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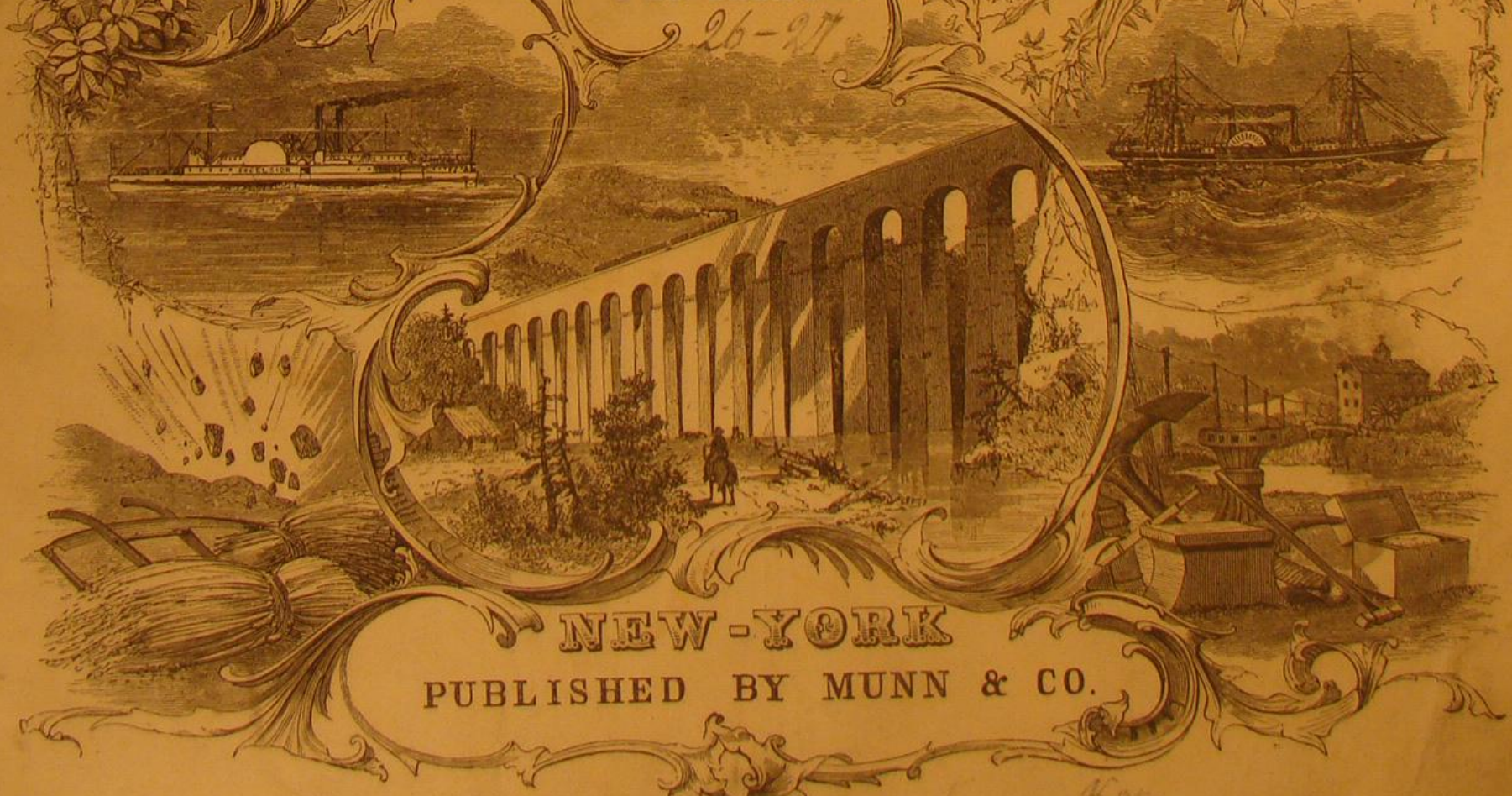

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SCIENTIFIC AMERICAN

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PROFESSOR LOUIS AGASSIZ.

At the very pinnacle of scientific fame stands the subject of the present article. No living man has studied nature with greater ardor and perseverance, and no living man has contributed more to the solution of natural problems than Professor Agassiz. His life has been intensely laborious, but he has labored in love, and has therefore endured an amount of work that would have wrecked the health of ordinary men.

His portrait, which accompanies this sketch, indicates a man of great mental and physical power, intense tenacity of purpose, and keen observation. He has a large brain, but a body that can nourish and carry it.

Louis Agassiz was born in the parish of Mottier, Switzerland, May 28, 1807, his father being the Protestant clergyman in charge of the parish. Up to the age of eleven years his education was in sole charge of his mother, a most intelligent and in every way superior woman. At eleven he commenced a regular course of study at the gymnasium of Bienne.

At a very early age he evinced a taste for and ability in the prosecution of scientific researches that gave large promise of future usefulness; but we have not space to follow him through the various steps which prepared him for the position he has filled in the world of science in later life.

The New York *Tribune* has recently published two incidents, in the life of this great man, which are so well narrated and are so characteristic that we reproduce them here. One is an event that took place in his youth, another relates to riper years; both demonstrate the fact that to this investigator the love of Nature and the study of her works have been the sources of his single minded devotion to a life of study. The first story is as follows. It is "of a poor Swiss lad, who, refusing to learn how to turn a penny by his father's trade, began alone and unaided to spell out the alphabet of Nature in rocks, and birds, and beasts. The knowledge did not promise to help him on one whit among his neighbors, did not put shoes on his feet, or salt in his porridge; a comfortable home and successful business waited for him, but he chose to go wandering through the Alps, hatchet in hand, and often but a *sou* in pocket, 'a sum so little,' he said, 'when my hunger was so big!' So, hungry and half clothed, he followed for years the half effaced signs of this unknown language, which he fancied God had spoken and not men, as a child might trace the footsteps of a lost mother. At last he made his way to London, to Sir Roderick Murchison, who, he thought, could help him.

'Well, sir, what do you know?' demanded the great naturalist, noting his beardless chin and ruddy cheeks. 'I think—' hesitated the lad, 'a little about fishes.' That night, at a meeting of the Royal Society, Sir Roderick held up a covered package. 'I have here,' he said, 'a fish, which existed in such an era'—some time long before Adam was born, and proceeded to state the exact conditions and position in which it was found. 'Can our young friend, who knows something about fishes, tell us anything about it?' Whereupon the Swiss boy promptly drew upon the blackboard a skeleton monster, of which the real one, when uncovered, proved to be the exact duplicate, and then the old graybeards present recognized him as one of themselves, and gave him place, very much as the kings in Hades rose to receive Napoleon."

The second is shorter. "There is a story of a shrewd agent who tried vainly to buy the great naturalist for a winter's lectures. 'Why, sir, you will make more money than by ten years of this work,' he reasoned. 'But I have not the time to make money,' said Agassiz. When will that generation of Americans be born who will not have time to make money, and who will prefer deep sea dredging to building houses of sand on the shore?"

Professor Agassiz, now at the age of sixty-four years, is about to engage in the conduct of a deep sea exploring expedition, which will involve arduous labor and care for a considerable period. We trust, however, that the vitality which has hitherto sustained him, will not fail him, nor become so impaired, by his zeal in the cause of science, as to break him down at the end of his self-assumed task.

In a recent letter to Professor Pierce, Professor Agassiz states what results he expects from the expedition in question. We have room for only an abstract of this letter, much of which, indeed, is too scientific and technical for the general reader. He writes:

"My Dear Friend: On the point of starting for the deep sea dredging expedition, for which you have so fully provided, and which I trust may prove to be one of the best rewards for your devotion to the interests of the Coast Survey, I am desirous to leave in your hands a document which may be very compromising for me, but which I nevertheless am determined to write, in the hope of showing within what limits natural history has advanced towards that point of maturity when science may anticipate the discovery of facts. If there is, as I believe to be the case, a plan, according to which the affinities among animals and the order of their succession in time were determined from the beginning, and if the plan is reflected in the mode of growth, and in the geographical distribution of all living beings: or, in other words, if this world of ours is the work of intelligence, and not merely the product of force and matter, the human mind, as a part of the whole, should so chime with it, that, from what is known, it may reach the unknown; and if this be so, the amount of information thus far gathered should, within the limits of errors which the imperfection of our knowledge renders unavoidable, be sufficient to foretell what we are likely to find in the deepest abysses of the sea from which, thus far, nothing has been secured. I will not undertake to lay down the line of argument upon which I base my statement, beyond what is suggested in the few words preceding, namely, that there is a correlation between the gradation of animals in the complication of their structure, their order of succession in geological times, their mode of development from the egg, and their geographical distribution upon the surface of the globe. If that be so, and if the animal world designed from the beginning has been the motive for the physical changes which our globe has undergone, and if, as I also believe to be the case, these changes have not been the cause of the diversity now observed among organized beings, then we may expect, from the greater depth of the ocean, representatives resembling those types of animals which were prominent in earlier geological periods, or bear a closer resemblance to younger stages of the higher members of the same types, or to the lower forms which take their place nowadays.

PROFESSOR LOUIS AGASSIZ.

And to leave no doubt that I have a distinct perception ofwhat I may anticipate, I make the following specific statement:

"It lies in the very nature of these animals that, among vertebrates, neither mammalia nor birds can exist in deep waters; and if any reptiles exist there, it could only be such as are related to the extinct types of the jurassic periods, the ichthyosauri, plesiosauri, and pterodactyles, but even of these there is very little probability that any of their representatives are still alive. Among the fishes, however, I expect to discover some marine representatives of the order of ganoids of both the principal types known from the secondary zoological period, such as lepidoids, sauroids, pycnodonts, coelacanthes, and amioids, and glyptolepis-like species may even be looked for. (These are families of fishes.) Among selachians some new representatives of cestraciontes or hybodontes may be forthcoming, connecting the latter more closely to odontaspis. (These are families of sharks.) I also look forward to finding species allied to corax, or connecting this genus with notidanus, perhaps also jurassic-like forms. Among chimæroids (a genus of fishes) we may expect some new genera more closely related to the extinct types of that family than those now living. Among ordinary fishes I take it for granted that beryx genera may be added to our list, approaching perhaps acanus, or rather sphenocephalus; also types allied to istieus, to anenchelum, and to osmeroides, elops, and argentina. Dercetis and blochius may also come up. (These are all names of families of living fishes.) Species of all classes of the animal kingdom, which have been very rarely met with by fishermen and naturalists, are likely to be found in the deepest waters, in which neither hooks nor nets are generally lowered. Nothing is known concerning the greatest depth at which fishes may live. Upon this point I hope to obtain positive data."

Professor Agassiz then proceeds to enumerate a long list of genera and species, to which he expects to add novel specimens, and adds:

"With the monograph of Pourtalés, assistant in the United States Coast Survey, upon the deep sea corals it would be sheer pretence to say anything concerning the prospect of discovering new representatives of this or that type. His tables point them out already.

"But there is a subject of great interest likely to be elucidated by our investigations—the contrast of the deep sea faunæ of the northern with those of the southern hemisphere. Judging from what Australia has already brought us, we may expect to find that the animal world of the southern hemisphere has a more antique character, in the same way as North America may be contrasted with Europe, on the ground of the occurrence, in the United States, of animals and plants now living here, the types of which are only found fossil in Europe.

"A few more words upon another subject. During the first three decades of this century, the scientific world believed that the erratic boulders, which form so prominent a feature of the surface geology of Europe, had been transported by currents arising from the rupture of the barriers of great lakes among the Alps, or started from the north by earthquake waves.

"Shepherds first started the idea that, within the valleys of Switzerland, these huge boulders had been carried forward by glaciers, and Swiss geologists, Venetz and Charpentier foremost among them, very soon proved that this had been the case. This view, however, remained confined to the vicinity of the Alps in its application, until I suggested that the phenemenon might have a cosmic importance, which was proved when I discovered, in 1840, unmistakable traces of glaciers in Scotland, England, and Ireland, in regions which could have had no connection whatever with the elevation of the Alps. Since that time the glacial period has been considered by geologists as a fixed fact, whatever may have been the discrepancies among them as to the extent of these continental masses of ice, their origin, and their mode of action.

"There is, however, one kind of evidence wanting to remove every possible doubt that the greater extension of glaciers in former ages was connected with cosmic changes in the physical condition of our globe. All the phenomena related to the glacial period must be found in the southern hemisphere with the same characteristic features as in the north, with this essential difference, that everything must be reversed; that is, the trend of the glacial abrasion must be from the south northward; the lee side of abraded rocks must be on the north side of hills and mountain ranges, and the boulders must have been derived from rocky exposures lying to the south of their present position. Whether this is so or not, has not yet been ascertained by direct observation. I expect to find it so throughout the temperate and cold zones of the southern hemisphere, with the sole exception of the present glaciers of Tierra del Fuego and Patagonia, which may have transported boulders in every direction. Even in Europe, geologists have not yet sufficiently discriminated between local glaciers and the phenomena connected with their different degrees of successive retreat on one hand, and the facts indicating the action of an expansive and continuous sheet of ice moving over the whole continent from north to south. Unquestionably, the abrasion of the summits of the mountains of Great Britain, especially noticeable upon Schiehallion, is owing to the action of the great European ice sheet during the maximum extension of the glacial phenomena in Europe, and has nothing to do with the local glaciers of the British Isles.

"Among the facts already known from the southern hemisphere are the so-called rivers of stone, of the Falkland Islands, which attracted the attention of Darwin during his cruise with Captain Fitzroy, and which have remained an enigma to this day. I believe it will not be difficult to explain their origin in the light of the glacial theory, and I fancy now they may turn out to be nothing but ground moraines, similar to the "Horsebacks" of Maine.

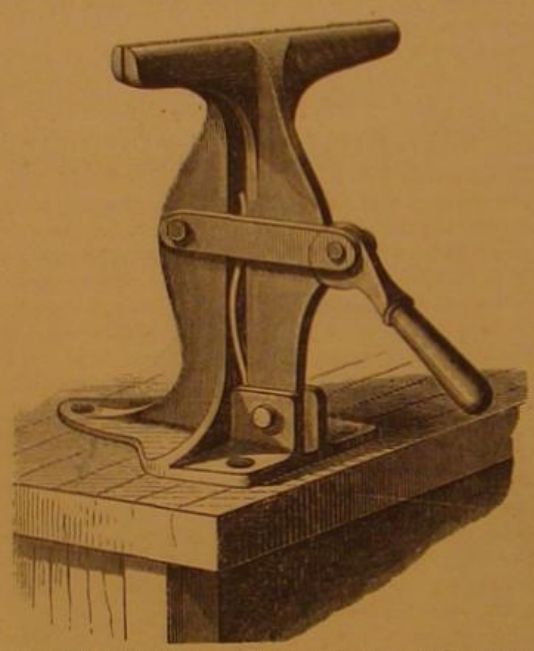
"You may ask what the question of drift has to do with deep sea dredging? The connection is closer than may at first appear. If drift is not of glacial origin, but the product of marine currents, its formation at once becomes a matter for the Coast Survey to investigate, and, I believe, it will be found in the end that, so far from being accumulated by the sea, the drift of the lowlands of Patagonia has been worn away to its present extent by the continued encroachment of the ocean in the same manner as the northern shores of South America and Brazil. * * * * * * * * *

"Hoping some at least of my anticipations may prove true, I remain, ever truly yours."

And so this old man, still thirsting for knowledge, scorning wealth, luxury, and even the ease and comfort usually so longed for by people of his years, is to dare the dangers of the deep, to suffer exposure and risk the health of his declining years, that the world may be enriched by his additions to its lore, and to gratify his unquenchable love for science. Instead of being morally deformed by avarice, and clutching for dollars as though all depended upon accumulation, "he has no time to make money," and will die a poor man, as the world counts wealth, but rich in all that is noble and worthy, rich in the respect of his fellow men, and, let us hope, rich in the assurance that the splendid, well stored mind, which still shines with unabated luster, will find an unlimited expansion beyond the dark valley.

ECCENTRIC SPRING VISE.

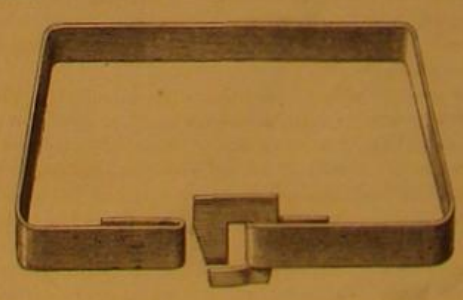
This is a handy implement, of English origin, very convenient for pattern makers' and saw filers' use, the principle of which is obvious from an inspection of the engraving. Instead of the usual screw, an eccentric and link movement



forces the jaws together. When released from the action of the lever eccentric, the jaws are separated by a spring. It would be easy to connect a treadle and rod attachment to the vise, so as to operate it wholly by the foot, in work where both hands are needed in placing the article to be held.

SHEPPARD'S COTTON TIE.

This is an improvement in the tie or buckle used in fastening together the ends of iron bands employed in baling cotton. The tie is made of a piece of flat wrought iron, and is so constructed that a lip covers the place of entrance of the band, thus making it impossible to disengage the band through any accident arising from the sudden relaxation of the same, caused by the rough handling to which cotton is constantly subjected.



The advantages of this tie are security, strength, simplicity, and ease of appliance. In using it, the band is passed around the bale, and, having been drawn tight, the ends are formed into loops, on one of which the tie is hooked, as shown in our engraving. The loose end or loop is then attached to the larger lip or arm of the tie by simply turning the tie slightly and inserting the band in the opening between the lips. This opening may be formed by beveling off the edges of the lips or by bending them in opposite directions. The corner of the lip on which the band rests is rounded off to throw the strain on the shank, as this adds to the strength of the tie.

This tie is simple in construction and can be very cheaply manufactured. Patented August 22, 1871, by J. L. Sheppard, of Charleston, S. C., who may be addressed for further information.

SCIENCE RECORD FOR 1872.

We have in press, to be issued shortly, a new and valuable book of 350 pages octavo, entitled as above, which, we think, will be read everywhere with interest. It is a compendium of scientific progress of the past year, and is profusely illustrated with steel plate and wood engravings.

The following is a partial outline of the general contents of the *Science Record:*

Notices and descriptions of the leading discoveries and improvements invented or introduced during the past year, pertaining to Engineering, Mechanics, Chemistry, Philosophy, Natural History, Agriculture, Architecture, Domestic Economy, and the various Arts and Sciences, with many engravings.

Biographical notices of prominent men of science, with portraits.

Descriptions of the most important public works, began or completed during the past year, with illustrations.

Notes of the progress and extension of railways, telegraphs, and other means of communication.

Descriptions of the new applications of steam, electricity, and other motive powers, with engravings.

Almanac for the present year, and a chronological table of notable scientific events and phenomena.

Reports of Patent Office proceedings. Classification of inventions at the Patent Office, with the names of all examiners, officials and employees.

Portrait and biographical sketch of the Hon. M. D. Leggett, Commissioner of Patents.

Description of that great engineering work, the Mount Cenis Tunnel through the Alps, with engravings of the tunneling machinery, portraits of the chief engineers of the work, and other illustrations.

Description of the great Government works at Hell Gate, New York, with many illustrations, showing the wonderful galleries now being cut in the rocks under the bed of the East River, preparatory to removal of these obstructions by explosion, the drilling machinery, the electric apparatus, and other interesting objects.

Description of the great Suspension Bridge between New York and Brooklyn, now in process of erection, with interesting engravings.

Steel plate engravings of the celebrated Gatling Gun or Mitrailleur, showing its construction and use in various forms, upon wheels, horseback, camels, boats, etc.

Illustrations of recent improvements in cannon, fire arms, etc.

Recent applications of science to the construction of steam and sailing vessels, with illustrations.

Reports of the important law trials, and decisions pertaining to inventions and scientific matters.

Proceedings of scientific bodies, with notes of interesting papers.

Illustrations of late improvements in all the leading departments of mechanics and science.

Useful tables and practical recipes pertaining to the principal branches of industry.

The whole forming a convenient and popular SCIENCE RECORD of the past year, of permanent value and importance necessary for reference and interesting to everybody. It should have a place in every library.

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CHLORAL IN TOOTHACHE.—Dr. Page, in a letter to the Brittsh *Medical Journal*, states, that for some time past he has employed chloral hydrate, not only as an internal sedative in dental neuralgia and caries, but also as a local applicarious tooth. A few grains of the solid hydrate placed on a quill point introduced into the dental cavity, speedily dissolved, and the pain was either deadened or effectively allayed. A second or third application of the remedy may be necessary.

CHLORAL HYDRATE has had a great run, and even young men are known to be purchasing it at the drug stores, to be used in promoting sleep; it should never be taken unless advised by the family physician, for the medical journals are constantly publishing cases where serious harm and even fatal results attend its habitual use.—*Journal of Health.*

A NEW STYPTIC.—Collodion, 100 parts; carbolic acid, 10 parts; Pelouse's tannin, 6 parts; benzoic acid (from gum) 5 parts. Mix the ingredients in the order above written, and agitate until perfect solution is effected. This preparation has a brown color, and leaves on evaporation, a strongly adherent pellicle. It instantly coagulates blood, forming a consistent clot, and a wound rapidly cicatrizes under its protection.

MR. RAYMOND, the United States Commissionar of Mining Statistics, estimates the total product of gold and silver in the United States, during the year 1870, at $86,000,000. Of this amount California yielded $25,000,000, and Nevada $16,000,000. Gold, to the value of from $9,000,000 to $13,000,000, is used every year in the arts, by jewelers and others.

MANUFACTURERS of governors of steam engines may be interested in knowing that a suit brought by Junius Judson against A. P. Brown and others, for infringing his patent for a *graduated opening* in governor valves, and which has been pending three or four years, has been discontinued, without costs against either party as against the other. Any licencees of James Watt, if such there be, may now rest at ease concerning the principle of *graduated openings.*

GOUX'S IMPROVEMENTS IN EARTH CLOSETS.

We recently had occasion to notice the issue of patents in this country for the above invention, and we now have the pleasure of presenting engravings thereof, with additional particulars.

The earth closet, as heretofore made, consists of a tub or holding vessel, to receive the excreta, and above it another vessel or holder, containing dry earth; there is also a lever and valve arrangement, so connected with the earth chamber that, when the lever is operated, a small quantity of earth is thrown down upon the excreta, which are thus deodorized. This plan, although valuable, is, in practical use, attended with some trouble, as the machinery and the chambers must be frequently looked after, the contents of one, when full, removed, and the other chamber filled when empty. It requires some little intelligence to keep these machines in proper order; hence, for general use, they are not quite the thing.

The improvement of Goux consists in lining the interior wall of the tub or excreta holder with earth or any other suitable deodorizing absorbent; and thus prepared it is ready for use, requiring no further attention until it becomes filled, when its contents are removed to the manure heap, and a fresh earth lining substituted. The earth lining absorbs the noxious effluvia and liquids, and the closet thus made is odorless. There is no machinery about it. It is admirably fitted for family use; and it presents this striking advantage, that its products form a manure of the highest value, which may be collected and transported without nuisance to anybody. The product is, in fact, odorless, although it is a rich fertilizer.

This form of earth closet has been extensively introduced in London, where a corporation, known as the "Sanitary Improvement and Manure Manufacturing Company" has been formed, and a large and profitable business inaugurated. The company employs a large number of drays and men, who go around to regular customers, removing the filled tubs and

Fig. 1.

substituting fresh ones, a work of only a minute in each case, with nothing disagreeable about it. The fertilizer thus produced and collected brings the highest prices, and the demand is much greater than the supply.

Referring to our engravings, Fig. 1 represents one of the excreta holders. A is the lining of absorbent materials, such as earth and other matters. The absorbent lining is placed and formed within the holder by means of a band mold of the form shown in Fig. 2, the earthy material being lightly packed between the walls of the holder and the exterior surface of the mold; the latter is then withdrawn, leaving the lined holder ready for use, as shown in Fig. 1.

Fig. 3 shows a special application of the invention to urinals, the interior of the ornamental holder being wholly or partially filled with the absorbent earths, A, as shown, the liquid being conducted from the receiving urn, B, down through a pipe, C, which is perforated at its lower parts to permit the absorption of the liquids by the earth. These simple devices are most effective, and may be used in the apartments of dwellings with advantage.

Fig. 2

The urinal fluids, it is well known, are among the most precious fertilizing agents, and by this excellent apparatus they are not only saved, but converted into an article of great commercial value, ready for immediate use.

The Goux system possesses all the advantages of the dry earth system without its disadvantages; it is economical, deodorizing, and self-acting. The whole refuse of every house, as excreta, liquid or solid, ashes, and sweepings, are disposed of and turned to account, and it is applicable in individual cases, dwellings, and in large communities. The alterations to the ordinary closets, to adapt them to the dry system, are less costly in the Goux process than in any other, and it is applicable to the best description of houses, as well as to the dwellings of the poor.

By the adoption of this simple process in cities, all communications between the sewers and the interior of houses are effectually stopped, and all danger of infection from the

Fig. 3.

neighborhood avoided; every case of epidemic disease can be at once isolated and dealt with separately; and in course of time the sewers themselves, no longer contaminated by the human excreta, will become comparatively harmless, while their contents will then be allowed to run into the rivers without poisoning the water.

After a protracted trial made at Aldershot during last season, the British War Department, on the recommendation of several sanitary commissioners specially appointed, has determined to adopt the system, and the London company has taken a contract for the whole of the North Camp. As a proof of the adaptability of the system to large bodies of men, it may be observed that, although the contract was made and arrangements prepared for about 4,000 men, yet the service has been extended without difficulty or inconvenience to about 11,000 or 12,000 men, and no complaints have been made of any nuisance; and the official certificates show that the Goux closets gave perfect satisfaction. No foul odors were observable under their long continued use by this large body of troops. A more severe test could not well be suggested.

The large town of Halifax, Eng., has also adopted the system, and will soon be entirely fitted. The towns of Bradford and of Wakefield, after a close examination of the results obtained at Halifax, have decided on adopting the system, and the company is in treaty with several other corporations for the same purpose. For hospital purposes the system is unrivalled. When it is considered that this is the progress made in the course of one year, it will appear that the process must have some considerable merit.

The Goux system is now being introduced in this country, and its practical operation may be seen at the establishment of A. L. Osborn & Co., 424 West Canal street, New York, where further information can be obtained.

Creuse's Stable and Tasteless Medical Compound of Iodide of Iron.

The iodide of iron is one of the most important and useful curative agents known in pharmacy; but, as heretofore made, its compounds have a harsh, inky, disagreeable taste, so bad that many patients are unable to use them. They also blacken the teeth, and, in some cases, produce constipation.

The object of Mr. Creuse's invention is to provide a stable and tasteless medical compound of iodide of iron, by combining the sesqui-iodide of iron with a vegetable salt.

The sesqui-iodide of iron, though very unpleasant and even caustic in taste, has the property of combining with various vegetable salts, forming compounds almost tasteless, which may, it is claimed, practically be kept unaltered any length of time.

The vegetable salts found to have such an effect are the citrates, the tartrates, and the oxalates of potassa, soda, ammonia, and lithia, or any mixture of these different salts. Of all these, the combination of sesqui-iodide of iron with citrate of potassa has been selected as the best suited for medicinal purposes though the right to use any is allowed in the patent.

The solutions of the iodide of iron thus obtained must be kept from direct sunlight, and protected by either sixteen per cent of alcohol or a quantity of sugar sufficient to make an officinal sirup.

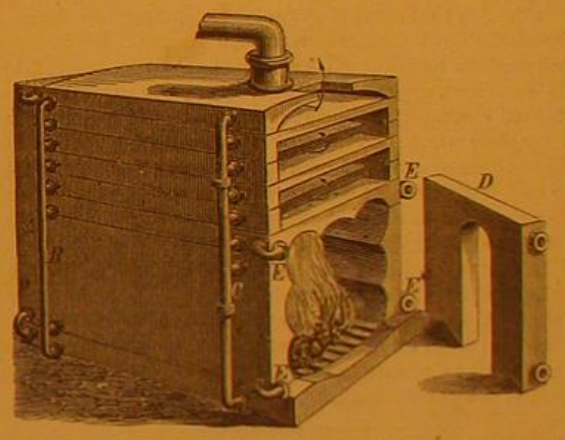
The usual preparations of Peruvian bark may be made with this compound, and are claimed to keep indefinitely under the conditions specified. This preparation, an iodide by the combination of sesqui-oxide of iron with vegetable salts, was patented through the Scientific American Patent Agency, November 28, 1871, by Jules Augustus Creuse, of Brooklyn, N. Y.

Motors for Tremolos of Musical Instruments.

John R. Lomas, of New Haven, Conn., assignor to B. Shoninger, has secured a patent for an invention which has for its object to provide a steady and economical mechanism for operating tremolos of organs or other musical instruments; and consists in the use for that purpose of a wind engine, which acts directly on the crank of the tremolo. Various means have ere this been proposed for the working of tremolos in musical instruments; but all were objectionable either on account of uncertainty of action, or because they wasted more power than was required, or were finally too apt to get out of order and difficult to retain in action. In this invention, a tremolo of prismatic or other suitable form is hung in a fixed frame, by means of projecting pins at the ends, so that it will readily revolve in its bearings. One of the pins is extended, and bent to form a crank, which is, by a pitman, connected with the operating mechanism of a wind engine. This engine consists of a hollow case or box, containing within its cavity a flexible diaphragm or partition, which divides it into two chambers. The diaphragm is directly, or by means of a rod, connected with the pitman. Air for operating the engine is let into the chambers through proper apertures, and exhausted through other apertures. A slide, which is connected with the crank pin, and set by the same at every half revolution of the tremolo, has suitable posts, and serves to regulate the inlet and outlet of air to and from the chambers alternately, in the same manner substantially as the slide valve in a steam engine regulates the admission and exhaust of steam. The air is, by suitable mechanism, either forced into or sucked from the engine. Instead of the diaphragm a sliding piston may be used, the former being preferable, as it requires less friction to operate.

HOT WATER HEATER FOR GREENHOUSES.

A want of means of heating greenhouses more perfectly than the appliances hitherto at command, has been long felt. The accompanying engraving illustrates an English invention, which is stated by a cotemporary to have given excellent results in all respects, being very economical of fuel, and maintaining the heat with great uniformity, on account of the free circulation it secures. It is sectional, the sections having hollow water spaces between which the heated gases of combustion pass, as indicated by the arrows. The sections all connect through the pipes, B C, and the front and back sections are joined to the others, as indicated at E. The water flows through the upper elbowed pipe to supply the system of heating pipes, and returns to the lower part of the boiler



in the usual manner. A large amount of heating surface is thus secured in small space, a matter of much importance in city greenhouses.

[From the Boston Journal of Chemistry.]

ENCKE'S COMET.

BY PROFESSOR C. A. YOUNG, OF DARTMOUTH COLLEGE.

This comet, now in its most favorable position for observation, and faintly visible even by the naked eye in the early evening, derives its name from the distinguished astronomer who first in 1819, determined its orbit, and afterwards through his whole life expended great labor upon the investigation of its motions.

In itself a very insignificant object, it derives its interest mainly from the fact that its average distance from the sun, and of course its period also, is less than that of any other comet. It completes its course in a little less than three years and four months, at aphelion receding to a distance of nearly 380 millions of miles from the sun, a distance as great as that of the remoter asteroids, while at perihelion it approaches within 31 millions of miles, or nearer than the planet Mercury.

Another circumstance has added to its celebrity. Since its first discovery there has been noticed a gradual shortening of its periods, which according to the calculations of Encke, cannot be accounted for by any known action of the planets. He inferred, therefore, and maintained with great ability, the existence of a resisting medium filling the interplanetary spaces. This conclusion, however, is by no means acquiesced in by all astronomers, because the other comets as yet show

nothing similar, and it is thought quite possible that a new computation from the more accurate modern observations of the last five or six returns might show the presumed acceleration to be due to the disturbance of the planets, or even to a collision with some flock of such meteors as cause our November star showers. The question cannot be settled without a re-investigation of the whole matter. This would be exceedingly laborious, and thus far no one seems to have inherited Encke's paternal interest in the "little stranger."

As seen in the telescope at present, it is a rounded mass

of nebulous matter some 5′ in diameter, with no definite outline and without a distinct nucleus, although it is considerably brighter in the center. Last evening (Dec. 5) I detected for the first time a tail about half a degree in length.

The diameter of the comet is between 40,000 and 50,000 miles, and yet so transparent is it that when on December 1st at 6.04 P. M. (Hanover time), it passed centrally over a little star of the 9th magnitude, it did not in the least dim the star's brightness. For a minute or two, even with a power of 200, it looked as if it had simply acquired a nucleus. Similar observations have been often made before, and show that the substance of comets is inconceivably rare.

But the spectroscope speaks still more distinctly. It indicates that the material is gaseous, and, so far as my observation goes, gaseous only; for there is no trace of any continuous spectrum such as must result from the presence of solid or liquid dust, in a state of however fine division. The annexed diagram represents this spectrum, as observed here on December 1st, 2d, and 5th. It consists of three bright bands, the central of which is far the brightest. The wave lengths of the less refrangible edges of these bands are respectively 557·5, 517·5, and 470·4 millionths of a millimeter. The spectrum seems to correspond exactly with that of Comet II., 1868, which was investigated by Huggins and by him identified as due to carbon.

ENGLISH OBSERVATIONS OF ENCKE'S COMET.

At the meeting of the Royal Astronomical Society of England, on the 17th of November, Dr. Huggins stated that he had succeeded in obtaining the spectrum of the comet, which as in the case of that of Comet II. of 1868, consisted of three bands, apparently identical with the bands in the spectrum of the vapor of carbon. The middle band, "near b," was much brighter than the other two, and he was quite satisfied as to its identity with the middle bands of carbon vapor, but the outer bands were so faint that he could not speak confidently concerning them. It will be perceived that this report from Dr. Huggins confirms the observations made by Professor Young, though in the early part of November the comet was too faint to permit the former to determine the position of the outer bands of the spectrum.

At the meeting just mentioned, the Astronomer Royal called attention to the fact that the longer axis of the comet was directed almost exactly towards the sun, and that its head and nucleus were turned away from that luminary. This, he remarked, appears to be the rule with nearly all the class of comets. "Unlike the sheep of little Bo Peep, they carry their tails before them, and not until their smaller fan shaped appendages have been well warmed by the sun's rays do they begin to shoot out large tails in the other direction." The aspect of the comet, according to a drawing made by Mr. Carpenter of Greenwich, was that of "a somewhat shuttlecock shaped nebulous haze, with two wings of much fainter light, extending on either side, giving a flattened appearance to the head of the comet." A drawing, made by Dr. Huggins agreed quite closely with the above. He thought he had detected a minute but distinctly marked nucleus in the head of the "shuttlecock."

The Hartford Steam Boiler Inspection and Insurance Company.

The Hartford Steam Boiler Inspection and Insurance Company makes the following report of its inspections in the month of October, 1871:

During the month 794 visits of inspection were made, by which 1712 boilers were examined—1597 externally, and 516 internally—while 170 were tested by hydraulic pressure. The number of defects in all discovered were 1023, of which 110 were regarded as dangerous. These defects in detail are as follows:

Furnaces out of shape, 64—4 dangerous; fractures, 59—21 dangerous; burned plates, 36—7 dangerous; blistered plates, 146—8 dahgerous; sediment and deposit, 207—7 dangerous; incrustation and scale, 169—5 dangerous; external corrosion, 61—8 dangerous; internal grooving, 21—6 dangerous; internal grooving, 20—3 dangerous; water gages defective, 54—8 dangerous; blow out defective, 22—3 dangerous; safety valves overloaded and out of order, 41—11 dangerous; pressure gages defective, 104—6 dangerous, varying from — 15 to + 4; boilers without gages, 2; cases of deficiency of water, 4—1 dangerous; cases of broken braces and stays, 39—20 dangerous; boilers condemned, as in an unsafe condition, 20. There were 5 boiler explosions during the month, by which 3 persons were killed, and 13 badly injured. These exploded boilers were not under the care of this company.

Hardening Iron and Steel.

The inventor, John McDonald, of Kankakee, Ill., forms a compound of six substances in certain properties. The iron to be hardened—mold boards, plow points, cultivator teeth, etc.—is smoothed off by grinding in the usual manner, and then heated to a temperature a little above a cherry red color. It is then immersed in the compound and allowed to remain until nearly cooled. Then the articles are removed and plunged into cold brine—salt and water—when they are ready for use. When the mold boards or other articles of iron are treated in this manner, it is claimed, they are not liable to spring, and are thoroughly hardened, so that their durability is greatly increased. Edge tools and other articles of steel may be hardened in a similar manner, but the process must be varied according to the temper required.

Iron Window Shutters.

A correspondent, X. X. X., of Cincinnati, Ohio, writes to recommend the use of iron shutters as a preventive of the spreading of fire and the depredations of burglars. He points out, moreover, the desirability of introducing a new design, which should afford the same opportunity for an ornamental and decorative pattern, and at the same time be as difficult to burn or to open surreptitiously, as a solid cast iron shutter. He states that such a shutter might be made of bronze or any material other than iron, to conform to the architectural style of the building; and asks whether it "should slide back into cases in the wall, or how it should be arranged?" There is an opening in this direction, says X. X. X., for some one to enrich himself and benefit his fellows.

Correspondence.

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

Testing Turbine Wheels.

To the Editor of the Scientific American:

Having had two of my new turbine water wheels, a 24 and a 36 inch, tested, this season, at the Lowell, Mass., testing flume, and thinking that it might be interesting to some of the many readers of your excellent paper, I offer the following statement, which is based on my own observations. The testing flume is built of wood, and is decked down about ten feet below the head of the water in the forebay. The length of the shaft in the water wheel is about seven feet, and it passes up through a box on the top of the deck, above which, on the upper end of the shaft, is attached the dynamometer. The tank, which receives the water discharged by the wheel, is about thirty feet long, fourteen feet wide and four feet deep, at the lower end of which is a weir seven feet long, the bottom immediately above the weir being two and a half feet below the breast of the weir. The edges of the weir are faced with iron bars one half inch thick, and three inches wide. The rim and two of the arms of the dynamometer are hollow, and so arranged that a half inch stream of cold water passes through them when in motion. The friction band surrounding the rim of the dynamometer is likewise hollow, and has a similar stream passing through it. On one side of this friction band there is an arm, which is connected to the scale beam by a link; on the top of the dynamometer is a dial, which is laid off in 100 equal parts. There are two hands on this dial, which are attached to arbors, so that each can be held at zero, until the word is given to start. One of these hands makes one revolution whilst the water wheel makes 100; the other makes one revolution whilst the water wheel makes 1,000. The testing of the thirty-six inch wheel commenced with the gate full drawn, and continued about an hour and a half, all things connected with the dynamometer working satisfactorily. I find, by referring to the report furnished me, that the testing was commenced by putting 600 pounds on the scales, and drawing up the friction band until the scale beam became level. After running the wheel with this weight for five minutes, the revolutions were noted, also the depth of water on the weir, the working head, etc.; after which the weight on the scales was increased, every time after running five minutes, by ten pounds, until the whole weight was 730 pounds. The best results from these tests with the thirty-six inch wheel, were when it made 140 revolutions per minute under 15·425 feet head, with 680 pounds on the scales; discharging 1,873·78 cubic feet of water per minute, and yielding 43·27 horse power. The testing of the wheel with seven eighths, three fourths and one half discharge of water was carried through in a similar way as with full discharge. Experience, I think, teaches that buyers would do well if they were to insist, on those having water wheels for sale, to have them examined and properly tested by competent parties at some public place, that they may know whether a wheel will fully answer the purpose for which it is intended; nor can I see that such a requirement would do any injustice to the builder.

York, Pa. A. F. BURNHAM.

[We most heartily approve of the suggestions of our correspondent, that water wheels be rated according to the power they develop by actual test. To rate wheels, made as they are ordinarily, by the power developed with similar sized wheels finished in the highest style possible to mechanical skill, is a trick which imposes upon buyers who have not the knowledge of the way such tests are conducted. We have before called attention to this matter, and we now again insist upon the importance of practical tests with practical wheels, not with wheels constructed specially for the purpose with highly polished bearings, such as are never offered for sale; and which, if put into actual use, would soon have their polished surfaces so roughened as to lose a considerable percentage of power. We are informed our correspondent's wheels were such as are regularly made for sale, and that they developed 79·20 per cent. of the power of the water. We should be glad to see an impartial test of various wheels such as are offered in the general market, and which would be really valuable in establishing the relative merits of different turbines.—EDS.]

It Moves.

To the Editor of the Scientific American:

The crucial experiment, proposed by Mr. J. A. Solliday (Dec. 9), to illustrate and to demonstrate the reality and universality of the psychic force, has proved with me a perfect success. I balanced a delicate slip of paper upon the point of a needle thrust through a cork, and, holding my hand as directed, the paper commenced moving round and round at the rate of 15 or 20 revolutions per minute. Turning aside to cough, it came to a dead halt and would not start again till I directed my face towards it. Presently, a malicious fly sailed past it, and set the thing whirling in a contrary direction, which shows that flies possess the psychic force as well as men,—another argument in favor of Darwinism. Soon after, feeling an irresistible inclination to sneeze (and I am a hard sneezer) the paper leaped 4 feet into the air, while the cork bounded like a shot against the window; the candle went out, and stars darted about the room like the bursting of a meteor. The experiment was getting interesting. But I thought of witches, and fearing possible consequences if I should sneeze again (as I only half sneezed before), I desisted, fully satisfied with my experiment. Mr. Solliday is undoubtedly correct in his conclusion, that any one can succeed with this experiment who has *breath*. What mysteries there are in Nature!

JONES.

[The experience of Mr. Jones has been verified by a large number of our correspondents. In our experiments, we took special care to provide against aiding psychic force by ascending currents of air, being accustomed to attempt accuracy in experiments. We are glad to learn that the majority of the readers of the SCIENTIFIC AMERICAN "can tell a hawk from a handsaw when the wind is southerly." Psychic force stock appears to be declining in the scientific market. Yet let us go slow. Some things may be done as well as others. A new sensation is wanted. EDS.]

To Prevent the Burning of Chimneys.

To the Editor of the Scientific American:

The burning out of chimneys, like house cleaning, generally occurs once a year, and, in like manner, without previous warning; and the risk of losing one's property by the burning is not less than that of losing one's papers or patience by the cleaning.

To prevent the former, (the latter cannot be prevented) take the stove handle or any convenient knocker, and rap the pipe smartly on all sides, from the elbow down to its junction with the stove. Repeat the operation as often as once a month during the winter. It will help to drive the rats out of the house, besides adding to the heating power of the pipe. After each of these pipe cleanings, the stove, of course, will need cleaning. This is readily done with an instrument shaped somewhat like a hoe, made by fastening a piece of hoop iron 4 or 5 inches long to the end of a light stick 3 feet long, by means of a couple of nails or a screw. With such an implement, the ashes and soot, deposited on the bottom and sides of the air passages of the stove, can all be drawn out, which will greatly increase the heat generating capacity of the stove. Stove pipes should be taken down once a year and thoroughly cleaned, especially the horizontal parts; the upright parts, together with the stove, can be cleaned as described. J. H. P.

The Pigeon's Flight.

To the Editor of the Scientific American:

Your European readers will be amazed at your admission of the Montclair pigeon flying *canard* into your issue of the 25th ult., which makes the absurd declaration that carriers, tossed one and two thousand miles at sea, returned; and, as if that would not sufficiently test public credulity, at an average speed of over 200 miles an hour, or double that of the most devastating tornado, in which buildings and forests are scattered like chaff!

This audacious assertion, unchallenged by you, evinces a singular credulity and misapprehension in regard to the powers of homing pigeons. As one of the antagonisms to excessive application, I have bred and flown for recreation the most celebrated types of flyers, and have in my cotes probably the largest trained flight in America of wild and spirited Antwerps, the best and boldest flyers the world has ever known. No homing pigeon, however sedulously trained, has yet returned, even over a familiarized land route of a thousand miles, nor from two hundred at sea. These birds do not return by any instinct like the migratory, or the nest building, but by the exercise of the perceptive faculties, the recognition of familiar objects and configurations of land. When birds are thrown at sea they seem bewildered, and if they cannot descry land in a brief flight, they return and cannot be forced to leave the rigging. They can only be trained by gradually increasing stages, till they get familiar with the features of the country and acquire confidence in their capacity. When these stages are too rapidly increased, the birds are lost.

Pigeon races constitute the great national pastime of Belgium, and it is believed that there are in that little kingdom 20,000 trained birds, the poorest of which would return within one or two hundred miles, and the most expert within four, five and perhaps six hundred. The longest flight (900 miles) ever attempted, was that from Rome, in 1868, when 200 long trained and skillful birds competed, all of which had been practiced to the confines of Italy. Only twenty ever returned, and the first, not till more than two weeks had elapsed from the tossing at Rome.

Their velocity of flight is greatly modified by the state of the atmosphere, the force and direction of the wind, condition of the bird, and also by its familiarity with the route.

In the record of about four hundred authenticated flights, when expert and carefully trained birds were flown over well known ground, the average velocity was less than forty miles an hour. The most rapid flight of old, tough, trained Antwerps, in finest racing condition, over routes with which they are perfectly familiar, never has exceeded sixty miles an hour. O. S. HUBBELL.

Philadelphia, Pa.

Zinc Amalgamation for Extracting Gold and Silver.

To the Editor of the Scientific American:

A recent communication in the SCIENTIFIC AMERICAN states that gold and silver can be extracted from pulverized ore, by amalgamation with melted zinc, in a greater degree than with mercury. Permit me to ask if this is a new discovery, or if it is practically used in any place on a large scale? Col

orado cannot be said to have gone so much in the beaten track, in extracting the precious metals from the ore, as the writer suggests. It has suffered much from experimenting on new processes." Still, while we receive new ideas with caution, Colorado is open to improvements, and always ready to adopt them. The communication referred to is highly plausible, and appears worthy of consideration, especially as it comes through the SCIENTIFIC AMERICAN without comment.

Any further information on the subject would perhaps tend to remove an incubus long felt, crushing one of the great interests of our country. If, by passing sulphuretted finely pulverized ore through a volume of melted zinc, the gold and silver will be retained in the zinc, without the ore being previously roasted (which last is at best but an imperfect, expensive, and skill-requiring process), the expense of reduction works would be so much reduced that it might truly be said to be a poor man's process; and, if generally adopted (which it would be, if no objection other than appears in the communication referred to above intervened), Colorado would next year add millions to her shipments of both gold and silver. EDWARD BUTLER.

Gold Run, Colorado.

Psychic Force.

To the Editor of the Scientific American:

The following is my experience in making various experiments with a slip of paper like that mentioned by Mr. Solliday, on page 372 of your last volume:

Whenever the paper is not warped, no person's hands nor the heated air from a stove or lamp will cause it to rotate. Whenever the near approach of any one's hands will make it revolve, an upward current of air from any source will also move it, and in the same direction as when influenced by the hands. Other conditions remaining unchanged, the direction of rotation depends on the direction of the warp and the velocity on the amount of warp. The warmer the hands, whether of the same or of different individuals, the more rapid the motion of the paper. Hands that will not affect it in a warm room will readily cause a rotation in an atmosphere much colder. In encircling it with both hands, it matters not the slightest whether the fingers point in the same or in opposite directions. A warm cylinder (a lamp chimney is a good article) lowered over the slip of paper will cause it to rotate precisely as do warm hands, while a chimney much colder than the surrounding air will reverse the motion. I have repeated all these experiments several times and with entirely harmonious results.

Now, as Mr. Solliday knows that heat is not the cause of this motion, and I know that it is not attributable to the man in the moon, it is perfectly plain that this wonderful (?) movement is produced by the gyrations of the spirit of Demosthenes! How is it possible for any one to think differently? J. E. SMITH.

Easton, Pa.

Mud.

To the Editor of the Scientific American:

Mud is generally thought to be an unmitigated nuisance, without one redeeming quality; but it forms a much safer alighting place for a gentleman and lady thrown from a runaway carriage than either frozen hubs or jagged boulders. Mud when dried is very hard, and in some respects resembles lime mortar.

A year ago, wishing to make my stone pig pen warmer, I collected a quantity of mud from the road; and, with a mason's trowel, applied it to the walls. The mud plaster soon froze, and remained without change till spring. The spring thaws and rains caused the surface of the plastering to scale off; but the mud in the interstices, between the stones and beyond the reach of storms, still remains and the wall is nearly as tight as when it was first plastered. Wishing to experiment still further with road mud, in October last I plastered two sides of my cellar wall with the same material. The mud plaster, on the side covered by a wing, is now entirely dry and very hard. There are a few small surface cracks, but no air appears to circulate through them. That on the side exposed to the drippings from the eaves is still moist but firm; and in rain storms, water trickles through in places, but the mud shows no signs of clearing off. What effect freezing and thawing may have upon it, I cannot tell; but thus far mud has proved itself to be a tolerable substitute for lime mortar, and it has the double advantage of being easily obtained after a rain in any quantity, without money and without price. J. H. P.

A Remedy for Cancer.

To the Editor of the Scientific American:

I wish to speak, through your widely circulated medium, to the many suffering with cancer. In 1863, a cancer came on my left hand; after much suffering, all remedies having failed, I had it burned with caustics. In 1864, it came in my right arm, this being more troublesome than the other. I nearly suffered death again with caustics. Next it came in my right hand. In the spring of 1871, the hand, growing very bad, became helpless, and I carried it in a sling. All remedies and caustics failed; I feared that my hand must be taken off. Hearing of several cancers cured by drinking wild tea and poulticing with the grounds, I used wild tea in earnest. In four weeks my hand was entirely well. For the sake of many suffering with cancer, I give these facts. Wild tea grows in most of the States, and can be had for gathering. This remedy should have a widespread publicity.

Alleghany City, Pa. J. B. WILLIAMS, Health Officer.

Incidents in Engineering.

To the Editor of the Scientific American:

On page 325, current volume, is an article headed "Incidents in Engineering" by F. West, who would like to see it commented on.

I have had a considerable experience with steam, having designed, built, and run several styles of engines and boilers. When experimenting, I have several times evaporated every particle of water out of a boiler without any injurious effects, except perhaps to make the boiler leak a little. In case of F. West's boiler, the flaw where the water leaked out must have been very much weaker than the parts immediately joining it. The pressure it received being a little more than usual, it quietly tore open the weak spot to the sounder portions in the boiler, causing no other damage. Of the boiler explosions throughout the country, one half the verdicts rendered assign the cause to low water. But simply low water will not cause explosion. The following incident will confirm this statement. An engineer of my acquaintance, who runs a propeller engine, was at one time on Lake Michigan in sight of Milwaukee when the pumps stopped working. It being very rough weather, it was considered dangerous to stop the engine. The captain became much excited and thought the boat would be lost. The engineer told the captain that he would run the engine as far as Milwaukee without any additional water, if he would be responsible for the boiler. "Go ahead," says the captain, "I don't care a fig for the boiler, if we can get the boat and crew safe into port." The pumps were shut off, so that, if they got to working, no water could possibly enter the boiler. They arrived safely in port with a boiler one third full of water; the upper flues were red hot and considerably sprung, but the furnace doors were closed tight, all air drafts being stopped with ashes. The fire on the grate was allowed to die out and the boiler gradually cooled off. Strange as it may appear, the flues became straight again, and no perceptible injury to the boiler was afterwards discovered.

Cleveland, O. E. NICHOLSON.

Facing Oil Stones.

To the Editor of the Scientific American:

I have in the course of my life spent a good deal of time in facing off my oil stones. I have used sand on a board, wet and dry, or an old millstone, or a hard brick. If the oil stone was soft, it could be cut or rubbed down in a short time; but if a hard one, it was a serious job. The thought struck me about two years ago that emery would be the thing to quickly cut a hard stone which I have. I dressed off a white pine board, put a thin coat of glue on it, when dry put on and another, sprinkled coarse emery on the glue, rubbed it in well, and when dry put on another coat of glue and emery. I have been using it ever since; it does not take one tenth of the time to face off that stone than it formerly did with sand, etc. This may save somo one some hard rubbing.

Camden, N. J. R. J. MCCREIGHT.

To Smoke or not to Smoke.

To the Editor of the Scientific American:

I wonder if V. B. thinks himself competent to advise people upon the important subject of tobacco using. About as much so, probably, as in relation to drinking; and his competency, in this direction, may be measured as accurately as with a carpenter's rule, by his declaration that "potatoes, cereals, and, in fact, nearly all vegetables, contain alcohol." That is enough for a man who sets himself up as a teacher.

N. D.

Screw Threads.

To the Editor of the Scientific American:

It may be interesting to your readers who are machinists, to note the fact that all simple lead lathes with United States standard lead screws will cut threads to the pitch of one millimeter, by using, upon the lead screw a, wheel of 127 teeth, and upon the spindle, a pinion having 5 times as many teeth as there are threads to the inch in the lead screw.

Where the lead is compound, multiply also by the ratio in which it is compounded; for instance, if the lead screw has 6 threads to the inch, and the lathe makes 3 revolutions to 2 revolutions of the pinion spindle, then $6\times5\times\frac{3}{2}=45$ number of teeth in pinion, the constant number for the wheel teeth being 127.

Binghamton. JOSEPH P. NOYES.

The Evaporative Power of Steam Boilers.

To the Editor of the Scientific American:

May I remind your readers that the boiler test, used by the Committee of Judges on the steam engines and boilers in the American Institute Fair, is substantially the same as the one proposed in your journal, page 313 of Volume XXIV? Your article of Dec. 2, makes no allusion to the fact that the system adopted is nothing but the steam hygrometer of Mr. Leicester Allen, on an enlarged scale; and it is strange that the judges have not given the inventor the credit.

D. B.

New York City.

To Fly or not to Fly.

To the Editor of the Scientific American:

As to your flying machine man, I wonder if he knows that birds support the entire weight of their bodies in the air, by the power of their pectoral muscles acting upon their wings. They fly in the air as men swim in the water, except that men are supported by the water, and their pectoral muscles are only used as propellers. For a man to be able to fly, the first requisite is to be able to support the entire weight of the body by the extended arms. The experiment can easily be tried. Let him make parallel bars, such as are used in the gymnasium, so far apart that, in standing between them, each will come under the elbow, with extended arms. Now take away all other support, and if he can sustain the weight of the body in that position, for an indefinite time, perhaps he may have strength enough to sustain his body on wings;—if not, *not!* N. D.

[For the Scientific American.]

LATENT HEAT OF VAPORS AND GASES.

BY P. H. VANDER WEYDE.

The change, in the physical condition, which a substance undergoes by heat, is much greater when a liquid is converted into a vapor or gas (is evaporated), than when a solid is converted into a liquid, or melted. In the latter case, there is scarcely any change in density or volume, while in the former case this change is enormous; the density is reduced, and the volume accordingly increased, many hundred times. It may, therefore, be expected that the amount of latent heat required to produce this greater change, from a liquid into a gas, will surpass many times that sufficient to produce the lesser change, namely, from the solid into a liquid; and this is indeed always found to be the case.

Ice, when changed by heat into water, does contract slightly, namely, one eleventh part of its bulk; while the water, when changed by heat into steam, expands 1700 times. At the same time, it will absorb as much as 962 units of heat; that means, that when one pound of water, boiling under the common atmospheric pressure—that is, heated to 212°—is, by the addition of more heat, changed into one pound of steam of the same pressure, it will absorb, or make latent, as much heat as would suffice to heat 962 lbs. of water one degree, or 96·2 lbs. water 10 degrees, or 9·62 lbs. water 100 degrees; but we cannot well say 0·962 lbs., 1,000 degrees, as this is practically impossible. There is an absurd statement in some text books on chemistry, which still persist in calling the latent heat of steam 962°, or, in round numbers, approximately 1,000° Fahr., in place of units of heat. As, unfortunately, many text books are only products of compilation by persons neither possessing the latest information nor competent for their labor, this incorrect or rather erroneous expression is kept up, even by many teachers, causing misconception and confusion in the mind of the students.

One of the methods of finding the latent heat of gases, or heat of evaporation, is similar to that, explained on page 405 of the last volume, for finding the latent heat of liquids, or heat of fusion. If, for instance, we take a vessel containing one pound of ice cold water, and place it over a constant source of heat, which, for instance, will raise the temperature of this water 10 degrees every minute, then in 10 minutes we will have $32+(10\times10)$, or 132°; and in 18 minutes, $32+(10\times18)$, or 212°, when the water will commence to boil. Suppose, now, we keep this boiling up till all the water is boiled away, that is, converted into vapor; then we must conclude, as our constant source of heat supplied every minute 10 units, that $\frac{1}{10}$ minute, or 6 seconds, will be a fair approximate measure for one unit of heat; if, then, it takes 1 hour and 36 minutes, or 96 minutes, for the water to boil all away, we must conclude that 10×96, or 960 units of heat, have been consumed in this operation.

A second method of investigating this subject is exactly the reverse of the above method. A certain quantity of water, say 1 lb., or 27 cubic inches, is being converted into 1 lb., or 27 cubic feet of steam: this is, approximately, a correct supposition, as every cubic inch of water produces nearly one cubic foot of steam at 212°. This steam, when escaping from a proper orifice, may be conducted into cold water, and be condensed in the same, giving, during this condensation, its latent heat to the water. Suppose we use 10 lbs. water of 60°, and by blowing into it all the steam produced from one lb. water, and thus condensing the same, taking proper precautions against loss of heat, we shall find that we have 11 lb. of water of 156°; the 10 lb. water has thus, by the condensation of the steam, obtained a rise in temperature of 96°, which is equal to 10×96, or 960 units; this was heat, as it were, hidden in the steam, and only coming out during its condensation.

It is clear that, in this method, it is necessary to take in account the amount of heat absorbed by the metals, or other material of which the apparatus is made; which may be easily done by finding their weight, and applying the knowledge of the specific heat of the same (see page 372, last volume), so as to obtain the necessary corrections.

By means of an apparatus, arranged on the principles just explained, Brix determined the latent heat of water, alcohol, ether, and oil of turpentine; and I did the same of ammonia, carbonic acid, and chymogene or petroleum ether, used by me for the artificial production of ice. I give here a table containing the same, and also the boiling point and specific gravity of these bodies, as well in the liquid as in the gaseous condition.

TABLE OF LATENT HEAT, ETC., OF VAPORS.

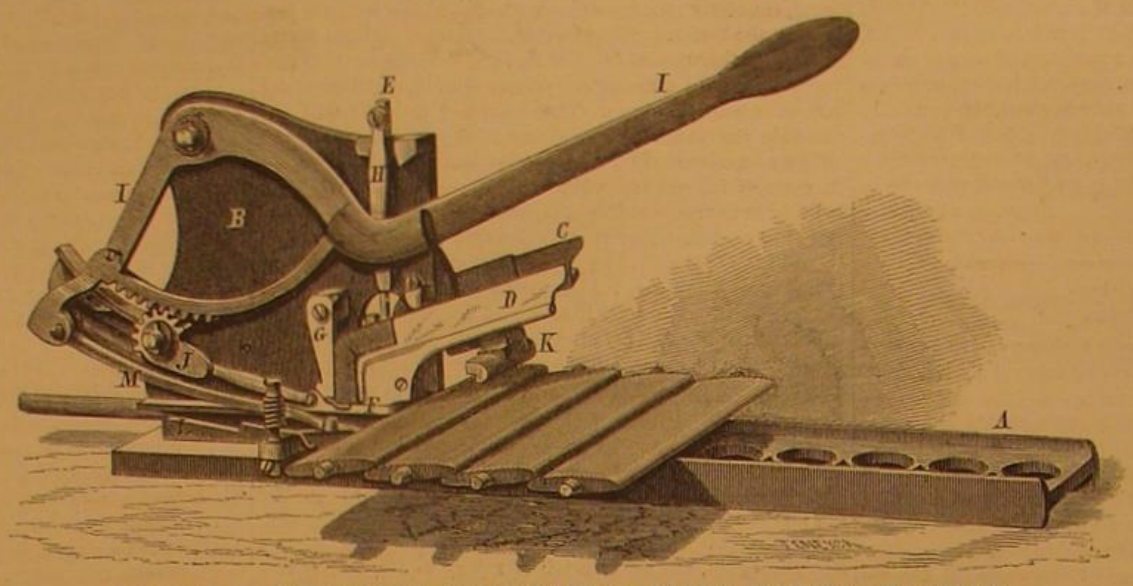
Name.	Units of latent heat of vapor.	Spec. grav. of vapor. (Air=1.)	Spec. grav. of liquid. (Water=1.)	Boiling point of liquid.
Water	962	0·45	1·00	212° Fah.
Alcohol	385	1·25	0.80	176° "
Ether	162	2·26	0·71	95° "
Oil of Turpentine.	133	3·21	0·00	311° "
Bisulphide of Carbon	210	2·60	1·27	112° "
Ammonia	900	0·59	0·76	— 30° "
Carbonic Acid	300	1·53	0·80	—112° "
Chymogene	170	4·00	0·60	+ 28° "

FATHER SECCHI intends experimenting in the Mont Cenis Tunnel, to ascertain if any variations in the magnetic influences and in gravitation occur.

Blind Wiring Machine.

This is an ingenious and valuable improvement in blind wiring machines, whereby the staples are inserted both in the slats and the rod at the same time and in a single operation. The machine thus does the work hitherto requiring two machines for its performance. Its simplicity is a marked feature of the invention, and we have no doubt it will come largely into use by blind manufacturers.

The bed plate, A, sustains a vertical plate, B, which carries the working parts of the apparatus. The staples are carried on the rails or staple holders, C and D. The staple holder, C, is on the back side of the plate, but turns and passes through an aperture to bring its staples successively under the vertical punch, E. The rail, D, delivers its staples, one by one, to the punch, F, the cut-off, G, operated by the punch, F, causing them to descend properly. A similar cut-off, not shown, is operated by the vertical punch, E, which moves in guides on the plate, B, and is actuated by a connecting link, H, pivoted to it and the lever, I. The punch, F, is actuated by a connecting rod pivoted to it and the arm of the armed segment, J, the latter being impelled by the toothed arc on the lever.



NELSON & WHITMAN'S COMBINATION BLIND WIRING MACHINE.

The end of the vertical punch, E, is forked so that it straddles, and causes the staple it impels to straddle the staple inserted in the slat.

Suitable devices control the movement of the slats and the rod, and hold them properly. Some of these devices are not distinctly shown in the engraving, a portion of the machine being hidden from view by the vertical plate, B. One of these is a lever attachment which forces down the clamp, K, to hold the slat while the punch, F, is forcing in its staple.

The rod is hooked to the notched feed bar, L. The feed bar, L, is caused to traverse intermittently by the action of the pawl, M, which engages the notches and is pivoted to the lever, I, suitable devices being employed to cause the feed bar and rod to travel in a right line.

We have thus given the general features of a very compact, strong, and effective machine for the purpose intended, in which everything is practical and easily manipulated and adjusted.

The invention was patented through the Scientific American Patent Agency, Oct. 31, 1871, by James H. Nelson, who may be addressed, for further information, Little Falls, N. Y.

Knife Sharpening Machine.

This machine is admirably adapted to sharpening long straight knives with chisel edges, for whatever purpose such knives may be used. The grinding is done without heating or drawing the temper, and a perfectly true bevel and straight edge secured. The machine requires very little attention, is automatic in its action, and supplies a long felt want.

Fig. 1 is a perspective view, and Fig. 2 a side elevation.

A post, A, rises from a suitable pedestal. From the top of the post extends a bracket which supports the carriage, or slide-ways, B. C is the carriage. The carriage carries the knife plate, D. This plate is pivoted at the ends to supports rising from the carriage. The supports, E, are movable to and from the grinding wheel by adjusting screws, F. The knife is attached to the knife plate, D, by bolts, as shown in Fig. 1. The proper bevel is secured by shifting the knife plate on its pivoted bearings, the lever, G, being used to move and support the plate in position, the lever itself being held, by the thumb nut and set nut, at H. The pulley, I, Fig. 1, on the shaft of the grinding wheel, transmits power through a belt to reversible feed gear, which causes the carriage to traverse from end to end, and carries the knife edge in a straight line as it is applied to the wheel.

The principle of the feed gear is the same as that used on metal planers, pins on the carriage actuating a belt shifter, J, which controls the feed belt and the gearing impelled by it.

The grinding wheel is of emery and may be of any kind in market. The ones used are, however, those made by the Union Stone Company, of Boston. The simplicity of the machine and the accuracy of its performance must, we think, secure for it an extended sale.

Patent pending through the Scientific American Patent Agency. Address, for further information, Union Stone Company, 29 Kilby street, Boston, Mass.

Fig. 1

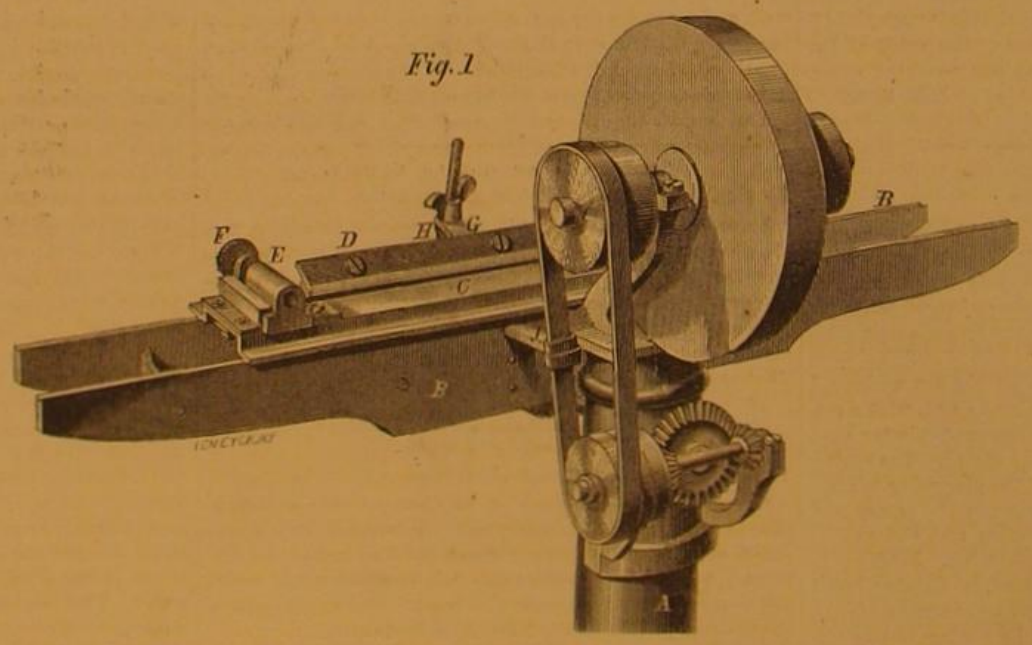
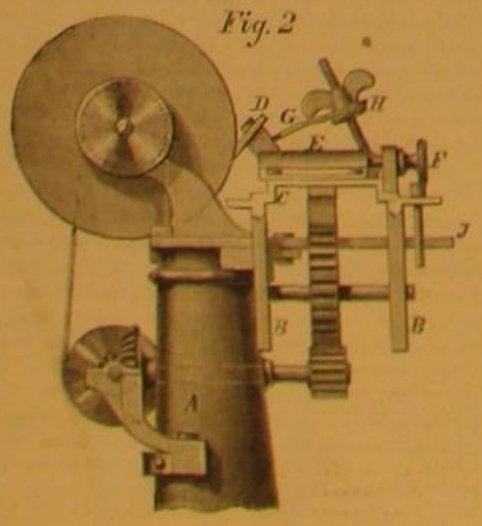


Fig. 2



HILL & PROCTOR'S MACHINE FOR SHARPENING KNIVES OF PLANERS, TOBACCO CUTTERS, PAPER CUTTING MACHINES, Etc.

Life Detector for Coffins.

This invention is an improvement in means for detecting the recurrence of life in persons that have been buried in a state of trance or apparent death; and relates particularly to that class of appliances whose main feature is a tube leading down into the ground. Heretofore such tubes have had signal attachments, in the form of bells or analogous devices, arranged to be operated by a cord extending down into the coffin. In this invention the tube is so shaped or curved at its upper end, and the lid so applied, as to allow it to open by its own gravity when released from engagement with a spring catch placed within the tube. Thus the lid will be instantaneously opened without any exertion or movement, on the part of the person buried, other than the slight one required to operate the delicate catch by aid of a cord or electrical appliances, giving instant admission of air, at the moment of recurrence of symptoms of life, and reducing the physical exertion requisite to effect it to a minimum.

The lid of the tube is not only adapted to open, as it were, automatically, but to constitute or display a signal, so as to give timely warning of the need of assistance. By this invention, it is thought, the timely exhumation of the unfortunate person alluded to will be effected, much misery avoided, and precious lives restored to useful activity. The connecting apparatus, with the lid, may vary in its construction. It may be mechanical or electrical, and in either case admits of numerous modifications. The inventors consider the use of the lid, closed as long as life is not detected but opened as quick as life appears, of great importance. It prevents the escape of noxious gases from actual corpses, and the consequent deterioration of the outer atmosphere, but causes a supply of wholesome fresh air to reach the person entombed when waking to life, and at the same time produces the signal, as stated.

Should the lid remain closed for three or more days after burial the tube is withdrawn and the aperature closed with earth. The invention has been patented by Dr. Theodore A Schroeder and Herman Wuest, of Hoboken, N. J.

Holmes' Electric Indicator for Elevators.

This invention is a combination, of an elevator in hotels and other buildings, with stationary electrical apparatus, to cause the production of visible and audible signals within the elevator by electrical impulses given by the closing of circuits on the several floors. The persons controlling the elevator can thus be informed on which floor the elevator may be wanted.

The invention consists in combining the movable elevator, which contains a suitable indicating instrument, with a flexible or movable series of conductors leading to the several floors, and thence to the operating battery. As the elevator moves up or down, the flexible or movable conductors retain the metallic connection between the parts of the indicator and the stationary conductors that extend from the battery.

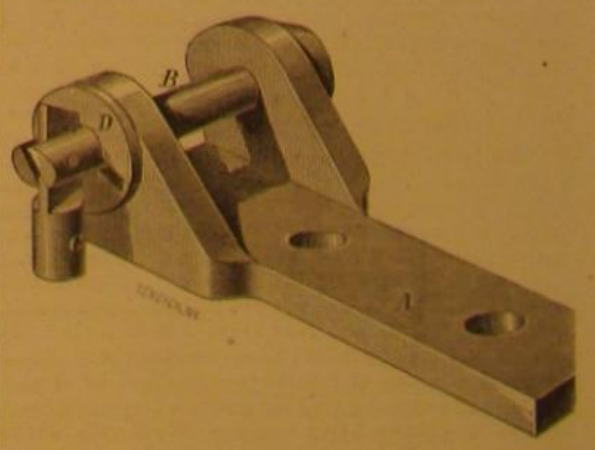
Mr. Edwin Holmes, manufacturer of the celebrated Holmes' Burglar Alarm Telegraph for protecting houses from burglars, office No. 7, Murray street, New York, is the inventor and patentee of this improvement.

BRIDGMAN'S THILL COUPLING.

Our engraving illustrates a very simple method of locking the pins of thill couplings, patented through the Scientific American Patent Agency, September 26, 1871, by Mr. C. Bridgman, of St. Cloud, Minn.

A, in the engraving, represents the coupling iron, through the ears of which passes in the usual manner the coupling pin or bolt, B. Instead of being held by a nut, as in the old style of coupling, the pin is slotted in the end, and to it is fitted and pivoted the piece, C, forming a rule joint as shown, which can be straightened, when the pin is turned, so that the tenon of the piece, C, can enter a slot in the ear of the coupling iron. In ordinary use the weight of the piece, C, prevents its ever assuming the proper position for unlocking which can only be done by intentionally turning the piece till its tenon corresponds with the slot. When this is done, the piece, C, is at once straightened into line with the shaft of the coupling pin, and the whole is then thrust out, thus obviating the use of a wrench, and enabling the coupling or uncoupling to be performed in a mere fraction of the time necessary for the same operation with the old style of coupling.

A slotted washer, D, may be used if desired, between the piece, C, and the ear of the coupling iron. The device is cheap, simple, secure and extremely convenient. It is one of a numerous class of improvements in carriage construction which have been made during the past year, and which demonstrate that, even in the oldest appliances, modern inventive genius finds scope for its labors.



Further information may be obtained by addressing the patentee.

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NEW YORK, JANUARY 1, 1872.

Contents:

(Illustrated articles are marked with an asterisk.)

ARTIFICIAL STONE AND FIREPROOF BUILDINGS.

We have hitherto neglected no opportunity of informing our readers of the modes of manufacture, materials, and uses of the various artificial stones now in use. The Ransome patent, the Victoria stone, the Sorel process, the *Béton-Coignet*, and others, are now all before the world; and have, with more or less success, stood the tests and investigations of practical men and experts. But the two crucial experiments, to which these materials must be subjected before they can be considered to have earned the popularity they claim, are time and fire; and we must wait patiently for the result of the effects of the first of these. Unhappily the test of fire is likely to be soon applied, to one or other of the new materials, in any city where it has been introduced. We have not yet heard of any of these substances being used in Chicago, and cannot therefore find any record of the behavior of artificial stone under the fierce heat which has lately done such appalling destruction to buildings of iron and natural stone, to say nothing of materials without any reputation for permanence and durability. But we read, in our London exchanges, of the burning of a large manufactory in that city; and this conflagration gives us some valuable information on the resisting power of certain concretes to fire, an experience which we believe is new to the American public.

Such of our readers as are acquainted with the vexed question of houses for working men in the large cities in Europe will be familiar with the houses built in London, by Baroness Burdett Coutts, by the trustees under the will of the late Mr. George Peabody, and by a public joint stock company. There are many points of similarity in these buildings, but the particular characteristic which calls for our notice is the courageous and original spirit with which the most recent improvements in construction and material are used. Of the last named owners, the large houses are finished with dressings of artificial stone, made according to a discovery by Mr. Matthew Allen, a London builder. We have had an opportunity of inspecting sills and steps made of this material, and can give testimony as to its durability under great friction and heavy traffic. But it has recently been tried in a fire, and has not been found wanting.

In the construction of the factory before alluded to, which has been destroyed, Mr. Allen's concrete was used for many of the purposes for which natural stone is usually employed, and was, in this building, placed side by side with the best building stones in use in London; an excellent comparison was thus afforded to the builder, the proprietor, and the public. In almost every case, says a contemporary, where the fire reached the natural stone, the latter shivered and split to pieces, or altogether gave way. "In every instance where the artificial stone has been subjected to the ordeal it remains intact, and with its outline as sharp as on the day it was fixed in its place. In the windows of the building, the dressings were of the artificial material, and on them were bedded sills of natural stone. The latter is in fragments, the former unbroken, and in most cases uninjured in the slightest degree. It is, indeed, the only material used in the construction of the building that has stood the fire. Even the brick walls are rent and shattered, and girders and stays, where unprotected, are distorted or fractured." The inventor states that the resistance of his concrete to fire surpassed his own good opinion of it, and he intends to use it much more largely than heretofore. He announces a new method of building which deserves trial in this country. He looks to iron for strength in construction, but proposes to clothe it with this fire resisting stone, to use his own words, "as the bones on which the human body depends for strength are clothed and protected by the flesh and muscles." A brick building in which no lath and plaster partitions were used, with floors and stairs of this artificial stone, and with every girder and stay surrounded with the same material, would be, he says, as nearly as possible absolutely fireproof.

While rival claimants for popular favor are doing their best to introduce their materials to the notice of owners and builders, there is little doubt but that the people most interested will be well informed as to the claims of each compound; but the one which induced the writing of this article is anybody's property, and every builder may make it and try it for himself. The hardness and impenetrability of Mr. Allen's concrete is due to the admixture of "breeze" (coke dust or fine ashes) in its composition, good Portland cement being the chief constituent. One part of the former mixed with five or six of the latter will provide any one with a specimen, and the effect of friction and wear on it can be easily observed. Its cost in London is about one fourth that of cut stone, and from the difference in the value of labor for working the natural product, the saving by the use of Mr. Allen's concrete will be in this country proportionately larger; so that the inducement of a considerable economy will be added to those of accessible material and ease and simplicity of working.

EDUCATION OF THE EAR.

Standing in the weaving room of any of our large cotton mills, a stranger is often surprised to see the attention of an operative at some distance suddenly attracted to the "boss." The deafening rattle of the machinery precludes the possibility of communication by speech. The loudest shout would add so little to the general din as to be wholly inappreciable at a little distance. Some mysterious signal, however, has passed. No gesture has been made, no message has been sent; yet suddenly a lad in some part of the room starts and turns with expectant look for some further sign from his superior. The "boss" is asked for an explanation, and the inquirer learns the following lesson in acoustics.

Only by making a sound radically different from any of the hummings, batterings and clashings which combined make up the confused and scarcely varying din of the room, can the ear be impressed with the sense of a new sound; and if the sound thus made, even if not very loud, does so differ from the prevailing clang, it requires but little effort on the part of the listener to hear it, if he has once heard and recognized it. So when the overseer of a weaving room forces his breath between his teeth with a sharp hiss, this hiss may be heard yards away, distinctly over the din of the machinery, this being a method commonly employed to attract the attention of any one in the room.

Perhaps the reader has at some time visited the Board Room of the New York Stock Exchange at a time when business was lively. He found there a modern Babel. A hundred men shouting at the top of their lungs, each vociferating something different from any other, begets a scene of apparent confusion which, to the uninitiated, seems the last place where any serious business can be transacted. Yet a member of the Board has told us he could go into the room, and, with his eyes shut, could distinguish the bid of any man in it with whose voice he was acquainted. Notwithstanding the apparent difficulty of following with accuracy the multifarious transactions in this room, a record is kept, and very few mistakes occur.

The ear early learns to follow and unravel the intricacies of sound in common speech; no easy matter, as it found by those who attempt to learn a new language.

The sound of machines is often the best guide by which to judge of the accuracy of their performance. An experienced clock maker will tell at once whether the works of a clock are properly leveled by the beat of the pendulum. The carpenter tapping lightly with his hammer upon a plastered wall, determines easily where are the underlying timbers. A practical woodman can tell, by striking a tree with his ax, whether the timber is sound, shaky, or hollow. Huntsmen also become skilled in detecting various sounds by which they trace their game. Old fishermen, seeking to beguile some wily trout by a more tempting bait than the one he has rejected, place their ears upon the side of a decaying log. If a wood grub be present, they soon detect the sound of his teeth as he works his way through the wood. A few blows of a hatchet reveals the success of their auscultation. The rat-tat-tat of the telegraphic instrument speaks as plainly as a human tongue to the experienced telegraph operator. But we forbear to multiply instances in which the ear is educated to other than ordinary uses.

How far this education might be carried, and what useful purposes, at present unknown, might be subserved by it, it is impossible to say. At present, all the systematic education of the ear is confined to perfecting its accuracy in distinguishing musical sounds and intervals. Once in a while there is found an ear with sensibility so refined as to be able to determine and distinguish any isolated sound of the diatonic or chromatic scales. "Blind Tom," the negro pianist, possesses this faculty, and it is said Jenny Lind could do the same thing. Our own opinion is that almost any fine musical ear can be educated to this degree of refinement. There seems no natural reason why absolute pitch of sounds should not be discriminated as well as quality, if the proper training were employed to produce such a result.

In conclusion, we will remark that few are conscious how far the ear aids in the accomplishment of many nice operations, usually regarded as strictly manual. As with the eye, we are so accustomed to its constant employment, that we become unconscious of any effort in its use, or of the true importance of the sense of hearing compared to the other senses.

METEOROLOGY, ITS CAPABILITIES AND ITS FUTURE.

Of all the sciences now engrossing public attention, and lending aid to the benefit of mankind, there is none deserving of more minute study than that of meteorology. It is a late birth into the world of knowledge; it is within the memory of persons now living that its phenomena have been demonstrated to be reducible to a system. And our fathers could not, had they wished, and had they possessed the requisite information, have utilized their discoveries and observations. The comparison of facts and data in different and far apart localities is the means by which the value of the science is chiefly known to the world, and it is by the electric telegraph alone that such statistics can be collected. Indeed, we shall probably find that, of the many invaluable benefits that electric communication has conferred upon us the establishment of the science of meteorology, on a firm and intelligible basis, will be not the least valuable and the least important. The diffusion of such knowledge affects the condition of agriculture all over the world, and so long as our national prosperity consists largely in agricultural wealth, the people of the United States must be considered to be vitally interested in the establishment and success of a proper system of meteorological observation.

While it must be admitted that the results of such investigations as have hitherto been made, have already been of great practical use to the world, the principles of the science can scarcely as yet be considered settled, and the ideas of most persons on the subject are still very vague. In inquiring into the history of this branch of knowledge, we find that the earliest mention of the study is found in the history of the Egyptians, who regarded it as part of astronomy. Aristotle was the first writer to gather the scattered ideas and traditions, preserved to his time only by the hieroglyphics of the more ancient race, into a book; and his friend and disciple Theophrastus did much to promulgate the scanty information then obtained. The writings of the latter dealt only with the popular ideas of the changes of the weather, and made no attempt to account for facts so exceedingly multiform and capricious. And perhaps, even in our day, it is not possible to form a complete concrete and codified set of laws of a science which deals with elements so vast, various, and mobile as air and water, to which qualities the infinity and complexity of the phenomena must mainly be attributed.

Of the almost inconceivable distance of some of the influences which affect the temperature of the atmosphere and seas, and thus create or regulate winds, ocean currents, evaporation, and rain, we may form some idea by reflecting on a few astronomical facts. It is certain that if a line be extended through space in any direction, it will sooner or later come in contact with a stellar body, radiating both light and heat; and thus every point in the universe must be constantly influenced by innumerable heat rays, modifying more or less its temperature. There is no star so remote from us as not to alter the condition of the atmosphere of the world we live on; for the diminution of heat by distance is a question of degree, and the vanishing point of the heat is situated only at the infinity of distance. And although it may seem, to many minds, trifling to talk of the heat communicated to our planet by stars scarcely within the field of vision of the most powerful telescope, it must be remembered that, while the distances of these bodies are almost incalculable and their heat radiation can only be an imaginable quantity, their number is equally inconceivable; and if a lifetime would not suffice to calculate the proportion of heat received by us from the more distant stars, it is equally impossible to ascertain their numbers; and thus the aggregate heat of all space is increased by bodies at once inconceivably numerous and remote. The researches of Pouillet served to show that the normal temperature of the earth's surface, leaving the heat of the sun and the stars and the internal fires of the earth out of the question, is 254 degrees below the freezing point of water. The heat given us by all the stellar influences was found, by the same eminent physicist, to be 94 degrees; leaving, at a temperature of 32 degrees, 160 degrees attributable to the sun and earth itself.

Another complication of the question of heat, which is the prime creator and motor of clouds, rains, winds and currents is the inclination of the actual axis of the earth to the direction of its revolution. By this the two poles are alternately directed towards and away from the sun, thus making summer and winter, and all the changes of season; and it is also by this that the slightly higher average temperature of the northern hemisphere, and the consequent excess of ice in the regions of the south pole, are caused. But it has been calculated, we believe by Sir John Herschel, that the ellipsis of the earth's orbit is gradually changing its situation, and that a period of about five thousand years will suffice to reverse this order; and that then the nations of the southern hemisphere will enjoy the more genial climates, and the arctic circle will be as difficult of access as the antarctic now is. Of radiation by atmospheric influences, and other causes which affect the earth's heat, and, by it, the ever varying appearance of earth and sky, there is no need to speak, enough having been said to show how various and complex are the powers which create the aerial changes, the chronicling, cataloguing and describing of which is the peculiar province of meteorology, a field as yet little trodden by the foot of the investigator. It invites earnest and capable laborers at once to enter into the harvest, for there is at present demanding public attention no science which promises so ample a reward to students, and such valuable results to society as this of the phenomena of earth, sky, and sea, and their effect on the products of the soil, scattered everywhere over our planet by the Infinite Wisdom and Goodness.

THE LAST SIX MONTHS OF CHEMISTRY.

The attentive reader of the SCIENTIFIC AMERICAN has had an opportunity of acquiring a knowledge of the most important chemical discoveries and inventions of the last half year; and, although nothing startling has crossed his path, he cannot fail to have discerned that the same restless activity has obtained in this department of science as in all others. Unquestionably great progress has been made; and the condition of mankind is ameliorated, and the severity of toil softened, as a result of all this exertion. It may be well to recapitulate a few of the most important researches of the last half of the year that has just closed upon us. Take first, for example, the department of photography. The number of improvements in this art have been great and important.

One of the most startling was the proposed deposition of metal, directly upon the thin gelatin film obtained in the Woodburytype, and of using it at once as an electrotype. If this proposition is carried out, it will simply be necessary to take a photograph in the usual way, to print with chromatized gelatin, and to convert the print into an electrotype for immediate use. Improvements have been noticed in developers, in artificial illumination for night work, in dry processes, in the use of cryolite glass as a substitute for porous porcelain, in printing paper, in retouching, in the chemicals employed, and, in fact, in all branches of the photographic art.

The proposition to make chlorine directly from hydrochloric acid in the soda ash manufactories, which was started a year ago, has been thoroughly tested within a few months. The hydrochloric acid is taken at once from the condensing towers, is passed over the floor of a reverberatory furnace, where it is decomposed through the agency of copper salts, which, it is said, can be regenerated, and used any number of times. This process dispenses with the use of manganese, and must greatly reduce the cost of bleaching powders, the economical production of which depends upon cheap chlorine. Parallel with the direct use of hydrochloric acid, has been matured the plan of regenerating the manganese salts of the chlorine process, so as to use them an indefinite number of times; between the two improvements, we are likely to have our paper stock and cotton goods bleached at a much lower rate than formerly.

The economical preparation of oxygen, from the atmosphere by its absorption in water, according to Mallet's invention, is one of the latest chemical contributions; but is even yet so new as to require further experiment before full confidence can be reposed in its economy. In the meantime, the uses of oxygen have been extending, and there is greater need than ever of some cheap method of its manufacture. Nickel plating, we have spoken *of* at length; it has surmounted the state of skepticism and mistrust, and become a truly valuable contribution to the arts. We wish we could say the same of manganese and aluminum, but we are not in possession of accurate information in reference to the electro-deposition of these metals. The employment of manganese and aluminum in alloys has, however, made considerable progress. The artificial production of alizarine, one of the madder colors, which was announced as having been accomplished, was received with considerable doubt; but, during the past six months, several manufacturers have succeeded in making it, and it now appears to be a fixed fact. We are so accustomed to important announcements that we take very little note of them, but it is nevertheless a fact that few inventions, of equal value to that of the artificial production of the magnificent alizarine dye, have been made in many years. In general, synthetical chemistry in the characteristic feature of the present age. Berzelius believed "that chemical forces alone could not effect organic synthesis, and that when such changes occurred, they were due to the agency of vital force." All of this has been overthrown, and such men as Wöhler and Berthelot have made for us urea, alcohol, fatty bodies, and numerous other organic compounds; and the bold man of science has gone far beyond mere matter, even into the realms of thought, and we are told "that chemistry teaches us that thought-force, like muscle-force, comes from the food, and demonstrates that the force evolved by the brain, like that produced by the muscle, comes not from the disintegration of its own tissue, but is the converted energy of burning carbon." From all this it follows that the brain is a machine for the conversion of energy, and we have only to lubricate it well and supply it with fuel to accomplish great things. It is evident that we live on the borders of important discoveries, and it is never safe to laugh at anything, as the ridicule may be turned against ourselves.

Modifications of nitro-glycerin, in the forms of dynamite and dualin, have been given to the engineer and miner; and gun cotton has been rendered more manageable as an explosive. Beet sugar has received large attention in this country, and it now looks as if we might hope to see it become an established industry before many years. Extracting gold and silver by means of zinc, if not a recent application, is still one that the last half year has seen worked out more accurately and economically than ever before. The manufacture of artificial stone has received fresh impetus since the Chicago fire; and more attention is devoted to the study of hydraulic cements. In glass and porcelain, in glycerin and glue, in tanning and dyeing, in artificial heat and cold, in antiseptics and disinfectants, in pharmacy and medicine, whichever way we turn, we find progress everywhere, and constantly something new. The past *has been* rich in execution; the future is still richer in promise.

IN the oxyhydrogen light, the use of cylinders of burnt dolomite, in place of ordinary lime, is recommended as increasing the regularity of the light.

SCIENCE RECORD FOR 1872.

The announcement of this new book is everywhere approved, and the publishers are already in receipt of numerous orders. The notice of its contents, published in another column, gives an outline of its character; but it is only an outline. In value and interest the book will, we think, exceed what is there said of it, and we are confident that every reader will enjoy its possession.

Among the orders received, some, for considerable numbers of copies, are from prominent firms, who intend to make a present of the book to esteemed and deserving employees. We commend this example to others. As a gift for the New Year, it would be difficult to select anything of more useful and permanent value than the SCIENCE RECORD, 350 pages octavo, profusely illustrated with engravings, elegantly printed and bound: in muslin, $1.50; extra binding, half calf, 50 cents additional. Sent to any address, post free, on receipt of price. One copy of the SCIENTIFIC AMERICAN for a year, and one copy of SCIENCE RECORD, $4. Munn & Co., Publishers, 37 Park Row, N. Y.

SCIENTIFIC INTELLIGENCE.

MANUFACTURE AND PROPERTIES OF GLYCERIN.

P. Champion has been experimenting upon the properties of pure nitro-glycerin, and the best methods of its manufacture. As only a few seconds are necessary for the complete action of nitro-sulphuric acid upon glycerin, it is important to have the mixture made as rapidly as possible, in order to cool it down by immersion in cold *water*. This is accomplished by a blast of air, through the vessel in which the reduction is performed, and a contrivance for rapidly emptying the converter into a reservoir of water. On a large scale, the proper proportions to take are as follows: 380 parts of glycerin of 31°, 1,000 parts of fuming nitric acid of 50°, and 2,000 parts of oil of vitriol. The yield will be 760 parts of nitro-glycerin, or 200 per cent.

To free the product of acid, it is necessary to subject it to repeated washing in pure water, and finally to add carbonate of soda. It can be freed of water by chloride of calcium.

The presence of water in nitro-glycerin diminishes its explosive force and prevents the infusorial silica from absorbing a large quantity, in the process of the manufacture of dynamite. Pure nitro-glycerin is an oily, colorless, inodorous liquid, of at first a sweet taste, and a subsequent burning taste; specific gravity, 1·60. It is insoluble in water, miscible in all proportions with ether and methyl alcohol, slightly soluble in cold, but readily in warm alcohol. When pure, it does not undergo spontaneous decomposition; at —15° C., it thickens without solidifying; at —20° C. it crystallizes in a short time. It is dissolved and decomposed by nitric and sulphuric acids, and hence the loss in its manufacture, if the mixture is not rapidly thrown into water. *Aqua regia* also destroys it. The following list exhibits the relations of nitro-glycerin to heat: At 185° C., it boils and evolves yellow vapors; 194° C., slow volatilization; 218° C., lively combustion; 257° C., violent detonation.

At a red heat, nitro-glycerin assumes the spheroidal condition, and vaporizes without detonation. By percussion, it detonates violently, but the electric spark does not explode it.

TEST FOR HUMAN BLOOD.

Dr. Day confirms the discovery of Neumann, that the pattern or network, which human blood exhibits when evaporated on the slide of a microscope, will serve to distinguish it from the blood of any other animal. The blood to be examined is spread on a glass plate, put on the stage of the microscope, and the stain observed until coagulation has taken place. Human blood shows a pattern of small network; the blood of other animals, the calf, pig, etc., requires more time for coagulation and yields a much larger pattern; in fact, every animal appears to furnish a blood of a characteristic and peculiar form. Not only is this the fact, but blood from different functions of the body is peculiar and capable of comparison and distinction. Scientific men have carried this investigation so far that blood stains can be traced to *their* source, and murder often discovered.

GASES FROM THE EXPLOSION OF NITRO-GLYCERIN.

The analysis of nitro-glycerin is accomplished in an eudiometer. A mixture of hydrogen and oxygen is first introduced into the eudiometer; and afterwards, a weighed and a minute quantity of nitro-glycerin. By passing the electric spark through the gas the mixture explodes, and the percussion detonates the nitro-glycerin, and the analysis of the results is conducted in the usual way. The gases produced by the explosion, of a small quantity of nitro-glycerin, were found to be

Carbonic acid	45·72
Binoxide of nitrogen	20·36
Nitrogen	33·92
	100·00

DECOMPOSITION OF WATER BY HEAT.

Grove has shown that when melted platinum is poured into water, the elements are dissociated, and a mixture of hydrogen and oxygen produced, in the same way as by electrolysis. The experiment must be performed with caution, as an explosion may be occasioned by the ignition of the liberated gases. The discovery was recently made, at some steel works in Germany, that a few pounds of melted steel will also decompose water with explosive violence. Five pounds of fused metal were poured into a cast iron trough filled with water, and the fragments of the trough were blown about the foundry, doing considerable damage and seriously injuring some of the workmen. The water was dissociated by the melted steel, and the gases fired by the heat.

TO PRESERVE ANATOMICAL SPECIMENS.—The simplest means of preserving anatomical and pathological preparations is the use of the following solution: Saturated solution of alum, 100 grammes; saltpeter, 2 grammes. The article to be preserved is immersed in the solution, when it becomes decolorized; but in a few days the color returns, when it is taken out of the solution, and kept in a saturated solution of alum and water *only*.—*American Journal of Pharmacy.*

PATENT DECISION.

United States Circuit Court, before Judge Blatchford.—Moritz Mahler *vs.* William Ettinger. Injunction granted against the defendant, William Ettinger, enjoining him from making or selling muffs in infringement of the Letters Patent of Moritz Mahler. In this suit, it appeared in evidence that a combination had been formed to oppose the Mahler patent, and that Ettinger had participated in getting it up, and was Secretary of it. The Court in its remarks severely condemned combinations gotten up to oppose patents.

TO CITY SUBSCRIBERS.

The SCIENTIFIC AMERICAN will hereafter be served to our city subscribers, either at their residences or places of business, at $3·50 a year, through the post office by mail carriers. The newsdealers throughout this city, Brooklyn, Jersey City, and Hoboken keep the SCIENTIFIC AMERICAN on sale, and supply subscribers regularly. Many prefer to receive their papers of dealers in their neighborhood. We recommend persons to patronize the local dealers if they wish the SCIENTIFIC AMERICAN or any other paper or magazine.

TIMELY SUGGESTIONS.

Agents who receive their weekly supply of the SCIENTIFIC AMERICAN through news companies are urged to canvass their localities. By a little effort among intelligent mechanics and manufacturers, they can add largely to their lists. We will send specimen numbers, when desired, for that purpose.

What more valuable present can be made to young mechanics than a year's subscription to the SCIENTIFIC AMERICAN? Employers will be doing their employés a great service by acting on this hint, and we feel sure that at the end of the year they will consider the investment a good one.

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If handsome illustrated posters and prospectuses are wanted to assist in obtaining subscribers, send to the publishers of this paper.

It is the intention of the publishers of the SCIENTIFIC AMERICAN to make the paper this year better and handsomer than any previous year during the last quarter century it has been published.

It is the intention of the publishers to illustrate, by superb engravings, all new and practical inventions and discoveries that may be developed during the year.

For Prospectus and terms to Clubs see last page.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

Lowell, Mass., December 16, 1871.

To O. E. MERRILL & CO.
Beloit, Wis.

Gentlemen,—In answer to yours, as well as many other inquirers, as to when and in what Journal my Report of Turbine Tests will be published, I would state, in reply, that I yet have seven wheels to test, and am waiting for suitable weather to close up for the season. As soon as completed, a full Report will be published in the Journal of the Franklin Institute.

Yours, truly,
JAMES EMERSON.

Notes & Queries.

[We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.]

1.—TEST FOR CALOMEL.—Is there any simple, chemical means for detecting the presence of calomel in a medical compound?—F. D. H.

2.—BÉTON-COIGNET.—What are the ingredients, proportions and exact method of forming the Béton-Coignet stone?—J. H.

3.—GUN SCATTERING SHOT.—I have a shot gun that scatters too much. Can some one inform me how I can make it throw the shot closer together?—H. W.

4.—CEMENT FOR LEATHER AND IRON.—Can any of your correspondents give me a recipe for a cement with which I can fasten strips of leather to a rough cast iron surface?—E. A.

5.—CLEANING PAINT BRUSHES.—Can any one inform me through your columns of some process or method for cleaning or rotting the paint off old brushes, without injuring the bristles?—J. G. M.

6.—BRONZE PAINT.—I am anxious to know a cheap process for bronzing iron; something that can be applied with the brush—I think there is such a process. Any subscriber who knows of above will confer a great favor on me by answering.—J. G. H.

7.—FRICTIONAL ELECTRICITY.—Can this, by the ordinary means, be used for telegraphing? Also, is it as good for producing the electric light as chemical electricity?—E. N.

8.—TINNED IRON.—I wish to know the simplest and most expeditious method of preparing common iron castings, that they may be coated with tin, zinc or other material, in order to protect from rust by contact with water. Also, an outline of the process for tinning or coating as above.—R. B.

9.—COMBINATION OF SHELLAC AND OIL, ETC.—How can I make gum shellac combine or intimately mix with boiled linseed oil and mutton tallow, so that the gum shellac will not separate from the oil and tallow upon cooling?—E. L.

10.—CASTING HOLED PATTERNS.—What is the best method of making a casting which requires to have a hole 10 or 12 inches long in it ⅛ x ⅛ in. cross section, there being no chance of supporting a core except at each end? I have tried turning dies the proper length, and immersing them in coal tar, and also immersing in clay wash, but blows or bubbles are apt to occur, spoiling the casting.—D. W. W.

11.—FLUX FOR BRASS.—Does any one know of any flux which, in melting down brass turnings, borings, etc., will cause the iron contained therein to unite and fall to the bottom in a body, or else prevent it from melting? This flux, if I could obtain it, would be of very great advantage to me.—J. A. S.

12.—CEMENT FOR RUBBER.—Can any one inform me if a cement has been discovered capable of uniting india rubber surfaces in such a way as to prevent their subsequent separation by the contact of a liquid? I have just broken the tip of my rubber fountain pen, and am too remote from New York to get it mended by the maker. Does any one know of a cement for uniting rubber and glass (for a hypodermic syringe) and keeping them so under similar conditions? Will such a one give myself and others the benefit of it in "Answers to Correspondents?"—J. A. B., M. D.

13.—INVENTION WANTED.—I have been trying for the last six months to construct an article, which would be wanted in almost every store, but have tried in vain to find machinery to revolve the said article. I want some one to suggest what movements are most suitable to attach to a vertical shaft (which will be attached to a glass case) the weight of which will vary from 50 to 80 pounds, to work on a pointed pivot, and to revolve for twelve or fifteen hours at the rate of about three revolutions per minute. I have tried clock work and a coffee roaster; neither are powerful enough. A spring is the most suitable way of working it, I think, something like a clock movement on a large scale.—W. T. V.

14.—PLOW HANDLES—HOW TO STEAM AND BEND.—Will some of your many readers inform me how to steam plow handles best to bend them without breaking the wood? I have a kettle which holds about 100 gallons, and I have a steam (wooden) box over it about 10 feet long, and connected to the kettle by a square (wooden) box or tube. Some of my handles bend very well, and some will not bend at all without breaking. Will wood bend best when seasoned, green, or half seasoned? Some one of your many readers will confer a favor by giving me all the necessary information to enable me to bend plow handles successfully.—A. C. S.

15.—CLEANING CASTINGS.—Will some reader of the SCIENTIFIC AMERICAN please tell me how to clean the core sand out of small brass castings? In reaming or boring out, the sand soon wears off the cutting edges of my tools. Also, what will clean brass castings to make them ready for lacquering? And where can I have small malleable iron castings made?—L. V. B.

16.—CUTTING TIMBER.—What is the best time to cut spruce, pine, hemlock, fir, juniper, ash, and birch, for fencing, building, or any other purpose, for which durability is required?—J. S.

17.—OILS IN WINTER.—Is there anything that could be mixed with seal oil or sweet oil, to keep it from getting stiff in winter, without hurting its lubricating quality?—J. S.

18.—CLEANSING OILY LINEN.—What will effectually cleanse linen that has been greased with a mixture of kerosene and sperm oils, the latter having been used on machinery?—V.

19.—ETCHING CHARACTERS ON GLASS.—How can I etch characters on glass lantern globes or similar spherical articles?—F. H.

20.—ROTARY ENGINES.—I wish to learn, through the SCIENTIFIC AMERICAN something in regard to rotary engines. Are there any yet made which have proved really practical and durable machines? If not, what is the practical difficulty found in the way by those who have had experience with them? Is there any really good practical engine of this class yet invented? I, and many of your readers, would like to know of it; and if there is not, I am firmly convinced that our inventive fraternity are fully equal to the task of producing such; and will do so, whenever they see fully its importance, and learn in what particular direction to devote their energies. This can best be learned from plain statements of the individual experience of intelligent engineers who have used them. I have used steam engines frequently for twelve years, and found the subject of rotary engines one of the most difficult upon which to get information. I have a situation now in view where a rotary would suit much the best, if there are any really reliable ones. Please let us have light—not unproved theories, but the results of practical tests.—T. H.

Answers to Correspondents.

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 must be by volume and page.

SOFTENING LEAD.—C. W. L. can prevent his lead from hardening, or soften what has already hardened, by melting a little tallow with it.—T. H. B., of Mass.

PREVENTION OF FERMENTATION.—To F. S. C., query No. 8, November 18: Wine or cider made by thorough air fermentation, and then sweetened to suit by refined sugar, is not subject to after fermentation. R. d'H.

E. F. G., of Mass.—Of the minerals that you send, No. 1 is sulphuret of copper in quartz rock, valuable if abundant; No. 2, quartz crystals of no value; No. 3, iron ore.

BEES IN WINTER.—If J. E. R. leaves his bees where they will be covered with snow all the winter, as he says in his query (No. 6 in the SCIENTIFIC AMERICAN of December 2d), he may expect they will all be smothered. An ordinary colony (say 20,000 bees) will consume about twenty-five pounds of honey during an ordinary winter.—J. M. C., of Ill.

LAND AND SEA BREEZES.—B. R. Jr. (query 16, December 16), is informed that the breezes at morning and evening are caused by the different heat radiating powers of land and water. When the sun has set, the earth cools more rapidly than the sea, and a breeze off shore is the consequence, and the reverse occurs at sunrise.—D. B., of N. Y.

REVOLUTION OF BODIES.—To R. O. H. (query 18, December 16). It is certain that the man goes round the squirrel. As the squirrel is always within a circle a few inches in diameter larger than the tree, and as the man goes round that circle, he goes round the squirrel.—D. B., of N. Y.

C. T. McM., of Florida, says: "Inclosed you will find a stone which my wife picked up in my field. Please tell us what it is." Answer: It is a silicified fragment of a coral, common on the coast of Florida. It belongs to the genus *Astræa*, so named from the star shaped spots, each of which represents an individual polyp.

BATTERY POWER.—In reply to query 10, page 395, Vol. XXV.: If the sounders have helices of No. 23 copper wire, and a gas or water pipe is used for a ground connection at each end of the line, five cups of Daniell's battery will work the sounder through 650 feet of No. 16 copper wire, and give a strength equal to an ordinary local circuit of two cups. With less perfect ground connections or a wire coarser than No. 23 on the sounders, a somewhat large battery would be required.—F. L. P., of N. Y.

J. W. W., of Mo.—The exact way in which water is converted into steam by heat, and whether any portion is instantly converted, are matters of dispute. In ordinary boilers the water must be heated to the proper degree before working steam can be obtained. Steam can be generated very quickly by the projection of water upon heated surfaces, but the surfaces must not be too hot for this purpose, as then the spheroidal state of water is formed. We make a distinction between the vaporization of water which proceeds at low temperatures, and the production of steam as done in boilers. There are various theories upon this subject, which you will find elucidated in "Heat as a Mode of Motion," Tyndall, "A Practical Treatise on Heat," Box, the works of C. Wye Williams, and in the transactions of various learned societies.

LEATHER BELTING.—Some one inquires, in your paper, whether a belt is tightest in dry or wet weather. I answer, in wet weather, always. Ten years' experience in the use of belts satisfies me that they should be thrown off the pulleys every night and allowed to relax, or, as I term it, "to let the belts rest." They will last much longer than if allowed to remain on the pulleys continually day and night. To prevent a belt slipping, there is nothing better than to keep it clean and apply fish oil occasionally.—S. S. F., of Ind.

BACK PRESSURE IN EXHAUST PIPE.—A building is to be heated by exhaust steam from an engine, 22 inch stroke, 16 inch bore, pressure of steam 75 pounds, cut off at 15 inches. The engine exhausts into a large tank, used for heating the water and filling the boiler. The exhaust pipe from engine to heater is four inches. The outlet in tank is to be stopped, and the exhaust steam forced through 300 feet of five inch pipe with nine elbows. Will the 300 feet of five inch pipe cause any back pressure on the piston? If it will, would a small pipe direct from the boiler be more economical?—R. K.

COMPOUND GEARING ON SCREW CUTTING LATHE.—Answer to query 9, page 395. Take any wheel for the spindle (for fine threads, a small one, and a larger for coarse threads), multiply the number of the teeth in it by the number of threads you wish, and divide by four; the result will be the number of teeth in the wheel wanted for the screw. If the result is fractional, or is a number of teeth for which you have no wheel, try the same rule on another wheel for the spindle until you find a combination that will answer. As four threads are to threads wanted, so is spindle wheel to screw wheel.—J. P. N., of N. Y.

P. J. K. writes to ask whether a pictorial representation, of three abandoned ships, which shows the vessels elevated in the air on icebergs is correct, or whether there is an error in the perspective. Answer: The raising of ships on icebergs is by no means an uncommon occurrence in polar latitudes. There is a larger part of the iceberg below the surface of the water than above it; and if a ship be stranded on ice, and drift into a higher temperature, the melting of the upper part of the iceberg will lift the ship, as the ice will rise to preserve its equilibrium in the water. Ice is also subject to upheavals from other causes. Dr. Kane in his narrative gives an account of what he calls one of these "mysterious pulsations which lifted his vessel so high out of the water that she was in imminent danger of capsizing."

HYGROMETER.—T. M. Jr.'s query (No. 19, December 16), is a puzzle. In a frost, the ordinary means of determining the quantity of water in the air are nearly all useless. One method, that may be of some use, is putting chloride of calcium in a tube, and weighing the tube and its contents; then passing air through, and the chloride of calcium will absorb the moisture. To ascertain the quantity, weigh the tube and salt once more. The ingenious hygrometer of Saussure is good for all temperatures, its indications being given by the expansion and contraction of a hair. A piece of catgut is similarly affected by humidity, and T. M. Jr.'s ingenuity would be well exercised by arranging an apparatus to exhibit the increase or diminution of its length.—D. B., of N. Y.

TWIN BOILERS.—In your issue of December 2d, I read an article headed "Curious Freaks of Twin Steam Boilers," by H. P. S., of Kansas City, Mo. For the information of H. P. S. and others who may think such actions in boilers curious, I will give them my idea. I have experienced the same trouble with boilers similarly connected, and, upon due reflection, came to the following conclusion: That it is a matter of impossibility to keep two fires burning in such a manner that the same quantity of heat will be produced by each at all times. Taking this for granted, more steam will be generated in one boiler than the other. The pressure increases gradually a few pounds per square inch, and the water is gradually forced backwards through the pipe or pipes into the other boiler. As the pressure of the one decreases by receiving not only all of the feed water, but also the water from the other; the motion increases with the pressure of the other. It is my opinion that if the boilers were connected by a four inch pipe, the action would be the same.—P. O. S., of Ga.

Declined.

Communications upon the following subjects have been received and examined by the Editor, but their publication is respectfully declined:

BOILER EXPLOSIONS.—J. H. G.—J. M.—W. E. L.
BRICKS.—J. M. McC.
CAR STOVES.—L. V. B.
CURIOUS FREAK OF STEAM BOILERS.—E. F. C. D.—J. & J. T.—S. T. P.—T. J.—W. G.—W. H.
EXTINGUISHING FIRES.—H. A. H.
FIREPROOF SAFES.—T. W.
IMPROVEMENTS IN THE STEAM ENGINE.—H. L. B.
PSYCHIC FORCE.—A. H. C.—G. L. B.—G. L. Du L.—G. S.—G.T.—H.—H. H. B.—H. W. H.—T. C.—T. J. L.—W. E. A.—W. H. D.—W. T. B.
RECOVERY OF DROWNED BODIES.—J. W. C.
SOLAR INFLUENCE.—J. M. McC.
TEMPERATURE AT THE NORTH POLE.—J. B. P.
WATERWHEELS.—O. J.
ANSWERS TO CORRESPONDENTS.—E. A. S.—E. M. A.—G. L. B. J. C. K. L.—J. M. B.—N.—R.—R. J. McC.—R. L. K—T. H. C.—S. J. W.—T. W. S.—W. H. V.—W. L.—W. M. H.
QUERIES.—C. S. S.—G. S. A.—H. A. S.—H. W. A.—J. F. L. J. J. C.—J. T.—N.—R. & B.—R. C.

Recent American and Foreign Patents.

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

PRINTING TELEGRAPH.—Richard Herring, of Canonbury, Eng.—This invention relates to that class of telegraphic printing apparatus in which the signals are effected by printing or marking dots and dashes or short strokes on a band or strip of paper as it travels through the apparatus. The object of the improvements is to increase the rapidity of transmission of the printed signals, and to simplify and facilitate the manipulation, and to render the signals easier to read and less liable to error. To this end, instead of making the dots and signals run in a line, the dashes or strokes are arranged in a vertical position. By this means the signal can be read with great facility. It takes up less space, and, it is claimed, can be transmitted with greater rapidity than the old style of signal. To effect this object a style or instrument of peculiar construction is employed. As it is composed of separate parts or styles, it may be termed a compound style. One of these parts is made in the form of a blunt, round point, so as to make or print a dot. The other part of the style is made with a long narrow edge, so as to form or print a dash or stroke; or, by means of any combination or construction of the style or styles, any other signs which may be deemed preferable to adopt may be used. In any case, the two parts are operated by separate currents of electricity or by distinct magnets.

CHAIR SEAT FRAME.—Henry Buchter, of Louisville, Ky.—The corner pieces are made of wood or metal, applied to the front corners. They are provided with holes to receive, respectively, the ends of the rounds and the screw by which they are fastened to the posts or legs of the chair frame. By this construction the seat frame may be much more readily and conveniently detached from and attached to the chair frame, and in this modification the invention consists.

EXCAVATING CART.—Jesse King, of Oswego, N. Y.—This invention has for its object to furnish an improved cart for moving earth, designed especially for use in grading roads and grounds, and which is so constructed as to load itself, and which may be conveniently unloaded either at once or gradually, as may be desired. A horizontal paddle wheel is arranged within the upper part of the earth box, and combined with a rotary bucket carrier, discharging the soil over one side of the box by an arrangement of chain and pulleys.

ROAD DRESSER.—Samuel D. Reynolds, of Rochelle, Ill.—This is an improved machine for dressing roads, filling the cuts made by the wagon wheels, and rolling down the dirt, so constructed as to hold itself to its work even upon inclined or sideling roads. It consists in the construction and combination of inclined timbers and plates attached and operated together, and in a scraper platform having a keeper combined with the roller platform frame hinged to the middle thereof, to enable the roller to be adjusted at different angles; also in a combination of the roller and scraper frames, when the former projects over and is attached near the middle of the latter, to enable the driver to bring his weight to bear upon the scraper.

WATER WHEEL.—De Witt C. Teller, of Fort Plains, N. Y.—This invention has for its object to furnish an improved turbine water wheel, simple in construction, easily adjusted, and effective in operation, utilizing a very large per cent of the power of the water; and it consists in the construction and combination of various parts, the nature of which preclude detailed description in this notice, but which seem well adapted to form an effective and compact wheel.

SHINGLE MACHINE.—Elisha Hughes, of Gowie, Canada, assignor to G. Miller Aylesworth, of the same place. A large circular saw is mounted on any suitable frame. A carriage on said frame is adapted to receive the block to be quartered near the center, and carry it up to and away from the saw, the said block setting endwise and being cut to the center by the saw each time it is moved up. A horizontally revolving turntable is mounted on the top of a vertical shaft, which is stepped in the end of the short arm of a lever, and supported in bearings of the frame, so that it can rise and fall, being lifted by the said lever, and falling back by its gravity. The carriage is provided with a large hole in its center—that is, directly over the turntable when it stops at the end of the movement away from the saw—and the block to be sawed is placed over said hole, so that, after each cut and the return of the carriage, the attendant can raise the block on the turn table by forcing the outer end of the lever down by his foot, and then turn the block readily by hand to adjust it for the next cut, after which it is let down on the carriage and moved up to the saw. A forked lever is pivoted to standards on the side of the carriage next to the saw, and provided with dogs or pins for entering the block to hold it, by the pressing of the free end of the lever down, which the attendant does as he pushes the carriage to the saw. These points or dogs are so arranged on the lever that in cutting to the center of the block they pass slightly beyond the cutting edge of the saw, enabling them to engage and hold the last two bolts of a block.

ANIMAL TRAP.—Milton D. Brown, of Newburg, Tenn.—This is one of that class of traps where the animal is dropped into a chamber below by treading on a pivoted door or board. The invention consists in the peculiar arrangement of the bait hook and catch with respect to the pivoted treadle board, and in the construction and combination of the various parts of the trap, which is designed to be placed over and secured to a box of suitable size, the bottom and three sides of which may be made of wood lined with tin, and the other or fourth side should be made of wire, cloth, or other suitable grating. In using the trap a quantity of bait is scattered about in the cage and also attached to a hook. The animal in seeking to reach the bait enters the trap, which seems to be clear and open. He enters without fear, and a slight pull upon the bait disengages a lever catch from the forward end of the fall, which is lifted by the animal's weight, precipitating the animal into the cage. As the animal drops from the fall, the latter is raised to its former position by the recoil of a spring, again setting the trap.

UPRIGHT PIANO.—Charles F. Chickering, of New York city.—This invention has for its object so to improve the construction of upright pianoforte action frames that more room is obtained for the hammers without varying the arrangement of strings or size or shape of instrument. This object is attained by arranging the hammers in a curved line and making the rails in the action frame arched to correspond.

LOOM PICKING MECHANISM.—Elijah D. Gove, of Holyoke, Mass.—This invention consists in an arrangement of the outer ends of the rocker and rocker bed for the application of a block for holding the rocker on the bed in such manner that a rolling contact of the moving parts is obtained when the staff is operated, which saves considerable friction and avoids the necessity of using oil, which is very desirable to prevent the collections of dust and dirt, said arrangement requiring no "finishing" and being cheaper than other arrangements now in use. A part of the arrangement constitutes a weight for throwing the picker staff back.

BUCKLE.—John Buche, of Apple River, Ill.—This is an improvement in breech buckles. A body and ring together constitute the breeching buckle. A tongue is hinged to the side of the buckle and has a pin in the center. The pin passes through a hole in the strap, which passes over the hinged tongue and under each end of buckle. By slipping the strap back the tongue is released, and the strap may be lengthened, shortened, or withdrawn. The side straps are permanently attached to the ring.

WHIFFLETREE CLIP.—William J. McMaster, of Dixmont, Pa.—This invention furnishes an improved whiffletree clip which is claimed to be stronger, better, and less liable to come off the whiffletree than clips made in the ordinary manner. It consists in a clip constructed with a rib upon its outside, a groove upon its inside, and a wing or flange upon one or both of its side edges. When the clip is used for the end of a whiffletree, only one wing or flange need be used; but when the clip is used for the middle part of the whiffletree, a wing or flange should be used upon each side of the body.

LIGHTNING ROD.—Stephen H. Miner, Winona, Minn.—This invention relates to a lightning rod constructed of two sheet metal plates of any suitable material, one of said plates having a longitudinal rib struck along its center line, which plate is placed side by side with the other flat plate, the two together forming a rod with a hollow central triangular chamber, and being connected by bending the edges of the ribbed plate around those of the flat one in the shape of beads.

WASH BOILER.—Maria C. Hubbard, of Troy, N. Y.—The boiler, of the common oval or other form and of any size, has a frame or hoop, made adjustable so as to fit boilers of different sizes, which is suspended in the boiler by means of hooks or supported in the boiler near the top in any other manner. It may be supported on a bead or projections in the boiler; but, to adapt it to boilers already made or in use, hooks are preferred. On the top of this frame, or near the top of the boiler, are placed one or more longitudinal rods and one or more transverse rods, as may be found necessary. The cover of the boiler is made to fit as nearly steam tight as convenient. A small quantity of water is placed in the boiler, and the clothes to be washed are soaped, hung upon the rods, and not allowed to touch the water. The cover is placed on the boiler and the water is made to boil. The clothes will be exposed to the steam only. There will be a slight pressure of steam within the boiler owing to weight and friction. The water, which condenses on the clothes, will drip down by its own gravity. The action of the steam upon the clothes is claimed to very speedily remove the dirt and thoroughly cleanse the clothes, no rubbing being necessary. The time required for cleansing the clothes is also claimed to be much less than when the clothes are immersed and boiled in the usual way, while the steaming thoroughly cleanses them. This result is accounted for by the fact that the clothes are not packed tightly together as in boiling, but hang loosely in the boiler in a temperature somewhat higher than 212°.

PIPE WRENCH.—Henry A. Hyle, of Shamburg, Pa.—This invention relates to that class of pipe wrenches which has one pivoted jaw held on the pipe by spring pressure, and which will bite very well upon pipes slightly varying in circumference, but not on different classes of pipes; and it consists in making the pivoted jaw adjustable so as to gripe a large or small class of pipes, and also in adjusting the throw of the spring impelled jaw so that it cannot bite with so much force as to crush the pipe.

CAKE STIRRER.—Sarah M. Clark, of Beaver Dam, Wis.—A sheet metal vessel or cup holds the dough and other matters to be compounded. It is provided with metal brackets or ears, clamping plate, and screw for attachment to the edge of a table, shelf, or other suitable support. A pinion, mounted on the top of a vertical shaft and gearing with a driving wheel which has a handle or hand crank for turning, gives motion to the stirrer shaft, on which, within the vessel, are arranged concavo-convex arms, on the outer ends of which are mounted vertical blades or plates, also shaped in concavo-convex form. Both the arms and the plates have large holes through them, through which and the spaces between the arms and plates the substance to be stirred or beaten is caused to pass, as the said arms and plates are rapidly rotated against it, thereby beating, mixing, and preparing it as is required.

GOVERNOR FOR STEAM ENGINES.—Aaron A. Kline, of Readington, N. J.—The character of this invention is a modification of the long used ball governor, calculated to cheapen it and render its action more delicate. Without an engraving it is impossible to convey a good idea of its peculiarities in construction.

BINDER FOR SEWING MACHINE.—Bernard Goldsmith, of Newark, N. J., assignor to Jenny Goldsmith, of the same place.—This is a simple and seemingly a neat and effective device for the purpose above set forth. It consists of a nearly circular plate, with two tongues, proceeding tangentially therefrom, and provided with diagonal slots, the plate and tongues being subsequently bent into a peculiar form, to constitute a double hemming binder, to be secured to the bed of the machine by a suitable set screw.

COTTON AND HAY PRESS.—John Day Nix, of Noble, Illinois.—This press accumulates pressure through the agency of a system of pulleys and rope, actuating a toggle joint movement. A combination of catch bars and cross bars, with friction rollers, and also a combination of catch bars, cross bars and catches, constitute the principal features of the invention.

FANNING MILL.—Daniel Collins, of Zanesfield, Ohio.—This consists of a quite novel arrangement of various devices for the separation of chaff and other foreign substances from grain, forming a more compact machine than others in use for the same purpose, and possessing, we judge, advantages over those heretofore employed.

CORN PLANTER.—Jeremiah Matthews, of Lincoln, Illinois.—This invention consists of a frame provided with a bar pivoted to the axle of a corn planter having a friction roll at each end, by which levers are actuated, to give the desired control over the movements of various other parts which constitute a seed planter, the whole forming a simple and compact machine.

REVERSIBLE FLOCK CUTTING MACHINE.—James Pitts, of Millville, Mass., Robert Aldrich, of Slatersville, R. I., and Edwin T. Marble, of Worcester, Mass.—This invention is an improvement in machines for cutting flock; and consists in means for making the cylinder reversible and the blade self sharpening; in the arrangement for feeding in the stock and vibrating the cylinder; and in the mode of holding and adjusting the blades of the bed. By means of the driving belt or belts on the pulleys of the cylinder shaft, the motion of the cylinder is reversed or made to revolve in either direction at will. When a flock cutting cylinder is revolved continually in one direction, the natural consequence is that each of the blades is dulled at one angle or cutting edge and sharpened at the other. The only remedy in such a case is to grind or sharpen the blades, which, of course, consumes much time and involves considerable expense and trouble. By means of this reversible feeding device and arrangement of the discharge orifices, the inventors render their machine self sharpening. Reversing the motion of the cylinder at will, carries the flock in either direction and discharges it at either end of the machine. As the blades of the cylinder wear away, spring plates are adjusted to allow more or less of the blades to be exposed, either to compensate for the wear or govern their action upon the stock. As the blades of the bed wear, they are adjusted from time to time either separately or collectively, as may be desired; but the reversal of the motion of the cylinder renders all the blades in both cylinder and bed self sharpening. The central portion of the blades is iron, covered on each side with a plate of steel, so that the central portion will readily wear away and leave a steel cutting edge on each side.

REVOLVING URN AND SPICE STAND.—William John Evans, New York city.—This is an improved urn stand and urn for use in bar rooms, saloons, private houses, etc., for holding the hot water, spices, sugar, glasses, etc., required for use in mixing and preparing drinks, so as to have the various articles needed conveniently accessible at all times, and which shall be so constructed as to heat the water, keep it hot, and dry the glasses, and at the same time keep the spice stand cool.

HAY AND COTTON PRESS.—John J. Sivley, of Clarksville, Texas.—A strong vertical frame of four posts and suitable cross pieces or ties has a case into which the cotton or other substance is pressed in the top. The follower has a long wood stem, extending into a pit below the base of the frame, passing between guides suitably arranged for maintaining it in a vertical position while allowing it to work up and down. This stem is connected at the lower end to ropes which rise up to and wind over drums having the counter weights suspended on cords working over reduced portions of the drums. These weights are intended to counterbalance the follower, and are suspended from the small part of the drum, so that the follower may be raised sufficiently high while they move to the bottom of the pit. The stem is provided with toothed rack bars, one on each side of two opposite sides, and a lever is provided for each, the levers being suspended in yokes, which admit of their being moved toward and from the bars for the point to pass the teeth of said bars when moving from one to another in operation. A holding pawl is pivoted on any firm base, one in front of each toothed rack, to fall into the notches and hold the follower up when the levers let go for a new hold. Each pawl is connected to its lever by a chain or cord, of suitable length to draw it out of the notches when the lever is pulled back to let the follower down. Of course, the machine may be worked by one lever and rack bar only; but it is preferred to employ two.

MACHINE FOR BLACKING BOOTS AND SHOES.—Nathan Eisenmann, of New York city.—This invention has for its object to furnish an improved apparatus for polishing or blacking boots and shoes, which is simple in construction and effective in operation, whereby the boots may be quickly and thoroughly polished, by means of three brushes, so formed as to fit upon and cover the entire surface of the boot or shoe. The apparatus is operated by a crank. To the outer end of the crank is swiveled a socket, to receive a handle, to enable the apparatus to be conveniently operated by any one desiring to blacken his own boots and shoes. To the upper side of the lid or cover of the box is attached a short pedestal or standard, to rest the foot upon when applying the blacking to the boots or shoes.

APPARATUS FOR FREDING WHITE LEAD, ETC., FROM THE MIXING TUB TO THE MILLSTONES.—James B. Pollock, of Port Richmond, N. Y.—This invention consists of a feeder or conveyor for oily and pasty substances, of which the essential features are a longitudinally grooved cylinder, inclosed in a cylindrical case, and a scraper, arranged in such manner that the paste is forced from the mixer or a hopper into the groove of the cylinder at one side of the case, and carried thereby to the other side, where it is taken out by the scraper, which is caused to drop into the groove, and discharged upon any receiver, preferably a revolving disk, from which it may be discharged by a fixed scraper to any other receiver or conveyor. The case serves as a cut off to remove any excess of the paste, and cause the feed to be regular and even, being the exact quantity the grooves are capable of taking; but the quantity discharged may be varied by varying the speed of the cylinder, or by limiting the dip of the discharging scraper into the groove, so that it will not take out the whole quantity contained in them.

LET OFF MECHANISM FOR LOOM.—Charles Schilling, Auburn, N. Y.—This invention relates to improvements in "let off" apparatus for looms. It consists in a novel arrangement of devices for automatically shifting the weights on the levers of the friction straps as the size of the roll of yarn decreases. Levers, with weights thereon, and friction straps, are caused to act on friction disks of the warp beam. A cord connected to these weights passes over pulleys, one at each side of the loom frame, and thence around a grooved pulley, supported on the loom frame in any suitable way. This cord is crossed between the weights and the pulleys, so that when the cord is moved in one direction by the wheel, the weights will be moved from each other and toward the pivots of the levers, and, when moved the other way they will be moved toward each other.

STUD FASTENER.—Adolph Hartmann, New York city.—This is a new means for fastening studs, sleeve buttons, etc., so that they can be readily applied and removed, and still be properly held in the fabrics. To a stud of suitable style and size are pivoted two levers, which are connected with coiled or other springs, whereby they are spread apart to engage the fabric. The levers can be swung nearly at right angles to the stud, to apply or withdraw the same. The levers are preferably so bent that their ends will meet when they are swung up, and thus facilitate their passage through the button holes.

BELT FASTENER.—Marcellus Olmstead, Alum Creek, Texas.—Two frames are used, each consisting of side bars and cross bars. The two side bars of each are fastened together by a hinge joint. The belt, which corresponds in width to the cross bars, is passed alternately over and under the bars whenever it is discovered to have become slack, while the joint allows the fastener to conform to the direction of the belt. The reader will find an advertisement of this invention in another column.

HOISTING MACHINE.—Samuel L. Lord, of New York city.—The object of this invention is to furnish a convenient portable machine for raising weights—one which shall give a slow motion for raising heavy weights, and a quick motion for raising light weights, or unwinding the rope or chain. This hoisting machine is designed for hoisting stone and other materials, in the erection of buildings, and may be moved from place to place for hoisting weights in all situations. The motion is made slow with greatly increased power, or fast with diminished power, by turning the same crank in opposite directions. The machine is thus adapted to raising heavy or light weights, and for the various purposes for which hoisting machines are required.

FEEDWATER REGULATOR.—Nicholas Nolan, of New York city.—This invention relates to feedwater regulators for steam boilers, and consists in a vertical waterchamber, valve seated, and held fixedly within the water of the boiler, and connected with a valved rod passing therethrough, and also having a float at the upper end thereof, adjusted to the water line of the boiler, for the purpose of automatically feeding water to the boiler.

WRENCH.—Luke Chapman, of Collinsville, Conn.—This invention relates to an improvement in monkey wrenches of that kind in which the upper head or jaw, its shank, and the supporting step of the adjusting screw are all made in one piece, as has been described in the specification which accompanies the Letters Patent of the United States numbered 100,978, granted to the same inventor on the 22d of March, 1870. The present invention consists more particularly in a new mode of manufacturing the wrench by welding the step on the shank after the movable jaw has been applied to the latter; and also in a new manner of sustaining and holding the lower end of the adjusting screw, and supporting the pin on which said screw turns.

WASHING MACHINE.—James Abbot, of Fitchburg, Mass.—A perforated dasher is made of upright and horizontal rods, and is claimed to be very effective, without being the least injurious to the clothes. Being balanced, it can be operated with ease. As the suds will be automatically liberated of sediments, the machine will require less water on a given quantity of clothes, and consequently, it is claimed, less soap than any other machine. The combination of a suds' box having inclined sides and a concave perforated bottom with a longitudinal trough, having a faucet, and the dasher made of longitudinal rods attached between perforated bars, with a balance handle, constitute the invention.

HEMMER FOR SEWING MACHINE.—David Forrest, Eastport, Me., assignor to himself and A. H. Bibber, of the same place.—This is a simple attachment, consisting in a plate of peculiar form, jointed, and having an arm with a stud thereon, combined gage plates, scroll, and a detachable block. Also in a combination with the hemmer scroll of detachable blocks or tongues whereby, it is claimed, a more perfect operation in hemming is secured.

PADDLE WHEEL.—William Thomson, of Madison, Wis.—This wheel is cast or made like a hollow drum, with sections or compartments therein, which may be filled with water when the vessel is light or without freight, so that the water may act as ballast. The propelling buckets consist of a series of notches in the face or periphery of the wheel, the sides of which are at an angle of about forty-five degrees with each other. A channel extends forward from a point beneath the center of the wheel, through which water passes to the wheel. This channel is cut in the filling beneath the guards and forward of the wheel, the filling being flush with the side of the wheel, and circled out in front of the wheel. When the motion of the wheel is reversed, the water carried up by the wheel is discharged through an opening which is provided with a flap valve which closes on the outside. The wheels may be used either with or without the channel.

FIRE SHIELD.—Henry Rieger, of Beaufort, N. C.—This invention is intended to provide convenient and efficient means for preventing the spread of fires in cities and villages; and it consists in a portable adjustable shield screen, formed of fireproof plates or sheets mounted on wheels, so that the same can be transported from place to place and be applied with expedition. A light frame or platform is supported on axles of wheels, but raised above and projecting over the wheels. Two pairs of stanchions, attached at the bottom to the platform and connected at their top ends, have a pulley hanging from the center of each pair. There is an upright rod at each corner, or one for each stanchion, rigidly connected to the platform, and extending up about half way, more or less, to the top of the stanchion. The upper ends of these rods are curved and forked, and each contains a pulley. There is a brace for each of the rods on which horizontal pulley shafts are supported. A horizontal pulley shaft at each corner of the platform is supported by stands. Another horizontal pulley shaft at each corner of the platform is also used. All these shafts are provided with cranks, by means of which they are revolved, and with ratchet wheels and pawls, by which back movement is prevented. Sheets or plates of metal or other incombustible material are suspended from the stanchions and from the rods by means of chains, and are raised and lowered by means of the crank pulley shafts. The plates are so arranged that they work independently of each other, and they may be adjusted in a mass or so as to present two or more thicknesses to the heat or flame of a burning building. The sheets or plates may be of any required thickness and size, and any required number of them may be used. By interposing this shield between buildings, one of which is on fire, it is claimed the fire may be confined to narrow limits and much property saved.

REFRIGERATOR.—John P. Oeth, of Canton, Mo.—This invention consists in a combination of a suspended ice and water receptacle with a perforated cylinder for detaining the impurities from the ice. The case of the refrigerator is made of wood and lined with non-heat-conducting material in suitable manner. From the top of the box in the middle is suspended a sheet metal vessel, open on top and provided with a cover. Ice is placed in the vessel upon a grate therein contained, and serves to cool the entire interior of the case, the vessel being so placed that air can freely circulate around it. Water can also be poured into the vessel to be cooled and drawn off through a faucet, which is applied to the lower part. The faucet connects at its inner end with a perforated cylinder, as shown, said cylinder detaining impure matter that may have adhered to the ice and prevented it from flowing out through the faucet. A sliding drawer is arranged in the lower part of the case. It can be drawn out to catch drippings from the faucet. The front of the case is provided with doors, which, when opened, will disclose an arrangement of shelves within at both sides of the vessel.

LUBRICATOR.—William T. Garratt, of San Francisco, Cal.—This invention consists in the application to the oil chamber of a steam heating coil for conveying steam through it to keep it fluid in cold weather; also, to make it available for using suet and the like substances, which will be rendered by the heat.

CONDENSED STEAM EXHAUST FOR STEAM ENGINE.—William H. Wheatland, of Newark, N. J.—This invention consists in the application to the cylinder heads of an exhaust tube or nozzle, and a valve with a spring behind it to open when the steam pressure is relieved, and let the water of condensation escape at each stroke of the piston, the said valve being closed by the steam pressure when the latter is on.

TICKET HOLDER.—William James Campbell, of St. Louis, Mo.—This invention relates generally to ticket holders, and particularly to that class in which the ticket is ejected from a box by a frictional slide. The slide is moved back in a slot by pulling down upon a handle, when springs yield and allow it to pass the tickets without contact. A cover is then closed down, and the slide pressed forward. The ticket is thus ejected with great facility.

UNWINDER FOR BOOKED TOBACCO.—George Storm, of New York city, assignor to Stralton & Storm, of same place.—This invention relates to a new machine or attachment for unwinding booked tobacco; and has for its object, during the process of unwinding, to moisten the booking apron so that the subsequent booking process can be carried on to greater advantage. The booking of tobacco is done by placing the leaves between the coils or layers of an apron, which is rolled around a drum; thereby the leaves are properly flattened out, the more so if the apron is moist. After having been booked, the tobacco is removed by unwinding the apron from the drum, either on a separate unwinding machine, or directly on the booking machine, a second drum being used for receiving the apron. The combination of the apron, drums, and friction rolls for unwinding booked tobacco with a dampening roll, constitute the claim allowed in the patent.

CHIMNEY TOP.—Thomas Ketchen, of New York city.—The object of this invention is to provide a remedy for smoky chimneys. This chimney top consists of an upper section, covered by a cap and a lower section, which rests upon the top of the chimney, or is confined thereto in any substantial manner. This lower portion corresponds in shape and size with the chimney, and may be divided by vertical partitions arranged to correspond with the separate flues in the chimney. From the four corners of this lower section, wings project, which overhang the lower section. Shutters are hinged to the cap, so as to close down on the wings at each of the four sides, thus making two pairs of shutters. Each two shutters, which stand opposite each other, form one pair, and are connected together by a rod, the rod being of such a length that when one shutter is closed, the other shutter will be pushed open. There is an opening beneath each shutter, through which the current of air will pass when the shutter is closed. By means of these openings the draft of a chimney is greatly increased when the wind is blowing against the closed shutter. When the wind strikes quartering, two of the shutters will be closed and two opened. The current of wind, through the openings and upper sections of the top, carries the smoke with it as it escapes from the other side. After making many efforts to discover a sure cure for smoky chimneys, the inventor finds the above described arrangement to answer the purpose perfectly.

SOUNDING BOARD FOR PIANO.—Edward L. Taylor, of Jersey City Hights, N. J.—This invention has for its object to furnish an improved sounding board for pianos, so constructed and arranged as to increase the tone of the piano. There are three boards, similar in form, the upper and lower ones of which are of equal size, the middle one being made narrower. The ends of the three boards are separated by narrow strips of wood, to which the ends are secured. The side edges of the platform are incased with boards, attached to the edges of the bottom and top boards. The forward edge of the platform is recessed sufficiently to allow space for the pedals to project down in front. By making the central board a little narrower than the top and bottom boards, the central board will be free to vibrate, the air passing in and out through the spaces between the pieces, castings, and the edges of the central board. The piano is placed with its legs standing upon the four corners of the platform described. The legs of the piano should be shortened, to keep the piano at the proper hight. Casters should be placed beneath the four corners of the platform, to enable the piano to be moved about with the same facility as an ordinary piano. The casters or other supports are necessary to raise the platform from the floor to obtain the proper vibrations. The sounding board platform thus constructed is adapted for use with either grand or square pianos, and may be used either with or without the center sounding board.

HORSE POWER.—Marion H. Marmaduke and Benjamin F. Stewart, Santa Fe, Mo.—The invention consists in locating the multiplying mechanism in such relation to other parts that the lower arms are always maintained in a horizontal plane, thus removing the ordinary friction from sagging and reducing the draft some 20 per cent.

MECHANICAL MOVEMENT.—Thomas H. Percival, Harper's Ferry, Va.—This invention consists in a device for rotating a shaft by means of a double lantern wheel working in connection with a double spur gear fixed on the shaft, the arrangement being such that the lantern wheel also operates as a pawl and prevents any backward rotation of the spur gear in either direction.

STEAM PUMP.—Albert Perry, New Philadelphia, and George W. Perry, Mahanoy City, Pa.—This is an improved valve gear for steam pumps, in which the valves are prevented from stopping on the center by the use of springs which supplement the motion imparted to the valves through the movement of the piston.

PLOW.—Justin Malaneen Smith, of Haddam Neck, Conn.—This invention consists in a construction of the share and mold board, calculated to cause the furrow slice to discharge or pass over the mold board more easily than with the common mold boards; also, to be pulverized and disintegrated at the same time, and to be turned over more completely. It also consists in a self sharpening toothed colter, an improvement on that for which letters patent of the United States were allowed the same inventor August 30, 1870. Plows as now made cut the furrow slice flat and level on the bottom, and the mold boards, which are concave in the cross sections, have the effect to compress the upper portion of the furrow slice together, so that it is prevented crumbling and disintegrating, as it is desirable that it should. Another result is, that the furrow slice bears mostly on the surface of the mold board near the upper and lower edges, passing lightly over the center portion, or not touching it at all, whereby the earth clogs thereat and prevents the free action required. In this invention the share is made convex on the bottom, so as to cut the lower side of the slice concave, and to shape the mold board so that it will be convex in the cross section, whereby this compression of the furrow slice will not only be avoided, but the tendency of the concave under surface of the furrow slice resting on the convexity of the mold board, will be to cause the said slice to separate vertically by the overhanging sides, and become disintegrated. The clogging will also be prevented at the center, and there will be no clogging either side of the center, for the slice breaking down will bear on the mold board sufficiently to prevent it. The improvement in the construction of the teeth of the colter consists in forming teeth in the knife edged colter, by means of grooves in the sides, beginning at the edge, extending nearly to the rear, terminating in a point vanishing in the surfaces, being alternately on opposite sides, so that the knife edge of each tooth is subject to wear on both sides alike, by which the edge is preserved as the colter wears away. These grooves are inclined in the transverse direction of the colter, so that when in position they will be nearly vertical, and the earth in passing them will move upward through them to some extent in such manner as to keep them from clogging.

ROTARY VALVE.—Daniel Snowhill and John D. Bown, Spottswood, N. J.—This is a new form of valve within a steam chest, and has for its object to reduce friction and simplify the operation of the valve. The invention consists in the use of an oscillating, cylindrical, or slightly conical valve, containing cross slots for conveying the steam from the top of a chest to the ports, and a cavity for the exhaust. In this manner a simple valve is produced, and the steam chest, as such, actually dispensed with, the steam passing from the pipe directly to and through the valve.

BROOM HEAD.—Cornelius Blom, Jr., and John Aling, Holland, Mich.—This invention relates to the manufacture of brooms; and consists of a metallic broom head and mode of screwing the brush of the broom therein. The advantages are that, when the broom wears out, another brush may be inserted, by simply taking out two screws. The head itself will last for an indefinite length of time.

GRAIN CAR.—Alphonso E. Gordon, New Brunswick, N. J.—The object of this invention is to provide an improved means for moving grain on railroads, namely, a car that shall be cheaper, lighter, more easily filled and readily discharged, and of less hight and weight than those heretofore used for the same purpose. It consists in a railroad car provided with a slide valve opening for delivering the grain, and of a door for securing the valve or valve opening, the car being made of such form or shape that the grain will flow from the same by its own gravity when the valve orifice is open. The labor, time, and expense, attending the discharge of grain from railroad cars, have been serious drawbacks to the transportation of grain on railroads. Shovelers have to be employed, much time is consumed, and much grain is usually wasted. By this improvement the grain is discharged by its own gravity, the conveyer box receives the grain, so that none is wasted, and the contents of the car are conveyed to the proper destination, after the conveyer is attached, by simply opening a valve orifice. The car is provided with a water tight roof, in which is a receiving orifice provided with a tight cover. Thus cars can be made of either wood or metal—preferably the latter—and they may be constructed so as to contain return freight, as bales and bundles of goods. The required weight of grain fills the ordinary car only about half full. These improved cars, being made especially for the transportation of grain, are much lower and lighter than the ordinary car. The advantages to be derived from the use of cars made expressly for the transportation of grain, and in the manner described, are obvious.

WATCH ESCAPEMENT.—Abel Coombs, Burlingame, Kansas.—By this improvement the lever only acts on the roller pin during its vibration in one direction; but the pallet is twice as far from the pivot as it could be if arranged in the common way, and consequently the wheel has twice the leverage to act on the roller pin and throw the balance, thereby making only one escapement to two as heretofore, and avoiding one half the stops of the train. A short pallet throws the lever back against the tappets of the escape wheel which pass it without stopping. The train only stops as the balance swings one way, while in the common arrangement it stops every time the balance swings either way. The less stopping and starting a watch has to perform, the better for the whole machinery; and it is less likely to cease running, as it has only half the stoppings to overcome, and as the cessations occur from failing to start after any of these stops. A spring strikes against the collar pin in the return stroke of the lever and arrests the blow of the pallet on the scape wheel teppet which would otherwise occur. By this arrangement the roller table is constructed with the "banking" notch on one side of the roller pin, and, therefore, the watch can only "overbank" on one side of the same; whereas, in the common way, they may overbank on either side of the pin, owing to the notch being in front of the roller pin. As, by this plan, the lever moves twice as far at one beat, it is more likely to overcome any obstruction in the train. The lever is curved in its side between the pallets, and it is also slotted, so that the escape wheel is set closer to it and economizes space. Power is also gained by getting a wider sweep of the lever, in consequence of which the size of the roller can be increased and the roller pin placed further from the roller axes, thus gaining leverage on the balance. In consequence of this enlargement of the roller, the banking notch may be made much deeper, so that the banking pin will reach into the roller so far that it cannot overbank, which all other watches with detached levers frequently do, and stop immediately or "throw off" and catch the banking pin on the edge of the roller in the line of the balance staff, which also stops the watch. The banking pin, striking into the roller on one side of the roller pin, never gets on the other side, as the lever always stops on one side of the balance staff, while a common lever stops on both sides, and, in passing the line, dips into the roller in front of the pin but slightly, whereby, the sweep being narrow, the roller small, and the banking notch necessarily shallow, the watch is frequently stopped.

APPARATUS FOR SUPPORTING AND LOWERING COFFINS.—Charles A. Thompson and James O. Coleman, Hopkinsville, Ky.—This invention has for its object to furnish an improved apparatus for supporting coffins or burial cases when the deceased is lying in state, and to serve as a bier for carrying the coffin. It is so constructed as to be a convenient means for lowering the coffin into the grave. This apparatus consists mainly of a rectangular frame formed of two longitudinal shafts, connected together by end pieces, supported on folding legs, with adjustable pulleys on the shafts, and a worm gear device by which the shafts are revolved. The legs are held in position when folded and when standing vertical by means of spring buttons, gravity springs, or slides, or in any suitable manner. There are adjustible flanged pulleys on the shafts. These slide on the bars, and are adjusted to suit the length of the coffin. When adjusted they are held in position and prevented from turning on the bars by means of set screws. Belts are attached to the pulleys by means of stirrups. These stirrups are attached to the pulleys, and hold the belt by frictions, the arrangement being such that by raising the stirrup the belt is readily drawn through and detached. Metallic supports for the coffin to rest upon hook over the longitudinal shafts, and are removed before lowering the coffin into the grave. To allow the supports to be removed, the bars are revolved so that the belts are wound around the pulleys sufficiently to raise the coffin. When the apparatus is placed over the grave, and the supports are removed, as above stated, the shafts are turned in opposite directions, by means of a crank and the worm gearing above described, and the coffin is lowered gently and evenly to the bottom of the grave. The belts are withdrawn, and the legs folded up, which allows the apparatus to be placed in the hearse. This is a convenient and complete device for the purposes intended, and its advantages over the awkward contrivances usually employed at funerals are obvious.

ATTACHMENT FOR SEWING MACHINE.—Albert H. Hewitt, Batavia, N. Y.—This invention consists in an arrangement of devices, whereby a gage is provided by which lace or other trimming may be stitched on the cloth at the same time it is hemmed, and on the wrong side. This gage is placed on the machine at the same time the hemmer is used, so that a part will cause the edge of the trimming to be stitched on to the cloth to run under the needle properly. The plate is then set so that a tongue will project about as far as the side of the hemmer. The trimming is then put in over another tongue and under the first and a third tongue, so as to pass close alongside of and gradually work sufficiently under the hemmer to have the piece of the cloth turned over it.

FIFTH WHEEL FOR CARRIAGES.—Amaziah Finley, Bainbridge, Indiana.—This invention, the nature of which cannot be verbally explained with clearness, secures the following advantages: The bolster is locked to a stand plate, thus preventing the detachment of the bolster from the wagon in case of such extreme turning of the front wheels as to throw the box upward on the wheels, or when the wagon is overturned. It also prevents the floating of the bolster off the sand board in fording deep rivers, etc. The large hole required in the common axle when the ordinary bolt is used, is avoided.

GLOVES.—Edwin V. Whitaker, Gloversville, N. Y.—The object of this invention is to produce a glove, having palm piece lapping on the back, so as to leave seamless sides, with a peculiar curve at the wrist portion to better adapt it to fit the hand, and a minimum waste of material and expenditure of labor in making up.

CLOTHES WASHER.—David P. Sulouff, Milton, Pa.—This invention is an automatic washer and rinser which condenses the steam at its own boiler by a water vessel on top, and by means of the same vessel heats the rinsing water which is afterwards conveyed by a connecting pipe into the bottom of the boiler.

HARVESTER REEL.—George S. Grier, Milford, Del.—This invention is an improvement in harvester reels by which the circumferential sweep of the reel as well as the hight thereof may be changed with great rapidity and ease by the operator.

SPARK ARRESTER FOR LOCOMOTIVE SMOKE STACKS.—David R. Proctor Gloucester, Mass.—This invention is an improvement in spark arresters by which the sparks and cinders are sprayed with water and discharged harmlessly on one side of the locomotive.

FILE FOR NEWSPAPERS, MUSIC, LETTERS, INVOICES, ETC.—Louis Cohn, Montreal, Can.—This invention relates to a file so contrived that papers are held by it side by side in such a manner that the pages may be read in their natural succession; and provided with an expansible frame for holding both sides of the paper open at the same time, and having a rest to support the file and papers upon the knee of the reader, or upon a table.

CHURN.—John A. Jordan, Shelbyville, Tenn.—This invention relates to a churn having an outer and an inner skin with an annular space between for the reception of hot water to warm the cream held within the inner vessel; and having also circular beaters revolving around a perforated stationary plate which gathers butter.

APPARATUS FOR PRESERVING AND FORCING BEER WITH COLD AIR.—Franz Blucher, of Mascoutah, Ill.—This invention consists in injecting cold air into beer barrels through a pipe connected with a cone shaped case or enlargement filled with powdered charcoal or other purifier, and provided with a perforated bottom through which the air is drawn. The pipe is flexible, and is let into the lower part of an ice box or ice receptacle, where the air is coldest. A pump draws the cold air, and discharges it through the pipe into the barrel. The end of the last named pipe is inserted through the bung into the barrel. When beer has been drawn from the barrel in such amount as to require a supply of air on its top for necessary pressure, the crank handle of the pump is turned until the necessary amount of air has been pumped. The air, being taken from the coldest part of the box and further purified in the enlargement, is of the proper quality for preserving the beer, besides applying pressure. Small dealers, or parties who use a barrel for a considerable length of time before entirely emptying it, will by this invention be enabled to always keep the beer fresh and cool, where hitherto it was rapidly destroyed when kept in a barrel but partly filled.

SELF OPERATING GATE.—Albert N. Holmes, of Tyrone, Mich.—This invention relates to an improved latch for gates, used in connection with a gate provided with means for being opened or closed without the necessity of the operator descending from his carriage or horse. It consists in a cord wound around the hinged post of the gate and extending at each side to a lever for actuating it to revolve the post and thereby swing the gate, and an arrangement of the lower hinge or pivot of the gate which causes a lifting action on the free end to raise it up for unlatching previous to swinging it open, also to disengage it from the catches for holding it open, the gate being suspended from an eye at the upper end of the oscillating post.

METHOD OF MAKING HARNESS PADS.—Conrad Gahr, of Newark, N. J.—This invention consists in a peculiar construction of dies, whereby the leather of a harness pad may be shaped and filled under pressure and within the same female die, and whereby a flange may be formed on the edge of the leather to enable it to be riveted conveniently.

CALCULATING MACHINE.—Robinson Teasdale, of Alberton, Ga.—With this remarkably ingenious machine, examples in addition, subtraction, multiplication, division, square and cube root, etc., may be worked out with great rapidity. For addition—stops being set on a plate to the figures to be added in as many of the slots as there are columns to be added—one turn of the crank adjusts faces of disks so that the sum of the amount represented on plate at the said stops and the amount seen on said disks before the operation will be seen on said disks after the turning of the crank. The operation is repeated for as many figures as there are in the columns. The operation for subtraction is precisely the same, except that a cover is shifted so that the faces of said disks, with their figures arranged reversely to those on the faces for addition, are seen. For multiplication—the disks being all adjusted so that the zero or nought of the faces are seen through the cover—the disks are adjusted to represent the multiplier on their faces, and the stops are adjusted for the multiplicand; then the crank is turned as many times as the denomination of the right hand figure of the multiplier; after a simple adjustment, a similar operation is performed for the next figure of the multiplicand, and so on. The multiplication of any two sums together is accomplished by as many turns as the sum of the figures in the multiplier added together. We cannot, without diagrams, give any idea of the way in which division and the extraction of roots are performed. The machine is certainly one of the most able attempts to perform these operations mechanically that we have met with.

LUBRICATOR FOR CAR AXLES.—Joseph Barber, of Bridesburg, Pa., assignor to himself and Richard B. Duncan, of same place.—This invention consists of a spirally ground roller arranged on spring bearings, working in vertical guides, and all mounted on a plate, which is screwed up against the bottom of the axle box. The plate has a large hole to admit the roller and its support into it from the bottom, the plate holding the roller up against the under side of the axle, and made fast by bolts which hold said roller against the axle to be revolved by the contact of it, and cause it to carry the oil up to the axle. The lubricating roller is made large enough, as others have been, to extend from the journal nearly to the bottom of the box, so as to insure the carrying up of the oil to the journal when but little remains in the box.

BURIAL CASE.—Joseph Hackett, of Louisville, Ky.—The sheet metal side of the casket is generally made of zinc. The upper and lower cast metal moldings are cast, in any ornamental form in cross section that may be preferred, being in thin plates fitting the side of the coffin at one edge, and springing away from the side as they extend to the plane of the edge of the said side; in order to make them as tight as possible, they are connected to the side, at or near the edge, by rivets. The lower one is connected, at its lower edge, to the coffin side by a sheet metal flanged plate, soldered to it by one of its edges, and connected to, or bearing against the side by, its outer edge. The upper molding is provided with a recess, in its upper corner fronting the side, which receives the edge of a cast zinc angle bar, the flange of which is soldered to the side at the upper edge. This angle bar serves to straighten the top edge of the side of the body, and to take the strain off the rivets when the top is secured down on the body. This is important, as any strain on the rivets might create a leak, which would ruin the casket.

FOUNTAIN.—Henry Broesel, of Manston, Wis.—This invention is an improvement upon the artificial fountain for which letters patent of the United States were issued to A. P. Yates, May 31, 1870. The improvement consists, mainly, in arranging the flexible or compressible water reservoir in the upper end of a tubular or hollow standard for the purpose of bringing it nearer the place or point of discharge of the water, to avoid taking up the space within the base or pedestal that would be perfectly employed to contain flowers or other ornaments to cause the descent of the fountain top to assist in expelling the water from the flexible reservoir, and to avoid forming rack teeth on the outside of the standard or pillar, where they are constantly exposed to view.

CAR COUPLING.—Theodore B. Tremper, of Rockland Lake, N. Y.—This invention consists of a pair of hooks pivoted in a socketed connecting bar; adapted for connecting with the ordinary socketed draw head by the ordinary connecting pin, to be used in one draw head and couple with a vertical triangular pin in the other head behind the place where the common pin is, which triangular pin opens the hooks when they are pushed in. The hooks are closed behind the triangular pin by springs. The triangular pin has a triangular or wedge shaped part below that which opens the hook, with its apex arranged to open the hooks and uncouple the cars while exposed to the draft, when the pin is raised up so that said part comes between them, and an elbow lever is provided in connection with said pin for so raising it.

PRESERVING EGGS.—William S. Marsh, of Raymond, Wis.—This invention consists in the successive application of alum and sulphur to the surface of eggs as a preservative coating.

SCROLL SAW GUIDE.—Samuel Ide, of Medina, N. Y.—A pair of steel guides are clamped against the sides of the saw at one end and together at the other end behind the saw in such manner as to make a wedge shaped groove corresponding to the saw, which is thinner at the back edge and gradually thickens towards the front. Above these steel guides is a pair of cotton waste and oil holding cups for lubricating the saw and the guides, one on each side of the saw. These are connected to plates somewhat like the plates of the guide, and they are clamped against a thin plate as thick as the thickest saw that will be used, which plate has a V groove in one end which comes against the back edge of the saw and forms a guide therefor, no matter whether the saw be thick or thin. The said oiling cups and thin plates thus serve to hold this guide, besides serving for the essential object for which they are designed.

MODE OF BALANCING PULLEYS.—Ebenezer W. Phelps, of Elizabeth, N. J.—This invention relates to a new and useful mode of balancing pulleys and fly wheels. It consists in an interior flange on the rim containing holes or apertures for attaching weights for balancing the pulleys or other body. This flange corresponds with the arms, and serves to strengthen the rim, and also serves to shorten and consequently strengthen the arms. The weights may be made of lead, each with a stem, so that it can be readily riveted to the flange. The invention is not confined to any particular form of weight or manner of attaching it. The weight may be made with holes, so that two may be placed opposite each other on the flange and both be fastened thereto by a single rivet. Instead of being continuous, the flange may be sectional, but a continuous flange is preferred.

BREASTPIN.—This is a thermometer plate, graduated in the usual manner, with a thermometer suitably attached to the plate. The attaching device consists of a bent pin projecting from the back of the plate, by which the latter may be quickly and conveniently attached to any part of the clothing. The whole is made in an ornamental form and of small size, so as to be suitable for a breastpin, shawl pin, etc.

Official List of Patents.

ISSUED BY THE U. S. PATENT OFFICE.

FOR THE WEEK ENDING DECEMBER 19, 1871.

Reported Officially for the Scientific American.

SCHEDULE OF PATENT FEES:

On each Caveat	$10
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On filing each application for a Patent, (seventeen years)	$15
On issuing each original Patent	$20
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On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On an application for Design (three and a half years)	$10
On an application for Design (seven years)	$15
On an application for Design (fourteen years)	$30

121,925.—CURING MEAT.—W. G. Bell, Boston, Mass.
121,926.—FRUIT BOX.—C. A. Blair, New Britain, Conn.
121,927.—BOOT, ETC.—M. Bray, Newton Center, Mass.
121,928.—BAGGAGE TRUCK.—W. H. Brown, Bangor, Me.
121,929.—PIPE COUPLING.—C. Burger, Reading, Pa.
121,930.—LIQUID SOAP.—D. Cardullo, Titusville, Pa.
121,931.—ADDRESSING MACHINE.—W. H. Clague, R. B. Randall, Rochester, N. Y.
121,932.—HORSE POWER.—W. Deering, Louisville, Ky.
121,933.—FURNACE.—G. H. Diehl, Chicago, Ill.
121,934.—HEAD BLOCK.—T. Douglass, Warren, O.
121,935.—STEAM ENGINE.—E. Evans, North Tonawanda, N.Y.
121,936.—TOY.—G. W. Fisher, Rochester, N. Y.
121,937.—METER.—V. Fogerty, Boston, Mass.
121,938.—LAMP SIGN.—J. T. Foley, New York city.
121,939.—THRASHER, ETC.—C. S. Hall, Rochester, N. Y.
121,940.—NEEDLE SHARPENER.—T. Harris, Cote St. Paul, Can.
121,941.—CHAIR.—E. W. Hastings, Boston, Mass.
121,942.—AIR REGISTER.—H. F. Hayden, Washington, D. C.
121,943.—COFFIN.—M. M. Hersman, Delavan, Ill.
121,944.—HEMMER.—W. Johnson, Haverhill, Mass.
121,945.—ROCKING HORSE.—E. Kirsch, South Amesbury, Mass.
121,946.—DYED PAPER.—G. La Monte, G. G. Saxe, C. H. Clayton, New York city.
121,947.—ROTARY ENGINE.—R. Leach, Bangor, Me.
121,948.—RECOVERING TIN.—C. Lennig, Phila., Pa.
121,949.—LAWN SPRINKLER.—J. Lessler, Buffalo, N. Y.
121,950.—SAW.—C. V. Littlepage, Austin, Tex.
121,951.—FORMING SAW TEETH.—C. V. Littlepage, Austin, Tex.
121,952.—PIANOFORTE.—L. Matt, Boston, Mass.
121,953.—CLOTHES RACK.—D. Miller, Marietta, O.
121,954.—WHIP STOCK.—W. H. Millikin, Baltimore, Md.
121,955.—MOP.—C. S. Moore, H. P. Boyd, Worcester, Mass.
121,956.—SECURING RAILS.—J. Newton, Marengo, Mich.
121,957.—POTATO PLANTER.—A. E. Payne, Jonesville, Mich.
121,958.—HAY TEDDER.—J. G. Perry, Kingston, R. I.
121,959.—WHIP SOCKET.—G. M. Peters, Columbus, O.
121,960.—WATER CUT OFF.—P. B. Peters, Marietta, O.
121,961.—SUPPORTING CORES.—C. J. C. Petersen, Port Chester, N. Y.
121,962.—STEAM TRAP.—W. E. Prall, Washington, D. C.
121,963.—BELT KNIVES.—B. F. Radford, Hyde Park, Mass.
121,964.—NAIL CUTTERS.—E. Riley, Cleveland, O.
121,965.—SEWING MACHINE.—J. B. Secor, Chicago, Ill.
121,966.—CHECK LEVER.—J. B. Secor, Chicago, Ill.
121,967.—NEEDLE HOLDER.—J. B. Secor, Chicago, Ill.
121,968.—GOVERNOR.—H. F. Shaw, West Roxbury, Mass.
121,969.—CUTTING SOLES.—S. J. Shaw, Marlborough, Mass.
121,970.—PULP ENGINE.—C. Smith, South Windham, Conn.
121,971.—TELEGRAPH.—J. W. Stover, Boston, M. G. Crane, Newton, Mass.
121,972.—FLOWER STAND.—F. W. Test, Chicago, Ill.
121,973.—BOILER.—F. Till, Reading, Pa.
121,974.—HAND PROTECTOR.—J. Turnbull, Simsbury, Conn.
121,975.—ICE MACHINE.—C. Twining, New Haven, Conn.
121,976.—TREADLE.—J. B. Winslow, Charlestown, Mass.
121,977.—INCUBATOR.—E. Woodward, N. J. Millett, Charlestown, Mass.
121,978.—FAUCET.—J. H. Alexander, Geneva, N. Y.
121,979.—STEAM BOILER.—J. H. Ansell, Pontiac, Mich.
121,980.—DOOR SECURER.—D. Arndt, Cleveland, Ohio.
121,981.—DUMPING CAR.—C. Barrett, Boston, Mass.
121,982.—RUBBER ERASER.—W. N. Bartholomew, Newton Center, Mass.
121,983.—BARN FORK.—C. T. Beebe, Jackson, Mich.
121,984.—MEDICAL COMPOUND.—L. Bodenheimer, Paducah, Ky.
121,985.—STAMP GUIDE.—H. Bolthoff, Central City, Col. Ter.
121,986.—STAMP CANCELER.—F. W. Brooks, New York city.
121,987.—SEAL LOCK.—F. W. Brooks, G. A. Everett, New York city.
121,988.—BALE TIE.—F. G. Brown, Brenham, Tex.
121,989.—MEDICAL COMPOUND.—I. Brown, Phila., Pa.
121,990.—BED SPRING.—J. P. Chamberlain, North Abington, Mass.
121,991.—WATERING DEVICE.—D. Cheney, Brookfield, Mo.
121,992.—GARMENT STRAP.—S. L. Clemens, Hartford, Conn.
121,993.—PAPER FILE.—L. Cohn, Montreal, Can.
121,994.—PURIFYING BRINE.—L. R. Cornell, Syracuse, N. Y.
121,995.—HAT VENTILATOR.—W. Dale, New York city.
121,996.—PENCIL SHARPENER.—S. W. Davis, C. P. Elliott, Norristown, Pa.
121,997.—HAIR WEAVING.—N. Demongeot, Washington, D. C.
121,998.—EXTENDING TABLES.—A. Dickinson, New York city.
121,999.—BEE HIVE.—W. W. Dodson, J. B. Bray, Lynnville, Tenn.
122,000.—STEAM RADIATOR.—E. P. Doyen, Portland, Me.
122,001.—FURNITURE SPRING.—J. J. Eagleton, New York city.
122,002.—SAW MILL.—D. A. Edie, Norrisville, Md.
122,003.—GATE.—J. Faussett, Leonardtown, Md.
122,004.—CHURN.—W. Fritts, Flanders, N. J.
122,005.—ALBUM.—W. S. Gavan, Savannah, Ga.
122,006.—BUNG INSERTER.—J. Gillies, Glasgow, Great Britain.
122,007.—HARVESTER REEL.—G. S. Grier, Milford, Del.
122,008.—PINKING MACHINE.—T. Hagerty, Richmond, Va.
122,009.—FRICTION CLUTCH, ETC.—A. W. Hall, Northfield, Vt.
122,010.—BOILER CASING, ETC.—W. P. Hall, Piqua, Ohio.
122,011.—LATCH KEEPER.—W. Harvey, Albany, N. Y.
122,012.—DENTAL FORCEPS.—L. G. Haskins, Newport, N. Y.
122,013.—HASP LOCK.—W. D. Heister, Newton Hamilton, Pa.
122,014.—PROJECTILE.—J. H. Helm, Pittsburg, Pa.
122,015.—MOLDING INSULATOR.—R. Hemingray, Covington, Ky.
122,016.—CASTER.—S. S. Hickock, Methuen, Mass.
122,017.—HUSK SPLITTER.—B. Hollis, Randolph, Ill.
122,018.—PAPER HOLDER.—G. A. Howe, Niles, Mich.
122,019.—STEAM GENERATOR.—D. C. Howell, Goshen, N. Y.
122,020.—COW BELL STRAP.—J. H., A. Hughes, Wautoma, Wis.
122,021.—LINE CONNECTOR.—C. Jarvis, New York city.
122,022.—CHIMNEY CAP.—A. B. Johnson, Washington, Ind.
122,023.—PACKING PAPER.—A. L. Jones, New York city.
122,024.—GAS APPARATUS.—E. Jones, Boston, Mass.
122,025.—GAS APPARATUS.—E. Jones, Boston, Mass.
122,026.—CHURN.—J. A. Jordan, Shelbyville, Tenn.
122,027.—STEAM GENERATOR.—J. J. Jordan, Phila., Pa.
122,028.—HULLING MACHINE.—D. Kahnweiler, New York city.
122,029.—DENTAL GOLD.—E. G., L. Kearsing, Spring Valley, N. Y.
122,030.—BOOT, ETC.—P. Kleheler, J. C. Randlett, Bangor, Me.
122,031.—NEEDLE ELECTRODE.—J. Kidder, New York city.
122,032.—DISTILLING.—Gott-Hard Kleiner, Georgetown, Mo.
122,033.—ROTARY ENGINE.—T. S. La France, Elmira, N. Y.
122,034.—CIGAR MOLD.—J. J. Lahaye, J. M. Lyons, Reading, Pa.
122,035.—MINING TOOL.—I. Lamplugh, Peoria, Ill.
122,036.—LIFTING JACK.—R. B. Little, Providence, R. I.
122,037.—CORNICE.—W. Lloyd, New York city.
122,038.—GARMENT STRAP.—H. C. Lockwood, Baltimore, Md.
122,039.—HAY RAKE.—J. G. Lockwood, West Davenport, N.Y.
122,040.—UTERINE SUPPORTER.—A. Lowe, Nashville, Tenn.
122,041.—POSTAL CARD.—W. I. Ludlow, Cleveland, Ohio.
122,042.—GENERATOR, ETC.—M. N. Lynn, New Albany, Ind.
122,043.—CLOTHES DRYER.—W. C. Maynard, Marathon, N.Y.
122,044.—EMBOSSING FABRICS.—J. W. McKee, Brooklyn, N.Y.
122,045.—FORMING PAN.—F. Meyer, Newark, N. J.
122,046.—PROPELLER.—C. Mickle, Guelph, Canada.
122,047.—PEN CASE.—J. Monaghan, N.Y., T. Flynn, Brooklyn, N.Y.
122,048.—BED BOTTOM.—T. H. B. Morehouse, Lansing, Mich.
122,049.—STEAM ENGINE.—F. Motley, Phœnixville, Pa.
122,050.—GRATE.—D. Pangle, Belmont, Ohio.
122,051.—MEAT CHOPPER.—W. P. Patton, Harrisburgh, Pa.
122,052.—BESSEMER STEEL PLANT.—J. B. Pearse, Swatara, Pa.
122,053.—FLOAT VALVE.—J. Peters, Haverstraw, N. Y.
122,054.—FLOUR BOLT.—H. N. Petersen, Peoria, Ill.
122,055.—LIGHTNING ROD.—M. D. Phelps, Bristolville, Ohio.
122,056.—SHUTTER WORKER.—J. T. Pope, Scranton, Pa.
122,057.—COTTON CHOPPER.—A. G. Powell, Smithfield, N. C.
122,058.—SPARK ARRESTER.—D. R. Proctor, Gloucester, Mass.
122,059.—PUPPET VALVE.—J. E. Prunty, Baltimore, Md.
122,060.—COVER LOCK.—A. Richardson, New Brunswick, N.J.
122,061.—GATE LATCH.—H. W. Robie, Binghampton, N.Y.
122,062.—HARVESTER.—J. L. Rohrer, Upper Leacock, Pa., C. E. Roper, Canton, Ohio.
122,063.—TOP JOINT, ETC.—C. W. Saladee, St. Catharines, Ca.
122,064.—SHARPENING KNIVES.—I. C. Saunder, Trenton, Mich.
122,065.—MEDICAL COMPOUND.—G. W. Scollay, N. Y. city.
122,066.—SWING.—W. H. Scriven, W. K. Taylor, Flatbush, N.Y.
122,067.—FLOOD FENCE.—J. L. Seat, Nashville, Tenn.
122,068.—SASH HOLDER.—R. M. Seldis, New York city.
122,069.—CAR AXLE BOX.—M. Sessions, D. Muzzey, St. Albans, Vt.
122,070.—CAR COUPLING.—W. H. Skidmore, Secor, Ill.
122,071.—CLOTHES DRYER.—W. A. Sleppy, Berwick, Pa.
122,072.—PORCELAIN KNOB, ETC.—T. J. Sloan, Bronxville, N.Y.
122,073.—Not issued.
122,074.—AXLE.—W. H. Sparks, Absecom, N. Y.
122,075.—CHURN DASHER.—A. T. Still, Baldwin City, Kan.
122,076.—PIPE MOLD.—W. H. Story, Flatbush, N. Y.
122,077.—WASH BOILER.—D. P. Sulouff, Milton, Pa.
122,078.—HOLD BACK.—J. Thornton, E. G. Latta, Genesee, N.Y.
122,079.—CONNECTING SPRING.—J. A. Topliff, G. H. Ely, Elyria, O.
122,080.—BEE HIVE.—J. Tritt, New Richmond, O.
122,081.—CORSET, ETC.—M. J. C. Vanorstrand, Pekin, Ill.
122,082.—PUMP PISTON.—J. Van Tassel, Toledo, O.
122,083.—GRINDER.—P. W. Vaughan, De Kalb, Ill.
122,084.—STOVE.—J. V. Vrooman, J. H. Clute, Schenectady, N.Y.
122,085.—BOOT, ETC.—P. Ware, Jr., Boston, Mass.
122,086.—STEAM TRAP.—J. E. Watts, Lawrence, Mass.
122,087.—PLOW FENDER.—A. P. Webber, Saratoga, Ill.
122,088.—HINGE.—W. T. Wells, Decatur, Ill.
122,089.—WASH BOWL.—W. Westlake, Chicago, Ill.
122,090.—FAGOT FOR METAL BARS.—E. Wheeler, Phila., Pa.
122,091.—GLOVE.—E. V. Whitaker, Gloversville, N. Y.
122,092.—SOLDERING IRON.—J. Williams, Jefferson, Texas.
122,093.—WASHING MACHINE.—J. B. Wilson, Philadelphia, Pa.
122,094.—EXTRACTING GREASE.—J. B. Wilson, Phila., Pa.
122,095.—CONNECTING ROD.—J. W. Zinn, Morrison's Mills, Fla.

REISSUES.

4,677.—STEAM BOILER.—W. H. Cornell, Easton, Pa.—Patent No. 113,857, dated April 18, 1871.
4,678.—PUMP.—R. M. Lafferty, Three Rivers, Mich.—Patent No 101,604, dated June 21, 1870.
4,679.—BACK CHAIN.—W. B. McClure Alexandria, Va.—Patent No. 119,382, dated September 26, 1871.

DESIGNS.

5,424 to 5,426.—FRINGES.—W. B. Cunningham, P. Hill, Philadelphia, Pa.
5,427.—CARPET.—J. C. Johnston, Scarborough, N. Y.
5,428.—MATCH BOX.—J. Kintz, West Meriden, Conn.
5,429 to 5,432.—WATERPROOF GOODS.—B. Metz, New York city.
5,433.—MEDALLION HEAD.—J. H. Miller, Philadelphia, Pa.
5,434 to 5,441.—CARPETS.—R. R. Campbell, Lowell, Mass.
5,442.—CAKE TAZZA.—G. Gill, Taunton, Mass.
5,443.—THREAD SAMPLE CASE.—J. N. Leonard, Rockville, Ct.
5,444.—CARPET.—D. McNair, Lowell, Mass.
5,445.—CAKE TAZZA, ETC.—W. Parkin, Taunton, Mass.
5,446.—CARPET.—E. Perrin, Kidderminster, England.

TRADE-MARKS.

586 and 587.—WHISKY.—A. W. Balch & Co., New York city.
588 and 589.—GIN.—A. W. Balch & Co., New York city.
590.—WINE.—A. W. Balch & Co., New York city.
591.—PITCHFORK.—Bouton, Whitehead & Co., Naperville, Ill.
592.—COOKING STOVE, ETC.—Bridgeford & Co., Louisville, Ky.
593.—AXES.—C. Gerber & Co., Toledo, O.
594.—FERTILIZERS.—J. Horner, Jr., Baltimore, Md.
595.—SHEET IRON.—Rogers & Burchfield, Pittsburgh, Pa.
596.—GLOVES.—Ware, Marshall & Co., Boston, Mass.
597.—COLORS.—B. Weber, New York city.
598 and 599.—MEDICINE.—Holloway & Co., New York city.

EXTENSIONS.

LOCOMOTIVE FURNACE.—S. A. Bolster, Boston, Mass.—Letters Patent No. 18,883, dated Dec. 15, 1857.
MECHANICAL MOVEMENT FOR SEWING MACHINES, ETC.—J. ley, New York city.—Letters Patent No. 18,845, dated Dec. 15, 1857; reissue No. 4,583, dated Oct. 10, 1871.

APPLICATIONS FOR EXTENSION OF PATENTS.

STOP MOTION FOR HAIR CLOTH LOOMS.—Foster H. Stafford, Fall River Mass, executor of Rufus J. Stafford, deceased, has petitioned for an extension of the above patent. Day of hearing, March 6, 1872.

FLY NET.—William E. Wilson, Milton, Pa., administrator of Robert Wilson, deceased, has petitioned for an extension of the above patent. Day of hearing, April 24, 1872.

MACHINE FOR PLANING BLIND SLATS.—Charles Carlisle, Woodstock, and Leonard Worcester, Brattleboro', Vt., have petitioned for an extension of the above patent. Day of hearing, February 28, 1872.

VALVE FOR STEAM ENGINE.—Isaac Van Doren, Annandale, N. J., has petitioned for an extension of the above patent. Day of hearing, Feb. 21, 1872.

JOURNAL BOX KEY, ETC.—Levi Dederick, Jersey City, N. J., has petitioned for an extension of the above patent. Day of hearing, February 21, 1872.

SASH FASTENER.—Frederick W. Brocksieper and Joseph B. Sargent, New Haven, Conn., have petitioned for an extension of the above patent. Day of hearing, April 24, 1872.

WINDLASS.—Joseph P. Manton, Providence, R. I., has petitioned for an extension of the above patent. Day of hearing, March 13, 1872.

RAILROAD CAR AXLE BOX.—R. N. Allen, Pittsford, Vt., has petitioned for an extension of the above patent. Day of hearing, March 6, 1872.

ROTARY CUTTER FOR TONGUEING AND GROOVING.—James A. Woodbury, Boston, Mass., has petitioned for an extension of the above patent. Day of hearing, March 13, 1872.

Inventions Patented in England by Americans.

From November 15 to November 27, 1871, inclusive.

[Compiled from the Commissioners of Patents' Journal.]

DENTURES, ETC.—T. A. D. Forster, Philadelphia, Pa.
FURNACE.—M. Wilson (of Coldspring, N.Y.), London, Eng.
GOVERNOR.—D. J. Wolfe (of N.Y. city), Liverpool, England.
HOIST.—C. R. & N. P. Otis, Yonkers, N.Y.
IRON, ETC.—W. Sellers, Philadelphia, Pa.
LAMP.—R. W. Kemp, Philadelphia, Pa.
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SAFE.—C. C. Rowell, W. Duncan, Lebanon, N. H.
SAFES.—W. Corliss, Providence, R. I.
SEWING MACHINE ATTACHMENT.—D. McC. Smith, Orange, N. J.
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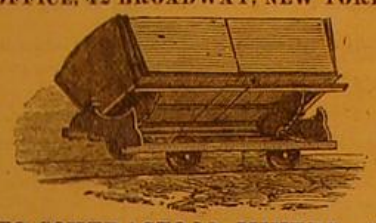

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