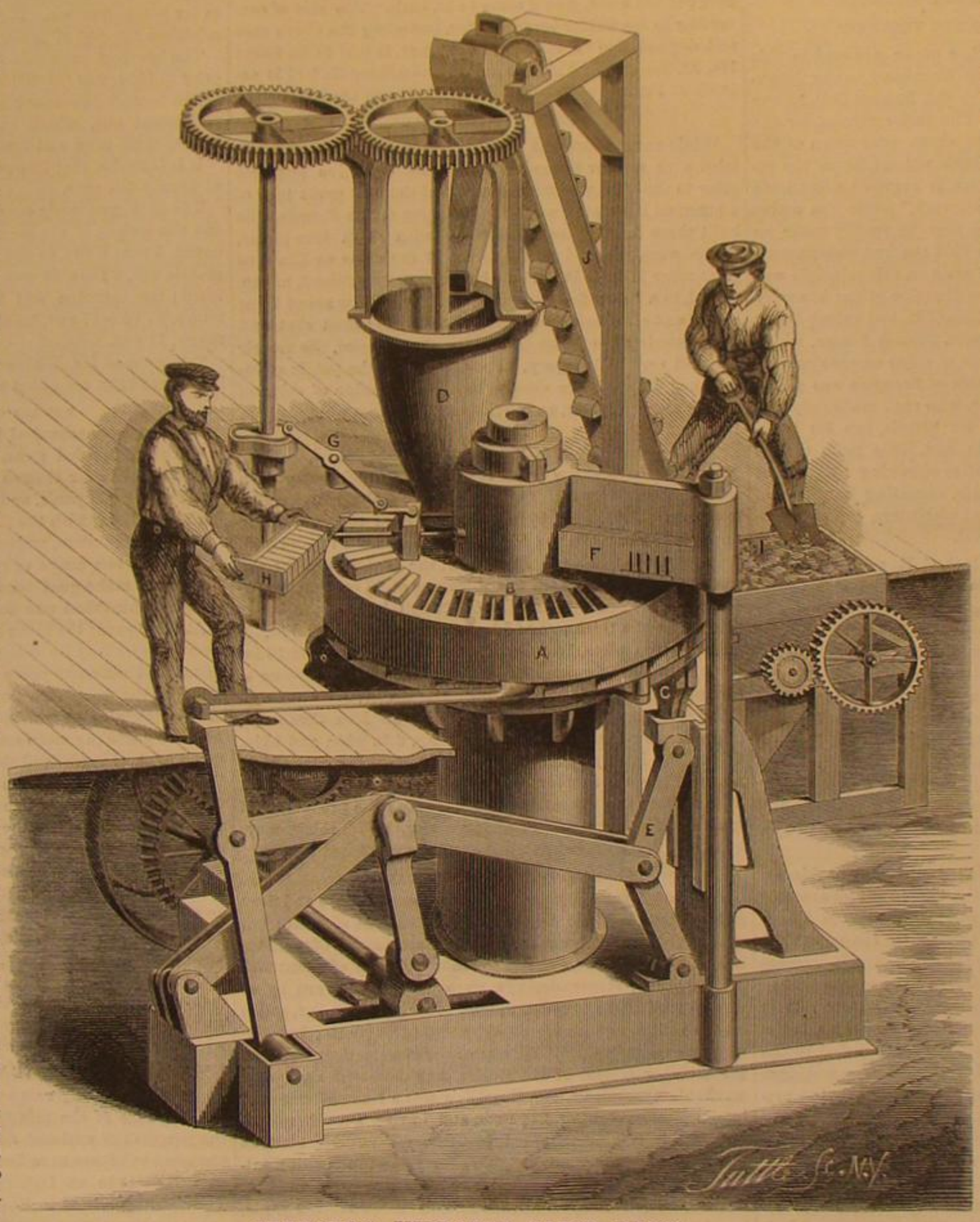
The proprietors of this patent state that it was the aim of the inventor to produce a machine with as few parts as possible, which could be run night and day, in summer and winter, and could be constructed so as to preclude the necessity of frequent repairs. That this has been successfully accomplished is satisfactorily proved by the practical operations of the press.

This improved brick press, constructed to mold and press bricks, has a horizontal revolving wheel, A, in which are placed permanent molds, B, extending from the upper to the lower surface. In these molds are placed movable plungers, C, which are used for pressing the bricks. The wheel A, is made to revolve and pause, so that the molds, B, pass continually under the mixing cylinder D, from the bottom of which the clay is forced into the molds, B, and then over the toggle bar E, which, being straightened, presses the plungers C, up into the molds, the clay being retained by the fixed cover F, under which each mold passes and stops as the wheel A, revolves and pauses. When the bricks are pressed, the wheel A, moves round, and they are forced gradually out of the molds, and are swept off by an adjustment, G, on to a board H, or an endless belt, as may be desired. The clay is first ground by rollers, I, placed on the ground, and thence carried by buckets on an endless belt, J, into cylinder D, in which it is mixed by revolving arms which also force it into the molds.

Pressure by the toggle bar, considered in all respects, is the best known in mechanics. In this machine, it can be regulated with ease to suit the material used. This invention can be quickly adjusted to mold bricks of wet clay without pressure; or the pressure can be increased to hundreds of tuns for dry clay.

The bricks manufactured by this press, being of great density and tenacity, with sharp corners and angles, are superior to those made by hand, and equal in every respect to those produced by other machines. As they come from the press they can be handled without injury, and may be hacked under sheds, thus preventing the large loss that is incident to exposure in the open air.

This machine attracts especial attention by its simplicity; its cost and weight are only about one third of those of other machines claiming to do the same amount and quality of work; and the motive power required to work it is comparatively small. The press can be made "single" or "double," the capacity of the former, the proprietors state, being 25,000 bricks per day of ten hours, and that of the latter 50,000 bricks.



SHEPARD'S IMPROVED BRICK PRESS.

The following advantages are further claimed for this new brick press: It is the cheapest machine which has been offered to the public, that does the work of molding and pressing bricks; it accomplishes this work without change in the action of the machinery; the motion is continuous, no cessation of power being necessary after the machine is set in operation until the work is finished; it grinds and mixes the clay so that the bricks are uniform in density, and less liable to break in burning, thus obviating one of the most serious objections to pressed bricks; it is a self-delivering machine, requiring very little manual labor to run it; it is very durable and not liable to get out of order; the degree of pressure can be varied to suit the material used; the pressure exerted and the number of bricks molded are greater than that of other machines using the same amount of motive power; the machine is simple in its construction— any ordinary mechanic, or workman, can set it up, adjust and work it; it is of a compact form, and of much less weight than other machines claiming the same capacity, and can be readily adapted to make pressed fuel of fine coal or of peat.

This press was patented through the Scientific American Patent Agency January 8, 1867, and is owned by the "Combination Brick Press Company," of which George W. Quintard, Esq., is President. For further particulars address or call on J. M. Moorhead, Superintendent, at the Morgan Iron Works, foot of Ninth street, East River, New York City.

Improved Pavement.

Patented by H. G. McGonegal, of New York city. This invention relates to a new wooden street pavement, which is so arranged that the blocks in each row are connected with each other, so that not one can be forced down without the others also sinking; thereby the holes, now generally occurring in wooden pavements by the sinking of single blocks, will be avoided, and a whole, coherent wooden pavement will thus be provided.

The invention also consists in boring vertical holes into the blocks for the purpose of receiving sand, cement, or tar. The same will wear quicker than the wood, and the surfaces of the filling will, therefore, be lower than the face of the wooden blocks; thereby a sufficiently uneven surface is provided for the purpose of giving a secure foothold to the horses.

Machine for Exterminating the Cotton Worm, Etc.

Recently patented by Charles Steinmann, of Napoleonville, La. This invention consists, to state its nature in comprehensive general terms, of an ordinary steam boiler, that is provided with a novel arrangement of tubes or pipes for the distribution of the steam generated by it, in combination with a reservoir or tank to contain oil, which, in its turn, is supplied with mechanical appendages for the proper bestowal and distribution of the oil, the whole combination being placed upon a suitable frame or platform supported on wheels, in order that the machine may be easily portable or transportable in its operations against the creatures it is intended to destroy.

The boiler being supplied with a proper quantity of water, and the heater filled with water, and the oil reservoir with oil, the operation is as follows, to wit: Steam is raised and the machine placed in position to begin work between two rows of cotton, which we may suppose to be the two rows next one end or side of the field. The stop cocks are now opened, and as soon as the oil begins to flow from the jet pipes the machine is started. The steam, as it rushes out of its own series of jet pipes or nipples, passes through the dripping oil and expands and transforms the same into vapor, which, intermingling and spreading out with the steam and changing its character, envelopes the proximate rows of cotton plants, and kills every caterpillar or other insect upon them. It does more; its effect is so deadly that it destroys the eggs of the worm, and leaves an invisible influence upon every part of the plants that have been bathed with it, which keeps off those worms that, coming into the field from other quarters afterward, might otherwise prove as destructive as those that have been killed would have been if they had been permitted to live. This I have verified by prolonged and careful watching, and hence it will be seen that my invention not only will destroy the unhatched and living insects upon any given field, but that it will shield that field from all danger of depredation from such as may come into it from outside localities, and hence, further, that upon its general use, it will finally exterminate every tribe of insect, and relieve the country of the anxiety and heavy loss they have heretofore every year inflicted. But to return to the operation of the machine; after two rows have been covered with the vapor, the machine is carried across the field between the next two rows of plants, and so on until it has been made to traverse the whole field, and envelope every plant in it with its oleaginous vapor, and then its work for the season is accomplished, and the crop saved on every foot of ground over which it has passed.

My invention may be of any prescribed dimensions, to be drawn by one or more mules or horses, and there is no need to make it of costly construction. Any cheap oil may be employed, such as petroleum, lard, or cotton-seed oil, or the like, care being taken that no acid is contained in it. Those oils that give out the strongest and most disagreeable odors are, perhaps, the most effective.

HARMLESS "PHARAOH'S SERPENTS."—A new method of making the curious chemical toys called Pharaoh's Serpents has been suggested by Vorbringer. The black liquor which results as a useless product when coal oil is purified with sulphuric acid, is to be treated with fuming nitric acid. The dark-colored resinous matter which swims on the surface is then collected, washed and dried, when it forms a yellowish-brown mass having about the consistency of sulphur which has been melted and poured into water. When this mass is ignited it undergoes such a wonderful increase in bulk that a cylinder one inch long will give a snake about four feet in length. The briefness of the popularity enjoyed by the "original" serpents was due to the unhealthy vapors given off in the process of burning.

THE BRITISH INSTITUTION OF CIVIL ENGINEERS.

This most useful society celebrated its fiftieth anniversary on the 2d of January last, when the new president, Mr. C. H. Gregory, made an able address, full of much useful and valuable information. We subjoin some extracts from this address, in which, among other things, the history, influence, and introduction of American inventions and engineering practice in England are noticed:—

Fifty years ago, on the 2d of January, 1818, this Institution was founded, its members then being only six in number. On the 21st of March, 1820, Thomas Telford, our first president, in his inaugural address, referred to the nature of the Institution and its probable future usefulness, and pointed out the significant fact, that while in foreign countries, such institutions depended on governments for their support, in this country their existence and their prosperity were dependent on the united action of the individual members. In this, our jubilee year, we may, with pardonable pride, congratulate ourselves that Telford's views have been justified, and even surpassed, in succeeding years of increasing prosperity, in our satisfactory financial condition, in our numbers, now comprising 1,472 members of all classes, in the formation of our student class, and our benevolent fund, and in the firm establishment of the Institution of Civil Engineers as the recognized representative body of the profession, comprising within its ranks, past and present, the names of so many illustrious in abstract or practical science, whose labors have enlarged the resources of our country and materially promoted the civilization of the world.

INTRODUCTION OF AMERICAN FIRE-ARMS.

On the 25th of November, 1851, a paper was read in this Institution "On the Application of Machinery to the Manufacture of Rotating Fire-arms," by Col. Samuel Colt, of the United States Assoc. Inst. C. E. The paper claimed for the machinery used the advantage of cheap production of the weapons in large quantities, and such uniformity in the various parts that "when a new piece is required a duplicate can be supplied with greater accuracy," while "in active service a number of complete arms may be readily made up from portions of broken ones." In 1852 the first manufactory in England for the construction of arms on this principle was erected at Thames Bank, under the direction of our honorary secretary, Mr. Charles Manby, M. Inst. C. E., and subsequently a manufactory was erected by Messrs. Dean & Adams, which in later years passed into the hands of other companies; but prior to this time the construction of fire-arms was really carried on by small manufacturers, who each made only one separate part—one for locks, one for barrels, one for bayonets, etc,; the gunmaker being, in fact, little more than a setter up; and the government, after obtaining by contract the separate parts of their muskets, excepting barrels and some small parts, from separate manufacturers, put them together at their own works at Enfield.

In 1853, Mr. John Anderson, M. Inst. C. E., engineer to the Board of Ordnance, proposed the construction and equipment of a government manufactory, in which, by the use of complete machinery, all the processes for the production of small arms should be carried on successively to completion. In 1854 the subject was considered by a select committee of the House of Commons, and the adoption of machinery, as recommended by Mr. Anderson, was advocated by Mr. Jos. Whitworth, M. Inst. C. E., Mr. James Nasmyth, Gen. Tulloch, R. A., and other officers and engineers; and, in spite of the views of those whose habits or prejudices led them to oppose a new system, the committee recommended a partial trial, which issued in the establishment of the present small-arm factory at Enfield.

This new factory, stocked with improved machinery, founded on that already in use in the United States arsenals at Springfield and Harper's Ferry, and made partly in America and partly in England, was set to work in January, 1857, under the direction of Col. Manley Dixon, R. A., the present superintendent of small-arm factories, in the construction of small arms generally but particularly of the Enfield rifle of the pattern of 1853, which, with trifling modifications, is the long rifle now used in our army, where not superseded by the Snider breech-loader [an American invention]. The machines used at Enfield are to a great extent varieties of copying machines, in which a standard model is reproduced by a revolving cutter, in wood or metal, as the case may require. The different parts, as produced, are checked with templates and gages, and finally the finished parts, stock, lock, barrel, bands, bayonet, plates, screws, etc., find their way in numbers to an "assembler," who, furnished with a screwdriver and a chisel, takes the parts up indiscriminately and puts them together; and so entirely interchangeable are the parts found to be that a payment of 3 29d. for each rifle put together gives the workman wages of about 50s. per week.

The long Enfield rifle consists of 53 parts, and passes through about 740 processes of manufacture. These processes are multiplied so as to simplify each operation, to divide the labor, and to require mostly only a cheap class of workmen. All parts, including the stock, are issued for repair in a finished state, any damaged part in a rifle in use can at once be replaced by a corresponding part without any fitting.

Up to the present time the government has had no contract for interchangeable arms, excepting one for 30,000 with the London Armory Company. The Birmingham Small Arms Company has, however, lately made interchangeable short rifles for the Turkish government. The cost of non-interchangeable long Enfield rifles with bayonets, under a contract made in 1859, was £2 18s. 6d. each, to which must be added the cost of the stock, 2s. 6d., and viewing expenses, 3s., bringing the total cost to £3 4s. each. It is stated that the average cost of the long Enfield rifles made at the government factory, including an allowance of five per cent on the cost of buildings and machinery, for depreciation, has averaged about £2 each. In 1859 a contract was entered into for short Enfield rifles, which, complete, and including stocks and viewing expenses, cost £4 14s. each. The cost of subsequently producing the same weapon at Enfield is stated to be £2 14s. each. Neither interest on capital nor profit are included in the government estimates here quoted.

It has been estimated that the improvement arising from the accurate work produced by good machinery, coupled with that arising from better ammunition, has resulted in reducing by 50 per cent the mean deviation in rifle shooting. The old smooth-bore musket was considered to make good practice if at 100 yards 75 shots in 100 hit a target 6 feet square. With the present service rifle and ammunition 100 shots can, at the same range, be placed in a space of 6 inches.

From January, 1857, to December 26, 1867, the total number of new arms made at Enfield was 616,828. The number of arms converted to breech-loaders on Snider's plan up to the same date was 175,550. On April 1st, 1866, an order was sent to Enfield to prepare for the conversion to breech-loaders of 40,000 arms; on July 1st this order was enlarged to 100,000; between July and September 10,000 converted breech-loaders had been sent to Canada, and by April 1st, 1867, the whole 100,000 had been supplied. The cost of the alteration of old machines and the supply of new ones for the purpose of the conversion has nearly reached £10,000, which, divided over 200,000 arms, would come to 1s. each. The cost of converting to the Snider breech-loader, including the above sum and depreciation on buildings and plant, is said to be about 16s. 3d. per arm. With the present machinery Enfield is capable of turning out about 130,000 new arms annually.

THE FIRST IRON-CLADS.

While suggestions had been made and partial experiments tried with a view to the use of iron for defensive purposes prior to the Crimean war, the credit of the first great trial of a practical nature is due to the Emperor of the French, who built three floating batteries cased with thick iron plates, which were engaged in the attack of the allies on Kinburn on October 17th, 1855. These batteries were exposed, unsupported, to a heavy fire at a range of 700 yards for about three hours, and although some casualties occurred from shot and shell entering the large old-fashioned port holes, the vessels received very little injury, From this date the public attention was drawn more closely to the protection of ships of war by armor plating, and various experiments were made in this country.

FIFTEEN-INCH WROUGHT-IRON PLATES.

During the last few years the size and thickness of iron plates have greatly increased. The plates of the *Warrior*, constructed in 1861, were 4½ in. thick; those of the *Bellerophon* are 6 in. thick, while the *Hercules* has plates of 8 in. and 9 in. thick at the water line. In France, the plates used for the navy have been increased to a thickness of 15 centimeters, or 6 in., and the *Marengo* and the *Ocean* will have at the water line plates of a thickness of 20 centimeters, or nearly 8 in. A wrought-iron plate, 14 ft. long and 6 ft. 6 in. wide and 15 in. thick, has been prepared for trial at Shoeburyness. Some of the principal English manufacturers (Messrs. J. Brown and Co., C. Cammell and Co., and the Millwall Iron Company), now offer to roll plates about 20 ft. long, 6 ft. wide, and 15 in. thick; but it may be doubted whether plates of such thickness and size can at present be so perfectly manufactured as to give their full proportionate resistance; the production of sound and uniform plates of large size, 10 in. thick, may, however, I believe, be regarded as an accomplished fact.

GREAT GUNS AND MORTARS.

For many years before the Crimean war, brass and iron guns had been made with very little change of form; but when public opinion was drawn to the application of mechanical improvements to the production of guns of great size and strength, clever designs were brought forward by so many that I will not attempt here to give even a list, much less to assign to each its due proportion of merit; but the large wrought-iron Horsfall gun of the Mersey Company, and the monster mortar of Mr. Mallet, may be cited as two remarkable examples. The Horsfall's was a smooth-bore gun, in one piece, weighing 21½ tuns, and having a caliber of 13 in.; and it is now mounted at Tilbury Fort. Mr. Mallet's mortars were compound, weighing forty-one tuns, with a caliber of 36 in., from one of which, with a charge of 70 lb. of powder, a shell weighing 2,395 lb. was thrown 2,759 yards, burying itself eight yards in the ground on its fall. The limited practice with this mortar was interrupted by the fracture of a tie-bolt; but it is greatly to be regretted that no further experiments have been made with it, or with the second piece, which has never been fired.

BREECH-LOADING CANNONS.

You will all remember that in 1860 breech-loading rifled guns were the order of the day, and that neither brass nor cast iron, as materials, were considered to fulfill the necessary conditions. The designs which had earned the greatest consideration, both from the government and the public, had been produced by those two distinguished members of our body, Sir William Armstrong and Mr. Whitworth; and as far as the construction of the guns was then concerned, the leading points of difference were, that while the Armstrong gun was built up of several rings or tubes of coiled wrought iron shrunk over one another and over a steel lining, with small grooves to take a soft-coated projectile, the Whitworth gun was built up of tubes of mild steel, forced with a taper over one another and over a steel lining, the bore being polygonal, with a hard, mechanically-fitting projectile.

ENGLISH CANNON AS NOW MADE.

Irrespective of breech-loading, which has been abandoned in this country for heavy guns, and of rifling, in which the original mode has been to a great extent superseded by larger grooves to guide soft metal studs fixed on a hard metal projectile, the gun now generally manufactured for the service has undergone considerable structural changes, the most material one being the diminution of the number of parts, and the substitution of outer coils of fibrous Staffordshire iron for coils of the best Yorkshire iron, tough steel being still maintained for the lining, as best resisting surface wear. In the former type of gun there was a forged breech-piece over the breech end of the steel lining tube, and, according to the size of the gun, a greater or less number of coiled tubes, carefully and successively fitted on. The pattern at present in use for all guns consists of only four pieces, viz: 1st, the steel barrel, or lining; 2d, a coiled tube over the barrel, extending from the muzzle nearly to the trunnions; 3d, the breech coil, consisting of three coils in alternate directions, welded together, with a trunnion welded on, the whole piece shrunk on over the breech of the barrel, and lapping over the front coil; 4th, the cascable. It is considered by the present authorities that the diminution in number of parts leaves the gun less liable to injury by accident, and less dependent upon perfection in manufacture, and that practically an equal amount of strength is obtained; while it is held that a fibrous iron is to be preferred, as more workable for coils, and as giving out its greatest strain over a greater distance than the best Yorkshire iron, which, while strong statically, is considered not to yield so far before fracture. It is stated that this change has diminished the cost of production by 35 or 40 per cent.

The heaviest projectile thrown by any gun in the service prior to 1854, was the 200 lb. shell of the 13 in. mortar.

The largest Armstrong gun hitherto constructed is an experimental one, which has a caliber of 13·1 inch, weighs twenty-three tuns, and throws a shell of 600 lb.

It is intended that future 12 in. guns shall have a weight of twenty-five tuns.

The 11 in. gun lately constructed weighs twenty-three tuns, and the weight of the several parts are as follows: The steel barrel, 5 tuns 5 cwt. in the rough, 2 tuns 16 cwt. finished; the muzzle coil, 2 tuns 15 cwt. in the rough, 1 tun 16 cwt. finished; the trunnion and breech coil, 22 tuns 6 cwt in. the rough, 17 tuns 17 cwt. finished; the cascable 14 cwt. in the rough, 11 cwt. finished.

Two guns of Mr. Whitworth's, of 9 in. caliber, and weighing fifteen tuns, are about to be delivered for trial.

RANGES OF PROJECTILES.

Prior to the mechanical improvements which have led up to the present rifled guns, the greatest distance to which a projectile was ever thrown from a smooth-bore gun was not much over 6,000 yards, and the limit of bombarding range at high elevations, with the 13 in. mortar was 4,500 yards. With the modern ordnance, projectiles have been thrown with greater precision to a range exceeding 10,000 yards; the guns of the service make good practice at 6,500 yards—in fact, much better practice than was formerly attainable at 3,000 yards.

At 1,000 yards the mean error of range of round shot from smooth bores may be taken as forty-three yards, and that of rifled shot nineteen yards; the mean error of direction (referred to the mean direction of all the shot) with round shot may be taken as 4.1 yards, and with rifled shot as 0·8 yard. At 2,000 yards the mean error of range of round shot may be taken as sixty yards, and that of rifled shot twenty-one yards: the mean error of direction with round shot ten yards, and with rifled shot twenty-one yards. In other words—the accuracy being inversely as the products of the errors—the rifled gun is in one case more than eleven times, and in the other more than thirteen times, as accurate as the smooth bore.

I may be allowed to express my belief that great as have been the advances made in the manufacture of heavy ordnance in France, in Prussia, and in the United States, neither have attained the certainty, the economy, or the perfection, of the productions of British factories. But all our improvements will be of little avail in time of need until smooth bores are much more largely replaced by rifled guns. Meanwhile, for all practical purposes, we are almost unarmed in many of our so called defenses at home and abroad.

RAILROADS IN WAR.

Any notice of the principal application of engineering to the purposes of national defense would be incomplete without some reference to railways, which have always been expected to have an important bearing on modern warfare. They were admitted to be of great use in the movement and concentration of troops in the war in Lombardy in 1859; and in the German war of 1866 the Prussian government organized a special corps consisting of workmen and railway servants, under the direction of engineers and traffic officers, of which a division was attached to each *"corps d'armée,"* to act, assisted by a military escort, in advance of the army, to repair any damages effected by a retreating enemy, to work lines occupied by the army, and in case of retreat, to destroy lines in their rear.

Lieutenant Hozier, in his admirable account of the Seven Weeks' War, admits the value of improved roads and railways in shortening the duration of campaigns, and especially in facilitating the transport of provisions, stores, and a siege train, and in relieving soldiers of heavy loads; but he considers that the power of railways for the support of troops has been over-estimated, and that in an enemy's country railways have been proved to be of no use for the transport of the troops of the invader during his advance, as the defending army breaks them up, and they cannot be repaired quickly enough.

AMERICAN RAILROADS OPERATING DURING THE WAR.

I cannot but think that Mr. Hozier's views of the carrying

capacity of railways might have been modified by the knowledge of what is done on the volunteer field days in this country, while his opinions on the uselessness of railways in an enemy's country are apparently inconsistent with the experience of the last American war.

In that war railways and steamboats were found of inestimable advantage. The reports of General Parsons, chief of rail and river transportation for the United States, show that he considered the application of steam to transport had modified the art of war as much as the pursuits of peace; and he stated in 1865, as the result of his experience, that "it is now practicable, on twenty-four hours' notice, to embark by railway, at Boston or Baltimore, a larger army than that with which Napoleon won some of his most decisive victories, and landing it within three days at Cairo, 1,200 miles distant, there embark it on transports, and within four days' more time disembark it at New Orleans, 1,000 miles further." In January, 1865, in the depth of a severe winter, the 23d army corps was wanted for General Grant's operations before Richmond. After four or five days' notice this force, consisting of 20,000 men, with all its artillery, and over 1,000 animals, was started from the Tennessee river, and moved nearly 1,400 miles in an average time not exceeding eleven days. The distance was about equally divided between water and railway transport, along rivers obstructed by fog and ice, and over mountains during violent snow storms, with various interruptions, including thirty hours' detention from fog in the river, and at one point the unexpected delay of transferring the troops to boats of a smaller class, the railroad, meanwhile, being in the bad condition unavoidable in the severe winters of North America. Within seventeen days from the embarkation of the first troops on the Tennessee, General Parsons had the satisfaction of seeing the army quietly encamped on the banks of the Potomac, as fresh as when they started from Tennessee.

During the war, 611 miles of railway in Virginia, Maryland and Pennsylvania, 293 miles in North Carolina, and 1,201 miles in the military division in the Mississippi, giving a total of 2,105 miles, were more or less occupied by the United States authorities as military railways, under the direction of General M'Callum, the government staff carrying on all the working of these lines, and repairs of works and rolling stock, and to some extent the rolling of rails and the construction of new lines. At an early period a number of workmen, under competent engineers and foremen, were formed into a "construction corps," and stationed in detachments along any railway exposed to hostile attack, and stores were established at intervals to furnish the necessary supplies of rails, fittings, sleepers, and bridge timber.

HOW THE YANKEES BUILT BRIDGES.

This corps became at last very experienced in the work of repairing damage. General M'Callum's reports state that the Rappahannock river bridge, 625 ft. long and 35 ft. high, was rebuilt in nineteen working hours; that Potomac creek bridge, 414 ft. long and 82 ft. high, was built in forty working hours; that Chattahoochee bridge, 780 ft. long and 92 ft. high, was completed in four and a half days; that between Tunnel Hill and Resaca twenty-five miles of permanent way and 230 ft. of bridges were constructed in seven and a half days; and near Big Shanty thirty-five and a half miles of permanent way and 455 ft. of bridges in thirteen days. The last of these remarkable operations took place on the line by which General Sherman was connected with his base, in his advance from Chattanooga to Atlanta; and that the Military Railway Department, almost entirely through a hostile country, should have kept pace with the march of General Sherman, constructing and reconstructing the road in his rear, and ultimately have maintained the supplies of an army of 100,000 men and 60,000 animals from a base 360 miles distant, along a single line, exposed at all times to the attacks of an active and resolute enemy, is indeed a wonderful example of foresight, energy, patience, and watchfulness.

EDITORIAL CORRESPONDENCE.

NAPLES, Jan. 28, 1868.

Vesuvius—A Novel Spectacle of Neapolitan Life—Herculaneum and Pompeii.

Naples, apart from the extraordinary beauty of its situation, its rich museum and splendid churches, does not possess many objects to long detain a tourist; but in the number and variety of its excursions east and west, it offers more attractive features than any other city in Europe. From my youth up I have cherished a desire to visit Vesuvius, Pompeii, and Herculaneun, and to have had that wish gratified fully repays me for all the toils of a journey of four thousand miles. I have seen Vesuvius by dull star light, with its cone all on fire, vomiting streams of red-hot lava, which flowed down its sides like rivers of fire, and casting its dense clouds of smoke and its lurid light upward to the sky; again, on the second night, the appearance still more brilliant and the volume of lava considerably increased, but grander still was the effect of a visit to the mountain by night. Numerous parties go down every afternoon in carriages, as far as the village of Resina, which stands above the spot where Herculaneun lies buried eighty feet below the surface. Here we engaged horses and a guide, and some torch bearers, and thus provided made our way up the mountain near to the crater of the terrible eruption of 1858, which continued nearly three years. The afternoon being clear and still, we were favored with a fine view of the city and bay of Naples, the Castle of St. Elmo high above it, the isles of Capri and Ischia in the bay, and a range of the snow covered Appennines far to the north, while just above our heads rose the awful volcano, with its overflowing streams of liquid fire, and as often as every thirty seconds would a shower of stones be thrown upward hundreds of feet into the air, the shower succeeded by a heavy, rumbling sound, like the distant fire of artillery—certainly a grand and terrifying spectacle. We proceeded on horseback as far as the guide would permit, with sticks in hand, "to try the lava," as the people say when they urge you to buy them. We made our way up one of the principal streams by passing for some distance over the blackening crust of fresh lava, which but three days before was moving down the mountain like molten iron running from a furnace, and was still red hot underneath. At this point, and under cover of the night, we could take at one view not only the eruptions from the crater, but also the several channels through which the lava was working its way down the sides of the mountain, already covered with the blackened masses of former eruptions. We happened to see Vesuvius in one of its most angry moods, and I do not think any of our party will ever forget the sight, and yet no one seems to fear this burning mount. The inhabitants of Naples, and the towns along the base of the volcano, live, eat, and sleep, regardless of the fate of cities that lie buried under its ashes.

The road to Pompeii runs along the eastern bay of Naples, and through a continuous line of villages, whose inhabitants appear to live upon macaroni, if one may judge from the immense quantities of this article hung out to dry. Almost every house has its string of macaroni poles hung out in front, and the people who make it are often so dirty that it is almost impossible to distinguish their features. Pigs are sometimes seen walking around under the pendant links, to say nothing of the dirty urchins who are permitted to handle it. I have heard it said that a lazaroni would keep fat on a daily diet of two cents' worth of grapes and macaroni, but it appears now that the latter article is a luxury which the lazaroni don't enjoy in such abundance.

The roadway from Naples to Pompeii was lined with the strangest assortment of men, beasts, and vehicles, that human eyes ever looked upon. Here is a vehicle or go-cart, resembling a long furniture truck, suspended on a pair of tall wheels, upon the platform of which is fastened what very much resembles an old-fashioned doctor's gig, with covered top thrown back, hung upon double C-springs The seat is occupied by a priest and a fat woman; while behind and underneath the top, sitting on the platform, are two old vegetable women just returning from market. Four men, with red caps, dressed in brown duck trowsers, and short sacks or tunics, are standing up behind, holding on to the gig-top. One is a lazaroni, exposing a pair of legs that might serve for an Apollo. In front, beside the driver, are seven men, who are either sitting or standing upon the platform; the whole load being drawn by one little horse, with a fancy top-knot, and carrying upon his back a huge saddle, provided with three long horns most fantastically ornamented in brass—the center horn carrying a turret of bells and a wind vane. The shafts of the vehicle pass obliquely along the sides of the little animal, and fasten to the saddle a little above his back by a heavily stitched leather band, which slides through openings or grooves cut in the top of the two outer horns. Here is another heavy cart, loaded with cabbages; the skeleton form of a large white ox is yoked between the heavy shafts. On one side of the ox is a little horse, a cow, or a mule; on the other, a small donkey, fastened to the cart by ropes and whiffletrees, to assist in hauling the load. Here is another immense load of carrots, macaroni, or salt cod-fish, drawn by a horse, mule, and donkey, working abreast. Here, again, is a small, open, two-wheeled gig, drawn by a donkey, or a very small horse; the rider is a full-grown man, who jogs along apparently indifferent of the cares and opinions of the world. There is a woman trying to drive a black pig, having a rope tied around his body, and is very nearly being run down by an elegant carriage with fine horses and liveried servants, while all along the sidewalks, fronting the houses, and covering church steps, are to be seen lazaroni sunning themselves; women washing, cooking, spinning from the distaff, examining their childrens' heads, or having their own attended too; half-naked boys running after our carriage, pounding their chins to attract our notice; and beggars, plenty, old and young, sick and sore—the whole constituting an actual scene of every day life along the shores of the bay of Naples, and no mere fancy sketch of a letter-writer. Beggary is reduced to a science in Naples, and we witnessed many singular and disgusting forms of it which suggested a most wretched form of society.

Herculaneum is still a buried city, and but little is known of its extent, except what can be conjectured by the discovery and partial excavation of a theater of very solid construction, and capable of seating 8,000 people. This structure was accidentally discovered during the process of digging a well eighty feet below the surface, and some fine marble statues were found which are now at the museum at Naples. All hopes of knowing anything more of this buried city of the dead are forever lost, as a modern city stands above it, and this may some day share the same fate.

Pompeii, of which the world already knows so much, lies buried upon an open plain, and it is estimated that about one fifth of the city has already been uncovered. It is a strange and melancholy sight to walk through its well paved streets, still bearing the marks of vehicles, worn more than two thousand years ago; and amidst ruined heathen temples, amphitheaters, forums, theaters, palaces, houses, mills, tombs, and other structures, which speak of a people who cultivated many of the refined arts and customs of our Christian civilization.

The museum of Naples contains a very extensive collection of objects of art and utility, dug out of this overwhelmed city; and the work is still going on, though slowly, under direction of the government. As I wandered about through the ruins of Pompeii, I could not resist the conviction that all the objects which have been dug up ought to have been kept where they were found, thus forming the grandest and most interesting museum in the world. S. H. W.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Canal Navigation---Steam Power and Enlargement of Locks.

MESSRS. EDITORS:—Having had some experience in building canals in this country and in Canada, and seeing considerable discussion going on in your State Convention respecting the New York canals, with your leave I will venture to make a few suggestions respecting them, not that I am silly enough to suppose I can effect any particular change in their management; but if I should happen to let fall even *one* idea that will benefit the people of your Empire State, I shall feel amply rewarded.

One great obstacle to the expeditious navigation of the Erie Canal is the numerous locks and the great length of time required to pass the boats through them. To obviate this difficulty, I would suggest the lengthening of the locks to eight hundred or one thousand feet by removing the gate at the upper end of the lock, and then extend the lower level by excavating the 800 or 1000 feet, at which point let the upper part of the lock and gate be put in as it was before. It will readily be seen that instead of locking one boat at a time, six, eight, ten, or more, could pass at the same time. Of course the sluices could be correspondingly increased, to give the water the same free passage it now has in the short locks. Wherever the fall is too precipitous, in order to carry out the foregoing, it will only be necessary to extend the length of the canal by a more circuitous route, thus lengthening the grade also.

Another obstacle to expeditious navigation by the canal, is the present method of towing the boats, which is not only slow but expensive. To obviate this, I would suggest the laying of a railway track on the present "tow path," and tow with locomotive engines. If a double track should be thought too expensive, double switch "turnouts" could be put in at each mile, or as often as necessary, which would be short, as only the engine and tender would require to occupy them. It is estimated that a forty-tun engine, with small drivers, will tow thirty boats at the rate of two and a half miles the hour. Suppose one-sixth of the time should be occupied in locking, the engine would take the thirty boats from Buffalo to Albany in about seven days—no small saving of time, to say nothing about expense. At this slow rate of speed, the wear on the track and engine would be scarcely perceptible.

At the present high prices for labor and fuel, the cost of running such an engine would not be over thirty-two dollars per day. For the seven days it would be $224, or a little less than eight dollars to tow each boat from Buffalo to Albany, and *vice versa*. The expense of towing, in such a case, would be added to the canal tolls; and the freighter would only have to furnish and man his boat.

By running the engines at a uniform rate of speed, it will be difficult to estimate the number of "trains of boats" that could be taken through at the same time.

The "tow path" of the canal being ready for the superstructure, or nearly so, the expense of this method of traction would only be the ties, iron, engines, water tanks, and engine houses.

The plan of lengthening the locks here suggested is a very different thing from "enlarging" them; as, after the excavation is made, the same gates, stone, etc., can be used that would be taken from the upper end or half of the short locks.

I am clearly of the opinion that there is no economy in moving freights on a canal, where horse-power is used, by enlarging the boats, and consequent increase in width of the locks, for the displacement of water is in proportion to the size of the boat; consequently the horse-power must be increased if the boats are enlarged. As for towing by steamboats or tugs, I believe it is an admitted fact, that in our shallow canals it is impracticable.

According to the foregoing estimate one engine would make two round trips from Buffalo to Albany per month, taking thirty boats, each way, each trip. This would be 120 boats taken through the canal per month. For the seven months of navigation it would give 840 boats as the work of one engine. At this rate 100 engines would move eighty-four thousand boats through the canal once during each season of navigation. Supposing each boat were to carry two hundred tuns of freight, it would amount to sixteen million eight hundred thousand tuns per season.

I am entirely convinced, if this plan of working the Erie Canal were adopted, there would be no necessity for building a ship canal around the Falls of Niagara, on the American side, or the adoption of any other expedient to move the heavy freights from the West to your city as rapidly as they may accumulate. ENGINEER.

The Mysteries of Boiler Explosions and Railroad Accidents.

MESSRS. EDITORS:—"Cause unknown." This is a favorite verdict for a coroner's jury on accidents of all kinds. It has in some sort, taken the place of the old-time mortuary verdict, "died by the visitation of God," and is an easy escape from responsibility and a soothing salve to conscious incapacity or willful negligence. "Nobody to blame" is another comfortable and accommodating verdict in case of accident. These set terms are well enough for whitewashing purposes,

but will they forever satisfy the public? When on one single railroad eighteen broken rails are taken up in one day; and on another the train stops four times in less than ninety miles to have broken rails replaced by whole ones; and when it is found that a boiler which exploded had ten out of fourteen head stays broken off for weeks before it blew up, it is about time that either intelligent mechanics and engineers be placed on these juries of inquest or the farce itself be omitted. Your paper has always denied the necessity of attributing boiler explosions to mysterious causes, and I sincerely hope you will continue as heretofore to expose the pretensions of self-sufficient charlatans. B. F. G.

New York city.

Onions and Epidemics.

MESSRS. EDITORS:—In the spring of 1849 I was in charge of one hundred men on shipboard, with the cholera among the men. We had onions, which a number of the men ate freely. Those who did so were soon attacked, and nearly all died. As soon as I made this discovery their use was forbidden. After mature reflection I came to the conclusion that onions should never be eaten during the prevalence of epidemics, for the reason that they absorb the virus and communicate the disease, and that the proper use for them is sliced and placed in the sick room, and replaced with fresh ones every few hours.

It is a well established fact that onions will extract the poison of snakes; this I personally know. Some kinds of mud will do the same.

After maintaining the foregoing opinion for eighteen years, I have found the following well attested: Onions placed in the room where there is small-pox will blister, and decompose with great rapidity; not only so, but will prevent the spread of the disease. I think as a disinfectant they have no equal, when properly used; but keep them out of the stomach.

If need be, the foregoing (which I have greatly abbreviated) can be attested on oath. Let us have all the facts bearing upon the subject. JOHN B. WOLFF.

BEMENT & DOUGHERTY'S STEAM HAMMERS.

The illustrations in this article represent three of the different styles of steam hammers built by Messrs. Bement & Dougherty, of Philadelphia. The hammers are rated or classified according to the effective weight of the piston and hammer head or drop, and range from 100 pounds up to 10 tuns.

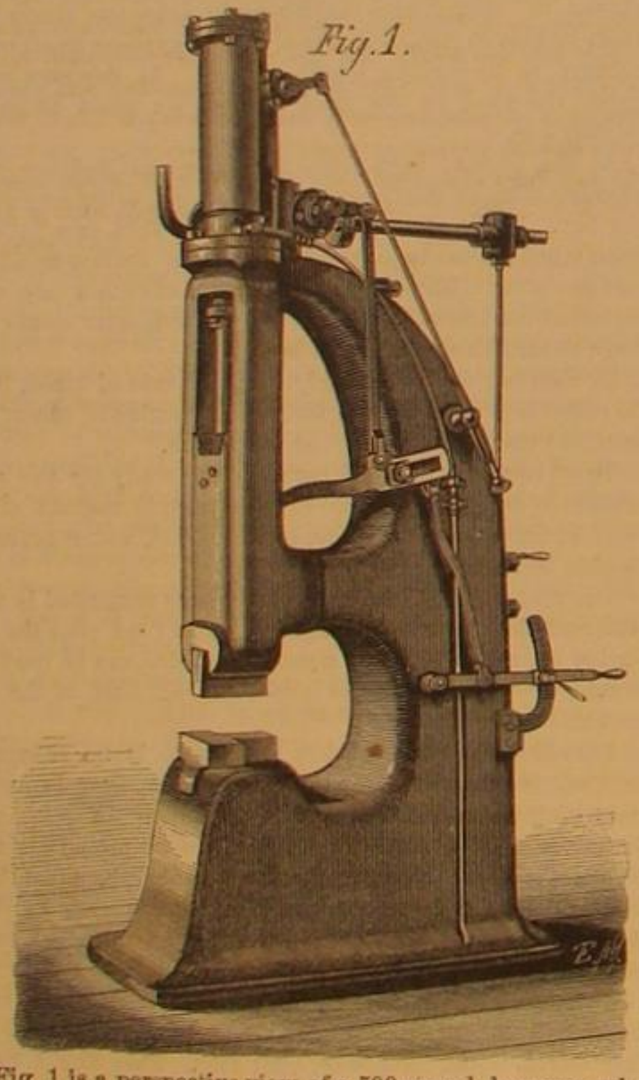


Fig. 1.

Fig. 1 is a perspective view of a 500-pound hammer whose anvil and frame are cast in one piece, to which are bolted the cylinder, guides, etc. It is fitted with an improved valve motion which can be worked at pleasure, single or double acting, adjusting itself to all variations in the thickness of the forging, controlling the admission of steam so as to produce at will a short and quick or a long and slow stroke, and graduating from the light-cushioned blow to the "dead blow," in which no steam is admitted beneath the piston until after the blow is struck, thus utilizing the *vis viva* of the falling weight impelled by the top steam. It can also be used as an ordinary hand-working hammer without altering the setting of the gear.

Fig. 2 shows a 1,000-pound hammer whose frame is keyed and bolted to a massive casting which forms the anvil and base, and expands below the level of the floor to such an extent and mass as to absorb the concussion and thus enables the foundation to be of the least expensive character. The piston rod and drop are of wrought iron forged in one piece. The piston head is of steel and also the guide, which is so arranged behind the drop as to leave the hammer face and dies entirely clear for convenient working. It has the same valve motion as that of Fig. 1, the details, however, not being seen on the side presented, they being sufficiently shown in Fig. 1. Messrs. Bement & Dougherty do not, however, restrict themselves to these designs, but are prepared to build these sizes of hammers with separate anvils if desired.

The 1,500-pound, 2,000-pound, and 3,000-pound hammers being similar in design and differing only in dimensions, are sufficiently illustrated by Fig. 3. They have separate anvils and double frames which form the guides for the drop and the supports for the cylinder, etc. They are fitted with

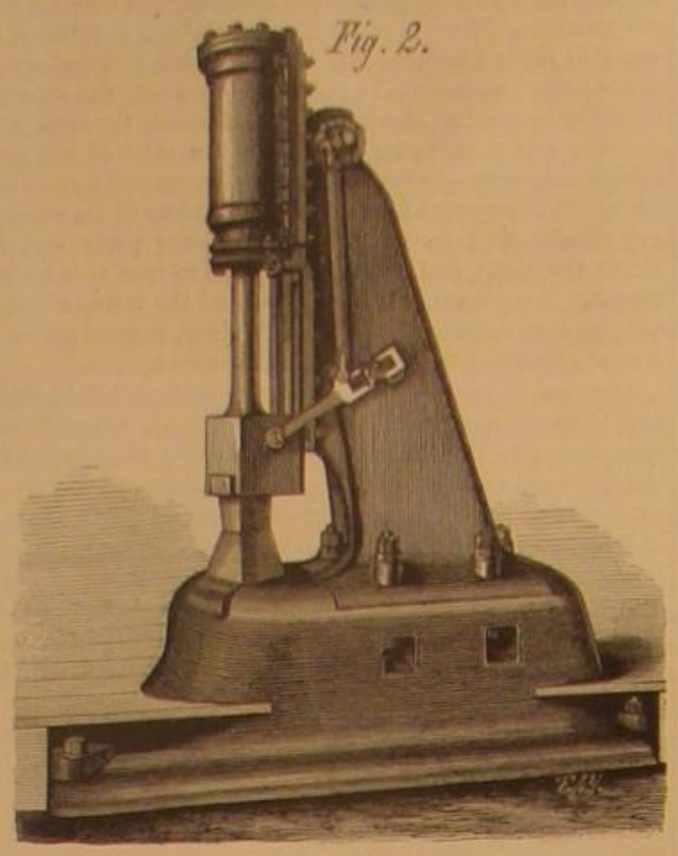


Fig. 2.

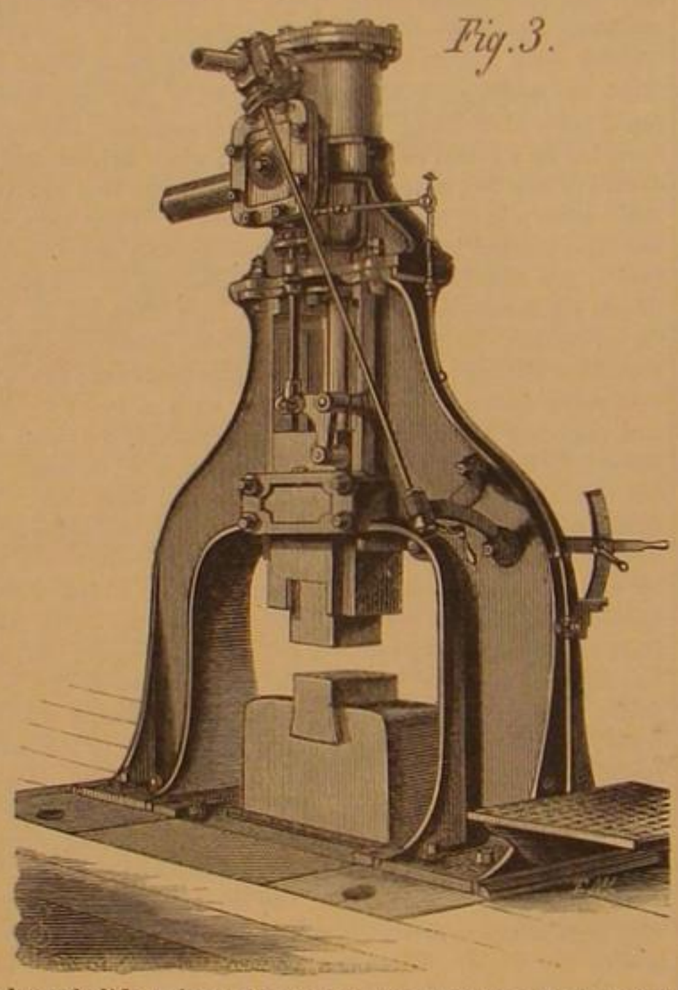


Fig. 3.

balanced slide valves of superior construction whose variable and self-acting motion is produced by the well-known expedient of a rock lever operated by an inclined slot or groove planed in the hammer drop.

Owing to the improvements made in many minor features since the photographs were taken from which these engravings were prepared, they can be said to give a correct idea only of the general style or design of these hammers. [See advertisement on another page.]

History of a Rail of Bessemer Steel.

In the early part of the year 1857 a steel bloom was made by melting in crucibles Bessemer metal with spiegeleisen. This bloom was rolled into a double-headed rail, and in the spring of 1857 it was laid down at Derby station. On the 21st of December, 1867, ten years and six months after it had been laid down, it was reported to be apparently little the worse for wear. Now the wear amounted to, on an average, 250 trains passing over it daily, and a like number of transits of engines and tenders. Reckoning now the weight of each train at 100 tuns average, and that of engines and tenders at 20 tuns, we have an amount of 30,000 tuns per diem passing over this rail, and this continued for, say 300 days per annum, 10½ years, gives a total of 94,500,000 tuns. Now on the Canadian railways the iron rails are worn out by a traffic ranging from 4 millions to 30 millions of tuns, according to the quality of the iron rails. The Derby rail, therefore, of Bessemer steel, has already sustained more than three times the amount of traffic which suffices to destroy the best iron rails, and, in spite of this, it is still "apparently little the worse for wear." The opponents of steel rails will argue, no doubt, that this rail is an exception, and was better than other Bessemer steel rails, because the metal was remelted. Such, however, is not the fact, for steel is always more or less deteriorated by remelting; and the rail ends from Bessemer steel rails, made at Crewe, and therefore, of course, the rails themselves, are of as good and as durable a quality of steel as this Derby rail. ROBERT MUSHET.

Science Familiarly Illustrated.

HEAT AND COLD.

BY JOHN TYNDALL, ESQ., LL. D., F.R.S.

Lecture IV.—Continued.

I have now to say a few words upon another subject—the propagation of this thing we call heat—this curious quivering motion of the atoms of bodies; and in order to make this evident to you, I will, first of all, make an experiment or two on liquid bodies, or on gases. I want you to understand the manner in which heat distributes itself in gases, and, for that purpose, I have here placed a little piece of platinum wire—that metal which we raised to a bright white heat in our first lecture. It is a refractory metal, and bears a very large amount of heat. Now, we will have the room made dark, and Mr. Chapman will excite our electric lamp, and I will ask you to look at the shadow caused by this little platinum wire on the screen. I trust that even the most distant young philosopher now sees that shadow. We will heat the platinum wire by an electric current, and you will observe two things. You see, first of all, that the platinum wire gets longer—swags, sinks down—when I heat it. Observe also the air rising up from the surface of the heated wire. That wave-like motion is due to currents of heated air rising from the wire. The air, when heated, rises in that way. The same is true of liquids; I have here a glass cell containing cold water, which will enable you to see this. I will place it in front of the lamp, and cast an image of it upon the screen. There is a means of warming this spiral of platinum wire within the water, and I want you to observe that the same thing occurs in water as you saw taking place with the air just now. Mr. Cottrell will now make the circuit for the electric current to pass; and then the moment the circuit is made you will find that the water will be heated by this spiral of platinum wire and the heated particles of water will rise to the surface of the liquid. There, on the screen, you see the action of the hot wire upon the water, causing the water to rise in these *striæ*. The water goes up from the heated surface, and in time the heated particles will distribute themselves through the entire mass of the water. I make this experiment in order to fix upon your minds the difference between this action and another which resembles it at first sight. The action which I have shown you receives the name of *convection*, which I should like the elder boys to remember, and I want you to distinguish between this and another process, which is a very different one, and which is called *conduction*. In order to illustrate this subject of conduction, I have placed here before you an iron bar and a copper bar (Fig. 6), and I want to ask them which conducts heat best. Mr. Cottrell will now light a lamp, and place it underneath the bars, so as to heat the ends of them at the same time; and as they become hot they will liberate these little balls, which are fixed on with wax; and I think you will find that the heat will travel along the copper better than along the iron. Here is a similar apparatus, with bits of tallow candle fixed to it. The greater the number of these pieces of candle that drop away from either bar, the further and better the heat has traveled through that body. This is almost a better experiment than the more elaborate one, and it is one which you can make at home for yourselves. The copper will be able to melt away all its candles, while the iron will not be able to do so. The whole philosophy of the clothes you wear is, that they are bad conductors of heat. Your bodies are sources of heat. Through the burning up of the food you eat, within your bodies, warmth is produced; and the object of the woolen clothes which you wear at the present cold season of the year, is simply to prevent the passage of heat from the body to the

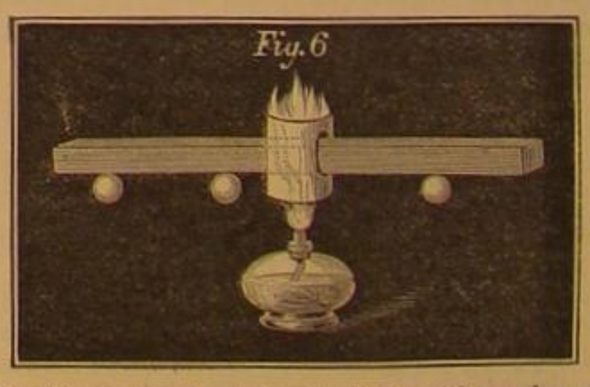


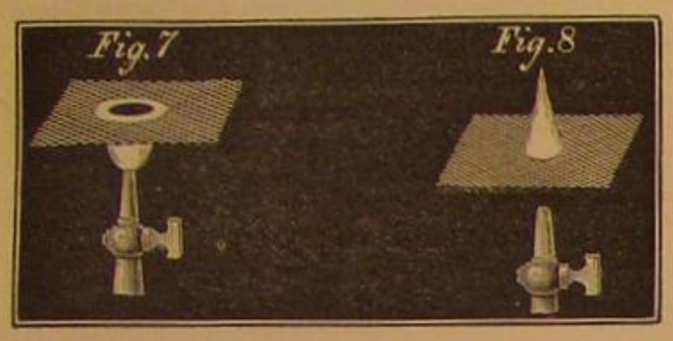
Fig. 6

air. For this reason we clothe the body with woolen cloth, that being one of the worst conductors of heat in nature. But the cloth has no warmth in itself; if I want to keep ice cool, as I did in a former lecture, I wrap my ice in flannel, which prevents the heat from without coming to the ice. Thus the woolen cloth simply prevents the transfer of heat in either direction, and hence the value of these non conductors as articles of clothing.

The experiment with the pieces of candle sufficiently illustrates the fact that different materials differ in their power of conducting heat. I might also show you this in another way. If I warm this piece of iron by putting it into warm water, and then place it upon a cylinder of glass which stands on the face of the thermo-electric pile, that glass does not allow the heat to pass through to the pile, and the needle still remains on the side of cold. It would be a long time before the heat of this iron passed through the glass and reached the face of the pile. I will now remove the glass and place a cylinder of copper on the face of the pile, and then put the warm iron on the copper. I suppose that not more than two or three seconds will elapse before the heat will pass by the conduction of the copper to the face of the pile, and the moment it does so you will see that the needle will come to the other side of the middle line, showing heat. Now, in this

case, instead of having the heat transferred, as in liquids or gases, by the passage of hot masses through the remaining bulk, we have a transmission of heat from atom to atom of the copper; and this process, as I have said, is called *conduction* of heat, in contradistinction to the other process, which is called *convection*.

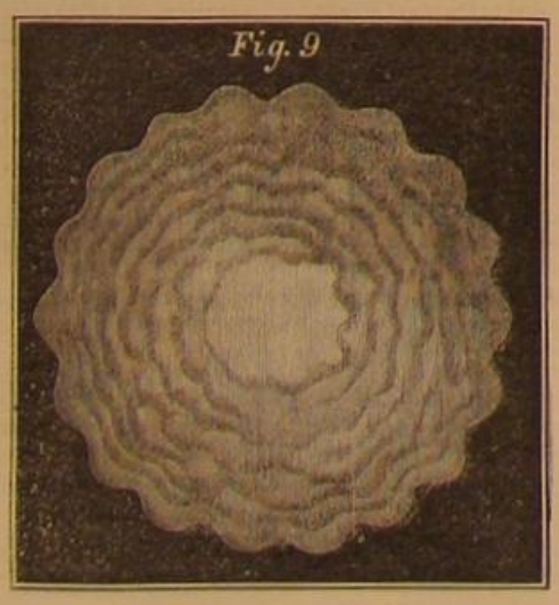
And now I have to go on to another subject of a somewhat different character; but in passing I must say a word upon a very useful piece of apparatus, the safety lamp, which, unfortunately, is not always wisely used. I will state the problem which the inventor of this simple, but very wonderful apparatus placed before him. You must know that in our coal mines the miners are prevented from using a candle to light them while at their work, in consequence of the quantity of gas which is in the air of the mines. In former times they used to employ a flint and steel, and work by the feeble light of the sparks. The problem which Sir Humphry Davy, the inventor of the safety lamp, set before him was this: "How can I give the miner light, and still preserve him from this explosive gas?" and he thought, "Can I put a light in any way within an apparatus so that, although the light shall shine through the apparatus, the gas outside will be prevented from exploding?" He found out that a flame could not pass through a piece of ordinary iron gauze. In fact, the flame is so much cooled by the wire gauze, in consequence of iron being a good conductor of heat and carrying the heat away from the flame, that the flame cannot get through. You see that when this iron gauze (Fig. 7) is placed over the



flame, the flame is entirely cut off, and cannot pass through; and if we light the gas above the gauze it will burn there, but the flame is prevented from reaching the gas below the gauze. (See Fig. 8). Now, Sir Humphry Davy, when he made the miner's safety lamp, surrounded the candle wick or the oil wick with a wire gauze; and, although the light can pass through the meshes of the gauze, you might have an explasive mixture within and without the lamp, but the flame inside could not propagate itself to the gas outside, being unable to pass through the gauze.

I come now to another subject, and a very interesting one. I will ask Mr. Cottrell to heat a silver crucible, or dish, almost to redness; and supposing I then pour water into it, what do you think will occur? You might at first say, "Well, the water will be converted into steam." That is not quite the case. You will find when I pour the water into the vessel that the heat of the vessel produces such an amount of vapor from the water, that the water is supported upon a spring or elastic cushion of its own vapor, and is thrown into the form of a sphere, and the water rolls about in its own vapor. In order to show you this effect, we will cause a beam of light to fall right into the silver basin, and that beam of light will illuminate the drop of water which we pour into the basin. The image of the interior will be then thrown upon the screen We now blow in a little water.

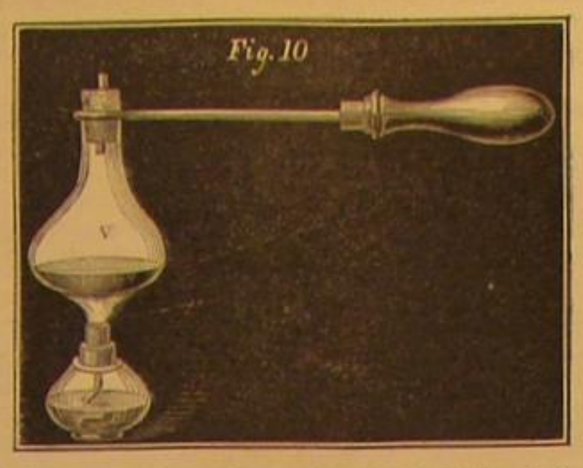
Now you see represented on the screen the globules of water rolling about—rolling about upon a cushion of their own vapor. Sometimes in this experiment we get a most beautiful figure produced by the water. We get a rosette form of globule. The vapor breaks away from the water in a kind of musical way. We will see if we cannot get the rosette form—a crimping of the edge of the drop of water.



[After a few seconds the rosette form occurred. See Fig. 9]. When the basin is not very hot, at first these little crimpings arise, and then, when the vapor is not sufficiently strong to lift the water out of contact with the basin, the water will come into contact with the basin, and will suddenly boil. There it is. [At this moment the spherical form ceased, and the water boiled up and immediately disappeared with a hissing sound]

I must now send Mr. Cottrell down stairs to prepare something of very great interest and beauty; but as I do not know whether the experiment will succeed or not. I do not wish to raise your expectation. If, however, it succeeds, the experiment will be a very useful and a very important one.

In the meantime I want to show you what may occur in consequence of this spheroidal condition of water on a hot surface. I have here a little copper boiler (Fig. 10). I will cork this boiler up, but I intend first of all to heat it very highly indeed, and then I will place a little drop of water into the boiler. I now heat the boiler, and Mr. Chapman



will hand me some hot water, and when the boiler is heated I will pour a little into it, and that water will roll about as a spheroid. Vapor will be given off, but being small in amount, while the water is rolling about it will escape through a small hole in the cork. I will then withdraw the boiler from the source of heat, and the drop of water will then come into contact with the hot boiler; steam will be generated, and I think that that steam will be sufficient to expel the cork into the atmosphere. [The experiment was performed with the result anticipated.] There you see the steam drives out the cork the moment the water becomes changed into vapor by contact with the hot surface of the boiler. In this way we may have very serious explosions, but that is a subject into which I cannot go at present.

I want now to make an experiment or two which shall illustrate the character of a certain substance with which I am now going to operate. I have had occasion to mention gases several times in these lectures. Now, gases and, in fact, the very air we breathe, are nothing more than the vapors of substances possessing very low boiling points. For instance, Mr. Faraday, to whom we are indebted for the very finest investigations upon this subject, succeeded in squeezing together the particles of the gas which is contained in this vessel, and forming it into a liquid; and there are other gases which have been liquefied by Mr. Faraday. One of them is a gas called carbonic acid, which we breathe out of our lungs. I want to generate a quantity of carbonic acid gas in this large round glass vessel. We have at the bottom of the vessel some bicarbonate of soda, and I have here an acid. If I pour the acid into the vessel it attacks the bicarbonate of soda, and we get this carbonic acid gas liberated. I dare say we shall presently have accumulated enough for our purpose. [After an interval]—Now let me see whether the gas which has been liberated has not the power of putting out a candle. This will show whether the gas exists in this vessel or not. [A lighted taper was lowered into the vessel, and was immediately extinguished by the carbonic acid gas therein contained.] Yes: there is the gas. You see it is incompetent to support the combustion of the candle. The vessel is very nearly full. Now I will show you that this gas is very much heavier than ordinary air. I might ladle it out or dip it out in a bucket, and if I did so in front of the screen you would see it fall like water from a vessel, although under ordinary circumstances it is quite invisible. But I want to show you its heaviness by means of a soap bubble. I will blow a bubble from this clay pipe, and allow that bubble to fall upon this invisible gas. You will find that the bubble will float about upon the surface of the gas as if it were floating upon the surface of a visible liquid. [Successive soap bubbles were then prodnced, and on being detached from the tobacco pipe, were gently dropped on the surface of the carbonic acid gas, and while floating there, were illuminated with electric light.]

Let me now tell you what I have sent Mr. Cottrell to do. Down stairs in the laboratory we have two very strong iron bottles, and these two bottles are filled with this carbonic acid. The gas in those bottles has been liquefied, and at the present moment he is turning a cock and allowing the liquid carbonic acid to turn into gas. What I want you to understand is that when the liquid carbonic acid turns into vapor it generates enormous cold, just as our vapor of water did on its production, only the cold generated by the carbonic acid is far greater. The consequence is, that when this liquid is turned into a gas and generates this cold, a portion of the vapor is turned into snow, and we thus obtain carbonic acid snow. I am almost afraid to speak to you about this matter, lest we should fail to get this wonderful substance. If I do get it I intend to put it into this vessel and make a few experiments with it which will both delight and surprise you. If we get the solid carbonic acid we shall be able to freeze water and produce ice in a crucible when it is actually heated to redness. First of all the carbonic acid snow is itself very cold, but in order to make it still colder I pour a little ether upon it. This turns it into a paste; and this mixture of carbonic acid and ether gives us nearly the greatest cold which has ever yet been produced. If we put that paste of carbonic acid and ether into the hot crucible, what occurs? The carbonic acid and the ether evaporate, and they so evaporate as to produce a protecting coating of vapor of carbonic acid between the red hot crucible and the pasty mass within it. In point of fact, the pasty mass does not touch the crucible at all. It remains intensely cold within the crucible. If we are successful in getting the solid carbonic acid, I shall dip this small brass sphere containing water into the mixture of ether and carbonic acid in the hot crucible; and I have no doubt that the water will freeze and will burst the brass sphere, and we shall then be able to take from the red hot crucible a sphere of solid ice. Mr. Cottrell is a long time bringing the solid carbonic acid. I am afraid he is not successful. Allow me simply to walk down stairs and see that the matter is going on rightly. [The lecturer then went in quest of the carbonic acid. On returning to the theater he resumed as follows]—I am sorry to say that my worst anticipations have been realized. The experiment below has has not succeeded. Here, however, is a little of this wonderful carbonic acid snow—solid carbonic acid. I will put a little in my mouth, and breathe against a candle. If I inhaled it I should kill myself; but I do not intend to inhale it. I intend simply to *exhale*. [The candle flame was then extinguished by the gas exhaled from the lecturer's mouth.]

TURNING A MOVABLE WHEEL AROUND A FIXED WHEEL.

"How many revolutions on its own axis will a movable wheel make in rolling once around a fixed wheel of the same diameter?"

This discussion continues with unabated interest and we are in receipt of a great variety of additional communications, with models and curious diagrams. Examination of the subject leads to study of the laws of motion, which becomes more interesting the further it is carried and is undoubtedly of benefit to the participants.

The two revolution philosophers may rejoice in the accession to their cause of Dr. Vander Weyde, late Professor of Mathematics and Chemistry, Gerard College, whose letter follows.

The editor of the Newburyport, Mass., *Daily Herald*, also appears as a two-revolution champion, and winds up a leading editorial as follows:—If the editor of the SCIENTIFIC AMERICAN "really needs any further light on the subject let him stand up face to face with another man of about his size—or a good looking woman—and revolve around him or her, and he will see that he will face the same side of the room *twice*, before he returns to his original position.

"The reason of the apparent discrepancy between a wheel revolving once to measure off its circumference on a plane and twice on a circle, is simply that in the latter case half of the motion is constantly wasted in space, so to speak, in getting round to the surface on which it is to revolve—'that's what's the matter.'"

Clear as mud that. If our cotemporary cannot do better the two-revolutionists will disown him. We would say to correspondents that we are always glad to hear from them; but of course we cannot publish every letter. We shall however endeavor to give every side a representation, and if a direct reply is not always given, correspondents will find their answer in some parallel representative case.

We still adhere to "one" and the majority of our correspondents coincide with us. We however take pleasure in giving a full and fair hearing to those who say "two," and for this reason make perhaps the most numerous selections from their letters.

MESSRS EDITORS:—Let us suppose fixed wheels of different diameters and the case will become clear. First, let the fixed wheel be very small, commence with one infinitely small, a point; then a movable wheel turning around a point will have made exactly one revolution around its own axis when it has returned to its first position, no matter where this point is situated, it may be near the axis or near the circumference, inside, or even far outside the wheel. In the same manner the moon makes one revolution around its own axis when it turns once around the center of the earth. (In regard to the earth the moon makes, of course, no revolution at all around its own axis but she does so in regard to sun, stars and the rest of the universe.)

But when a wheel rolls in the same time around another wheel the effect of this rolling is added to its own rotation; however small this fixed wheel may be the moving wheel will make more than one revolution around its own axis; the number of these revolutions will depend on the relative size of the movable and fixed wheels; so when the fixed wheel is half the size of the movable it will make one and one half revolutions; if the wheels are equal the movable will make two revolutions, if the fixed wheel is twice the size the movable will make three revolutions, if three times the size four revolutions, and, in short, the movable wheel will always make one revolution more than the number expressing how often the size of the movable wheel may be divided into that of the fixed wheel.

It is scarcely worth while to exhibit wood cuts to illustrate these truths. Let any one who is not clear on the subject make the wheels out of disks of cardboard and rotate them rolling one along the other; it will serve him at the same time for a mental, geometrical and mechanical exercise, taking for his model the figure, page 67 (which is perfetly correct and demonstrates clearly the two revolutions), and making the wheels of different relative diameters the above-mentioned number of revolutions will be found to take place when rolling one around the other. P. H. VANDER WEYDE, M. D.

MESSRS. EDITORS:—I have just tried the experiment of a movable wheel revolving round a fixed wheel of the same diameter, and find it makes one revolution. I cut two wheels out of a thin piece of wood, made one fast, and from a given point on each rolled one around the other and one revolution is all I could make. It is astonishing what an amount of figures have been indulged in to prove the contrary while by a simple experiment they might prove "one" to be correct.

Camden, N. J HENRY M. TEST.

MESSRS. EDITORS:—About the wheel question: I would like to ask L. M. how many times the arrow head points to

ward the center of the fixed wheel in making one revolution around the fixed wheel? It points there but once and therefore the movable wheel makes but one revolution on its own axis. N. L. B.

Boonton, N. J.

Messrs. Editors:—A wheel rolling once around a fixed wheel of the same size makes two revolutions on its own axis: you say "one" but avoid giving a demonstration anxiously desired by your readers—you are not obliged to give it, but must stand by the consequences. I maintain the "wheel" makes two revolutions on its own axis, this I will demonstrate with your permission, in the Scientific American; but should you refuse my offers, then I would necessarily get the assistance of some other paper. An answer would oblige

Aurora, Ill. James Thierry.

In reply, if our correspondent will look at back numbers he will see that we have been engaged in demonstrating the subject for several weeks past. But it seems we do not progress quite fast enough for him; and he turns his wheel once too often for us. If he can write something interesting and short, we shall be happy to publish it.

W. E. H. replies as follows, to our comments on his article and diagram published last week:

"Until I received your paper of March 7th, I supposed that not only was I sound in the faith, but that my belief was known of all men.

"I most certainly hold that the movable wheel makes two revolutions on its own axis, while passing once around the fixed wheel. This I prove by showing that the index, *b*, secured to the movable wheel, points in every direction from its axis twice while passing once around the fixed wheel.

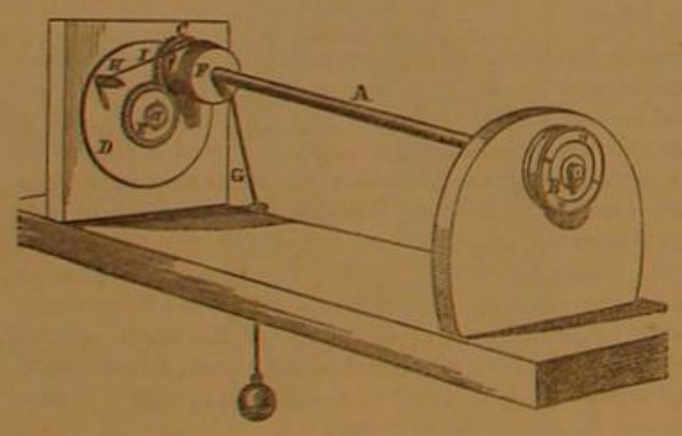
"With regard to the axis, I would say that an axis 'of a body' is 'that *line* about which the body revolves, or may be supposed to revolve.' It has no extension but length, and is no more capable of revolution than a cherub is of sitting down.

"If we once admit that an axis may be a cylinder, and revolve, such expressions as the earth's revolution *on* its axis every day, become absurd.

"For, if we suppose a pointer fastened to this so-called axis of the earth, near the pole, like the short pointer in the diagram of last week, it will turn with the earth each twenty-four hours. The earth, moving with the same angular velocity, the pointer will ever be directed to the same meridian; according to your argument the earth will not turn on its axis at all, seeing that, to turn over, it must have twice the angular velocity of the so-called axis. It was to avoid this difficulty that I used the word "bearing" so frequently in my letter. The axis of the wheel coincides with the central line of the bearing of which it is also the axis.

"Wm. E. H."

W. E. H. also sends us, from the office of the two-revolution philosophers, another very neat model illustrating their views, with the following note:



"Messrs. Editors:—Having leisure, I have made another machine to illustrate the question. The postulate here taken is, that when one end of a shaft revolves on its center or axis, the other does also. Two wheels, B C, are fastened to the opposite ends of a shaft, A, one end of which is pivoted in a movable disk, D, which rotates around a fixed wheel, E, of the same size as C; the shaft, A, being long and slightly inclined. The wheel, B, is to be turned by hand until it has made a complete revolution, when the opposite wheel, C, will be found to have moved but half way around the fixed wheel, E. Another turn of the wheel, B, will carry wheel, C, completely around E.

"I have, also, attached a pulley, F, to the wheel, C, on which a cord, G, may be rolled, and will be found to encircle the pulley twice in each 'orbit.'

"Middletown, Conn. W. E. H."

In reply to our correspondent's postulate, it is sufficient to say, that, because both ends of a shaft make the same rotation, it does not therefore follow that a wheel revolves twice upon its own axis, in rolling once around a fixed wheel.

The above diagram represents a device by which compound rotary may be converted into direct rotary motion, or *vice versa*. The axis of wheel, C, is carried in the rotating disk or carrier, D, which has its axis of motion at *a*; and by reason of the gearing together of C E (the latter being fixed) the wheel, C, is caused to rotate once upon its own axis for each rotation of the disk, D, upon its axis, *a*. These motions are both transmitted through the gear teeth; and a cord, G, hung upon pulley, F, or upon wheel, B, will be wound twice for each rotation of the disk, D, because the effect of both rotations, namely, the rotation of the carrier or disk, D, upon its axis, *a*, and the rotation of the wheel, C upon its own axis, are both imparted to the cord.

Now when we separate these two motions and allow only one of them, namely, that of the wheel, C, to act upon the cord, we shall then make clear to the eye the true and actual number of rotations of the wheel, upon its own axis, in rolling once around the fixed wheel, E.

In order to separate the cord from the effects of the rotation of the disk, D, we have only to set the cord spool, H, upon the disk and extend the thread, I, to the pulley, F; and now, on rolling the wheel, C, once around the fixed wheel, E, the cord will be wound up once, because the wheel, C, has rotated once upon its own axis.

Our friend's model and diagram practically illustrate the error of the two-revolution philosophers, and prove the correctness of those who adhere to "one."

Messrs. Editors:—Having been a reader of your valuable paper for twenty years except the four years that I was locked up in Dixey, I feel an interest in anything in which its opinions are opposed by any one, as I have always found them correct. I do not suppose that you need any assistance to show that you are correct on the wheel question. But as it is an open one, allow me to give my views on the subject. L. M., and others are trying to prove to the world that there is a wheel within a wheel; allow me to say that I am unable to see it. If L. M. will place a pin in the center of the fixed wheel and one in the center of the movable wheel and connect them by a strip or rod, and mark a point near the center of the movable wheel and pass the movable round the fixed wheel, he will find that the point marked will pass the connecting rod but once, therefore it makes but one revolution around its own axis, and one revolution around the fixed wheel, making two distinct revolutions. Samuel Hand.

Midville, Ga.

Messrs. Editors:—Here is a mathematical solution of L. M's problem. If a wheel three feet in circumference is rolled once around on a plain surface it, of course, accomplishes just three feet distance, the axis also has traveled just three feet indicated by the dotted line. Now when this wheel is rolled around another of the same size the axis will travel through a space of six feet, it being the circumference of a circle two feet in diameter.

Now for mathematics. If a wheel makes one revolution while its axis travels three feet how many revolutions does it make when its axis travels six feet? Ans. Two. Because six is twice as many as three. Surrender! all you "oneists" as gracefully as you may after such a persistent fight all on the wrong side. T. L. B.

Boston.

The question is not how far the axis travels, and we therefore decline to surrender.

Messrs. Editors: Referring to the diagram in your last Vol. XVIII., page 133, of H. Anderson, Peekskill, N. Y., if the loose end of the thread be held at the center of the fixed wheel, A (the only place to hold it), H. Anderson will find the thread wound only once around the shaft of the movable wheel, B. A. R.

Rochester, N. Y.

Messrs. Editors:—As a solution to the question, "How many revolutions does a wheel make on its own axis rolling around another of the same diameter once?" A. C. Sekell tries to prove that the wheel makes two. Mr. Sekell in his diagram makes the wheel turn a quarter of a revolution at each right angle of the square. But in doing this he changes the center. The second center is at the extremity of the diameter of the first circle. But in thus changing the center he destroys the first circle. Therefore the quarter of a revolution made by this circle cannot be added to the quarter of a revolution made by the first circle in passing over the first side of the square.

Again, to prove it mechanically, suppose a wooden block squared, the sum of its four sides equal to the circumference of a wooden wheel. Putting an axle in the wheel, let us commence at the first corner of the square; roll the wheel on its axle to the second corner. Thus far one quarter of a revolution has been made. Now let us lock the wheel; change the center to the tire of the wheel; on that center swing the entire wheel around the second side, and we are ready to make the second quarter revolution; yet the wheel has not revolved on its own axis, for the axle has been locked. Unlock the axle, and we can make the second quarter as before.

Newbern. P. W. T.

Messrs. Editors:—Every one seems to understand the wheel problem, but none seems to understand the cause of the difference of opinion. I think both sets of philosophers may congratulate themselves on being correct upon this question. The wheel makes one or two revolutions, according to the point from which it is contemplated. In relation to any point inside the circle scribed by the center of the moving wheel, it makes one revolution. In relation to any point outside of this circle it makes two. In relation to the sun, the moon revolves upon its axis. In relation to the earth, it is fixed.

Bristol. B. B. L.

It appears to us that both sides cannot be right. It is a question of fact, not of optical appearance.

Messrs. Editors:—If you want any wheels, to test "L.M.'s" principle with, we can send you a few dozen. Every one here has been manufacturing wheels for the last three weeks.

North Madison, O. H. R. S.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The extension of the Erie broad gage track to Chicago is no longer doubtful. The contract for the building of the intermediate connections of the Great Western with the Toledo, has been already made. This move has been demanded by the Western freight interest, on account of the high rates of the New York Central, the late advance being such as to prohibit the forwarding of freights further than Toledo. If the Erie directors had refused to meet the views of the railroad interest West, a junction would have been made with the Pennsylvania Central and the Baltimore and Ohio.

An English patent has lately been granted for an improved metal, from which it is claimed castings may be procured or steel manufactured in much less time and at a greatly reduced rate, than by other processes. After the ore is reduced in the blast furnace to the state of molten crude metal, the furnace is tapped, and the liquid metal runs off into a vessel or receptacle, when a blast of atmospheric air of a pressure of four pounds to the square inch, and upwards, is introduced into the mass through a hollow stirring rod. The effect is the driving off of the impurities, and the metal may run directly into molds, or steel of a fine quality may be procured by adding unmelted spiegeleisen or other compound of iron and carbon.

The new West Shore Hudson River Railroad is advancing with commendable energy, and the contracts for the first sixty miles will be closed this week. The negotiations for the purchase of the Northern New Jersey Railroad by this company have been successful, and the latter will enter upon possession shortly. The new road will connect with the proposed Midland line to Oswego and the Lakes.

California is rapidly extending her silk manufactures. It is announced that at the town of San José there has been started a silk manufactory with a capital of $100,000. The machinery has arrived, the foundations of the building are laid, and the worms are at work.

The Cheyenne papers claim that besides her gold treasures the territory of Wyoming proves to be very rich in the baser metals. Copper, iron, and lead are found in inexhaustible quantities along the base of the mountains for a long distance, from the Colorado line north. Good coal can be found all over the Laramie Plains, and in the same vicinity the discovery of oil and mineral springs has been reported.

The proposd Mexican Central Railroad, if built, will prove of the greatest benefit to that Republic. The design is to construct a road from the City of Mexico, four hundred and fifty miles, to Matamoras. From the Rio Grande to the Mississippi, supposing Vicksburg to be the objective point, is a distance of six hundred and forty miles. There is a road now running from Vicksburg west to Monroe, aiming at Shreveport, while an other is in progress from Houston eastward, aiming to touch both New Orleans and Baton Rouge. With the entire business of the best part of Mexico as a prize, both these roads would soon be completed.

The famous Comstock Lode, probably the most productive mineral vein in the world, is a strip of land only three miles long by 600 yards wide. The yield is valued at $12,000,000 annually. Five thousand men find employment in working it, and the produce for each workman is about $2,000 per annum. In 1865 there were forty-six companies working it, and they had excavated about twenty eight miles of tunnels and drifts. The longest tunnel made is 3,200 feet; the greatest depth penetated is by the Gould & Curry, 821 feet.

General Palmer, the Treasurer of the Kansas Pacific Railway, has been exploring a route to the Pacific by the thirty-fifth parallel of latitude. He reports that rarely have they been obliged to resort to the maximum grade permitted by Congress, and on the highest summit on the route there will never be as much snow as on the Alleghanies; and for a summer and late autumn resort, there is not a finer spot on the continent than "President's Park," at that summit. If the company obtain the subsidy next spring, the road can be completed in four years' time.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Governor.—Ephraim P. Rogers, Corning, N. Y.—This invention relates to a new and improved method of constructing governors for steam engines and other purposes, whereby the same are rendered more effective in their operation, and whereby the expense or cost of a governor is materially lessened.

Frame for Carriage Tops.—James H. Flagg, Perkinsville, Vt.—This invention relates to an improvement in frames for carriage tops, intended for a top to be used as a substitute for an umbrella.

Churn.—C. H. Carver, Taunton, Mass.—This invention has for its object to furnish an improved churn, simple in construction, easily cleaned, easily operated, and which will do its work quickly and thoroughly.

Crib Attachment for Bedsteads.—Harriet Ruth Tracy, New York city.—This invention has for its object to furnish an improved bedstead and crib, so constructed and arranged that when the crib is not in use and is pushed into its place in the bedstead, the said bedstead and crib shall present a neat and uniform appearance, giving no indication of the presence of the crib attachment.

Self-raising Flour.—Wm. C. Hughes, Scio, Mich.—This invention relates to a method of preparing self-raising flour, and consists in a thorough and intimate incorporation of the fermenting principle with the flour when the grain is ground, in a certain proportion and at a low temperature.

Harness Pad Tree.—J. W. Hinman, Berlin, Wis.—This invention relates to the construction of a pad tree for gig, coach, or other harness, and consists in attaching the opposite sides or sections of the pad to a center piece by means of joints or hinges, whereby it is rendered flexible and self-adjustable to the back of a horse, yielding on one side or the other freely to his motion, and resting in an easy and comfortable manner.

Spring Bed Bottom.—E. E. Worden and H. Wilms, Brandon, Vt.—This invention consists in the use of elliptic springs or stays, and in the manner in which the upper frame is supported thereby, and also in the manner in which the spiral springs are supported and held in position.

Washing Machine.—P. F. Bindewald, Stronzsville, Ohio.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, effective in operation, and which shall be made wholly of wood, so that there may be no danger of the clothes being injured by iron rust.

Securing Labels in Glassware.—Edward W. Davis, Pittsburg, Pa.—This invention relates to an improved method of securing labels of brass and other metallic bodies in glassware.

Animal Trap.—William Miller, Chicopee, Mass.—This invention has for its object to furnish a neat, simple, and effective means for catching rats, mice, and other animals.

Harness Motion for Looms.—James Greenhalgh, Sen., Woonsocket, R.I.—This invention has for its object to improve the construction of the parts of a loom, by means of which motion is imparted to the harness, so as to simplify their construction and make them more effective in operation.

Fastening Metallic Collars on Bottles.—Edward Watts, Philadelphia, Pa.—This invention relates to an improvement in the method of securing metallic collars to the necks of glass bottles or flasks, whereby the same are securely fastened without cement, and are rendered durable and firmly attached while the bottle lasts.

Combined Boiler and Hot Air Register.—B. B. Perkins, Chestertown Md.—In this invention a boiler connected with the register is attached to the side or end of the hot air flues in houses, for the purpose of utilizing the heat conducted away by the walls of the flue and of supplying hot water to the upper rooms of the house.

Rice Planter.—Elijah Wagoner, Westminster, Md.—This invention is a machine for planting and covering rice, by which all the operations required in the planting of that article are as carefully and accurately performed as if done by hand, and by which one man is enabled to perform the work hitherto requiring the services of dozens of laborers.

Envelope.—Sigmund Ullman, New York city.—In this invention a new method of constructing, folding, and sealing the envelope is employed, by which the use of adhesive gum is dispensed with, and when the envelope is sealed it is impossible for any one to open and close it again without leaving evidence of the transaction upon it.

Life-Saving Apparatus.—John B. Stoner, New York city.—This invention has for its object to furnish an improved apparatus by means of which

persons, when compelled to commit themselves to the water in case of accident on steamboats or shipboard may sustain themselves for days, or until they are rescued or reach a place of safety. Patented Feb. 4, 1868.

BALLASTING VESSELS.—John B. Stoner, New York city.—This invention has for its object to furnish an improved mode of temporarily ballasting a vessel, when necessary, by lowering weights into the water, so as to prevent the rolling or capsizing of said vessel. Patented Feb. 4, 1868.

MECHANISM FOR OPERATING STATIONARY MACHINERY.—Galusha Meranville, Hampton, N. Y.—This invention relates to a new arrangement of gear wheels, worms, cranks, and levers, for driving suction pumps, force pumps, and other suitable stationary machinery, and it consists in the general arrangement of gear wheels for obtaining the aforesaid object, and also in a new method of converting rotary into oscillating motion.

SCREW CAP FOR OIL CANS.—Wm. Rigg, London, England.—This invention relates to a new device to be applied to oil cans, in which kerosene and other oil is usually transported to foreign countries, so that the can may, when it arrives at its place of destination, be emptied without the loss of oil and without soiling the attendants.

TRIP HAMMER.—Charles Vogel, New York city.—This invention consists in a novel connection between the shank or stem of the hammer head and the beam through which the hammer head is tripped. Also in so constructing the beam carrying the hammer stem or shank, that it can be adjusted for raising the hammer head to a greater or lesser hight. Also a in novel combination and adaptation of springs imparting additional force and strength to the blow of the hammer, their combination and arrangement being such as to be susceptible of adjustment for a blow of greater or lesser degree of force and strength. Also in a novel arrangement of parts for arresting the motion of the hammer without requiring the driving mechanism to be stopped, the arrangement being such as to be self-operating when set free, and to arrest the hammer when at or near the end of its upward stroke or movement and there hold it, leaving the anvil exposed. And, finally, in an arrangement of parts upon the driving shaft of the trip hammer on which they are hung, to swing about and over its driving pulley, in combination with a treadle or other suitable operating lever, for the purpose of enabling the driving belt to be more or less tightened about the driving pulley, as may be desired, or found necessary in the running of the hammer.

MANUFACTURE OF BUTTONS.—Lewis Moses.—New York city.—This invention relates to a new manner of securing the eyes or loops of glass buttons to the body of the buttons, and consists in the use of liquid glass mixed with finely powdered glass or other mineral matter, by which a sheet metal plate to which the said loop is soldered, or cemented to the underside of the button, in which a recess has been formed for the purpose. This invention is applicable to all glass or porcelain buttons and ornaments, such as breastpins, etc.

TOY GUN—S. Hubbard, Quincy, Ill.—This invention consists in the application of an elastic cord to a toy gun, in such a manner that it may be stretched or distended and held in a distended state by a catch with trigger attached, the cord being connected to a slide which works within the barrel of the gun, and all so arranged that by pulling the trigger, and thereby operating the catch and releasing the cord, the latter will, by its elasticity, eject the shot, or other missile, from the gun.

RAKING AND BINDING ATTACHMENT FOR REAPING MACHINES.—Christopher Lidren, Lafayette, Ind.—This invention relates to an attachment for automatically raking and binding grain, and is designed to be applied to reaping machines, and receives its motion from one of the driving wheels thereof.

SPRING ATTACHMENT FOR THILL COUPLINGS.—Kingston Goddard, Richmond, N. Y.—This invention consists in the application of a spring to a thill coupling, in such a manner that the jolting or jarring of the vehicle, the vertical movement of the pent axle, caused by the pent wheels passing over uneven surfaces and obstructions, will not be communicated in an appreciable degree to the thills of the vehicle, and the horse thereby relieved in the labor of drawing the vehicle, especially in traveling over rough roads.

THILL COUPLING.—Kingston Goddard, Richmond, N. Y.—This invention relates to an improved means for connecting the thills of vehicles to their front axles, and it has for its object the attachment of the thills in such a manner that the latter may be connected to and detached from the axle with the greatest facility, and when attached with the horse harnessed before the vehicle, casual detachment of the thills rendered impossible.

DUST PAN.—Samuel E. Condon, Brooklyn E. D., N. Y.—This invention relates to an improvement in dust pans for taking up dust, sweepings from floors or carpets, etc., so that the latter may be carried around a building from room to room, and the pan used and the dust deposited in the chamber until the latter is filled, when the dust chamber may be readily deprived of its contents and the sweeping, if not entirely finished, resumed.

ATTACHING SHOES TO BRAKE BARS.—James Brahn, Jersey City, N. J.—This invention relates to an improved manner of attaching shoes to the brake bars of railroad cars, whereby the shoes may be readily attached and detached, all bolts and screws being avoided, and the shoes, when attached, effectually prevented from being casually detached. The invention also relates to a peculiar application of india rubber to the shoes, whereby a requisite degree of elasticity is allowed the same, in order to prevent wear and tear.

CLOVER SEED HARVESTER.—S. L. Stockstell and W. H. H. Scarff, Medway, Ohio.—This invention relates to a machine for gathering or harvesting the heads of clover, cutting the heads from the standing stalks, and consists of a suitable bed suspended from an axle and provided with a cutting and raking attachment.

ORNAMENTING BOOTS AND SHOES.—George Smith and Godfrey Smith, New York City.—This invention relates to a mode of ornamenting boots and shoes, designed as a substitute for and an improvement upon the ordinary mode of producing ornaments by crimping the leather through the medium of dies.

MACHINE FOR CUTTING VENEERS.—Henry Cassing, New York city.—This invention relates to a machine for cutting veneers, and consists in the employment or use of a reciprocating knife, arranged to work in a plane slightly inclined from a vertical position, in connection with a laterally moving log carriage, all being combined and arranged in such a manner that the knife is made to operate with a drawing cut, and perform its work in a perfect manner, and with but a moderate expenditure of power.

BOOT CRIMPING MACHINE.—E. H. Rice, Port Henry, N. Y.—This invention relates to a machine for crimping boots, and it consists of a series of rotary trees in connection with a plurality of jaws or pressure plates, all constructed and arranged in such a way as to admit of boots being crimped rapidly and in a perfect manner.

MOWING AND REAPING MACHINE.—James H. Redfield and Walter J. Cox, Salem, Ind.—This invention relates to a cutting apparatus, the same consisting of a series of hook shaped teeth, attached to or formed on a bar, the ends of which are attached to or connected with cranks, or crank pulleys, which operate the teeth or sickle bar so that each tooth of the bar will pass from the center of one guard or finger across the space and into the adjoining guard or finger, and in thus moving act with a drawing cut upon the grain or grass, cutting the same in a perfect manner, and with a very moderate expenditure of power. The invention further relates to a new and improved means for discharging the grain in gavels from the machine, and further, in a peculiar manner of applying the frame which supports the cutting apparatus and grain-discharging device, to the main frame, whereby the cutting apparatus may be adjusted higher or lower, as desired, with the greatest facility.

BED BOTTOM.—John C. Fry, Sidney, Ohio.—This invention relates to a new manner of securing the wire for holding the elastic rings, in the ends of the slats, and in the cross-pieces that are secured to the bedstead. The said wires are secured in such a manner that the ends of the slats are not only not weakened by their application, but are actually strengthened and prevented from splitting.

COSMETIC.—J. M. Wilson, Seguin, Texas.—This invention or discovery relates to a new and useful improvement in the composition of a cosmetic for removing freckles or tan discoloration from the skin and improving the complexion. This improvement consists in combining certain chemical ingredients and making a solution thereof with which the skin shall be wet for the purpose aforesaid without injury to the tissue.

HERNIA TRUSS.—Samuel Green, New York city. This invention relates to an improvement in the construction of a truss for ruptures of the bowels or hernia and consists in a novel and simple combination of springs and pads with the main supporting bars.

GATE HINGE.—Paul Dennis, Schuylerville, N. Y.—This invention consists of an improved gate hinge and has for its object increased strength and durability of the hinge and diminution of the friction in opening and closing the gate.

MACHINE FOR BORING POST HOLES.—A. Q. Allis, Dayton, Ohio.—This invention consists in operating a vertical boring bar by crank and gearing and in an arrangement whereby the auger is fed down into the ground by a screw and raised from the ground by a lever and also in the manner in which the feeding screw nut is made to engage with and is detached from the boring bar and also in a boring tube.

COMBINED PILLOW AND SUPPORTER.—Emeline T. Annis Mt. Morris, N. Y.—This invention consists in forming the pillow on a plate or flat surface of metal or wood or some other suitable material, and attaching thereto a jointed bracket and supporting rod so arranged that the pillow may be adjusted to suit the wants of the invalid or other person occupying it by turning a thumb nut.

TREATING PHOSPHATIC MINERALS OR EARTHS.—John Commins, Charleston, S. C.—This invention relates to an improved mode of treating natural phosphates or phosphatic minerals and earths for the purpose of rendering them soluble to serve as fertilizers.

HORSESHOE.—James Jorey, Westville, Conn.—This invention relates to a horseshoe of that class which are provided with removable or detachable calks. The invention consists in having the calks constructed and applied to the shoe in such a manner that they may be not only detached from the shoe but also reversed and secured thereto in such reversed position as to admit of a fresh cutting or sharp edge for the calks being obtained, the calks being constructed with two edges to obtain this result. If necessary or desired one edge of the calks may be made sharp and the other edge comparatively blunt so that a horse may, by a very simple adjustment of the calks be provided with either sharp or blunt calks, be either sharp or "rough" shod, the latter condition being preferable when the roads are not very slippery or icy and the former condition preferable when there is much ice.

BREAD AND VEGETABLE CUTTER.—Hiram A. Titus, Gloversville, N. Y.—This invention relates to a new bread and vegetable cutter which is so fitted at its two ends in a frame that when it is drawn through the article to be cut a combined drawing and pressing cut will be imparted to it.

MACHINE FOR CLEANING COTTON.—Richard H. Hilton, Newbern, N. C.—This invention consists of a perforated case, into which the cotton is fed from the cotton gin, together with rollers, for the purpose of ejecting the cleaned cotton in the form of a sheet or pressed web more convenient for packing.

MEASURING AND TALLYING ATTACHMENT FOR THRESHING MACHINES.—W. F. Abbott, Marengo, Ill.—This invention relates to a machine for measuring grain, and tallying the number of measures of the same, which pass through it, and consists of an elevating spout measuring chambers and automatic tallying register, and other mechanism perfecting the whole.

CLEAT.—Jonathan Bangs, South Dennis, Mass.—This invention consists of a lever, having on its upper side a hook into which the line or rope is passed, and is thus passed under the handle so that any draft upon the hook will press down the handle, and thereby bind upon the line.

CATTLE PRICKER.—R. A. Carson and W. T. Peter, Briensburg, Ky.—This invention relates to a new method of constructing apparatus whereby cattle are prevented from lying down away from from home at night, and whereby also they are prevented from jumping fences, and are made more manageable when they are driven by droves. It consists of a leather strap fastened around the foreleg of the animal, above the knee, said strap having sharp pieces of metal secured to the same, and bent downward, so as to prick the animal when it attempts to lie down or jump.

GRAIN REGULATOR FOR GRIST MILLS.—E. W. Hitchings, Potsdam, N. Y.—This invention refers to an attachment to grist mill stones, for the purpose of regulating the supply of grain passing into the stone. It consists of a cylinder carrying a governor which regulates the opening through which the grain falls according as the stone is driven fast or slow, together with other devices perfecting the whole.

WAGON LOCK.—C. A. Kenyon, McGregor, Iowa.—This invention relates to a new and improved method of constructing wagon locks, by means of which the brake is more firmly held against the wheel, and whereby also the pressure of the same is more quickly and easily taken off. It consists of a pawl, pivoted in a slot in the lever by means of which the brake is operated, engaging in the teeth of a metallic segment, so as to hold the brake firmly against the wheel, after the hand of the operator has been removed. It consists also of the lever being bent at the lever end, and provided therein with a slot in which the pivot on which said lever turns may move, so that by the reverse motion of the lever the slot in the bent end of the lever will slide over the pivot, and the pressure of the brake upon the wheel will be relieved.

SAND HEADS FOR AXLES.—Norman Maxham, Hancock, Vt.—This invention relates to a new and improved method of constructing apparatus for preventing sand or dust from working into and injuring the boxes or axles of carriages. It consists of a sand head attached to the hub, revolving with said hub around the axle within a cover or box attached to the axle, said cover being provided on the under side of the same with a nick or notch through which sand or dirt caught will fall to the ground.

DRILL AND COUNTERSINK.—P. A. Whitney, Woodstock, Vt.—This invention relates to a new and improved method of constructing drills and countersinks, whereby they are combined in the same tool, are more simple in their construction, and more certain in their operation. It consists in the countersink being in two parts, with the drill between the same, keyed in such way in splines in the chuck as that the same are adjustable, the chuck being screwed into the lathe socket so that the two segments of the same are forced firmly together, thereby holding the drill and countersink firmly in the chuck. It consists also in one of the splines in the same segment of the chuck being deeper than the other, and deeper, also that the opposite spline in the outer segment of the chuck, whereby the cutting edge of countersink is brought into proper position for cutting a countersink.

CURLING IRON.—Samuel E. Condon.—Brooklyn, E. D., N. Y.—The present invention relates to irons used for curling in the dressing of a person's hair, and consists in providing for the iron a casing or sleeve of suitable construction to incase and hold the same, whereby the iron, being first heated by inserting it in a suitable furnace therefor, or otherwise, and then placed in such case, the necessary heat is imparted thereto for curling the hair, when applied to the same, the combination of the case with the iron always preserving a smooth and even surface for being presented to the hair, however much the iron itself may become "scaled" from the action of the fire thereon.

BUCKLE OR FASTENER FOR STRAPS, ETC.—S. W. Durham, Ipava, Ill.—This invention relates to an improved fastener or buckle for securing and fastening the end of a strap when turned over at its end upon itself for forming a loop.

LITHOGRAPHIC AND AUTOGRAPHIC PRESS.—Chas. C. Maurice, New York city.—This invention relates to a lithographic, or other printing press, in which the stone or block is held in an adjustable frame, which can be expanded or contracted, so as to be adjusted to stones of different widths.

CONCRETE BRICK MACHINE.—Isaac Pardee, Vineland, N. J.—This invention relates to a new machine for pressing and forming concrete stones for building purposes, in a separate press, which is so constructed that it can be easily handled, and that the ready pressed concrete can be easily removed from it.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

202.—SEWING MACHINE.—Singer Manufacturing Company, New York city. Jan. 20, 1868.

214.—APPARATUS FOR INDICATING THE RELATIVE POSITIONS AND MOVEMENTS OF CERTAIN HEAVENLY BODIES.—John Davis, Allegheny City, Pa. Jan. 21, 1868.

207.—SECURING CORKS IN BOTTLES.—Richard Scrivener, New York city. Jan. 21, 1868.

215.—FURNACE.—Henderson Ross, Pittsburg, Pa. Jan. 21, 1868.

219.—LIBERATING THE COLORING MATTER OF MADDER, ETC., FROM THE LIGNEOUS MATTER OR CELLULOSE.—Alfred Paraf, Boston, Mass. Jan. 21, 1868.

269.—PULL FOR DOOR BELLS.—Sterling Bonsall and Louis Hillebrand, Philadelphia, Pa. Jan. 25, 1868.

278.—HATS, BONNETS, ETC., AND MACHINERY FOR MANUFACTURING THE SAME.—Henry Kellogg, New Haven, Conn. Jan. 27, 1868.

280.—MACHINERY FOR GRINDING AND POLISHING CONCAVE SURFACES.—Wm. C. Hicks, New York city. Jan. 27, 1868.

281.—MACHINERY FOR FORMING FLAT BODIES, SKIRTS, ETC.—John H. Prentice, Brooklyn, N. Y. Jan. 27, 1868.

299.—BELLOWS FOR FORGES.—John and Walter Bowden, Brooklyn, N. Y. Jan. 28, 1868.

317.—BREECH-LOADING FIRE-ARMS, AND CARTRIDGES AND BULLETS FOR THE SAME.—Hiram Berdan, New York city. Jan. 29, 1868.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

T. H., of Wis.—"In dispute A makes the following proposition: Of two equal bodies, impelled by equal force against equal resistance the time of their arrival at their respective destinations must be in the proportion of those distances, or: Equal bodies impelled by equal force against equal resistance will describe equal space in equal time. To this B dissents and asks for proof. A says the proposition is self-evident. What is your opinion?" We regard the proposition as self-evident and cannot conceive the ground of B's denial.

C. M. T., of Ind.—"How can I make a lithograph transparent? I have tried balsam of fir and dammar varnish but specks appear after drying." We think Canadian balsam, if pure and carefully laid on, would be effectual.

J. R. W., of N. C.—"What per cent of water is expended to elevate a given quantity of water to a certain hight by the hydraulic ram?" A good ram will yield effectively 60 per cent.

L. M., Jr., of Pa., is anxious to build a "paper boat" and wants to ascertain the sort of paper and *modus operandi*. Such boats have been built which were light, safe, and durable. A patent on making boats of paper is owned in part by Elisha Waters, Troy, N. Y. Write to him for information.

O. S., of Ohio.—"Is there anything gained by applying steam to the surface of a wheel, if confined as closely as in a steam engine cylinder creating no more friction? I have a simple device by which I can do this successfully." Yes. If you can make a rotary engine that has no more friction than a reciprocating one you have an invention we would like to see.

H. P. D., of Texas, says that kerosene oil on whet-stones is superior to any other for the purpose, as it keeps the stone in better condition and assists the operation of sharpening.

J. C. B., of Ill.—Tubing for an artesian well of 200 feet depth may be made of two-inch gas pipe, connected by thimbles and screw threads in the usual way. Piping or casing of cast iron four inches diameter should be sunk to the first stratum of rock.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Two Valuable Patents for sale—one for a Fertilizer, and the other for Harness Wardrobe. Address H. E. Pond, Franklin, Mass.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 569 Broadway, N. Y.

Merriman's Patent Bolt Cutters—Best in Use. Address, for circulars, etc., H. B. Brown and Co., New Haven, Conn.

For all sizes of Tube for Steam, Gas, or Water, and the most improved Tools for Cutting off and screwing the same, address Camden Tool and Tube Works Co., Camden, N. J.

Incrustations removed by Winans' Boiler Powder (11 Wall st., N. Y.), 12 years' use proves it reliable and uninjurious.

Inventors and Patentees wishing to get small, light articles manufactured for them in German Silver or Brass, address Schofield Brothers, Plainville, Mass.

Manufacturers of Ditching Machines of from three to four feet wide by same depth, address M. White, Jr., New Orleans.

Charles Ball, Bridgeport, Conn., makes Odometers.

Hardware men, agents, and others, address Robert Faries, Decatur, Ill., concerning his attachment to the monkey wrench for pipes.

A Rare Chance for Agents. Large profits and little capital needed. For sample and circular, inclose 25 cts. to Smith, Shepard & Co., P. O. Box 867, Waterbury, Conn.

Wanted—Address of Gas Holder, Purifier, and Condenser Makers. Apply to Edward T. Moody, C.E., Omaha, Neb.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

Address J. S. Elliott, East Boston, Mass., for best machinery for making lime and sand building blocks.

M. K. Anderson's patent self-acting alcoholic blow pipe wanted. They were made at Painted Post, N. Y. Address, stating price, or bring two to E. S. Taylor, No. 11 Adams st., Brooklyn, N. Y.

Parties in want of the best Pin Machines are informed that we are now prepared to receive orders for them. We have also on hand one machine for No. 4 pin, for sale low. Hoxie & Tolles, Hartford, Conn.

Patentees desiring to give exclusive right to dispose of Territory or their articles to a reliable firm who have the facilities for, and will advertise them, in every county in the United States, at their own expense, should address Oliver Crook & Co., Dayton, Ohio, and inclose a circular describing their patent.

Manufacturers of Agricultural Implements send circular to A. H. Briggs, Milton, Ky.

Manufacturers of Light Metallic Tubing please correspond with J. S. Lawson, Disco, Mich.

Manufacturers of Ditching Machines address, with description, D. A. Griffiths, St. Charles, Mo.

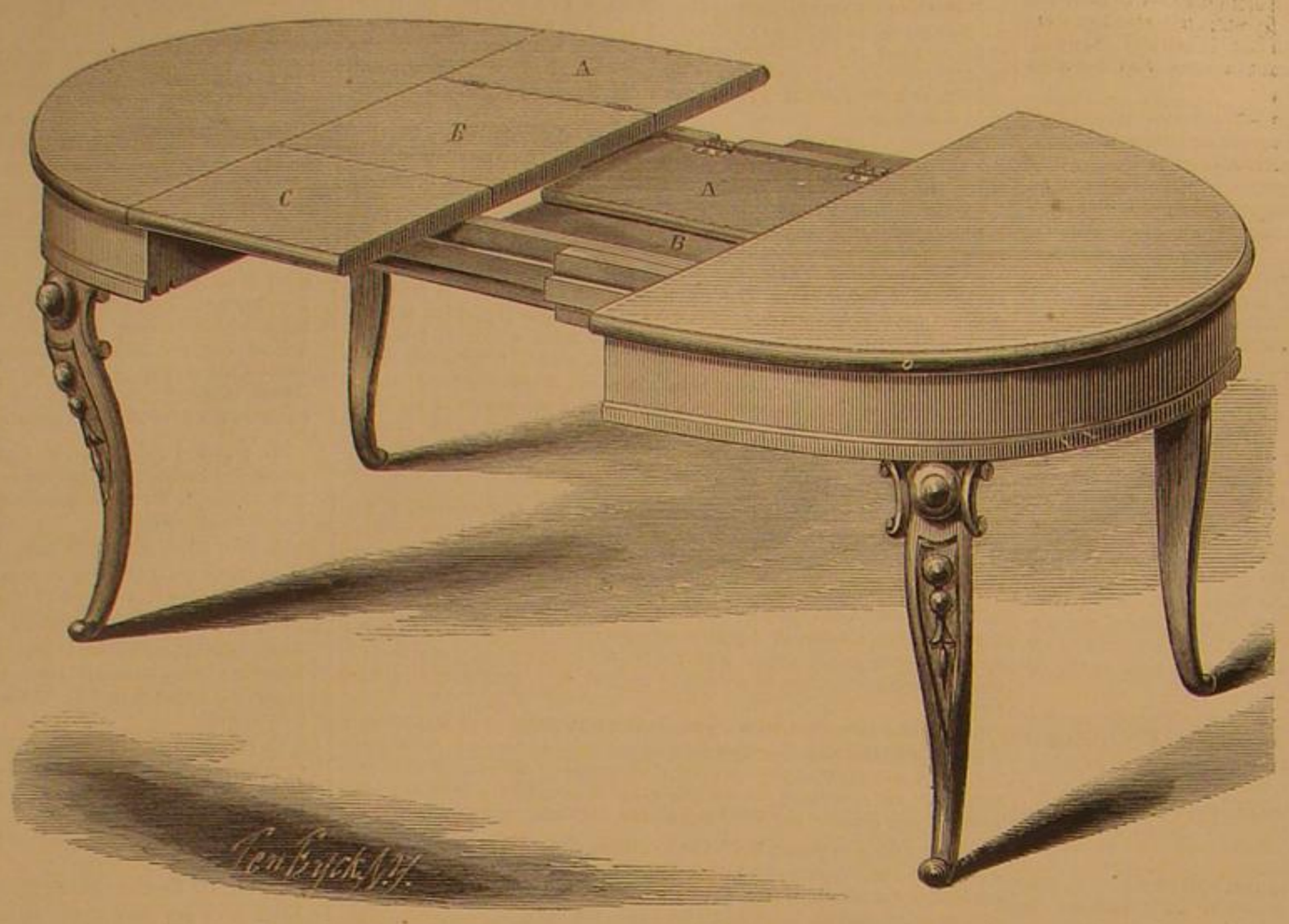
Buckelew & Waterman, 716 Market st., Philadelphia (city Sealer's office), Manufacturers and Dealers in weighing scales, weights and measures, will take the agency for some saleable articles.

A Practical Man wanted to make Wood Acid in crude. Also, Book Sellers, having books treating upon the subject, please send their address to Henry Winter, Honesdale, Pa.

Make your Patents Pay!—J. H. White, Newark, N. J., will make and introduce all kinds of Small Wares in Brass, Tin, and Iron.

Improvement in Extension Tables.

The dining table now in almost universal use, which may be made to accommodate from four to twelve or more persons, is a great improvement on the old fashioned table, the surface of which could be enlarged only by raising and securing in place hinged outside leaves. But to the modern extension table there are some objections, the lifting and finding a place to deposit the extra leaves when not required for use being quite a serious one. To obviate this difficulty is the principal object of the improved table seen in the engraving. As will be seen, the supplemental leaves are in three sections, hinged together in such a manner that they may be folded one upon the other and shut closely within the body of the table frame. One set is seen open in the engraving, and one set closed. A is the narrow section, being one of the outside leaves; B is the middle and widest section, and C one of the side leaves, folding, when closed, under the middle leaf, B. If greater support to the outer leaves than is afforded by their connection with each other and contact with the frame, is desired, a light bar is adapted to slip into suitable recesses on the outside rim of the table directly under the leaf.

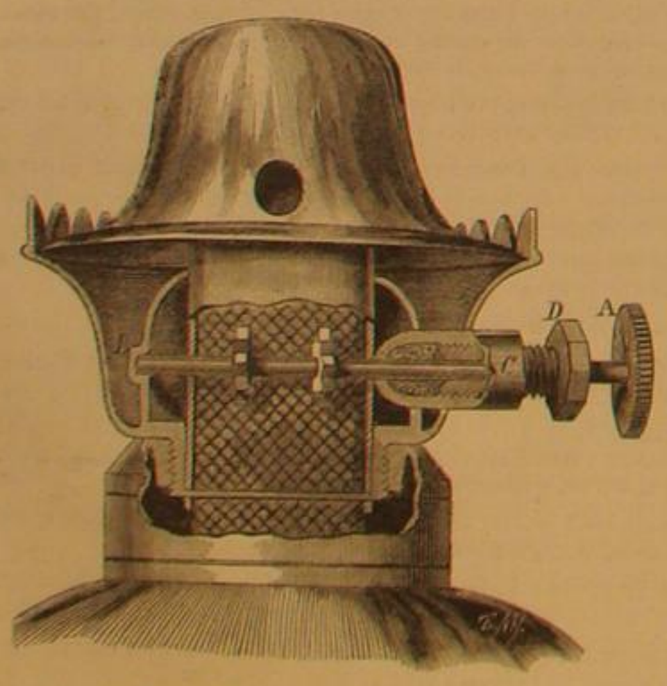


J. B. CURTIS' INCLOSED LEAVES EXTENSION TABLE.

It will be seen that there is no annoyance or labor of lifting out and putting in heavy sections of table top, nor is there so much danger of the leaves splitting and warping as when they are large and movable. The table is essentially a unit, and even when closed to its smallest dimensions can be readily moved about, or used for a center table, and still contains within itself all the elements of an ordinary extension table. It is an invention, we predict, that will come into extensive use. It was patented through the Scientific American Patent Agency, Nov. 6, 1866, by J. B. Curtis, whom address for further information, at Port Henry, N. Y.

GROSVENOR'S IMPROVED NON-EXPLOSIVE LAMP.

The cause of explosions of kerosene and other hydro-carbon lamps is generally believed to be the ignition of hydrogen gas contained in the reservoir between the surface of the liquid and the top inner surface of the lamp. Atmospheric



air or oxygen, being admitted to this space, makes, in combination with the hydrogen, a highly inflammable gas, needing only ignition or a certain degree of temperature to cause an explosion. Now if this gas can be displaced by one which is anti-phlogistic it is evident all danger from this source will be avoided. This, the inventor believes, he has accomplished in this simple improvement.

The engraving shows the details of this device as applied to an ordinary kerosene oil lamp. It is intended to entirely exclude atmospheric air from the interior of the lamp, no orifice but the wick tube—which should be filled by a closely fitting wick—leading from the external atmosphere to the interior of the lamp. All the joints of the burner are made air tight by soldering or brazing. The end of the elevating shaft opposite the thumb piece, A, which ordinarily passes through the side of the burner, is supported in a close socket, B, inside the shell, and the other end passes through a stuffing box, C, containing suitable packing which is set around the shaft by the hollow screw, D.

The inventor says, in brief, that "with this burner, as the vacuum made in the oil reservoir by the consumption of oil cannot be supplied with atmospheric air, it must, necessarily be supplied with nitrogen gas—or any uninflammable gas generated by combustion, as carbonic acid. As oxygen and nitrogen are separated by combustion, and the oxygen is consumed in the process, the liberated nitrogen necessarily descends by atmospheric pressure through the interstices of the wick, in sufficient quantity to supply the gradually extending vacuum, even to the entire exhaustion of the oil, when the reservoir will be filled with this anti-phlogistic gas, in which even a lighted match will not burn for an instant. As there is no orifice for ventilation, evaporation from within is precluded except through the tube to the flame, where it can be profitably used; consequently no oil can gather on the outside of the lamp to soil fingers or clothing or to invite external ignition and consequent internal explosion."

Patented Dec. 10, 1867, by Cyrus P. Grosvenor, who may be addressed at McGrawville, N. Y.

Treating Wood for Covering Walls, etc.

Patented by Abbot R. Davis, of Cambridge, Mass. My invention consists in the employment of glycerin for saturating the thin sheets or laminæ of wood to be used as a wall covering, or for other purposes. whereby the sheets are rendered soft and plastic, and thus prevented from cracking and breaking when exposed to a dry atmosphere before or after being applied to the wall or other surface.

Glycerin and water, in about the proportion of one part of the former to two or three of the latter, are mixed together, the two ingredients readily uniting. The thin sheets of wood above referred to are now saturated with this mixture, and then placed where the water may evaporate therefrom, the glycerin still being retained by the wood and being absorbed by it so as to cause it to remain permanently soft and pliable. The amount of glycerin to be mixed in water may be increased according to the nature and degree of hardness of the wood to be saturated, but I have found the mixture produced by the ingredients in about the proportions first named to answer a good purpose, and glycerin alone may be used without departing from the spirit of my invention. I am aware that glycerin has been employed for saturating sponge to render it elastic for use as a substitute for hair and other material for filling mattresses. The application of glycerin for this purpose I do not, however, claim, but confine myself to the following, viz: the employment of glycerin for saturating thin sheets or laminæ of wood to be used as a wall covering or for other purposes, substantially as described.

Illuminating Gas Mixture.

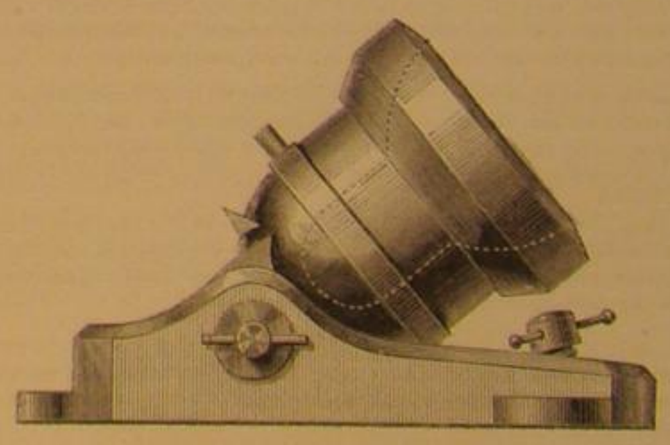
John J. Ensley, of New York city, has patented the following: I make common coal gas in the usual way, and by ordinary means. I also make separately a gas from any convenient vegetable substance or substances, such as wood, shavings, sawdust, etc., and mix the gas with the coal gas in any convenient proportions, according to convenience, or the relative abundance or cheapness of the two gases; or, I make a gas from any animal substance or substances, such as bones, offal, etc., and mix with the coal gas in convenient proportions say, of one part of the gas from animal substance to three parts of coal gas, or otherwise; or, I mix the gases, made both from vegetable and animal substances with the coal gas, in convenient proportions, no exact proportion of either being essential.

The object of this mixture of gases is threefold: first, by the mixture of different gases in this way, especially by the admixture of gas from animal substances with coal gas, I am more sure to produce good illuminating gas, by furnishing proper proportions of carbon and hydrogen; second, in the separate manufacture of gases made from vegetable and animal substances, I produce and utilize other products of the distillation, such as charcoal and bone black; and third, in many instances, by having an abundance of vegetable or animal substances, or both, at hand, and not otherwise of value, I can make use of them and thereby cheapen the manufacture of gas for illumination.

Mountain Mortars.

After all has been done to reduce the weight of mountain mortars to a minimum, it remains a fact that they are not portable in the highest degree, and it is not to be denied that in the endeavor to secure such portability as they possess much of their efficiency has been sacrificed. We believe that as a consequence of the existing prejudice against mortars a very valuable weapon has not been supplied to our Abyssinian troops, and, as none of the essentially military papers have called attention to the subject, we do so. About twenty-four years ago we carried on a war against certain of the aboriginal New Zealand tribes and a very troublesome, and, in its way, expensive little war it proved to be. At that time we had no rifled mountain guns, but we had little howitzers, intended to answer much the same purpose, and probably not much less efficient. These howitzers, however, proved to be next to useless. The natives entrenched themselves within pahs, from whence they could not be dislodged, and into which our troops could not get without great loss of life. The pah consisted of spaces inclosed by walls made of piles driven in two rows about four feet asunder, the space between being filled with clay after the manner of a coffer dam. The little howitzers in some cases could not be brought up to act against these pahs at all, and in others they could not breach the walls. "Toney Heckey," a native chief, constructed one of these pahs on the top of a hill, from which he could not be dislodged. In this emergency, Capt. G. R. Mann, R.E., proceeded to Sydney, and from his designs twelve little mortars, as illustrated in the accompanying engraving, were made by Mr. Russell, of Sydney.

Our engraving, for which, with this description, we are indebted to *The Engineer*, prepared from the original tracing made twenty-four years ago, illustrates their construction so clearly that no special description is necessary. The cast-iron base weighed but twenty-eight pounds, and was fixed to a piece of two-inch plank 24 by 16. The mortar, of gun metal, weighed only 65 pounds, and was, of course, still more portable. The charge consisted of 8 ounces of powder and a common 5-inch shell. It may be thought that as there was no length of chase, only half the shell being contained in the mortar, the range would have been very small. In point of fact, however, the range was 550 yards, quite sufficient for the required purpose. These little mortars were carried up



by a few men within a few hundred feet of the pah to be attacked, and pitched their shells with ease into the very heart of the camp. They proved perfectly effectual, and infinitely more useful than the small guns, not only in attacking pahs, but in dislodging the enemy from jungle, as they could be put down at a moment's notice, and used while troops were on the march. They certainly exceed in power any other weapon of equal weight, for a 5-inch shell, weighing some 12 or 14 pounds, and containing a heavy bursting charge, is no contemptible foe. The remarkable range of these little mortars is an excellent illustration of Lynall Thomas' theory of the percussive action of exploding gunpowder, and it is possible that with gun cotton the range would be still greater. Judging by the good service they have done, we cannot resist the conclusion that a few such mortars would prove a useful addition to our Abyssinian armaments.—*Mechanics' Magazine*

Chassepot Wounds.—It appears from the testimony of surgeons who participated in the last Garibaldian campaign, that while a large number of troops are put *hors de combat* from the multitude of missiles which this fire-arm can scatter over the battle-field, yet by reason of the small size of the projectile, the number of fatal injuries is very small in proportion to the total number of wounded. It has also been ascertained that the Chassepot bullet rarely shatters a bone, but in the large majority of cases passes around it.

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MECHANICS AND THEIR TOOLS.

It is useless to expect first-class work from even good mechanics using strange tools. The hand and the handle, the workman and his tools, should be well acquainted; if such a sentiment could be predicated of inorganic matter, they should be in sympathy. It has been said that "any fool can work with good tools, but it takes a workman to use poor tools." It is much nearer the truth to say that "few can work well with strange tools." Some branches of mechanical business offer advantages in this respect over others. The carpenter or the joiner, for instance, owns his own tools, selected with great care, or made by himself to suit his hand and his peculiarities of workmanship. But the machinist, unless a very ambitious workman and one who has possessed unusual opportunities for working for himself, seldom carries with him anything more than a pair of small callipers and a steel gage. When he goes into a shop, if he works at the bench the vise is strange, the hammers are not handled and balanced to his mind, the cold chisels are "stunt" and misshapen, and the file handles unhandy. If he works on the lathe or planer, he finds the cutting tools entirely different in their forged form and ground edge from those to which he has been accustomed; and until he "gets the hang of the new school-house" his productive work amounts to very little. So well is this understood that the new comer in the shop is generally allowed a day or two with *carte blanche* on the forger to put his tools in shape. This should always be the case, and the machinist ought to be encouraged to occupy his time "between jobs" with the work of finishing his hammers, center punches, scratch awls, etc.. until he gets a set fitted to his hand and consonant with his taste. Time so spent and material so used would not be wasted, as the workman, if he is worth anything, would, by his more cheerful and ready interest in his work, soon make up for the time thus spent, while if he did not purchase the tools at the expiration of his term of employment, they would add to the stock on hand, which is always available.

All this can be done under a judicious manager without encouraging finicalness or fanciful notions in the workman, while it would offer encouragement and assist endeavor. The habituation of the workman to his tools has been and still is too much overlooked by employers. If every workman was a machine, merely, what would suit one would fit another; but the human organism is affected and sometimes controlled by circumstances in themselves trivial; every workman should have his own tools, or he should be privileged to select his own style of tools to suit his handiwork. In the end it will be found to be better for both the workman and for the employer.

PRETENSIONS OF MECHANICS.

Assumptions of superior knowledge and pretensions of superior position and acquirements are, under any circumstances, obnoxious. Especially are they so when made in relation to mechanical processes. The workman who descends to this mean trickery of pretension to sustain himself at a fancied elevation above his fellows is either a charlatan, pretender, or miser. If a mechanic has made a discovery of any real value, whether relating to the construction of a machine or to an improved process of manufacture, our patent laws, liberal and just, will protect him in the proprietorship of his improvement; but the attempt to impose upon his fellows by the pretense of a knowledge above theirs, is neither manly nor honorable. Really, there is no reason for keeping a secret in the mechanical arts, and it is as impossible as unreasonable, especially if the improvement is valuable, and if not so, there is no reason for attempting to keep it private. We are aware that some large concerns make it a point to keep some of their processes secret; but out of a number we know, who have preferred this course to a publication by means of letters patent, no one of them has been able to preserve the secret inviolate. Locked doors and "iron-clad" oaths exacted from employés, avail nothing against the insatiable curiosity of men, or the cupidity or interest of employés. In fact, in many cases the product of manufacture, when analyzed by an expert, exhibits the method of production as exactly and satisfactorily as though the process itself had been exhibited.

As the working of steel involves many problems seemingly contradictory, not a few of which are still unsolved, its manipulation is made the occasion for much of this charlatanism. Pretended sleight of hand in heating and hammering, mysteriously compounded baths for hardening, etc., are used to befog the uninitiated and astonish the ignorant. Such nonsense is paltry, and wholly unworthy the dignity of the mechanic. It is highly proper that the mechanic should feel a pride in his superior skill and his superior knowledge, for these have been attained with labor, time, and patience, and are really valuable, but to make pretension where no ground for it exists is childish and foolish.

But if these pretensions are unworthy when made by experienced mechanics, they are simply contemptible in an ignorant charlatan who attempts to impose by loud talk and "blowing." Hardly a concern of any extent but has one or more of these "blowers" about the works. They pretend to know everything, while they really know very little. Such a one we once saw, who attempted to teach a machinist how to use prussiate of potash in case hardening, condemning the plan of one single heating, and insisting on re-heating the article after the flux had melted. When he failed to produce the hardness sought, he condemned the chemical, instead of acknowledging his ignorance of the process.

Running over in our mind the list of the best practical mechanics with whom we have had the honor to be associated and acquainted, we find that almost all of them were reticent of speech, careful of giving counsel or of obtruding their notions, obedient to the directions of those set over them, and otherwise unassuming in manner; while at the same time they were capable of doing, directing, and managing when their duty called. True merit is generally modest. Pretension may for a time impose upon credulity and good nature, but the shop is a great leveler, and the pretender will sooner or later disclose his true character by his assinine bray, in spite of his lion skin disguise.

LAMPBLACK---ITS MANUFACTURE.

A correspondent from North Carolina asks for information in regard to the manufacture of lampblack. He is engaged in distilling turpentine and making resins, and has large quantities of dross, etc., left, which he supposes may be made available in the production of lampblack.

Its manufacture is very simple and the apparatus cheaply built. The refuse tar, resin, etc., is put in iron pots or in a furnace and burned with the least possible admission of air—just sufficient to keep up a low combustion—in order to produce a dense smoke without much flame. The smoke is led into cylindrical upright chambers lined with sheepskin, woolen cloth, or canvas. The roof is conical in form, made of sheet iron, hanging within the cylinder, the circumference fitting the sides of the cylinder. This roof is suspended by pulley and chain, and is occasionally lowered to the bottom, in its progress scraping the accumulated lampblack from the sides and depositing it on the bottom, from which it is removed by means of a hoe or scraper through a small door. A series of these cylinders may be used, communicating with each other by horizontal passages, the roof of the last one being partially open at the apex, to allow for a draft. The lampblack deposited in the last of the series is the finest; but the best of it contains more or less resinous and oleaginous matter, which must be eliminated to purify the product. This is done by heating the lampblack in cast iron boxes with a close cover, raising and keeping the lampblack at a red heat for two or three hours.

Ivory black, used largely by artists as a pigment, and bone black, employed in the purification of sugars, are the product of the destructive distillation of animal bones. Spanish black is the carbon of cork, and has a brownish tinge. Peach black, resulting from the combustion of peach kernels, has a bluish tint. All these forms of carbons are used as pigments.

SIZE OF WHEELS FOR VEHICLES.

A correspondent from a portion of Hartford county, Conn., which is blessed with many hills, says he is in much need of a solution of the question as to the proper size of wheels for teams. He says, "With a team (two horses probably) I can draw a tun of 2,000 lbs., using wheels five feet diameter; how much more can I draw on wheels of seven feet diameter, and how about drawing on a level or on ascent?" He further says: "It has for a long time seemed to me that the principles involved in the above were very important to a large class. I propose to construct wheels of seven feet diameter on trial, as the roads over which I do my teaming are quite hilly."

We are not aware that any rules, practically effective, have ever been published as to the best diameter of carriage wheels. A great change has taken place within fifteen years in this respect, so far, at least, as relates to pleasure carriages. The small forward wheels, with low axles and high bolsters, which were the style ten, fifteen, or twenty years ago, have given place to those which are as large, or nearly so, as the hind wheels, the difference on the draft being made up by the downward rear curvature of the shafts. They run much easier than carriages with diminutive forward wheels. For level traveling it would seem that pretty large wheels, suited to the draft animals, would be preferable to small wheels; but on an upward grade they have their objections.

COMMUNISM IN THE SHOP.

Interchange of tools and other appliances in the shop may be made either very pleasant, or a source of great annoyance. The "stealing" of tools is often practiced, but only by those who not only forget their duties as mechanics, but their honor as men. No right-minded mechanic will refuse assistance to his fellow workman, either in advice or in the loan of tools, but it is the hight of impudence to reject the advice without giving a reason, or to return borrowed tools in a condition unfitted for service.

There must be more or less of the apostolic idea of communism in the shop: "all things must be in common" to a certain extent; but it is an evidence of a mean nature when the workman is willing to use the tools of his fellow and return them in a shape unfit for further service until repaired.

The habit of leaving a borrowed tool, when done with, where last used is almost criminal. This negligence—to call it by no harsher name—is very common, but it is dishonest as well as careless. Many valuable tools are thus injured, and sometimes lost. The workman who is so neglectful and careless can hardly be deemed honest. There is, or should be, a sentiment of honor in this repect among workmen, and we are certain that a simple allusion to the matter will induce our careless mechanics to "reform their ways."

UTILIZATION OF TINNER'S WASTE.

In the scraps of the tinshops, thrown away often to hundreds of tuns by the tinners of one single city, we possess two valuable metals, iron and tin. Attempts have been lately made for separating these metals by melting, but the process has been as yet without success. What physical action, however, could not do, chemical affinity, will surely complete. We say this in regard to a process by which the sheet tin may be freed from its coating without being subjected to heat. The process is by first treating the scraps with a solution of caustic lye, thereby obtaining as a product a valuable color base (stannate of soda, resp. potassa), which of late has come into extensive use among dyers. As both the iron scraps and the tin solution serve useful purposes in the arts, we trust that many of our readers will be interested and instructed if we devote some space to the above subject.

PREPARATION OF STANNATE OF SODA.—For fastening and brightening dyes, especially Turkey red from madder, stannate of soda is unsurpassed by any mordant; it is furthermore not poisonous, as is the double salt of arseniate and stannate of soda, a base hitherto employed to some extent for fixing fabrics. For its preparation the tin scraps are rolled up spirally and put in a wooden tub with 10 per cent of sulphur and 5 per cent of solid caustic soda (in manufacturing the resp. potassa salt, take 7 lbs, of the latter), enough water being added to cover them. Then steam is turned on and the same allowed to pass into the liquid, until the scraps are free of tin, when the alkaline liquor is drawn off by a faucet and left to evaporate in an iron kettle until crystallization takes place. From the crystals which simply constitute glauber salt, the mother lye is separated, evaporated to dryness in another vessel, leached out by water and filtered. The product thus obtained is left to crystallize, thus forming the stannate of soda; 100 lbs. of scraps yield 12 to 15 lbs. of the latter.

PREPARATION OF A NEW (TIN) GREEN.—This paint—which we propose to call "Phenician green," because its base, the tin, was first obtained by the ancient Phenicians—is not poisonous like Paris and other greens; it does not bleach; may be used as lime and water color and it deepens in oil. We prepare it by adding a solution of stannate of soda, made of 15 parts of the dry substance to one consisting of 12 parts of blue copperas. The precipitate obtained is collected and washed out; by adding chrome yellow or a decoction of fustic a blue shade may be imparted to it.

PREPARATION OF MOSAIC GOLD.—Bisulphuret of tin forms gold colored, translucent scales, of a peculiar soapy feeling. It is largely employed in bronzing wood. The following is a description of its mode of preparation from tin scraps: Put the scraps in glazed pots, cover them with muriatic acid, and when the tin is all taken up, transfer the liquid into another vessel. Should it yet contain free acid, add new scraps. Then immerse copper plates into the liquid; the tin will thus by galvanic action precipitate upon them as a spongy mass. Collect the tin, wash it with water, dry it and mix it intimately with equal parts of sulphur and salammoniac, fill the mixture into glass retorts and heat them up gradually on a sand blast. The bronze is obtained partly as a sublimate, partly at the bottom of the retort.

FOR THE MANUFACTURE OF COPPERAS.—This process is too well known to be described.

PREPARATION OF A NEW POLISHING FOR OPTICAL GLASSES.—The same is obtained by precipitating a copperas solution by oxalic acid, and drying and heating the precipitate.

PREPARATION OF "IRON GREEN."—First prepare Prussian blue by mixing a solution of copperas with one of yellow prussiate of potassa, solve the same in oxalic acid, and add to the resulting blue liquid a solution of bichromate of potassa and a small quantity of lead sugar. Collect the green precipitate, wash it out, and dry it. You may obtain any intermediate shade, from the deepest blue to the brightest green, in varying the proportions of the three solutions. In closing, we will mention that zinc and cadmium are thrown down in a dentistri from a solution of binoxide of tin in potassa.

A New Vessel of War.

Mr. John Elder, of the celebrated shipbuilders' firm, Randolph, Elder & Co., in Glasgow, has recently patented a most original form of iron-clad ram for coast defenses and attacks on sea fortifications. Mr. Elder's vessel is formed below the water line as a segment of an enormouns sphere, say 25 feet deep and 200 feet in diameter, of the circular water-line. This corresponds to a small piece of a sphere, of which the versine over a chord of 200 feet is 25 feet long. Over the water line the armor-clad sides are a short truncated cone, and in the center of this circular deck a high castle or tower, carrying three or four tiers of guns, is arranged. This vessel, being perfectly circular in plan, has neither bow nor stern, nor any of the other steering attributes of ships now in existence; it bears, in fact, the same relation of outline and form to the ordinary ships as the form of a crab bears to that of a fish. The power of locomotion is given to this craft by the reaction propeller. The reaction wheel—probably Mr. Randolph's improved water-jet propeller—is placed in the center of the vessel, at the lowest point of the spherical segment, and the ejection of water can be effected through four openings placed at four equi-distant points in the circumference, so as to command the direction of propulsion without any steering arrangement, by forcing the water through one or two of the passages which command any one of the four quadrants inclosed by them. There are, however, steering or deflection boards fitted to the end of the passages through which the water is ejected; and, by using these boards, a rotary motion can be given to the "crab." By ejecting the water from two opposite passages, or from all four passages simultaneously, and placing the steering boards into a corresponding position, the total engine power of the vessel can be made available for setting the ship into a revolving movement round its own vertical axis. The velocity which the ship is capable of attaining under these conditions, measured at the outer circumference, is very great, since there is no other resistance to this motion except the skin-friction. Mr. Elder proposes to make use of the great momentum which this high velocity of movement will afford for ramming purposes. The whole circular edge of his vessel which is of a sharp angle in section, represents, so to say, the edge of a circular saw or revolving disk wheel, and the accumulated momentum of the rotary movement can be used for producing a destructive effect upon the sides of any vessel with which this revolving turret ship would come into contact. The circular form allows of a very large stowage room as compared with the ordinary form of ships, and it produces a base of such stability as to allow the erection of a tower of great hight in the center, so as to obtain better facilities for attacking objects on shore. Mr. Elder has carried out some experiments as to the resistance to propulsion in a straight line offered by his form of vessel compared with the ordinary forms. He made two models representing equal tunnage, one of the *Black Prince* shape and the other of his spherical form, and the resistance of these two models was measured by an apparatus which afforded a simple mode of comparing the relative proportions of these resistances. The result was only about 10 per cent in favor of the *Black Prince* model, and this seems to indicate that the new vessel would be capable of attaining a fair speed under steam. The advantages offered by this form are of different kinds, the most prominent being a maximum of internal accommodation or stowage room, with a minimum of exposed surface, a circular or turret-shaped armored side, and an extraordinary facility of manœuvring in an action; last, but not least, the total absence of any exposed points of weakness, or "Achilles' heels," such as most iron-clads at present possess.—*Engineering.*

Treating Caoutchouc and other Gums.

J. B. Newbrough and E. Fagan, of New York city, have patented an improved material produced by treating caoutchouc and other gums as follows:

Sulphur is treated by boiling it in turpentine or equivalent oil, a portion of which will be decomposed, and will settle, with the sulphur, to the bottom of the vessel in which the materials are treated. The oil is then poured off, and the solid matter which remains is washed with dilute sulphuric acid, and is dried at a low heat. Iodine is treated in the same manner as the sulphur with oil to which sulphuric acid has been added, to prevent the formation of an explosive composition. Equal proportions of the prepared sulphur and iodine are melted together, and the composition, after cooling and hardening, is thoroughly incorporated with caoutchouc or equivalent gum in the proportion of about three ounces of the composition to one pound of the gum. The gum thus prepared may be molded or otherwise formed of any desired shape, after which it is introduced into an oven the temperature of which, during the first fifteen minutes, is raised to 320 deg. Fah. This temperature is maintained for five minutes, and is then quickly lowered to 250 deg., at which it remains for about an hour, or until the composition is hard. Any color imparted to this composition by the mixture with the same of suitable earthy or mineral matter will not be changed by the hardening process, so that no difficulty is experienced in obtaining a product of almost any desired color; and as but a comparatively low heat is required to harden the composition, the gum is not weakened or injured by the operation in any degree. The product thus obtained is hard, tough and durable, is not affected by nitro-sulphuric or other acid, and is applicable to many useful and ornamental purposes.

The same parties have also patented an improvement in manufacture of articles of rubber, gutta-percha, etc., as follows:

Gutta-percha, rubber, or other similar gum, after being molded, carved, or otherwise reduced to any desired shape, is immersed in bromine and is maintained in the same for such a length of time that, after the article is withdrawn and exposed to the air, the gum will become hardened and otherwise changed in its character so that it can be applied to purposes for which the gum, in its natural state, could not be used. In order to prevent the gum from hardening to any extent before it is withdrawn from the bromine, chloroform, or equivalent solvent of the gum, may be added to the bromine, in the proportion of nine parts of the latter to one of chloroform, and the article of gum is either immersed in the composition, or a portion of gum is dissolved in the same, and the solution is applied, in successive layers or coatings, to a mold on which an article is to be formed, or as a coating to articles of other materials which require to be covered, the gum hardening on the evaporation of the chloroform.

Crystals Containing Fluid.

Mr. J. B. Dancer lately read a paper before the Literary and Philosophical Society, of Manchester, Eng. containing a brief history of the discovery of fluids in crystals, including Sir H. Davy's chemical experiments on the fluids and gases obtained from the cavities in quartz crystals; Sir David Brewster's discovery of the pressure cavities in the diamond, ruby, emerald, amethyst, chrysoberyl, etc.; the existence of minute crystals in these cavities and the two new and remarkable fluids, which are immiscible, but sometimes found together in the same cavity—one a liquid hydro-carbon, named Brewstoline, the other Cryptoline; his experiments and examinations of artificial crystals deposited from aqueous solutions; his examination of the Koh-i-noor diamond and others in the East India Company's museum; and the geological speculations to which these discoveries gave rise. Mr. Dancer mentioned the experiments of his late father and others in producing artificial gems by intense heat, and stated that his own attention was drawn to this subject some twenty-four years since, by Sir David Brewster presenting him with a specimen of topaz containing fluid. Since that time he had examined a large number of crystals of various kinds, from the collections of friends, and had found fluid in quartz from South America, Norway, the Alps, Ireland, Snowdon, and the Isle of Man: and in fluor spar from Derbyshire; this latter specimen contained a considerable quantity of fluid, which burst the crystal of 180° temperature. [After this paper was written, Sir David Brewster informed the author that the fluid contained in crystals of fluor spar was water, and that the cavities burst at a temperature of 150°.] He suggested the employment of the microscope as a valuable assistance in detecting spurious from real gems; very few of the latter are perfect, and the flaws and cavities are so distinct in character from those which are so abundant generally in artificial gems that very little experience is sufficient for the purpose. This mode of testing of course is limited to transparent crystals, but might be employed when the usual methods are not practicable. He also mentioned Mr. Sorby's discovery of fluid cavities in the quartz of granite, in the quartz of volcanic rocks, and also in the feldspar ejected from the crater of Vesuvius, and Mr. Sorby's method of determining the temperature at which various rocks and minerals are formed. At the conclusion of the meeting, crystals containing fluid were exhibited under the microscope, and the expansion of the fluid by elevating the temperature of the crystal while under examination.—*Mechanics' Magazine.*

Compound for Destroying Burrs in Wool.

Patented by William H. Jubb, of Norwalk, Conn. The following are the ingredients for the compound for destroying the burrs: Sulphuric acid, one hundred parts, by weight; refined saltpeter, two parts, by weight, dissolved in the proper and sufficient quantity of water for the purpose regulated by the condition and nature of the wool. After the hard, knotty nature of the burrs is destroyed, which will be by the aforesaid compound, and they are reduced to a state of powder or pasty substance, I then use the following ingredients, compounded together, which will neutralize the injurious effects of the acids employed and completely cleanse the wool from the same and all other impurities, rendering the wool bleached to an excellent whiteness, without the least injury to the fiber: Sal-ammoniac, four parts, in weight; soda ash, thirty parts, in weight; whale-oil soap, ten parts, in weight; lime, five parts, in weight, dissolved in the necessary quantity of water to produce the desired effect. The utility of my compound for cleaning the wool from burrs and other impurities is in its economy; also in its freedom from the excessive and offensive smell when in operation, and the complete extermination of the burrs without the least injury to the fiber of the wool.

Preservation of Wood---Composition for Ships' Bottoms.

Mr. C. F. Raymond, of Norwalk, says he has used hot coal tar with great success in preserving from decay fence posts and other timber exposed to alternate wet and dryness. He places the posts in the boiling tar for a few minutes, then sprinkles them with clean sand. After setting the posts the portion above ground is paid over with hot tar and coated with sand.

He claims also to have a composition of which coal tar is the basis, designed to be used on the bottoms of vessels to prevent fouling and the ravages of the teredo. He claims that a vessel coated with it can make a voyage to the East Indies and back without, on her return, having a single barnacle clinging to her bottom or a worm in her timbers, except such as may have been in before the composition was put on.

Improvement in Artificial Stone, Stucco, Cement, etc.

George A. Frear, of Chicago, Ill., has obtained a patent as follows:—

"The nature of my invention consists in the use of an aqueous solution of gum shellac, or its equivalent, in cementing together particles of silex, alumina, calcium, or other mineral substances, to produce, artificially, a hard and durable stone, stucco, cement, or paint, for useful or ornamental purposes.

"My shellac solution is best obtained by boiling the gum-shellac of commerce in water previously made alkaline by the addition of any suitable alkaline salt, in proper proportion. The proportions of shellac, alkali, and water, may, and necessarily will, vary with the strength and quality of the solution required in producing various descriptions of stones, cements, etc.

"In the manufacture of artificial stones for building purposes, I use a solution obtained by first dissolving from two to four ounces of saleratus, potash, soda, or other equivalent alkali, in about one gallon of pure boiling water, and then adding thereto one pound of gum-shellac, boiling the mixture until the gum is entirely dissolved.

"A firm and durable stone, impervious to moisture, is produced by dampening a mixture of about one part of lime or cement and four parts of sand or other silicious material (with or without gravel or other ingredients) with my aqueous solution of shellac, and then firmly compressing the composition into molds of any desired form, either by suitable machinery or by hand, with mallets or tamping rods.

"The blocks or other articles thus produced will rapidly harden when removed from the molds, and in a few days are ready for building purposes. I prefer to obtain the compression of the material by percussion rather than by simple pressure.

"To produce a more perfect finish, I contemplate washing the surface or face of the artificial stone thus manufactured, five or six days after molding the same, with a weak solution of shellac dissolved in alcohol, ether, or spirits of turpentine (say about one pound of shellac in one gallon of the spirits).

"Instead of using a mixture of lime or cement, and sand, to produce an artificial stone, I contemplate moistening simple sand, clay, lime, chalk, or other earthy or mineral substance, as well as any combinations thereof, with my aqueous shellac solution, and the molding the same, by percussion, into suitable blocks or other devices, so that endless variety may be obtained therein at pleasure.

"To produce a mastic or stucco, I add so much of my shellac solution to lime, sand, clay, or any earthy or silicious material, or to mixtures thereof, so that the material or mixture shall be reduced by the solution to a pasty consistency, which can be readily worked and applied with a trowel. If then applied to any surface it will firmly adhere thereto, and, upon hardening, produce a firm, water-proof surface, which may be made to resemble stone so closely as not to be readily distinguished therefrom. By making the composition still thinner, it may be used as a substitute for paint, and it will also form a strong and adhesive cement for stone work, etc.

"Through a proper choice of the sand or other substances forming the basis of my improved artificial stones, etc., or by the use of coloring matter in connection therewith, nearly all descriptions of natural stone may be imitated, and any colors or shades of material obtained, at pleasure.

"In applying my improved stucco or mastic to buildings, whether of brick or stone, I first wash the surface with my aqueous shellac solution preparatory to laying on the composition hereinbefore described."

The Fine Arts as Applied to Industry.

The Paris correspondent of the New York *Times* describes a new kind of wall decorations for apartments, which is simply an imitation of the old tapestry work so much in vogue during the Middle Ages. The designs, it appears, are executed without weaving, in colors almost as indestructible as the originals from which they are copied. Close, as well as at a distance, the imitation is perfect, the hand and eye both being deceived.

The cloth which is employed for the ground work imitates in its texture the web of the old tapestry, it is composed of a white reps, and the sewings which are necessary to join the breadths for a picture of large dimensions, are made with great care, and follow the lines of the stuff, so that it is almost impossible to detect them, once the painting is finished. When the artist traces a line somewhat oblique with his brush, the effect on the raised lines of the cloth is a sort of a zigzag, like a woolen stitch on the canvas ground. The colors once laid in this way, he passes over them again with lines traversing the original ones, and thus imitates perfectly the web of the old tapestry.

In regard to the process itself, it is similar to that of water color painting, that is to say, it is the cloth itself which gives the lights, while in oil painting they are laid thickly on the canvas. The colors employed are the same as those used by decorative painters, but they are amalgamated by an albuminous composition which fixes them in the cloth so firmly that they become almost unalterable.

A FRENCH PATENT has recently been granted for a new process for the production of sulphuric acid. Its great recommendation is that in the improved method all large leaden chambers are dispensed with. The sulphur or pyrites is burned in compressed air, and the sulphurous acid, first washed to free it from arsenic, etc., is then brought into contact with the nitric vapors in a small leaden chamber of peculiar construction.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING FEBRUARY 25, 1868.

Reported Officially for the Scientific American.

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74,742.—HORSE BLANKET.—Seth W. Baker, Providence, R. I.

I claim a horse blanket, manufactured or made up of the fabric herein described, as a new article of manufacture.

74,743.—REVOLVING HAIR BRUSH.—Jabez Bayston, Chicago, Ill.

I claim the combination of the frame, A B D, the cylindrical brush, E, and the gearing for operating the same, and the elastic support, J, arranged and operating substantially as and for the purposes specified and shown.

74,744.—ROTARY ENGINE.—Jos B. Bennett, Brooklyn, N. Y.

I claim the arrangement of the springs around the wheels, D, D, with the pistons, E E, and cylinder, A, substantially as and for the purposes specified.

74,745.—SHOE NAIL.—James M. Bent, Wayland, Mass

I claim the cut shoe nail, with conical head, and tapering and parallel sides as described.

74,746.—KNOB LATCH FOR DOOR.—Albert Bingham, Newtonville, Mass. Antedated Feb. 7, 1868.

I claim the combination and arrangement of the latch, having link, B, and armed end, C, the removable tumbler, D, and spring, S, when the parts are constructed and operating substantially as described.

74,747.—SPRING BED BOTTOM.—Samuel F. Bouton, and Nathan P. Ames, Chicago, Ill.

We claim the combination of the arms, d and e, formed upon the coil of the spring, D, as shown, and a socket, c, applied or secured to the slat, C, in the manner and for the purposes specified.

74,748.—FARM GATE.—Henry H. Butler, Troy, Mich.

I claim 1st, The horizontal sliding bar, D, when constructed and operating substantially as and for the purpose set forth.

2d, The combination of the above with the rollers between the double posts E and F, the hangers, B C, with their rollers, and the gate, A, when arranged, constructed, and operating, substantially as and for the purposes described.

74,749.—MODE OF ATTACHING CIRCULAR SAWS TO THEIR MANDRELS.—Ela Calley, Franklin, N. H.

I claim the arrangement of the separate nut, C, and its confining screws, b b, shaft, A, the male screw, c, and the shoulder a, applied to such shaft in the manner and for the purpose substantially as specified.

74,750.—PISTON.—S. E. Chubbuck, and Isaac Y. Chubbuck, Roxbury, Mass., assignors to themselves and S. E. Chubbuck, Jr.

We claim, 1st, The peculiar construction of the ring sections, H, substantially as described and shown.

2d, The open-sided radial grooves, f f, in combination with the spring wedge, K, substantially as described.

3d, The lugs, u, in combination with the arms, c, to support those sections which work in a vertical or approximately vertical position, substantially as described.

74,751.—SEWING MACHINE.—Edwin E. Clark, Ann Arbor, Mich.

I claim, 1st, The slotted plate, C, constructed substantially as described, and for the purpose set forth.

2d, The needle-holder, E, constructed substantially as described, in combination with the slotted guiding plate, C, as and for the purpose set forth.

3d, The curved eye-pointed needle, F, operating in the arc of a circle, the center of movement of which corresponds with the plane of the movement of the cloth, and operated by means substantially as described.

4th, The looper, W, constructed and operated substantially as described.

5th, The combination of looper, W, and curved eye-pointed needle, F, when constructed and operating together as and for the purpose set forth.

74,752.—PAINT BRUSH.—Amos Cutter, Chelsea, Mass.

I claim the screw rod, g, when permanently secured on the handle, and forced downwardly by the female screw in the handle, f, in connection with the cylinder, a, as and for the purpose described.

74,753.—COAL STOVE.—E. A. De Camp, St. Louis, Mo. Antedated January 24, 1868.

I claim, 1st, The annular cooking top, C1 C2, in combination with the stove, A, substantially as described and set forth.

2d, The diaphragms B, and C3, when combined with the disks, C1 and C2, substantially as described and set forth.

74,754.—SULKY CULTIVATOR.—Elias S. Easterday, Nokomis, Ill.

I claim, 1st, Extending the plow beams, D, forward to form the tongue of the machine, substantially as herein shown and described, and for the purpose set forth.

2d, The iron frames, O, adjustably secured to each other, and sliding laterally upon a rod or equivalent slide attached to the axle, B, in combination with the plow beams, D, substantially as herein shown and described, and for the purposes set forth.

3d, The combination of the foot levers, Q, with the plow beams, D, and with the slotted irons or frames, O, substantially as herein shown and described, and for the purpose set forth.

4th, Adjustably securing the plows, M, to the standards, K, by means of sockets, N, substantially in the manner herein shown and described, and for the purpose set forth.

5th, The combination of the pivoted levers, E, chain, F, and pulley, G, with the plow beams, D, and with the plow beams D, and with the bars, c1, connecting the forward ends of the bars, C, substantially as herein shown and described, and for the purpose set forth.

74,755.—MANUFACTURE OF TIN-LINED LEAD PIPE.—John Farrell, Pittsburg, Pa.

I claim, 1st, The die, e', in a plunger, e, in combination with a cylinder, a, and mandrel, d, in a machine for making tin-lined lead pipe, constructed and operated substantially in the manner and for the purposes hereinbefore set forth.

2d, The method hereinbefore described of constructing a compound ingot of tin and lead, in the manufacture of tin-lined lead pipe.

3d, The use of a flange, l, attached to the tin part of a compound ingot of lead and tin, for the purposes and in the manner substantially as above set forth.

4th, In the production of a compound tin and lead ingot by the method hereinbefore described, the use of a cover, g, for protecting the tin pipe or tin ingot from the heat of the molten lead, substantially as and for the purposes hereinbefore set forth.

74,756.—BURNING FLUID.—George W. Flowers, Jacob C. Happersett, and D. W. Happersett, Urbana, Ohio.

We claim the fluid prepared of the materials and substances as herein described.

74,757.—WORK TRIMMER FOR BOOTS AND SHOES.—A. V. Hill, Limestone, N. Y. Antedated Feb. 12, 1868.

I claim, 1st, The guard, c, when applied to a work trimmer, in manner and for the purposes substantially as described.

2d, The blade, B, fitted adjustably into a head, A, by the shank, b, as herein set forth, and for the purposes substantially as described.

74,758.—IMPLEMENT FOR MAKING EYELETS.—David K. Hoxsie, Providence, R. I.

I claim, 1st, The movable forming punch, No. 2, constructed with a cylindrical shape or former, e, a shoulder, l, a bevelled end, a, and a center cavity, t, when combined with mechanism so as to operate substantially as described, for the purpose specified.

2d, The stationary die, No. 2, constructed with a circular entrance, n, a conical drawing cavity, s, a throat, x, and an expanding cavity, r, at the rear, when combined with mechanism so as to operate substantially as and for the purpose specified.

3d, The movable cutting punch, No. 3, constructed in a tubular form, with a bevelled surface, g, and a concentric cutting edge, c, when combined with mechanism, such as herein described, so as to operate substantially as and for the purpose specified.

4th, The method herein described, of forming an eyelet by first converting a planchet or disk of metal into a tube with a closed end, and then cutting out the closed end, and expanding this severed edge of the tube, to form the flange, by means substantially as described.

5th, So combining a drawing punch and an open drawing die, constructed substantially as described, that the planchet of metal from which the eyelet is to be made, will enter in at the front end of the die, and, passing through, be delivered, completely formed into an eyelet at the rear end of the die, substantially as described.

74,759.—ANIMAL TRAP.—Samuel Huffman, Westfield, Ill.

I claim, 1st, The pivoted chamber, B, turning on its axis, furnished with two opposite openings, c c, and the lateral opening, D, as and for the purpose specified, or equivalent.

2d, In combination with revolving chamber, B, the auxiliary balls, as described.

74,760.—BREECH-LOADING FIRE-ARM.—Barton H. Jenks, Bridesburg, Pa.

I claim, 1st, Combining a vibrating slotted breech piece, D, a vibrating locking latch, E, and a hammer, F, in such manner that these parts are confined between the cheeks, B, of the frame, and the hammer is on the outside of the breech piece, substantially as described.

2d, Arranging the tumbler, G, between the cheeks of the vibrating breech piece, D, and affixing the hammer to one end of the tubular bearing of said tumbler, substantially as described.

3d, So combining a vibrating hammer, F, which is arranged outside of a vibrating breech piece, and between the frame cheeks, B, that said hammer can be full cocked or half cocked without moving the breech piece, substantially as described.

4th, Providing for cocking a hammer, which is arranged outside of and pivoted to the axis, e, of a vibrating breech piece, by the act of drawing back the latter by means of an extension, b', or its equivalent, substantially as described.

5th, The relative arrangement of the breech piece, D, locking portion, F, tumbler, G, and trigger, B, the same being constructed and operating substantially as set forth.

74,761.—WHIFFLETREE.—Daniel W. Johnson, Bloomsburg, Pa.

I claim a whiffletree, having spring, A, slide, B, levers, H and M, chains, K, and button, C, constructed, combined, and arranged, substantially as specified.

74,762.—ANIMAL TRAP.—Wilmer W. Leech (assignor to himself and George Contast), Pittsburg, Pa.

I claim the curved or bent and coiled wires, e e', one or more, single or double, in combination with the baiting and tripping devices, constructed and arranged substantially as and for the purposes set forth.

74,763.—KNIFE AND FORK SCOURER.—Mary Merrill, Marengo, Ill.

I claim the combination of the box, A, the inner casing, E, the sieves, B and C, and the cork or rubber, D, as and for the purposes specified.

74,764.—MANUFACTURE OF BUTTONS.—Lewis Moses, New York city, assignor to himself and James C. Walter, Harlem, N. Y. Antedated Feb. 7, 1868.

I claim, 1st, The cement consisting of liquid glass and finely powdered mineral matter, substantially as described, for the purpose specified.

2d, The plate, B, containing the cement filled into the circular recess in the button, A, and subjected to heat, as herein set forth, for the purpose specified.

74,765.—BRICK MACHINE.—Meltier Nye and Abraham J. Knisely, Chicago, Ill.

We claim, 1st, The combination of the movable fulcrum, F, connecting levers, E M and N, with rolling shaft, P, chain, R, and weight, s, substantially as and for the purpose shown.

2d, In combination with the movable fulcrum, F, the connecting rod, G, lever, H, chain, I, weight, y, and rod, j, substantially as and for the purpose shown.

3d, Combining the adjustable pivoted springs, f, with the hinged valves, g, substantially as and for the purpose herein shown and described.

74,766.—MILK AND PROVISION RACK.—Erasmus Osborn, Rome Center, Mich.

I claim the construction of a rack, as hereinbefore described, with perpendicular posts, A, transverse bars or feet, B, horizontal bars, C, cap, E, and rectangular pans, F, when arranged and operating substantially as and for the purposes described.

74,767.—SHEEP HOLDER AND FLEECE FOLDER COMBINED.—George Paine Washington, Ohio.

I claim the herein described sheep table, consisting of the top, B, sides, C, leaves, D, adjusting standard, F, and box E, all constructed and arranged to operate in combination with the apron, H, and roller, I, in the manner and for the purpose substantially as set forth.

74,768.—WATER ELEVATOR.—Wm. M. Palmer, Middlebush, N. J.

I claim, 1st, The ropes, F, cylinders, G, collars, G1, roller, H1, oscillating levers, H, and lever, I, combined so as to operate substantially as set forth.

2d, The bucket, A, swinging on the arm, D, and provided with the spring hook, K, arranged to operate substantially as set forth.

3d, The arrangement of the slides, C, arm, D, bucket, A, bail, E, and hook K, substantially as set forth.

4th, In combination with the cylinders, G, and collars, G1, the oscillating arms, H, substantially as described.

5th, In combination with the ways, B', and slide, C, the lever, I, arranged to operate substantially in the manner and for the purpose set forth.

74,769.—CONCRETE BRICK MACHINE.—Isaac Pardee, Vineland, N. J.

I claim, 1st, The arrangement of the levers, F and J, when the same are connected with the sliding box, D, in the manner set forth.

2d, The sliding box, D, in combination with the uprights, B, plate, C, pin, b, lever, F, chain, K, shaft, I, and lever, J, all made and operating substantially as and for the purpose herein shown and described.

3d, The box, D, when provided with a core, E, in combination with the sliding plate, L, that has grooves, e, and fits over strips, f, as set forth.

4th, The hinged platform, O, in combination with the box, N, and box, D, all made and operating substantially as and for the purpose described.

5th, The springs, d, when arranged as set forth, for the purpose of keeping the box, D, up, as set forth.

74,770.—COAL HOD AND SCREEN.—Amos Porter (assignor to himself and N. S. Payne), Charlestown, Mass.

I claim, 1st, The combined hod or ash pan and sifter, when it is made of two parts so constructed as that one half fits into or upon the other half, and the bored holes of the sifting bottoms are so arranged as not to come opposite to each other when one pan is put into the other, thus fitting the parts to set as a hot or ash pan, all substantially as described.

2d, The rotating holder or sifting frame to hold the two parts of the hod sifter together, in combination with the hod sifter, when all are constructed and used substantially as described.

3d, The stationary holder or hod frame, when constructed with bails or handles, in combination with the two containing vessels or pans, when bored in the bottoms, all substantially as described.

4th, The general construction and arrangement of the whole device, when made and used substantially as described.

74,771.—CORD RETAINER FOR PICTURES AND MIRRORS.—Wm. Read, Jr., Boston, Mass. Antedated Oct. 10, 1867.

I claim the frame, a, provided with a projecting end or point, c, in combination with an elastic plate, b, as and for the purpose specified.

74,772.—MECHANICAL DONKEY.—Alfred Shedlock and Wm. Shedlock, New York city.

We claim, 1st, The combination of the cam wheel, K, made as described, with the spring, M, having a notched detent plate, N, attached thereto, for the purposes hereinbefore described.

2d, Also, in combination with the reacting spring, M, and a walking donkey, the independent or adjustable rider, Q, for the purposes hereinbefore set forth.

3d, Also, in combination with the feet of a walking donkey, the claw toothed shoes, S, or equivalent devices therefor, for the purposes hereinbefore set forth.

74,773.—SLEEPING CAR BERTH.—Wm. B. Snow, Chicago, Ill.

I claim the coil springs, L, enclosed in boxes between the floors of the car, in combination with pulleys, m n, cords G, and berths E, arranged substantially as set forth.

74,774.—PORTABLE GRINDING MILL.—Ambrose W. Straub, Philadelphia, Pa.

I claim securing firmly down together upon the frame, A B, cast in one piece, as shown and described, the detachable curb d', coping ring b', and hopper stool F, by means of four nutted screw bolts, a5 a5 a5 a5, substantially as and for the purpose herein described.

74,775.—CULTIVATOR.—C. F. Taylor, Vassalboro, Me.

I claim the A-shaped cultivator, A, with its center piece, a, and cross piece, a', in combination with the teeth, b, so arranged as to throw the earth inward, as and for the purpose described.

74,776.—COTTON CLEANER.—J. W. Thorn, Courtland, Ala.

I claim, 1st, Feeding drum F A, catch lever L C T, ratchet C R, and lug l g, the whole combined and constructed and operating in the manner and for the purpose above set forth and described.

2d, The lever L', catch C K, door D, and weight W, the whole combined in the manner and for the purpose above set forth and described.

3d, The combination of the drum F A, its catch lever L C T, and ratchet C R, and door D, lever L', and catch C K, and weight W, with a cotton bearing and cleaning machine, the whole constructed and operated in the manner and for the purpose above set forth and described.

74,777.—MACHINE FOR SHEETING AND PRESSING TOBACCO.—Wm. H. Watson, New York city.

I claim, 1st, The combination of two or more endless metallic belts, constructed substantially as described, for the purpose specified.

2d, The combination of the side belts with the same, for the purpose specified.

3d, Slitting or cutting the tobacco while under pressure, substantially as shown.

4th, Adjusting the cylinders D and D2, substantially as shown and for the purposes indicated.

74,778.—FLUID METER.—J. W. Weller, Cleveland, Ohio.

I claim, 1st, The cocks C C', arranged in combination with a projecting box A, in the manner and for the purpose substantially as set forth.

2d, The faucets D D' and E E', handles G, and chain F, in combination with the cakes C C', levers H, and box A, when arranged and operated in the manner and for the purpose set forth.

3d, The supplementary box A', adjusting screws P, and bail B', in combination with the vibrating box A, for the purpose and in the manner as described.

4th, The registering apparatus, consisting of the gearing B', dial f, hands e d, and lever Q, when arranged and operated in combination with the box A, in the manner and for the purpose set forth.

5th, The vibrating box A, in combination with the ball I, and levers H H', substantially as and for the purpose set forth.

74,779.—BURGLAR ALARM.—I. M. Wells, Jeffersonville, Ohio.

I claim, 1st, The rotary match lighter C, applied to a burglar alarm, and operating by a complete revolution, substantially in the manner and for the purpose described.

2d, The combination of the match lighter C, with the key E, substantially as and for the purpose described.

3d, The match holder B b, mounted in the box A A', and arranged and operating substantially as described.

4th, The combination with the match holder B b, of the fuse N, as and for the purpose set forth.

74,780.—DETACHING CHECK REIN.—Abram Westbrook and Stephen O. Doan, Leona, Pa.

We claim, 1st, A cord attached to the check rein and extending back and confined in one of the driving reins, substantially for the purpose as described.

2d, The combination of a check rein with a cord for detaching and attaching the same, substantially as specified.

74,781.—PERMUTATION LOCK.—Anton Wetzel, Cincinnati, O.

I claim, 1st, In combination with the tumbler D, the miter wheels G H, by which the gated disks F F' F'' F''' F'''', are situated and operated at right angles to the operating handle I, of the lock, as described and for the purpose specified.

2d, The inclined headed bolt K K', pin L, spring O, and disks P p p', arranged and operating in the manner and for the purpose set forth.

74,782.—FIRE LIGHTER.—Levi H. Whitney, Vallejo, Cal.

I claim as an article of manufacture, a fire lighter, constructed of the parts arranged substantially as described.

74,783.—TRAVELER'S TRUNK.—John N. Wunderlich, Philadelphia, Pa.

I claim, 1st, The boot-rack made by the combination of the horizontal shelves, s n, and folding legs E, when arranged beneath a traveling trunk, in the manner shown and described.

2d, The trunk A D, opening as shown, when so combined with the folding legs E, that the cover at forms a bureau table, and the falling front, C, a writing desk, substantially as shown and described.

3d, The combination of the under mentioned parts, when so arranged in a traveling trunk as to form a toilet mirror m3, table s4, writing desk C, and boot-rack, n, in the manner shown and described.

74,784.—MEASURING AND TALLYING ATTACHMENT TO THRASHING MACHINE.—W. F. Abbott, Marengo, Ill.

I claim, 1st, The elevator box A, pulleys F F, belt m, and buckets g, in combination with the bifurcated spout C C', doors D D, measuring chambers M, and doors N N, all constructed, arranged and operating substantially as set forth.

2d, The combination of the pivoted doors D, pivoted lever d, and plate d', with the bifurcated spout C C', and measuring chambers M, substantially as and for the purposes set forth.

3d, The combination of the sliding bar, a, pivoted pawls, l, doors, N, having projections, l, double ratchet bar, h, springs, q, pointer, s, and register, K, substantially as described and represented.

4th, In combination with the above the key, w, substantially as described and for the purpose specified.

5th, The doors, D, substantially as shown and described, in combination with the bifurcated spout, C, and measuring chambers, M, for the purpose of alternately opening and closing said spout, all as set forth.

6th, The projections, l, in combination with the discharge door, N, of a grain-measuring chamber, substantially as shown and for the purpose specified.

7th, The bar, a, and its pawls, l, in combination with the ratchet bar, h, and projections, l, or other equivalent device, substantially as shown and described and for the purpose set forth.

8th, The ratchet bar, h, in combination with the tally-scale of the case, k, substantially as shown and described for the purpose of tallying grain, all as set forth.

74,785.—MACHINE FOR BORING POST HOLES.—A. Q. Allis, Dayton, Ohio.

I claim, 1st, The half nut, o', and the method of engaging and detaching the same from the boring bar, substantially as and for the purposes described.

2d, The tube, E, in combination with the auger, D, substantially as described for the purpose set forth.

3d, A post hole boring machine so constructed as to swing round on the platform, substantially as and for the purposes described.

74,786.—PILLOW SUPPORT.—Emeline T. Annis, Mount Morris, N. Y.

I claim the pillow, A, formed on the plate, B, the bracket, C, the rod, E, and the nut, g, arranged, combined and operating substantially as shown and described for the purposes set forth.

74,787.—TEAKETTLE.—Cornelius Anthony (assignor to C. L. Sanford, George B. Near and James Trover), Schenectady, N. Y.

I claim, 1st, The key or wedge, B, in combination with recess, C, and bail, D, and swinging cover of a teakettle, substantially as shown and described.

2d, The lug or ear, A, of a teakettle when made with a recess, C, and used substantially as and for the purpose shown and described.

74,788.—BUTT HINGE.—M. A. Avery, Groton, N. Y.

I claim the right and left butt hinge having the screw holes countersunk upon each side when its leaf, b, is provided with an opening between the socket, a, and abutment, d, for the application of the eye, c, of the leaf, B, as herein shown and described.

74,789.—BELAYING CLEAT.—Jonathan Bangs, South Dennis, Mass.

I claim the cleat, constructed as described, consisting of the lever, A, having upon its upper side the hook, H, and pivoted between the ears, a, of the plate, B, all operating as described whereby the tension of the rope upon the hook, H, forces the long arm, K, upon the rope beneath it in the groove of the plate, C, securely clamping said rope in position, as herein shown and described.

74,790.—WASHING MACHINE.—P. F. Bindewald, Strongsville, Ohio.

I claim the combination and arrangement of the lever, I, shaft, B, arms, C, connecting bars, D, pivoted levers, E, arms, G, and heaters, H, constructed as described with each other and with the box or tub, A, substantially as herein shown and described and for the purpose set forth.

74,791.—PREPARING FINELY-DIVIDED IRON, AND THE SEPARATION OF COPPER, SILVER AND OTHER METALS FROM THEIR SOLUTIONS.—Gustav Rischo, Jr., Swansea, Great Britain, assignor to himself and John L. Kidwell, Georgetown, D. C.

I claim, 1st, The preparation of finely-divided metallic iron, in the manner and by the process substantially as described.

2d, The combination and arrangement of the receiver, F, with the furnace for deoxidizing the ore or oxides of iron and securing the product from the oxidizing effects of the atmosphere, as set forth.

3d, The precipitation of metallic copper from its solutions by the use of finely-divided iron, prepared as described and in the manner set forth.

4th, The use of the finely divided metallic iron produced in the manner set forth for the manufacture of steel and for other manufacturing purposes.

5th, The use of finely-divided metallic copper produced in the manner set forth for separating silver from its solutions.

74,792.—SHOE FOR CAR BRAKE.—James Brahn, Jersey City, N. J.

I claim, 1st, The shoe, B, cast with sockets, c, in combination with the plate, A, formed with projections, b a, substantially as described for the purpose specified.

2d, In combination with the above, the rubber strip, C, arranged substantially as and for the purpose specified.

74,793.—LAMP BURNER.—Arthur W. Browne, Brooklyn, N. Y.

I claim, 1st, The combination of the tube, B, and tube or wick deflector, C, constructed and arranged as herein described, and adapted for the employment of two flat wicks which are thereby spread and curved and made to produce a circular flame, substantially as set forth.

2d, In combination with the elements covered by the first clause, the shafts, F F1, toothed wheels, f, and disk or operating device, F2, arranged and employed substantially as and for the purpose set forth.

3d, The gauze, G, in combination with the slotted wick deflector or tube, C, as and for the purposes set forth.

74,794.—HORSE RAKE.—E. W. Bullard (assignor to himself and J. W. Jenkins), Barre, Mass.

I claim, 1st, The combination with a rake whose teeth are capable of being tilted or elevated in order to discharge the hay, of the stationary clearers, F, and vertical fingers, G, operating in connection with the rake, substantially in the manner and for the purposes herein shown and set forth.

2d, The combination with the axle and the rake teeth and thills hinged to the axle as described of, the horizontal fingers, F, and short vertical fingers, G, substantially in the manner and for the purposes shown and set forth.

74,795.—CATTLE PRICKER.—R. A. Carson and W. T. Peter, Briensburg, Ky.

We claim, 1st, An apparatus for preventing cattle from lying down or jumping, substantially as shown and described.

The strap, a, in combination with the pricking points, e', substantially as shown and described, and for the purposes set forth.

74,796.—CHURN.—C. H. Carver, Taunton, Mass.

I claim, 1st, The combination of the screw dasher, E, constructed as described, with the churn, B, having two or more inclined ribs or flanges, b', attached to its inner surface, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the clamp, H, constructed as herein shown and described, that is to say, with jaws, h1, bearing, h2, and arm, h3, with the dasher shaft, F, and crank wheel, I, as and for the purpose set forth.

74,797.—CHEESE BOX.—D. M. Cole, Elgin, Ill.

I claim, 1st, The combination of the outer and inner case, E and A, constructed substantially as and for the purpose specified.

2d, Connecting the cover and bottom to the rim and sides of a paper box by means of strips of textile substance, 1, 2, 3, 4, more or less, substantially as and for the purpose set forth.

74,798.—CLOTHESLINE HOLDER.—Albert Comey, Cuyahoga Falls, Ohio.

I claim the plate, B, with swinging cam, C, arranged in such manner as to operate by its own weight from either side, and flanged serrated roller, D, when combined as and for the purpose set forth.

74,799.—MODE OF TREATING MINERAL PHOSPHATES FOR THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.

I claim uniting phosphatic minerals or earth with a solution of common salt, chloride of sodium, and water while hot, as and for the purposes herein described.

74,800.—CURLING IRON.—Samuel E. Condon, Brooklyn, E. D., N. Y.

I claim the curling iron, A, when secured in the metal case, C, by means of the catch, F, upon the case, fitting over the flange, G, upon the handle, B, as herein shown and described.

74,801.—DUSTPAN.—Samuel E. Condon, Brooklyn, E. D., N. Y.

I claim, 1st, The hinged cover, D, applied to the dustpan, A, and arranged in connection with the inclined flange, C, when a space is left between the hinge of the cover and the rear end of the pan, A, and when combined with the automatic coupling, all constructed, arranged, and operating as and for the purpose described.

2d, The automatic or self-acting coupling composed of the pivoted rod, E, secured to the bottom of the pan with a hook, f, at one end, and a weight, h, at the opposite end, and the staple, e, attached to the under side of the lid or cover, D, substantially as and for the purpose specified.

74,802.—RUNNING GEAR FOR WHEELED VEHICLES.—W. C. Cook, Appleton, Wis.

I claim, 1st, The combination of the reach, E, with the hounds, C C, of the front axle, A, the bearing plates, a a, at the rear of the hounds, the pivoted rear axle, B, and the segment bar, c, with the front end of the reach connected to it by a staple, b, all arranged substantially in the manner as and for the purpose set forth.

2d, The construction of the metal stakes, G, secured to the bolsters, each by single bolt, f, arranged and applied substantially as shown and described.

74,803.—GLOBE VALVE.—Wm. S. Cooper, Philadelphia, Pa.

I claim, 1st, The combination of the central guide piece, G, cap, B, and body, A, substantially as herein set forth.

2d, The arrangement of the spindle, S, central guide piece, G, square shank, X, of the valve, V, with the cap, B, and body, A, substantially upon the principle as herein set forth.

74,804.—MODE OF SECURING LABELS TO GLASS-WARE.—Edward M. Davis (assignor to himself, J. B. Clark, and J. A. Hunter), Pittsburgh, Pa.

I claim, 1st, The process for countersinking a metallic substance in glassware, in manner and for the purposes substantially as described.

2d, The combination of the metallic substances, B and C with the glassware, A, in manner and for the purposes herein set forth and described.

74,805.—Gate Hinge.—P. Dennis (assignor to himself and Geo. Leggette), Schuylerville, N. Y.

I claim the construction of the gate hinge consisting of the forked portion, D, having a socket in which the pintle, C, of the box, B, fits, said box carrying above the pintle, in the grooved guides, b, the roller, A, as herein described, for the purpose specified.

74,806.—Channeling Tool.—F. E. Droll, St Charles, Mo.

I claim, 1st, The side bar, B, as united with main bar, A, for the use and purpose as specified and herein set forth.

2d, The adjusting my smaller knife, D, to the small or side bar, B, by means of the screws, independently of any other part of my machine, for the use and purpose as specified and hereinbefore set forth.

3d, My spring, E, as constructed, so that it may be moved up or down in main bar as a guide, for the use and purpose as specified and herein set forth.

4th, The entire combination of my knives, spring, and bars, with my mode of adjusting my knives and spring, for the use and purpose as specified and herein set forth.

74,807.—Strap Fastener.—S. W. Durham, Ipava, Ill.

I claim the strap fastener, constructed as described, consisting of the plate, B, having upon one of its sides the loops, C D, the latter bearing the tongue, E, whose inner end fits within the strap between the loops, C D, as herein shown and described.

74,808.—Sheep Shearing and Tagging Table.—Green Fenton, Streetsboro, Ohio.

I claim, 1st, The bottom, C, consisting of the sides, D, yokes, F, and straps, E, as arranged, in combination with the table, B, and adjustable neck block, G, for the purpose set forth.

2d, The sliding supplementary top, I, sides, J, pillow, K, and extension legs, A, all constructed and arranged in the manner and for the purpose specified.

74,809.—Frame for Carriage Tops.—James H. Flagg, Perkinsville, Vt.

I claim the carriage top frame consisting of two or more bows of metal or other suitable material, the side bows being hung on an internal one, and the whole jointed in the middle, in manner and for the purposes substantially as above set forth and described.

74,810.—Beehive.—M. D. Fogel, Alpha, Ohio.

I claim the within-described hive, when its several parts, exclusive of the trough, are constructed, combined, and arranged as set forth.

74,811.—Track Cleaner.—A. A. Freeman and Sam'l Ford, Philadelphia, Pa.

We claim, 1st, Bed plate, B P, bearings, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, shafts, T T' T'' and T''', brooms, C B C B' C B'' and C B''', shafts, S and S', bevelled wheels, V V' V'' and V''', geared wheels, G G' G'' and G''', all constructed, combined, and operating in the manner and for the purpose above set forth and described.

2d, The combination and arrangement of the screws, S C and S C', with the car frame, so as to give the proper dip to brooms, C B C B' C B'' and C B''', as above set forth and described.

3d, A track cleaner composed of the above-described parts, constructed arranged, and operating in the manner and for the purpose above set forth and described.

74,812.—Bed Bottom.—J. C. Fry, Sidney, Ohio.

1st, The loops, b b, constructed as described, consisting of the wires, E E, open at their outer ends, and applied to the slat, D, by inserting their opposite ends from the under side through the holes in the end of the slats, and bending them down upon the top of said slats towards each other, where they are again bent and inserted in the top of the slats as herein shown and described.

2d, The single metallic strip, C, secured to the end or side rails, A, by the strip, B, and bent to form loops, a, whose sides pass through the strip, B, and whose inner ends rest against the inner side of said strip, as herein described for the purpose specified.

3d, Having the hoops, b b, open in or near their center, as and for the purposes set forth.

4th, The combination of the loops, a, strip, B, loops, b, with central opening, elastic rings, F, as herein described for the purpose specified.

74,813.—Refrigerator.—A. Fuller and L. P. Reichert, Buffalo, N. Y.

We claim the combination of the fan wheel, C, sliding grate, M, the tubes, O P and Q, and charcoal chamber, J, arranged substantially as and for the purposes described.

74,814.—Hay Raker and Loader.—Merritt B. Fuller, Sanborn, N. Y.

I claim, 1st, The driving roller, B, provided with rows of curved teeth, b b, and intermediate teeth, s, which rest on the ground and support the roller in combination with the rake, c c, or equivalent, and endless carrier, C, operating substantially in the manner and for the purpose set forth.

2d, The guide blocks, i i, combined and arranged with the rows of teeth, b b, and the slats, g g, of the carrier, for retaining the latter in place and prevent slipping, substantially as specified.

3d, The guide board, J, constructed and arranged and operating in the manner and for the purpose specified.

74,815.—Toy.—A. C. Funston, Philadelphia, Pa.

I claim a toy, consisting of a case, having a glass top and containing figures or particles of paper, or equivalent material, to which movements may be imparted, substantially as and for the purpose described.

74,816.—Thill Coupling.—Kingston Goddard, Richmond, N. Y.

I claim the spring, C, secured at one end to the bottom of the clip, D, and extending around the axle and clip, secured at its other end to the thill, B, forming a spring coupling, as herein described for the purpose specified.

74,817.—Thill Coupling.—Kingston Goddard, Richmond, N. Y.

I claim the bending or forming of the outer end of the thill iron, substantially as shown and described, so as to be capable of being fitted to the under side of clip, in the manner as and for the purpose set forth.

74,818.—Truss.—Samuel Green, New York city.

I claim the combination and arrangement of the main plates, A A, hinged to the center plate, a, the stiff springs, c c, the slotted adjustable plates, B B, with cross-heads, g g, the pads, C C, and the light springs, b b, substantially as and for the purpose described.

74,819.—Harness Mechanism for Looms.—J. Greenhalgh, Sr., Woonsocket, R. I.

I claim, 1st, The links, O, and hooks, R, constructed as described, when removably pivoted together by means of the notched pivot and slot, o', in combination with the slide, L M, cylinder, S, as herein described for the purpose specified.

2d, The combination and arrangement of the arms, F H I, and adjustable connecting rods, J K, sliding bars, L M, links, O, hooks, R, cylinder, S, pawl, V, slotted arm, U, and upper jacks, P, with each other, substantially as herein shown and described.

74,820.—Carriage Thill.—S. B. Harmon, Portland, Me.

I claim the thill brace, b, when applied substantially as and for the purposes set forth.

74,821.—Fire-escape Ladder.—D. Haynes and Wm. Free, San Francisco, Cal.

We claim the combination and arrangement of the curved and grooved arm, a, with hinged ladder, c', winding roller, I, rope, H', and platform, B, substantially in the manner shown and described, for the purposes set forth.

74,822.—Machine for Cleaning Cotton.—R. H. Hilton (assignor to Mitchell & Allen), Newbern, N. C.

I claim the S-shaped perforated plate, b, the perforated plate, d, the side plates having perforations, a, drawing-rollers, E E, and hinged screen, D, all constructed and combined to operate as herein described for the purpose specified.

74,823.—Harness-pad Tree.—J. W. Hinman, Berlin, Wis.

I claim a harness pad tree having the two sides connected with a centerpiece by joints or hinges to render them flexible, substantially as and for the purpose herein described.

74,824.—Grain Regulator.—E. W. Hitchings, Potsdam, N. Y.

I claim, 1st, The combination of the revolving cylinder, A, and stationary cylinder, B, governor, D, cross bar, b, spindle, d, piston, E, and collar, q, substantially as set forth for the purpose specified.

2d, In combination with the above, the distributing plate, J, side pieces, K, and screw, S, said plate being attached to the revolving cylinder, A, substantially as shown and described.

3d, The hopper, M, substantially as shown and described, in combination with the cylinder, B, revolving cylinder, A, and piston, E, all as set forth.

4th, The guide, H, or the equivalent thereof, substantially as shown and described, in combination with a piston, E, of a cylindrical grain regulator, all as and for the purpose set forth.

5th, The adjustable feed collar, q, substantially as shown and described, in combination with the cylinder, B, and piston, E, all as and for the purpose set forth.

74,825.—Toy Gun.—Socrates Hubbard, Quincy, Ill.

I claim, 1st, Constructing the slide, D, of two heads, h h, an intermediate slip, J, and pendant projections, e f, whereby lightness, with strength and durability is obtained.

The stop, G, constructed and applied to the gun to retain the missile therein when the barrel is inclined downward, substantially as set forth.

3d, The combination of the elastic cord, C, slide, D, trigger, E, and stop, G, all arranged for joint operation, substantially in the manner as and for the purpose specified.

74,826.—Self-raising Flour.—William C. Hughes, Scio, Mich.

I claim the preparation of self-raising flour in the manner herein described.

74,827.—Buttonhole Cutter.—August Humann, New York city.

I claim the blade, F, having a tooth, e, formed at the rear end of its cutting edge, when said plate is laterally adjustable, in combination with the blade, E, provided with a stud, b, working in a slot in the shank, c, and secured in position by the thumb screw, c, all constructed, arranged, and operating as and for the purpose herein specified.

74,828.—Truss.—Charles A. Jefferies and E. F. Olds, Dexter, Mich.

We claim, 1st, The pad, A, provided with a rigid central projection as arranged in combination with springs, F, and belt, E, provided for the purpose and in the manner set forth.

2d, The pad, H, when constructed with a central adjustable projection or core, c, adjusting screws, I K, when arranged in combination with the cap, J, plate, G, and springs, F, in the manner as and for the purpose substantially as set forth.

3d, A pad, when constructed with a central air chamber, L, ventilating holes, a, and plate, N, in combination with the screw, O, and spring, F, when arranged in the manner as described and shown in fig. 7.

4th, The segment slide, D', segmental plates, E', and section or cap, C', when arranged and pivoted to the section, A', by an adjusting screw, F', working in and operating a central core, B', so that when the pad is turned around from one side to the other the said central projection or core, B', will always occupy the same direction from the center of the belt, in the manner substantially as described and shown in figs. 8 and 9.

74,829.—Horseshoe.—Jas. Jorey, Westville, Conn.

I claim a calk for a horseshoe, provided with two edges, and constructed and applied to the shoe in such a manner that it may be detached and reversed and either edge adapted for use, as circumstances may require.

74,830.—Machine for Cutting Veneers.—Henry Kassing, New York city.

I claim the worm shaft, M, worm wheels, N, screws, M', and bar, G, upon the inclined guide, d, all constructed, arranged, and operating upon the laterally moving table, H, as herein described for the purpose specified.

74,831.—Wagon Lock.—O. A. Kenyon, McGregor, Iowa.

I claim the slotted arm, F, of the lever, L, in combination with the pivot, a2, pawl, P, segment, B, connecting rod, a, and pivoted brake, C, as herein described for the purpose specified.

74,832.—Machine for Polishing Thread.—Peter Kerr, Paisley, England.

I claim, 1st, The machine for polishing thread, constructed and arranged substantially as herein described.

2d, The construction and arrangement of the polishing apparatus herein described, in which the thread is polished by means of rollers having grooves or indentations, said rollers working up against the thread, one inside and the other outside the bank, substantially as herein shown and described.

74,833.—Composition for Cleaning Millstones.—Daniel Kindig, Newville, Pa.

I claim the aforegoing solution, prepared substantially as described for the purpose set forth.

74,834.—Bolt-making Machine.—Wm. Klemm and Robert Dittrich, Pittsburgh, Pa.

We claim the keys, H and I, or their equivalent, arranged in relation to the other parts of the machine, and operated substantially as described and for the purpose set forth.

74,835.—Harvester.—E. E. Lewis, Geneva, N. Y.

I claim, 1st, The reversible conveyer, E, when used to deliver grain from a reaping machine behind the finger bar, substantially as specified.

2d, A discharging apparatus for harvesters which will deliver the second swath from a reaping directly upon or so near the first swath as to form a double swath or windrow convenient to be loaded upon a wagon.

74,836.—Harvester Rake.—C. Lidren (assignor to himself and R. Jackson), Lafayette, Ind.

I claim, 1st, The hinged platform, B, in connection with the elastic metallic bars, D, constructed, arranged, and applied in the manner substantially as and for the purpose herein set forth.

2d, The reciprocating rake, E, when operated from the wheel, K, of the main frame, through the medium of the jointed arms, h h', rock shaft, I, link L, and the slotted arm, J, on the axle of wheel, K, all arranged substantially as shown and described.

3d, The carriage, F, in which the rake head or rod, b, is fitted, in combination with the lever, F', curved bar, G, projection, L, pin, J, and the curved bar, M, all arranged to operate or adjust the rake, substantially as set forth.

4th, The hooks, N N', arranged as shown, and operated from the rock shaft I, through the medium of the lever, R, and the arm, m, on the rock shaft, all arranged substantially as specified.

74,837.—Egg Beater.—Henry W. Louden, Ephrata, Pa.

I claim the arrangement of the double beaters, D d C C', pipe or sleeve, B, and spindle, A, with the pinions, a b, in combination with the box or cover, K T, cogged gear and handle, substantially in the manner and for the purpose specified.

74,838.—Mechanism for Operating Stationary Machinery.—Galusha Maranville, Hampton, N. Y., assignor to D. A. Wilson and Ebenezer Gould, Jr.

I claim, 1st, Transmitting from one shaft, B, by intermediate gear wheels and shafts, C D E, motion to two revolving shafts, F and H, and to one oscillating shaft, G, all made and operating substantially as described, so that, from one driving shaft, three or more various machines may be operated, as set forth.

2d, The manner of converting rotary into oscillating motion by connecting a short crank, L, on the revolving shaft, F, by means of a rod, n, with a long crank, m, on the oscillating shaft, G, substantially as herein shown and described.

74,839.—Device for Fastening Shoe Lacing.—Oliver H. Marston, Sandwich, N. H., and Moses L. Morse, Stoneham, Mass.

We claim, 1st, The base, a, having openings, c c, for the lacings to pass through, and having the ends, d, bent upward at any convenient angle.

2d, The spring, b, having the edges, f, which are parallel to the upturned edges, d, of the base, slightly bent downward.

3d, The combination and arrangement of the base, a with the spring, b, to operate together as specified.

74,840.—Lithographic Press.—Charles Maurice, New York city. Antedated Feb. 13, 1868.

I claim, 1st, The case, C, when arranged so that it can be adjusted for wider or narrower stones or blocks, substantially as herein shown and described.

2d, The case, C, when consisting of two pieces or halves, which are laterally adjustable on the frame, A, and when combined with the up-and-down adjustable frame or plates, H, all arranged and operating substantially as herein shown and described.

3d, The roller, D, when connected with the weighted frame, E, and with the stone or block, G, so that by rotary motions of the roller the latter will be moved over the stone; i. e., it will come in contact with and press upon each part of the paper and stone, and will not be drawn over the same, thereby insuring neatness of workmanship.

4th, The adjustable frames, C and H, in combination with the roller, D, and weighted frame, E, all made and operating substantially as and for the purpose herein shown and described.

74,841.—Hub and Axle.—Norman Maxham (assignor to himself and C. G. Robbins), Hancock, Vt.

I claim the sand head, D, in combination with the hub, A, and cover, H, and axle, B, substantially as shown and described and for the purposes set forth.

74,842.—Animal Trap.—William Miller, Chicopee, Mass., assignor to himself and John Boyle, Erie, Pa.

I claim the combination and arrangement of the weighted drop door, B, loop or catch, C, pivoted catch, D, having a bait hook, d', formed upon or attached to it, spring, G, standard or post, E, and curved guard plate, F, with each other and with the top or cover, A, substantially as herein shown and described and for the purpose set forth.

74,843.—Wagon Coupling.—Henry Mitchell, Racine, Wis.

I claim, 1st, The method of coupling the reach, C, to the other running parts of a wagon or other wheeled vehicle by means of the front coupling, A, and the rear coupling, B, constructed and attached substantially as shown and described.

2d, The construction of the coupling box, A, having the sides thereof bent inward, so as to form the sockets, a, substantially as shown and described and for the purposes set forth.

3d, The flanges, c, upon the rear coupling box, B, in combination with the bolster, E, and the axle, F, substantially as shown and described and for the purposes set forth.

4th, The manner of adjusting the length of the reach, C, to the length of the load, substantially as shown and described.

5th, The forward coupling box, A, with the reach, C, and the hounds, D, in combination with each other and with the rear coupling box, B, and the axle, F, and bolster, E, substantially as shown and described and for the purposes set forth.

74,844.—Snow Plow.—George Place, New York city.

I claim the combination and arrangement of the knives, A A and B B, in sections, when combined with one or more plows, attached to the truck frame, and with the frames, E E E, of the truck, in the manner and for the purpose herein described.

74,845.—Harvester Rake.—Abraham Quick, Wm. S. Opie, and Andrew J. Farrand, Raritan, N. J.

We claim 1st, A standard for a revolving rake and reel, with its base bolted directly to the inner end of a finger beam, having a rocking or rolling axle above the plane of the cutters between the finger beam and main frame, whereby the finger beam can rock axially, without disturbing its relation to the rake.

2d, The combination, substantially as described, of a revolving reel and rake with a standard bolted directly to the inner end of an axially rocking hinged finger beam, and without support on the main frame.

3d, Mounting a rake and reel, revolving on a vertical axis, on a finger beam hinged to the main frame by three joints, substantially as described.

74,846.—Self-acting Bolt.—Thomas Rattenbury, Detroit, Mich.

I claim, 1st, The projection or thumb piece, C, working in the slot, E, by which the closing of the second door compels the bolt, B, to act.

2d, The combination of the above described parts with the frame, A, the spring, D, and the stem, F, when constructed to act automatically, substantially as described.

74,847.—Harvester.—James H. Redfield and Walter J. Cox, Salem, Ind.

We claim, 1st, The cutter bar, I, provided with the curved teeth, h, having their concave edges forming the cutters, in combination with the crank pulleys, j, upon the vertical shafts, k, gears, l, shafts, m m', bevel gears, n, shaft, o, pinion, p, and gear wheel, E, upon the axle, D, all arranged to operate as herein described, for the purpose specified.

2d, The endless bands, q q, when provided with the springs, bx, in combination with the gavel receiver, Ix, pinion, u, curved segment, w, shaft, wx, and crank, ax, all arranged and operating as described, for the purpose specified.

3d, The application of springs or elastic plates, bx, to the endless bands, q, for the purpose of discharging the cut grain into the grain receptacle, substantially as set forth.

4th, The pendant plate, I, when provided with the curved slots, f, in combination with the set screw, e, frame, H, and bar, A, all arranged and operating as described, for the purpose specified.

74,848.—Boot Crimping Machine.—C. H. Rice, Port Henry, N. Y.

I claim the rotary boot trees, C, in combination with the jaws or pressure plates, D D' D'' Dx Dxx Dxxx, all being constructed and arranged to operate in the manner substantially as and for the purpose set forth.

74,849.—Car Ventilator.—David C. Richardson, Lawrence, Mass.

I claim the combination and arrangement of the self-adjusting folders, d e, connected by the rod, j, in the open-mouthed space between the weather plates, b c, with the register plates, p p, substantially as and for the purposes herein set forth.

74,850.—Screw Cap for Oil Cans.—William Rigg, London, England. Patented in England Feb. 6, 1867.

I claim, 1st, The screw cap for oil cans struck up from one piece of metal, and used as a seal, substantially as herein shown and described.

2d, The combination of the faucet having a cutter upon it screw-threaded end, with the struck-up metallic cap and seal, substantially as described, for the purpose specified.

74,851.—Boot and Shoe Sole.—Homer Riggs, Oxford, Conn. Antedated Feb. 12, 1868.

I claim the toe piece, A, and rear plate, B, as constructed, and the manner of inserting the oversole, E, and securing it for wear, so that it can be sprung in or out, substantially as and for the purposes herein set forth.

74,852.—Governor.—Ephraim P. Rogers (assignor to himself, R. W. Payne, and Hiram Pritchard), Corning, N. Y.

I claim the governor constructed as described, and consisting of the hollow slotted disk, A, having tubular stem, B, and neck, n, the weight, K, provided with stem, m, valve stem, C, swivel joint, f, cross bar, F, connections, G, levers, E, and balls, D, all arranged and operating as set forth.

74,853.—Card Setting Machine.—James Russell, Springfield, Mass.

I claim, 1st, A reversible stop ring, A, with its flanges, b b, its slots, c c, and its rolls, d d, and groove, a, constructed as herein described and for the purposes specified.

2d, In combination with the above, a pin or plunger, I, worked by the cam K, as and for the purposes described.

74,854.—Beehive.—P. J. Severson, Knowersville, N. Y.

I claim, 1st, Separators, E, when constructed with top bar, G, and pins, H substantially as and for the purpose described.

2d, The double comb frames, D, in combination with spaces, s s' s'', and separators, E, substantially as herein set forth.

3d, Surplus honey box, B, with its cap or cover, C, and double comb frames D D, and separators, E, when constructed in the manner and for the purpose as herein described.

74,855.—Pan Lifter.—Morrill A. Shepard, Bridgeport, Ill.

I claim a pan lifter consisting of the members, A a a' B C and D, the whole being arranged and operating substantially as herein described and for the purpose set forth.

74,856.—Dumping Wagon.—Henry Shirey, Fond du Lac, Wis.

I claim, 1st, The revolving supporters, d d d d, cams, f, bar, g, lever, h, fulcrum, k, and brace, i, constructed substantially as described and operating as set forth.

2d, The bottom boards, b b, loops, c c, in combination with a body or wagon bed, when constructed and operating substantially in the manner and for the purposes set forth.

74,857.—Oyster Dredging Machinery.—Thomas P. Sink, Fairton, N. J., assignor to himself and J. F. Trenchard, Philadelphia, Pa.

I claim, 1st, The two rollers F, and G, arranged on the deck or gunwale of the vessel, for the boarding and tilting of the dredger, substantially as described.

2d, The combination described of the rollers, F and G, with the hinged bar, W.

74,858.—Boot and Shoe.—George Smith and Godfrey Smith, New York city.

We claim the ornamenting of boots and shoes by stitching a piece of leather or other suitable material to the inner side of the upper in such a manner as to form pockets or grooves between the upper and the inner material, to inclose cords of any suitable material, by which prominences are given the outer or external surface of the upper, substantially as shown and described.

74,859.—Pocket for Billet Strap.—Henry H. Smith, Wilmington, Del.

I claim a pocket, E, of metal or its equivalent, and at the lower edge of which is a perforated flange, for the purpose specified.

74,860.—Car Brake.—W. H. Smith and Joseph Steger, New York city.

We claim the combination of the spring, K, cams, I I', constructed as described, ropes or chains, h, and pulleys, g, substantially as and for the purposes described.

74,861.—Clover Harvester.—S. L. Stockstill and W. H. H. Scarff, Medway, Ohio.

We claim, 1st, The suspended bed, C, in combination with the thills, J J, attached to the axle, A, and the shaft, L, placed on the thills, with the segment, M, on said shaft, the arm, O, hand lever, P, and pawl, Q, all arranged substantially as and for the purpose set forth.

2d, The comb teeth D, attached to the front end of the bottom, a, of the bed, in combination with the reciprocating bar G, operated substantially as shown and described, and provided with knives I I, which are provided with pendant pins m, to work in zigzag slots n, in one or more of the teeth D, of the comb, to give said knives a reciprocating motion as set forth.

74,862.—Street Pavement.—Henry M. Stow, San Francisco, Cal.

I claim a pavement composed of tiers of wedge-shaped wooden blocks, driven into a foundation bed of sand or earth, with spaces between said tiers packed with gravel, or sand and gravel, substantially as shown and described.

74,863.—Lamp.—Alvin Taplin, Somerville, Mass.

I claim my improved lamp burner, constructed with the annulus E to screw into the neck or cap of the oil reservoir D, and with the body A, connected with the annulus by a hinge only, the whole being in order that the body, by means of the hinge and the annulus, may be connected with the reservoir or its cap, in manner as specified, and the body be movable, relatively to such annulus, substantially as and for the purpose set forth.

74,864.—Bread and Vegetable Cutter.—Hiram A. Titus, Gloversville, N. Y.

I claim arranging the plates B and D, in combination with the lever F, and knife E, all made and operating so that the knife will receive a slanting motion and the required pressure, substantially as set forth.

74,865.—Crib Attachment for Bedsteads.—Harriet Ruth Tracy, New York city.

I claim the bedstead when cut away in the center of its side to receive the crib E, sliding beneath the bars c, and between the transverse guide bars D, attached to the frame of the bedstead, the front end board of said crib enlarged to overlap the cut portion of the side of the bedstead, as herein set forth for the purpose specified.

74,866.—Skate.—Levi B. Tyng, Lowell, Mass.

I claim the combination and arrangement of the grooved stands c c, slots d d, screws or pins n n, spring seat e e, and springs f f, substantially as and for the purpose herein specified.

74,867.—Envelope.—Sigmund Ullman, New York city.

I claim, 1st, The envelope formed with the end flanges or flaps F F, and the folded and interlocking edges m m, substantially as and for the purpose specified.

2d, The combination of the eyelets n n, and stamped or printed impressions v v, around them, when constructed and employed substantially as and for the purpose specified.

74,868.—Trip Hammer.—Charles Vogel, New York city.

I claim, 1st, The bars or rods Q, secured to the cross head P, of the hammer stem C, when said rods are attached to the angular arms B, upon the front end of the beam S, as herein shown and described.

2d, The block U, provided with the cam-shaped end X, when adjusted upon the beam S, by means of the slots V, and screw bolts W, as herein described for the purpose specified.

3d, The arrangement of the sliding pulley A4, or its equivalent, with the block U, and with the operating beam of the hammer, substantially as described for the purpose specified.

4th, The tightener frame A5, bearing in one end the driving pulley B5, arranged with the connecting rod C5, curved treadle D5, and spring K5 as herein described for the purpose specified.

74,869.—Pepper Caster Bottle.—Edward Wattis, Sr., Philadelphia, Pa.

I claim the pepper caster bottle, having a slide C, in its flat bottom, enabling the latter to be formed at the extreme lower end of the bottle, and increasing the capacity of the same, as herein shown and described.

74,870.—Drill and Countersink.—P. A. Whitney, Woodstock, Vt.

I claim, 1st, An adjustable tool for the drilling and countersinking holes, composed of the countersink, c, in two parts, and a drill D, between the same, adjusted by a key or its equivalent, held between the segment A and B of my chuck, by being screwed into a socket C, substantially as shown and described and for the purposes set forth.

2d, A chuck formed in segments, having two splines or channels, a and a, of different depths, in combination with any countersink, c, and drill D, substantially as shown and described, and for the purposes set forth.

74,871.—Cosmetic.—I. M. Wilson, Seguin, Texas.

I claim the composition of a cosmetic, substantially as herein described.

74,872.—Spring Bed Bottom.—E. E. Worden and H. Wilms, Brandon, Vt.

We claim the stays C, supporting the outer edges of the frame A B, the ends of the upper piece of the stay slotted to slide upon pins in the lower frame, and connected at its center f, to the upper frame, the lower piece of said stay secured at its center to the lower frame, and at its end to upper piece all operating as described for the purpose specified.

74,873.—Culinary Steamer.—G. W. Worster, Bangor, Me.

I claim, 1st, Combining with tank, C, a plurality of receptacles, b b b, substantially in manner as described and shown.

2d, Combining the receptacles b b, with the tubes a a, so that the tubes prevent the return of the condensed steam to the tank, substantially in manner as and for the purpose specified.

3d, Serrating the curbs or upper ends of tubes, a a, as shown at c c, substantially as and for the purposes specified.

4th, In connection with receptacles b b, a conductor i, substantially as described and shown.

5th, Combining with tank C, provided with fixed receptacles b b, a removable receptacle f, substantially as described and shown.

6th, The removable receptacle f, formed to fit vessels of various sizes by its outward flare, and provided with the interior rim g g, substantially as and for the purposes specified.

74,874.—Stripper for Carding Cylinders.—Fletcher M. Abbott, Boston, Mass., and Edward F. Fields, Lewiston, Me.

We claim the mechanism, constructed and operating substantially as described, for moving and regulating the "stripper," as and for the purpose set forth.

Also, in combination with a "stripper," supported in a sliding bearing, a feed connecting and disconnecting mechanism, substantially as described and for the purpose set forth.

74,875.—Apparatus for Evaporating Sorghum Juice and other Liquids.—Hiram B. Avery, Bethel Township, Mich.

I claim the evaporator B, in combination with the steam chest A, when said chest is furnished with pipes, e g h and m, substantially as set forth.

74,876.—Sofa Cradle.—Henry A. Axtell, Westfield, Mass.

I claim the combination of the swinging sofa cradle C, with the device for converting the cradle into a sofa, consisting of the adjustable screws a a, and hinge E, constructed and arranged substantially as described.

74,877.—Lathe Tool Holder.—John Baillie, Salem, Ohio.

I claim the holders C C, when used in combination with the slotted clasp B, and thumbscrew D, substantially as and for the purpose herein set forth.

74,878.—Cleaning Cloths used by Bank Note Engravers.—Haydn M. Baker, New York city.

I claim the use of coal tar, benzine, coal-tar naptha, or refined coal-tar light oils, for removing printers' ink from cloths or other fiber used by bank note and other engravers.

Also, the separation and recovery of the printers' ink and solvent by distillation, or any other method substantially the same.

74,879.—PLANT PROTECTOR.—Robert M. Bartlett, Storrs Township, Ohio.

I claim, 1st, A plant protector, consisting of the following devices, to wit: A hood A, of any suitable shape, when used in connection with the pole B, and suspending cord F, the whole being arranged and operating substantially as herein described and for the purpose set forth.

2d, In combination with the elements A a a' a", C C' C", B, and F, the ventilator D, and cap E e e' e", as and for the purpose explained.

3d, The conical hood A, having one or more lighted openings or "bull's-eyes" C, and adapted for suspension to a stack or pole, in the manner substantially as set forth.

74,880.—APPARATUS FOR BENDING METALLIC PLATES.—John W. Bean, Henry, Ill.

I claim the improved apparatus for bending and tempering plow and similar plates, when constructed and arranged in its several parts substantially as described.

74,881.—SOLDERING IRON.—Theodore Beardsley, Springfield, Mass., assignor to himself and J. Dana Wyman, Fitchburg, Mass:

I claim, 1st, A soldering iron, in which the point is heated by a flame fed by a reservoir of fluid contained in the handle of the instrument.

2d, The combination of the valve H, reservoir B, and head C, substantially as and for the purpose set forth.

74,882.—RAILROAD CHAIR.—L. B. Bidwell, Hartford, Conn.

I claim an imorove l railroad chair, constructed of plate iron, with a portion of the sides turned up at right angles to the bottom, in such a manner as to leave the bearing ends of the same width as the original plate, and to have the turned up portion curved out to the edges of the bearing ends, to increase their stiffness, substantially as specified.

74,883.—BOILER FEED LOW WATER DETECTOR.—Joseph N. B. Bond, New York city.

I claim, 1st, The buckling tube B, operating the alarm whistle F, by means of the arms D f, and connected with the boiler A, as shown, when arranged and operating as herein set forth and shown.

2d, The float H, operating the valve l, in the conical nozzle of the supply pipe I, which is provided with the nozzle n, and check valve o, in combination with the pipes h p, steam cock j, and buckling tube B, substantially as and for the purposes described.

74,884.—BELLOWS.—John Bowden and Walter Bowden, Bushwick, N. Y.

We claim, 1st, The arrangement and combination of the valves c*, s, l, m, and c, relatively to and with the forcing chambers C and B, and air chamber A, substantially as set forth.

2d, The cover a, of the air chamber A, connected therewith by an annular, flexible diaphragm, arranged for operation in connection with the forcing chambers B and C, substantially as specified.

3d, The arrangement of the side slots f*, between the fixed and yielding covers of the air chamber A, for admission of air to the forcing chamber B, through valve s, substantially as shown and described.

74,885.—PLOW.—Jeremy Bradley, Owatonna, Minn.

I claim the combination and arrangement of the plow A, standard B, and clasp C, in the manner and for the purposes herein specified.

74,886.—ANIMAL TRAP.—A. C. Briant, Lafayette, Ind.

I claim the combination of the box A, with its partition B, shaft H, having platforms I and J, inserted directly into said shaft, door K, above plattorm J, and operated by the rod G, and cord F, all constructed and used substantially as specified.

74,887.—ANIMAL TRAP.—Manlove Butler, Vernon, Ind.

I claim an animal trap constructed with the parts A A', B, C, and D, arranged as described, the oscillating wheel D being constructed with one loaded wing D', so as to act by gravity only, substantially in the manner set forth.

74,888.—BREECH-LOADING FIREARMS.—Cornelius Callaghon, Great Britain.

I claim the combination with central rib, substantially such as described, of two breech-blocks swinging outwardly therefrom.

Also, the combination with a removable frame of the breech blocks, substantially as described, so that when the frame is removed from the stock and the blocks released from the rib, the blocks are free to be removed from the frame, substantially as described.

74,889.—ANIMAL TRAP.—Charles R. Capps, Illiopolis, Ind.

I claim the combination of the disk A, sections b b1 b2 b3 b4, platforms k k1 k2 k3 k4, with their studs and springs, as shown, projection o, spiral spring d, casing h, and cage R, of an animal trap, as and for the purpose specified.

74,890.—BOOT AND SHOE LAST.—Charles F. Carr and Gilbert F. Holbrook, Norwich, N. Y.

We claim the sliding bolt, b, operated on as described and shown and for the purposes as substantially set forth.

74,891.—TIP SLED.—Stephen Chamberlin, Boston, Mass.

I claim, in combination with the sled runners, a body so mounted as to tip, substantially as described.

74,892.—HORSESHOE.—George T. Chapman, New York city.

I claim, 1st, The continuous detachable calk, B, combined with the part, A, substantially as described.

2d, The continuous detachable calk, B, and pin, C, in combination with the part, A, substantially as described.

74,893.—GRAIN DRYER.—Lewis S. Chichester (assignor to himself, G. H. Nichols and C. W. Mills), Brooklyn, N. Y.

I claim, 1st, The vertical air flue, a, in combination with the deflectors, e, platforms, c, and grain tables, platforms, or hoppers, substantially as and for the purposes set forth.

2d, The sections, g, having hopper-shaped openings and placed together, substantially as and for the purposes set forth.

74,894.—CARRIAGE JACK.—Olney Churchill, Canton, Pa.

I claim a lever jack, when constructed and operating substantially as shown and described.

74,895.—COMBINED MANURE FORK AND HOOK.—C. C. Cole, Phelps, N. Y.

I claim the special construction and arrangement of the divided socket, C, provided with the corrugations or grooves, b c, the spring pawl, l, and the circular bearing, B, the whole combined with the changeable fork head, A, and scraper, G, and operating in the manner and for the purpose herein set forth.

74,896.—VALVE FOR WATER CLOSET.—William S. Cooper, Philadelphia, Pa.

I claim a water closet valve comprising hollow piece, B, annular space, A R, and holes, R' and R and h h, all constructed and operated in the manner and for the purpose above set forth and described.

74,897.—SNAP HOOK.—J. C. Covert, Newark, N. J.

I claim, as an article of manufacture, providing the shank of the snap hook with a groove into which is dropped the sliding bolt, D, and loose spring, e, said groove being covered by means of the plate, G, and the bridge, I, which conceal, keep in place, and protect the spring and bolt, one end of the shank being so formed that it can be pivoted to a hold-back, when the several parts are constructed and arranged as and for the purpose set forth.

74,898.—APPARATUS FOR BLEACHING WITH SULPHUR FUMES.—A. J. Crosby and O. W. Crow, Bluffton, Ind.

We claim the box, A, with the doors, B B, vessel, C, having a regulating slide, D, and the bars, E E, the whole combined, arranged and used in the manner and for the purposes specified.

74,899.—APPARATUS FOR HEATING AND VENTILATING RAILWAY CARS.—D. H. Dotterer, Philadelphia, Pa.

I claim the within-described combination of furnace, boiler, air-heating chamber, and engine with the fan blower, or equivalent device, whereby a forcible current of heated or cold air is created and maintained through pipes which convey the air to and distribute it within the several cars of a railroad train, substantially in the manner described.

74,900.—RAILROAD RAIL JOINT SPLICE.—Edmund H. Eberman, Lampeter Square, Pa.

I claim the construction of the flanged and double dove-tailed brace and filling or plugs, B B' b b', used jointly or severally, in combination with the bolt, C, and nut, D, and dove-tailed slot, a, cut in the rail, all arranged in the manner shown for the purpose specified.

74,901.—SHOE TIP.—Alfred B. Ely, Newton, Mass.

I claim the use of resinous bodies combined with fibrous material and shaped by means of heat and pressure, substantially as described.

Also a shoe tip made of the foregoing substances and formed into shape by means of suitable pressure with or without heat, substantially as described.

Also a shoe tip made of felted or woven material saturated with resinous substances or prepared rubber which when properly heated and pressed in molds will assume the proper shape and acquire and possess the proper hardness and elasticity, substantially as described.

74,902.—WASHING MACHINE.—Levi S. Enos, Almond, N. Y.

I claim the pounders, D D, as constructed and arranged for receiving weights, J J, in combination with the friction rollers, a a, vertical stationary board, G, having series of holes, i i i, and corrugated hinged lid or cover, A, substantially as and for the purposes herein set forth.

74,903.—WATER WHEEL.—F. R. Ferris, Dora, Ind.

I claim the collar, H, in combination with the collar, E, arms, G, and gates, L L, the same being used substantially as and for the purpose set forth.

74,904.—TOY PISTOL.—Russel Frisbie, Cromwell, Conn., assignor to J. and E. Stevens & Co.

I claim the toy gun having its barrel provided with an orifice or vent, a, arranged in relation with the piston, C, to operate substantially as and for the purpose specified.

74,905.—ELECTRO MEDICAL BATTERY.—Herman Fritz, Cleveland, Ohio.

I claim, 1st, The battery case, when constructed in sections, A B, in the manner as and for the purpose substantially as set forth.

2d, The special manner of connecting the porous cups to the caps of cylinders by means of the shoulder, c', metallic screw collar or rim, c, and cap, S, in the manner substantially as described.

3d, The arrangement of the helices, T T', surrounding the cylinders, D E, and inclosing circular magnets, N, when said magnets are so arranged that they may be raised or lowered within said helices by an adjusting screw, x, for the purpose and in the manner described.

4th, A case, constructed of metal or of any other suitable material inclosing the prime and induction coils, T T' and m' m", for the purpose specified.

5th, The foot plates, B', provided with the heel, R', and adjustable toe cap, C', as arranged in combination with the battery case, in the manner as and for the purpose set forth.

74,906.—STOVE HEARTH.—William I. Fryer (assignor to himself and John P. Whitbeck), West Troy, N. Y.

I claim the open hearth plate, C, projecting from and externally to the fire-box of the stove formed with flanges and slides so as to carry in combination with it the ash pan or drawer, D, and replacing pan, H, as described.

74,907.—MANUFACTURE OF SOLID STEEL KNIVES.—J. W. Gardner, Shelburne Falls, Mass.

I claim a solid wrought-steel knife or fork with a skeleton or open handle and formed out of one piece of metal, substantially as described.

74,908.—FENCE.—Melvin J. Gaskill, Pleasant Plain, Ohio.

I claim the holding of the wires firmly in their places upon the battens by means of clinches turned upon the ends of the wires and driven into the battens, substantially as set forth and for the purposes specified.

74,909.—TREE FOR SIDE SADDLE.—Joseph B. Gathright, Louisville, Ky.

I claim, as an article of manufacture, a tree for a side saddle combining in its construction the following elements, viz: the bars, A A', flattened cantel, B, extension, D D', leather base, E, and block, F, said parts being respectively constructed and arranged in relation to the other parts of the tree, as herein described.

74,910.—FOLDING CHAIR.—H. S. Golightly and C. S. Twitchell, New Haven, Conn.

We claim, 1st, A cross-legged folding chair in which the back is hung upon pivots, or in an equivalent manner, so that it may move or swing independently of the seat and frame to adjust itself to the back of the person occupying the chair, substantially as herein shown and described.

2d, The combination with the back legs and the seat, whether rigid or flexible, of a folding chair of the front legs and a back pivoted or hung between the ends of said legs which extend above the seat so as to swing or move independently of the seat and legs, substantially in the manner and for the purposes herein shown and specified.

74,911.—COUNTING ATTACHMENT FOR THREAD-WINDING MACHINE.—William Grover, Holyoke, Mass.

I claim, 1st, A releasing plate or tripper in combination with the spool-removing mechanism of a thread-winding machine, as and for the purpose set forth.

2d, The notched adjustable plate, b, secured to the vibrating arm in combination with the traversing stud, a, substantially as described.

3d, The vibrating arm, b', supporting the pawl, c, springs, e and e1, and notched plate, b, in combination with the revolving dial plate, detent, m, and tension spring, q2, substantially as set forth.

4th, The combination of the adjustable stops, s, and pin, q, with the revolving dial plate or a revolving index, arranged and operating substantially as and for the purpose specified.

74,912.—INSOLE FOR BOOTS AND SHOES.—Artemus N. Hadley, Richmond, Ind.

I claim, 1st, The provision of the spur piece or counter, B, at the rear edge of an elastic insole, substantially as and for the purpose set forth.

2d, The combination of the sole piece, A, spur or counter, B, and protuberances, C, as and for the purpose set forth.

74,913.—RATTAN MACHINE.—Levi Heywood, Gardner, Mass.

I claim a central tube or "quill" provided with slots or openings in combination with a series of adjustable cutters, B, substantially as and for the purpose set forth.

74,914.—GEARING FOR LAMP TRAIN.—Robert Hitchcock and George A. Jones, New York city.

We claim, 1st, A gear wheel constructed of hard rubber or similar material possessing sufficient hardness with elasticity for gearing, for the purposes set forth.

2d, The combination of gear wheels made of hard rubber or other material uniting like hardness and elasticity, with metallic gearing in mechanical movements, for the purposes set forth.

3d, The combination in mechanical trains for supplying air to lamps of the hard rubber gear, c, with the fan-wheel screw shaft, substantially as and for the purposes set forth.

74,915.—GATE LATCH.—Simon Ingersoll, Mianus, Conn., assignor by mesne assignments to himself and Job Johnson.

I claim the gate latch, c1 c2, suspended by the two fulcrum pins, b1 b2, and moving between the plates, D and E, substantially in the manner and for the purposes set forth.

74,916.—STRAP HOLDER.—George B. Kirkham, N. Y. city.

I claim the body of the holder as adapted with the slide, the bent wire, b, and chain, c, at one end and as adapted with the catch and spring at the other end, all as herein described.

74,917.—FOLDING CRADLE.—Charles Klein, Albany, N. Y.

I claim the sections, B B, bottom, C, rockers, A A, and end pieces, D D, when the several parts are hinged together, as specified for the purposes set forth.

74,918.—TWEER.—Hugh Laird, Mechanicsburg, Pa.

I claim the combination of air chamber, A, valve recess, G, valve, H, plug, C, and lever, D, arranged substantially as described.

74,919.—WASHING MACHINE.—Alford Lamb, Jeffersonville, N. Y., assignor to himself, William H. Morse and Mary E. Layman.

I claim the auxiliary spring bottom, B, india-rubber strip, C, and fluted roller, D, all arranged substantially as and for the purpose described.

74,920.—ROCKING CHAIR.—James Lamb, Hubbardstown, Mass.

I claim the arrangement as well as the combination of the middle or zigzag and the side or leaf springs with the chair seat and base, substantially as described the whole being to operate as explained.

74,921.—HARNESS PAD PRESS.—G. W. Lawbaugh, Geneseo, Ill.

I claim the combination of the bottom plate, A, stirrup, C, screws, d d, top plate, B, and screw, F, constructed and arranged in the manner herein as shown and described, and for the purpose set forth.

74,922.—HORSE RAKE.—Ellis Luther, West Troy, N. Y.

I claim, 1st, The block, G, and cradle, P, in combination with each other and with the head of the rake, substantially as hereinbefore described and set forth.

2d, The combination of the dog, b, and the hook, c, with the cradle, P, substantially as hereinbefore described and set forth.

3d, The combination of the spring, d, with the hook, c, substantially as herein specified and set forth.

4th, The combination of the arm, N, with the cradle, P, and the lever, J, substantially as herein specified and set forth.

5th, The combination of the cord, T, with the dog, b, and axle, A, substantially as herein specified and described.

6th, The lever, J, the arm, N, the cradle, P, the hook, c, the hooked lever, a, and the spring, d, all arranged and combined substantially as and for the purposes hereinbefore described and set forth.

7th, The combination of the cradle, P, with the chain, o, substantially as hereinbefore stated and set forth.

74,923.—MACHINE FOR SHEARING YARN.—Caroline L. Lutton, Philadelphia, Pa., administratrix of the estate of E. T. C. Lutton, deceased.

I claim, 1st, The combination of the revolving blades, h, the knife, D, and a plate or projection, m, between which and the knife the yarn is caused to traverse, all substantially as described.

2d, The combination of the above with the guiding plate, E, and revolving tubular spindle, H.

74,924.—HORSE RAKE.—William McCord, Sing Sing, N. Y.

Antedated Feb. 14, 1868.

I claim the radius arm, c, made adjustable on the rake head, C, and operating in combination with said rake head, substantially as and for the purpose set forth.

74,925.—SPRING FOR RELAY MAGNET.—William N. McInnis, Northumberland, Pa.

I claim the construction of the irregularly and loosely coiled steel spring, C, when attached to and combined with the winding axle, B, and the armature, G, as herein described and for the purposes set forth.

74,926.—RAILWAY SWITCH STAND.—Alexander McLeod, Covington, Ky.

I claim the arrangement of stand, A A', a a', target, C C', switch bar, D, lever, E, shot bolt, F, f f', pedal, H, and spring, G, or weight, J, as and for the purpose set forth.

74,927.—STARTING CARS.—John McMurtry, Lexington, Ky.

I claim, 1st, The beam, c, when provided with slots, d d, and rack, b, operating substantially as and for the purpose set forth.

2d, The disk, J, provided with pins, s s, in combination with beam, c, substantially as described.

3d, The spring, e, in combination with pins, t, and beam, c, operating substantially as specified.

4th, The cog wheel, H, and double acting pawl, q, in combination with disk, J, arranged substantially as and for the purpose described.

5th, The friction wheel, f f, and pinions, n n, in combination with beam, c, operating substantially as set forth.

6th, The brake, g, provided with a slot and spring, m, in combination with friction wheels, f f, and pinions, n n, as and for the purpose specified.

74,928.—CORN HARVESTER.—Q. F. Messinger, Easton, Pa.

I claim, 1st, The rotating wheel, K, with its pins, i, in combination with the cutters, the bar, L, or its equivalent, and with a platform, so connected to the rear of the machine as to be adjustable laterally for the purpose described.

2d, The platform, R, consisting of a series of plates, n, in combination with the devices herein described, or the equivalent of the same for operating the said plates, all substantially as and for the purpose specified.

3d, The arrangement of the bent bar, M, and the wheel, K, as and for the purpose set forth.

74,929.—HARVESTER RAKE.—Lewis Miller, Akron, Ohio.

I claim the combination of two revolving telescopic arms, turning upon a center arranged on the platform at a, one of which carries a fork or rake, and is caused to slide on the other by means of a roller or guide traversing a camp path or way, D, formed by two raised marginal ledges, c c, also on the platform, and surrounding the center, a, substantially as and for the purpose described.

74,930.—STEAM GENERATOR.—Marcus Neumann, New York city, Valdemar F. Lassoe, Brooklyn, and C. W. Mac Cord, New York city.

We claim, 1st, A steam generator, provided or fitted with vessels, L, forming flue enlargements, arranged one above the other, and containing draft deflectors, M, in combination with water courses or generator-dividing plates, K, situated below the vessel, L, and having escape outlets or openings, l, in such manner as that water injected on to said vessels, or the upper one thereof, is converted into steam in its passage over them and the dividing plates, by the detour given to the smoke and heated gases beneath and over the deflectors, substantially as specified.

2d, The combination of a sprinkler or feed water distributor, t, with the flue enlargements or vessels, L, containing deflectors, M, and water courses or generator-dividing plates, K, provided with escape outlets, l, for operation together as herein set forth.

3d, The combination, with the superheater, F, and arch, E, of the fire-box or chamber, of the cold air passage, f, arranged to communicate with the main or central flue, and controlled or supplied by suitable inlets from the outside, essentially as described.

4th, The feed water heater, N, arranged essentially as specified, and fitted with one or more flue-enlargements or vessels, L, containing deflectors, M, for operation in combination with a feed water sprinkler, s, or distributor, as herein set forth.

5th, In combination with a steam generator and separate heater, the automatic pressure regulator, interposed between the generator and superheater, and operating to supply the latter with steam on the pressure in the generator exceeding that in the superheater, as herein set forth.

74,931.—COMBINATION OF LIFE-PRESERVING AND SWIMMING APPARATUS.—Halvor Olsen, San Francisco, Cal.

I claim the combined use and application of the floats, and the extended ribbed and webbed gloves and sandals, constructed and attached to the user in the manner and for the purpose herein described and represented.

74,932.—BALLOT BOX.—Jesse P. Outcalt, Lancaster, Ohio.

I claim, 1st, The double spiral hopper, by which the balls are kept separate and conveyed to the tumblers in the manner described.

2d, The crescent-shaped tumblers, by means of which the balls are taken separately from the hopper and deposited in the drawer, as set forth.

3d, The spring, H, in combination with the slide, and tumbler for retracting the same, as set forth.

74,933.—MOSKETO CANOPY.—Isaac E. Palmer, Hackensack, N. J.

I claim the operating cord and holding stem, secured to the braces, D, and arranged to work through the tubular socket, A, of the ribs, B, whereby the canopy may be expanded from the exterior thereof, substantially as herein shown and described.

74,934.—HORSE HAY FORK.—Nelson Palmer, Albany, N. Y.

I claim, 1st, The combination of the tines, a and a', the braces, d and d', and the handle, h, when constructed and arranged substantially as and for the purpose set forth.

2d, The combination of the tines, a and a', and braces, d and d', the handle, h, the catch, g, and the roller, l, when constructed and arranged substantially as and for the purpose set forth.

3d, The catch, g, constructed and pivoted as described, so as to be locked by the action of the roller, l, against the catch, g, below its pivot, substantially as described.

4th, The roller, l, constructed as described, in combination with a catch, substantially as and for the purpose set forth.

74,935.—PROCESS OF SEPARATING COLORING MATTER FROM MADDER AND OTHER PLANTS.—Alfred Paraf, Boston, Mass.

I claim the compound process of liberating the coloring matter of plants from the ligneous matter by the solution of the cellulose, and the separation of the coloring matter from the insoluble compounds formed during the said solution, substantially as before set forth.

Also, the compound process of liberating the coloring matter of plants from the sugary and ligneous matters thereof by the removal of the sugary matter, the solution of the cellulose, and the separation of the coloring matter, substantially as before set forth.

74,936.—COMBINED BOILER AND HOT-AIR REGISTER.—B. B. Perkins, Chestertown, Md.

I claim, in connection with a boiler, arranged at the top or side of hot air flues in houses, the combination and arrangement of the perforated boiler top with the perforated cover, F, pivoted at f, the connecting rod, H, and the register, B, when the parts referred to are constructed and arranged substantially in the manner and for the purposes set forth.

74,937.—COFFEE-MAKING APPARATUS.—Julius Petsch, Hanover, Prussia, and Stephen N. Buynitzky, St. Petersburg, Russia.

We claim, 1st, A coffee-making apparatus, constructed with the shell, A, partition, B, strainer, D, and tube, C, or the equivalent of these parts, to operate in the manner set forth, and provided with the minute vent holes, e, through the partition, B, substantially as and for the purpose set forth.

2d, The coffee-making apparatus, constructed with a shell, A, partition, B, strainer, D, and tube, C, or the equivalent of these parts, in combination with the stand, E, or its equivalent, to support the said apparatus upon trunnions, as and to the effect set forth.

3d, The coffee-making apparatus, as set forth in the next preceding claim, in combination with a device to extinguish the heating flame, substantially as set forth.

4th, The signal bell, n, in connection with and operated by the coffee-making apparatus set forth in the second preceding claim, substantially as described.

74,938.—LOOM.—William J. Quinn (assignor to Furbush & Gage), Philadelphia, Pa.

I claim 1st, The combination, with a drop-box, of a series of self-adjusting plates or cross pieces, o o1, o2, whereby the threads of the shuttles above that in operation are held above the fingers of the weft fork, substantially as and for the purpose described.

2d, The weft fork, provided with a recess, x, formed between the rod, m, and fingers, n, as and for the purpose specified.

74,939.—CAR WHEEL.—John Raddin, Lynn, Mass.

I claim, in combination with the web, a, the sectional hub, c c', and the bolts, g, constructed and arranged as shown and described, the elastic packing, h, and the bolts, substantially as and for the purpose set forth.

74,940.—MEDICAL COMPOUND OR BITTERS.—G. V. Rambaut, Petersburg, Va.

I claim the compound made of the materials and substantially as herein described and for the purpose set forth.

74,941.—CHURN.—John B. Raynor, Mazo Manie, Wis.

I claim the shaft, C, provided with a series of straight arms, H H, when arranged in combination with the box, B, having a series of rods, I I, in the manner and for the purposes set forth.

74,942.—MACHINE FOR GRINDING REAPER KNIVES.—Chas. Richardson, Auburn, N. Y.

I claim 1st, Making the top piece of the swing-frame, H, to which the cutter is fastened when the knives are to be ground, adjustable, and using the same in combination with the adjustable grindstone, in the manner and for the purpose substantially as described.

2d, Affixing the water tank or reservoir, P, to one of the standards which support the grindstone, so that the same shall at all times hang directly under said stone, and using the same in combination with an adjustable grindstone hung upon a movable plate or disk, substantially as and for the purpose described.

74,943.—CHURN.—W. C. Robinson, Saltsburg, Pa.

I claim the dasher, H, composed of the perforated hollow cone, D, the frame, F F, the cylinder, E, and the disk, G, as and for the purpose specified.

74,944.—UMBRELLA.—Edmund F. Schreiner, St. Louis, Mo.

Antedated February 17, 1868.

I claim an umbrella provided with a channel or conductor, secured to its lower outside edge, substantially as described.

74,945.—TABLE CASTER.—Daniel Sherwood, Lowell, Mass., assignor to Woods, Sherwood & Co.

I claim as a new and improved article of manufacture, a table caster, consisting of the parts a, b, c, etc., constructed substantially as described.

74,946.—ARTIFICIAL WINE.—John F. Seibenmann, Milwaukee, Wis,

I claim the production of wine from the ingredients, and by the process substantially as herein described.

74,947.—MEAT CUTTER.—John E. Smith, Buffalo, N. Y.

I claim, 1st, The combination of the central shaft C, the cutting knives E E, and the spring I, or its equivalent, substantially as and for the purposes herein described and set forth.

2d, The double eccentrics T and U, the bars or spring catches W and X, or the equivalent thereof, and the levers U' and T', when constructed and arranged substantially as and for the purposes described.

74,948.—MACHINE FOR SEWING BOOKS.—David M. Smyth, Orange, N. J., assignor by mesne assignments to John T. Lary, New York city.

I claim the combination of the needles with hooks at one end and eyes at the other, the needle or its equivalent with an eye at the upper end, and the traveling hook, the said combination having a mode of operation substantially as and for the purpose specified.

Also, the needles with a hook at one end for retaining the interlacing thread and an eye at the other for locking threads, substantially as and for the purpose described.

74,949.—WASHING MACHINE.—Daniel E. Somes, Washington, D. C.

I claim, 1st, The wheel and cylinder, as described, when operated together, substantially as and for the purpose set forth.

2d, The inclined floor of the box, in combination with the wheel and cylinder, substantially as and for the purpose set forth.

3d, The combination of the box, wheel and cylinder, with or without netting or gauze, as and for the purpose set forth.

4th, The wheel or rock shaft, with buckets, and the cylinder with means for heating the suds or generating steam, substantially as and for the purpose set forth.

5th, A washing machine substantially as described, with means for heating the suds and generating steam, in combination with a safety valve attached to said machine, substantially as and for the purpose set forth.

74,950.—HOSE COUPLING.—Joseph Steger, New York city.

Antedated Feb. 14, 1868.

I claim the teeth a a, b b, and set screw c, or its equivalent, in combination with the two half couplings A B, constructed and operating substantially as and for the purpose set forth.

74,951.—RAILWAY SWITCH.—Wm. J. Stowell, Baltimore, Md.

I claim, 1st, The arrangement of the switch rail sections A' and B', between the turnout rail B, and the main track rail A, the former being laid so as to overlap the fixed main rail A, substantially as described.

2d, The spring b, or its equivalent, interposed between the rail B, and lever D, in combination with the connecting rod a, and switch sections A' B', substantially as described.

3d, A railroad-rail switch, constructed and operating substantially as set forth.

74,952.—MECHANICAL MOVEMENT.—William R. Swinnerton, Peoria, Ill.

I claim, 1st, The lever E, with its arms K, and all equivalents of the same, constructed and operating substantially as and for the purposes specified.

2d, In combination with lever E, the slotted wheel as described, and the shafts L and G, constructed and operating substantially as set forth.

3d, The mode of adjustment and arrangement of the shafts L and G, herein set forth, in such manner that their relative distance from each other shall correspond to about one fourth the diameter of the wheel.

4th, The combination and arrangement of the various parts herein described and shown, for the purpose of producing accelerated speed in machinery.

74,953.—HAT RACK FOR SEATS.—Philo Sylla (assignor to himself, Wm. F. Sylla and Edwin H. Sylla), Elgin, Ill.

I claim the combination of the forked rack F F G, vertical pivot H, and support C D E, substantially as and for the purposes set forth.

74,954.—CHURN.—John Tingley, Philadelphia, Pa., assignor to Philadelphia Wood and Hollow Ware Manufacturing Company.

I claim the inclined diaphragm, arranged diagonally in the vessel, and held in place by the detachable cover h, all substantially as set forth.

74,955.—CHURN.—Jose Toll, Locust Grove, Ohio.

I claim, 1st, The arrangement of the three oppositely reciprocating dashers B B' B", stems C C' C", cross head D, double crank I I J J, and pitmen K L, for the purpose set forth.

2d, The perforated and vertically adjustable frame M M', socket N, and pins O O', for the object explained.

74,956.—BRICK MACHINE.—Benj. Van Vranken, Schenectady, N. Y.

I claim, 1st, The spring catch g4, rod g3, and rock shaft g1, for holding up one end of table E, in combination with the arm w, and press box section J' arranged so as to operate substantially as described.

2d, Depressing the mold box table E, by an outward pressure of a hinged

section, J', or its equivalent, applied to the press box substantially as described.

3d, The application of a self-releasing follower to the mold box table E, substantially as and for the purposes described.

4th, Providing for a parallel adjustment of the bar K, by means of screws and pinion-spur wheels, substantially as described.

74,957.—Rice Planter.—Elijah Wagoner, Westminster, Md., assignor to himself and G. W. Mathews.

I claim 1st, The plows, E E, when constructed in the form described, and provided with the incline e, and guards, e' e', substantially as and for the purpose set forth.

2d, Connecting the coverer to the plow by a double joint h, as and for the purpose described.

3d, The coverer H, when constructed in the form described, and provided with the concave-formed edge, and a corrugated under surface, substantially as and for the purpose specified.

4th, The rod G, passing from the plow through the arm F, and provided with a screw and nut, by which inclination of the plow can be adjusted, substantially as specified.

5th, Constructing the seed conductors of the funnel form sections I I I, connected by straps i i, substantially as and for the purpose specified.

6th, The combination of the idler N, slide O, and roller K, substantially as and for the purpose indicated.

7th, The markers R R, when attached to the machine, and operating substantially as and for the purposes set forth.

8th, The arrangement herein described of a hoe and trencher outside of each of the supporting wheels.

74,958.—Salinometer Pot.—Henry Wanklin, United States revenue steamer *Wilderness*.

I claim a salinometer, in which the specific gravity of the water is determined or measured by its pressure on a movable piston, substantially as and for the purpose set forth.

74,959.—Feed Water Heater.—George I. Washburn, Worcester, Mass.

I claim, 1st, The combination with the condenser C, arranged between the reservoir and pump of the surface condenser D, fig. 1, situated between the pump and boiler, substantially as described.

2d, The arrangement of the condenser between two pumps or two ends of the same pump, substantially as described.

3d, A steam pump and condensing apparatus, constructed and arranged substantially as herein described.

74,960.—Blank for Hoe.—Hervey Waters, Boston, Mass.

I claim a blank for shovels, hoes, etc., made substantially as shown and described.

74,961.—Boring Faucet.—Alfred Weed, Boston, Mass.

I claim a tapping faucet having a combined valve and bit, arranged to operate substantially as set forth.

74,962.—Shoe.—Martin Wesson, Springfield, Mass.

I claim, as a new article of manufacture, a shoe, the upper whereof is composed of a woven or knit fabric, and having the "quarter" and the "vamp" of such upper, or either of them, formed of a web which is woven or knit of proper width to form the outside and the lining in one piece, whether such web is made tubular or flat, or with the lining attached to the outside by tying or connecting, substantially as specified.

74,963.—Concrete Pavement.—Wells H. White, Troy, O.

I claim concrete pavements composed of the materials, and laid hot, and then rolled with a hot roller, substantially as set forth.

74,964.—Preparing School Slates.—Lawrence Wiegel, Joseph Lehndenter, and Charles Fegers, Cincinnati, Ohio.

We claim an artificial slate made with a composition of liquid caoutchouc, asphaltum, and pulverized pumice stone reduced to a thin paste with spirits of turpentine and applied to pasteboard by means of rollers, all substantially as and for the purpose specified.

74,965.—Corn Sheller.—John R. Wilbur, Chicopee, Mass.

I claim, 1st, The V-shaped ribs, k, in combination with teeth or points, L, on the face of the cylinder, A, and bonnet, B, constructed substantially as described and for the purposes set forth.

2d, The crank, H, and shaft or arm, E, in combination with the hopper, D, constructed as described and for the purposes set forth.

74,966.—Cork Pull.—David Williamson (assignor to James Williamson), New York city.

I claim the cork drawer formed with a mortise, containing the sliding and pivoted cross bar, with its catch, and the spring for moving the bar crosswise to the mortise, substantially as specified.

74,967.—Clay Washing and Stone Separating Machine.—Ellis Wilzinski, Chicago, Ill.

I claim the tank, A, provided with partition, B, beater, M, and sliding gate F, with strainer, G, the whole constructed and operating substantially as and in the manner herein set forth, forming the clay washing and stone separating machine.

74,968.—Attachment for Hot Air Register.—James D. McBride, Mansfield, Ohio.

I claim in combination with an attachment for a hot air register, the water vessels, B and D, arranged in the manner and substantially as herein described.

Also the stand, F, when used for the purpose and in the manner substantially as herein set forth.

Also the combination of the several parts, A B C D E and F, for the purpose and substantially as herein described.

74,969.—Railroad Car Stove.—A. P. Winslow, Cleveland, O.

I claim, 1st, The water chamber or tank, B, and perforated water pipe, D, in combination with a railroad stove, substantially as and for the purpose set forth.

2d, The guards, a, in combination with a stove, substantially as and for the purpose set forth.

REISSUES.

2,874.—Lamp.—Chas. W. Cahoon, Portland, Me. Patented Dec. 3, 1861.

I claim, 1st, A lever with chimney fastenings, having that part of it on which the chimney rests extended, so as to form a deflector, substantially as described.

2d, The deflector, broad, flat-shaped, or nearly so, when filling the interior of the chimney, and combined with a air screen and ring with standards, substantially as and for the purposes specified.

3d, The combination of the said deflector with the conical foraminous piece of metal and the cylindrical tubular air screen, for the purpose of forming the air chamber, A, protecting the flame, and admitting the air from below the same, substantially as described.

4th, The combination with the lever for raising the chimney of the deflector, air screen, and foraminous piece of metal, substantially as and for the purposes specified.

5th, The ring surrounding the wick tube, a little above the top of the same, with the standards, s s, substantially as and for the purposes specified.

6th, A chimney holder having a projection for manipulating the same, chimney fastenings, a deflector, and a joint, substantially as and for the purpose set forth.

7th, The combination of the ring, f, supports, s s, and air screen, c, substantially as and for the purpose set forth.

8th, In combination with the burner of a lamp having a glass body, a metallic handle, as herein described.

2,875.—Eyeleting Machine.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May 14, 1867. Division A.

I claim, 1st, A reciprocating beading seat, constructed, arranged and operated substantially as described.

2d, A reciprocating piston or holding pin, in combination with the heading seat, when, constructed, arranged, and operated substantially as described.

3d, A spring piston rest, in combination with the reciprocating heading seat and holding pin, arranged and operated substantially as described.

4th, The reciprocating heading seat and piston, in combination with a vertical header, arranged and operated substantially as described.

5th, A reciprocating heading seat, in combination with a header and work supporting table, substantially as described.

6th, A heading seat, header, and work supporting table, in combination with a work feeding device, substantially as described.

2,876.—Eyeleting Machine.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May, 14, 1867. Division B.

I claim, 1st, A common receptacle or hopper, adapted and arranged for holding the eyelets when thrown in promiscuously, substantially as described, in order that they may be automatically discharged therefrom and delivered in proper position to the heading mechanism, for the purposes set forth.

2d, Agitating the eyelets so as to present them in proper position to the eyelet feeding mechanism, substantially as described.

3d, A promiscuous eyelet holding hopper, provided with means for delivering the eyelets in proper position, an eyelet feeding mechanism, and an eyelet heading mechanism, when combined and operating substantially as described.

4th, In combination with the above, a work supporting table, substantially as described.

5th, In combination with the element of the third claim and a work supporting table, a work feeding device, for the purposes described.

2,877.—Eyeleting Machine.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Patented May 14, 1867. Division C.

I claim, 1st, A reciprocating punching table, constructed and arranged so as to be alternately removed and replaced, substantially as described.

2d, The reciprocating puncher, in combination with the reciprocating punching table, substantially as described.

3d, The combination of a puncher, a work holding table, and a work feeding device, substantially as described.

4th, The combination of a puncher and gage for the line of holes, substantially as described.

2,878.—Eyeleting Machine.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gown. Patented May 14, 1867. Division D.

I claim, 1st, The combination of a puncher and header with a movable punching table, substantially as described.

2d, The combination of puncher, header, work supporting table, and work feeding device, substantially as described.

3d, An organized eyeleting machine, in which the work is supported and fed along, the holes punched, the eyelets supplied, inserted, and headed down, substantially as described.

2,879.—Eyeleting Machine.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Division E.

I claim, 1st, A puncher and header operating reciprocally, when combined, arranged and operating so as to strike alternately on or over the same fixed point, substantially as described.

2d, A reciprocating heading seat in combination with the puncher and header, when arranged and operating at the same fixed point, substantially as described.

3d, A laterally reciprocating punching table in combination with the puncher, header and heading seat, all arranged and operating at the same fixed point, substantially as described.

4th, The reciprocating punching table and heading seat so combined, arranged and operating as to alternately occupy the same place for punching holes and heading eyelets at the same fixed point, substantially as described.

5th, Supplying the eyelets from a common hopper to the heading seat or holding point by a belt and groove, substantially as described.

6th, The work-feeding device, constructed and arranged with an eyeleting machine, substantially as described.

7th, The adjustable gage in combination with the holding table for regulating the line of eyelets, substantially as described.

8th, Punching the holes and furnishing, inserting and heading the eyelets at the same fixed point automatically, by means substantially as described.

2,880.—Eyeleting Machine.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Division F.

I claim, 1st, The combination of hollow rod, J, and lever, I, arranged and operating substantially as described.

2d, The combination of hollow rod, J, and piston, K, arranged and operating substantially as described.

3d, The combination of hollow rod, J, piston, K, and lever, I, arranged and operating substantially as described.

4th, The combination of rod, J, piston, K, spring, I', and lever, I, arranged and operating substantially as described.

5th, The combination of rod, J, piston, K, lever, I, and header, C, arranged and operating substantially as described.

6th, The combination of hopper, N, with eyelet-feeding mechanism and rods, J and K, and header, C, substantially as described.

7th, The combination of puncher, B, and sliding plate, U, substantially as described.

8th, The combination of plate, U, and levers, V and I, substantially as described.

9th, The combination of puncher, B, header, C, sliding plate, U, and rods, J and K, substantially as described.

10th, The combination of puncher, B, header, C, plate, U, rods, J and K, hopper, N, belt, R, and groove, X, substantially as described.

11th, The combination of table, U, and pawl, Y, substantially as described with the set, or punch and set, of an eyelet machine.

12th, The combination of hopper, N, with bristles or flexible arms, o, substantially as described.

2,881.—Base Burning Stove.—Dennis G. Littlefield, Albany, N. Y. Dated August 18, 1863. Reissue 1,594. Dated December 22, 1863.

I claim, 1st, The devices described by means of which the magazine and each of the several sections of which it is composed are held in their proper positions while at the same time the several parts are so adjusted as readily to admit of being separated and reunited at pleasure.

2d, The corresponding notches or shoulders in the iron cylinder and the lining as described by means of which the lining is held in its place, notwithstanding the greater expansion of the cylinder by heat and without danger therefrom.

3d, The magazine, constructed as described, in combination with the furnace separated from it and suspended within a chamber isolated from the chamber surrounding the magazine.

4th, The combination of a magazine contracting in diameter from the middle or other line downward to its lower end with a furnace suspended within a chamber isolated from the chamber surrounding the magazine.

5th, The devices described by means of which I am able to construct what I denominate the upper and lower sections of the burner, each complete in itself separately and so to adjust them as to admit of their being conveniently separated and reunited without injury to either.

6th, The intercommunication to be opened and closed at pleasure between the chamber of a magazine coal burner which surrounds the furnace and that which surrounds the magazine.

2,882.—Lamp.—Wm. N. Ely, Stratford, Conn., assignee by mesne assignments of L. Bailey and R. Thayer. Patented May 4, 1858.

I claim, 1st, Suspending the body of the lamp within an outer case, so arranged that the air shall pass within the case and around the lamp body to the flame, substantially as described.

2d, A hollow lamp case, pedestal, and base, constructed and arranged in relation to the lamp body substantially as described.

3d, An annular lamp body in combination with an outer case, substantially as described.

4th, Constructing and arranging the parts so as to deflect the air coming up from outside the lamp body toward the flame, substantially as described.

5th, Supplying air to the flame by means of the channel formed between the body of the lamp and the outside shell or case, substantially as described.

6th, Arranging and using the rod or wire, K, in relation to the flame and hollow pedestal and outer case, substantially as and for the purposes described.

7th, The concavo-convex button constructed and arranged substantially as and for the purpose described.

2,883.—Tumbler Washer.—John Solter, Baltimore, Md. Patented Sept. 4, 1866.

I claim, 1st, In a tumbler washing machine, operating the valve, e, by pressing the tumbler, in seating it, in the manner as shown and described and for the purpose set forth.

2d, The combination of the lever, K, and valve, e, constructed and operated in the manner substantially as shown and described and for the purpose set forth.

2,884.—Hay Knife.—Philo O. Soper, San Francisco, Cal. Patented Jan. 29, 1867.

I claim, 1st, The construction of the blade, B, substantially as described.

2d, The bearing of the shank, C, in connection with the angle given to the edge of the blade, B, substantially as and for the purpose described.

3d, The point, A, substantially as and for the purposes above described.

2,885.—Last.—Ambrose Taylor, Osawatomie, Kansas. Patented Nov. 5, 1867.

I claim, 1st, The spring hook, E, secured by its shank, F, in the block, B, and engaging with the hook C, set in the last A, all constructed and arranged to operate as herein set forth, for the purpose specified.

2d, The prevention of lateral or backward movement of the block, B, by having the hook, C, extend upward above the surface of the upper side of the last, and within a recess in the under surface of the block, B, substantially as shown and described.

DESIGN.

2,940.—Clock Front.—Amos Wilder and Cyrus W. Strout, Boston, Mass.

Note.—Fifty-six patents in the above list were obtained through the Home Office of the Scientific American Patent Agency.—Eds.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address Munn & Co., 37 *Park Row, N. Y.*

59,395.—Hand Stamp.—B. B. Hill, Chicopee, Mass. Dated Nov. 6, 1866. Reissue No. 2,936. Dated Jan. 14, 1868. Application for reissue received and filed Feb. 8, 1868.

1st, I claim, in combination with the type wheel or wheels and inked ribbon of a hand stamp, a series of characters arranged in a circle concentric with the face or periphery of the type wheel and revolving with and always occupying the same relative position to the characters upon the printing face of said type wheel for the purpose of indicating to the operator the figures or characters to be stamped, substantially as described.

2d, I claim the base, G, having the projecting rim, U, and the axis pin, a, and the face plate, P, the whole forming a wheel case or protection for the type wheels, when constructed and arranged substantially as herein described and set forth.

3d, I claim the wheels, K K', arranged upon the same axle with the wheels, I J, in combination with a hand stamp, arranged and operating substantially as described.

4th, I claim the bracket, H, made on or secured to the case, G, having a step, c, or its equivalent, to enter the lower end of the spindle, and orifice for the screw, e, for attaching and detaching said case to the spindle, E, substantially as and for the purpose described.

5th, I claim the flange, K, in combination with the chase, L, for the purpose of easily and quickly attaching the type plate to or detaching it from a hand stamp, when constructed and operating substantially as herein described.

59,388.—Medical Vacuum Chamber.—George Hadfield, Cincinnati, Ohio. Dated Nov. 6, 1866. Application for reissue received and filed Feb. 8, 1868.

I claim the employment of a hand support or rest, substantially as and for the purposes set forth.

I also claim the sealing cap, F, substantially as and for the purposes set forth.

59,043.—Fire Grate.—W. D. Guseman, Morgantown, West Va. Dated June 20, 1866. Application for reissue received and filed Feb. 8, 1868.

1st, I claim the sliding blower or screw in combination with the grate, for the purpose specified.

2d, The damper in combination with the flue, sliding blower or screen and grate, all arranged substantially in the manner as and for the purpose set forth.

54,662.—Railway Car.—E. H. Ashcroft, Lynn, Mass. Dated May 15, 1866. Application for reissue received and filed Feb. 11, 1868.

I claim a safety car constructed with a water space with one or more showering pipes and a fusible plug apparatus, arranged substantially in manner and so as to operate with respect to the car chamber, as specified.

I also claim, in combination with a water space, substantially as herein set forth, a heating apparatus and circulating pipes, whereby the water shall be caused to circulate substantially upon the principle as herein set forth.

☞ Note.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* *MUNN & CO., Solicitors of Patents, 37 Park Row N. Y.*

EXTENSION NOTICES.

Thomas A. Steadman, administrator of the estate of Thomas S. Steadman, deceased, of Lyons, Mich., having petitioned for the extension of a patent granted to the said Thomas S. Steadman the 23d day of May, 1854, and reissued in three divisions the 19th day of June, 1860, respectively numbered 985, 986, and 987; No. 985 was again reissued the 5th day of June, 1866, and numbered 2,379, and No. 987 was again reissued the 20th day of June, 1865, and numbered 2,909; for an improvement in clover and grass seed harvesters, for seven years from the expiration of said patent, which takes place on the 23d day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 4th day of May next.

Frederic Howes, of Boston, Mass., having petitioned for the extension of a patent granted to him the 20th day of June, 1854, for an improvement in extra yard to topsails, for seven years from the expiraton of said patent, which takes place on the 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 1st day of June next.

George T. Bigelow, administrator of the estate of Samuel Nicolson deceased, of Boston, Mass., having petitioned for the extension of a patent granted to the said Samuel Nicolson the 8th day of August, 1854, for an improvement in wooden pavements, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

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Law Register and Official Directory. Merchants' Law Company, publishers, No. 128 Broadway, N. Y.

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Atlantic Monthly.

Ticknor & Field, Boston. March number just out.

Galaxy.

W. C. & F. P. Church, 39 Park Row, New York. Monthly. Price $3 50. March number just issued.

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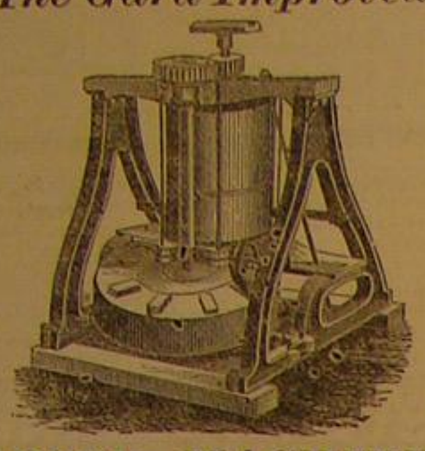

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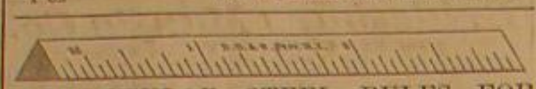

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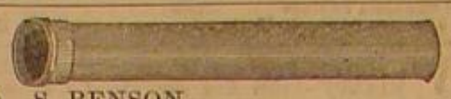

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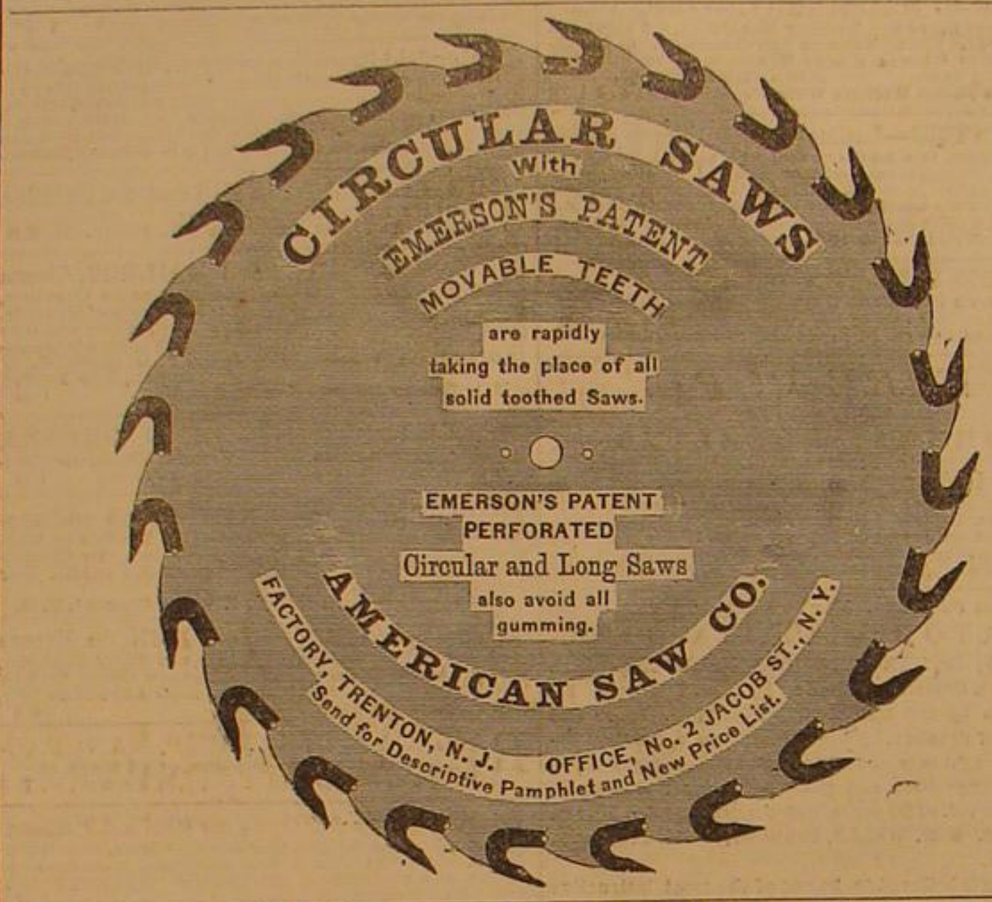

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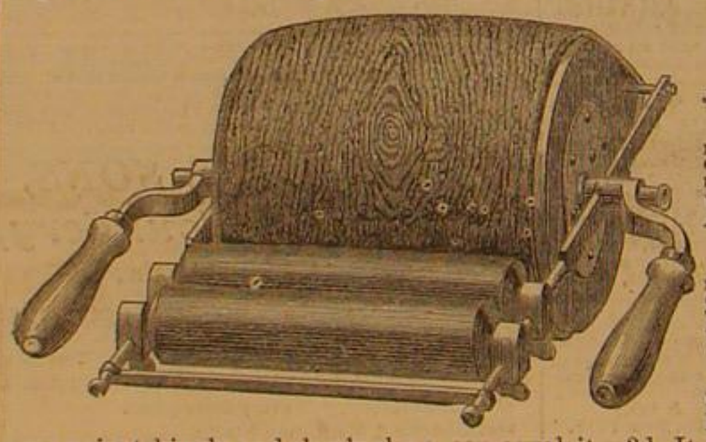

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