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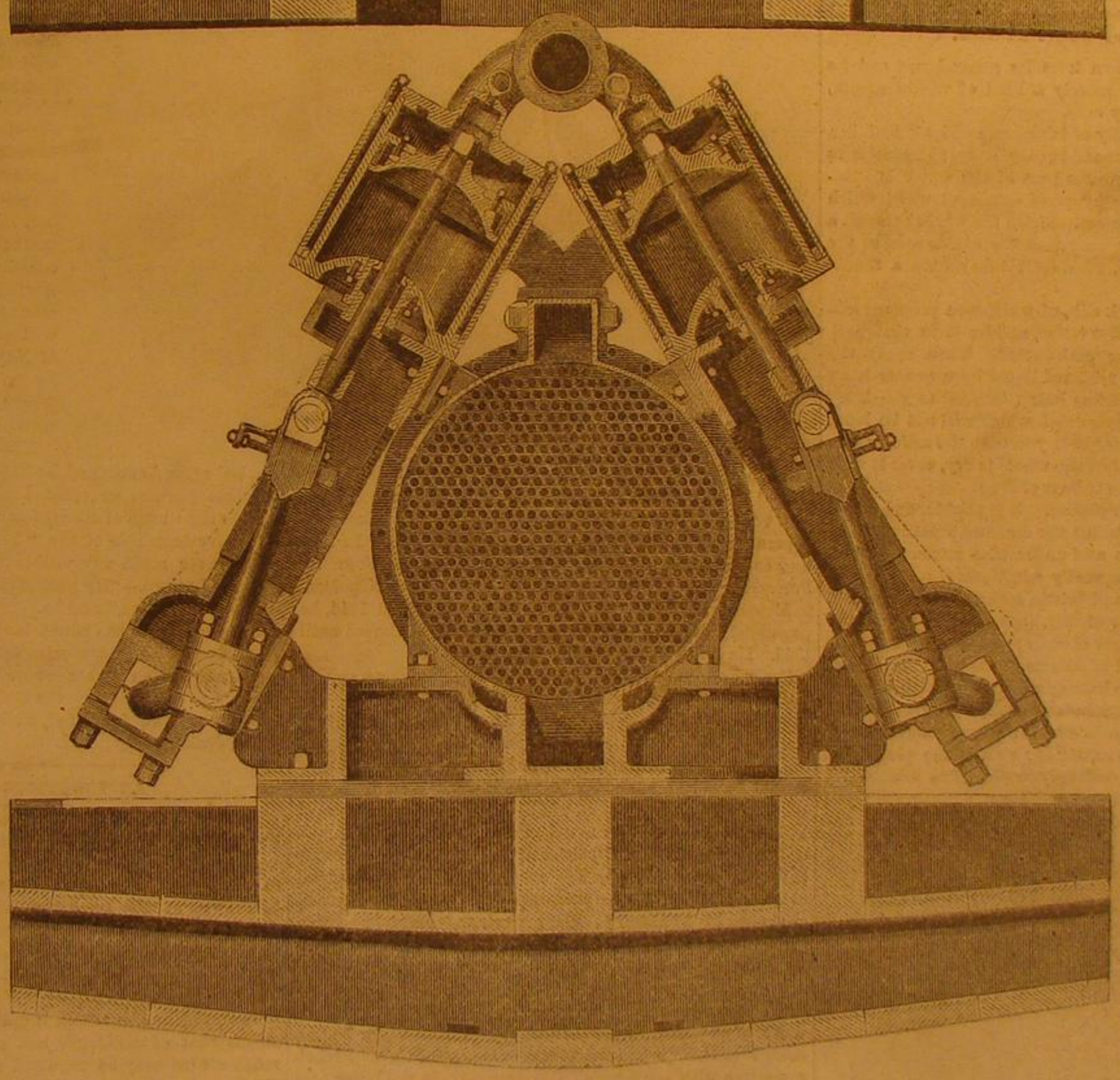
Engines of the Spanish Gunboats.

In our description of these boats in No. 25, Vol. XXI., special mention was made of the compactness of the engines.

It has frequently been urged as an objection against the twin screw system that the double set of engines, four steam cylinders with duplicates of all the working parts called for on this system, render the whole too complicated and heavy for small vessels, preventing, at the same time, the application of surface condensation. In the engines of the Spanish gunboats, of which we annex an illustration from *Engineering*, the designer, Captain Ericsson, has overcome these objections by introducing a surface condenser, which, while it performs the function of condensing the steam to be returned to the boiler in the form of fresh water, serves as the principal support of the engines, dispensing entirely with the usual framework. Besides this expedient, each pair of cylinders have their slide frames for guiding the movements of the piston rods cast in one piece. Altogether the combination is such that the total weight and space occupied by these novel twin screw engines do not exceed the ordinary single screw engines of equal power. Several improvements connected with the working gear have been introduced.

The outer bearings of the propeller shafts, always difficult to regulate and keep in order on the twin screw system, are self-adjusting and accommodate themselves to every change of the direction of the shafts. This is effected by their being spherical externally, and resting in corresponding cavities in the stern braces or hangers. The spring bearings for supporting the middle of the shafts are also arranged on a similar self-adjusting principle.

The thrust bearing is of peculiar construction, the arrangement being such that the bearing surfaces remain in perfect contact however much the shaft may be out of line. The reversing gear likewise is quite peculiar, insuring complete control over the movement of the two propellers under all circumstances. It is claimed that these engines are the lightest and most compact yet constructed for twin screw vessels.



ENGINES OF THE TWIN SCREW SPANISH GUNBOATS.

The Torpedo Boat Problem.

The *Army and Navy Journal* thinks the problem of a torpedo boat capable of firing rapidly and with certainty, has at length reached a satisfactory solution. It says:

"A boat has been completed which is proved by experiment to be faultless in machinery and arrangement. On the 2d of December, Secretary Robeson, Vice-Admiral Porter, and Commodore Case, Chief of the Bureau of Ordnance, went to the Navy Yard at Washington, to witness the experiment with this new engine of destruction. After examining the workings of the machinery, and the manner of firing, one of the destructives was put in the frame and the party proceeded to the shore to witness the result. A torpedo of only thirty-six pounds was first run out with rapidity and fired; but the result showed that this small amount of powder, even, would have been sufficient to destroy any ship, by lifting her out of the water and breaking her back, even if her bottom was not knocked out altogether. Mud and water were thrown up together, and the concussion was felt far up in the Navy Yard, the ground being shaken by the shock of the powder against the bed of the river. The concussion felt on board the torpedo-boat was not more than that caused by a wave striking a vessel at sea.

"Several torpedoes were fired from the vessel, the explosion of which the party witnessed on board, as they desired to ascertain for themselves the effect of the shock. The result seemed satisfactory, as no change whatever is contemplated in the machinery, which is very simple, and 'works to a charm.' The torpedo vessel is the *Nina*, a very strong iron boat of three hundred and fifty tuns burden, capable of crossing the ocean, and having a speed of seventeen knots an hour. She is not impervious to heavy shot, but can be made so, and is capable of resisting any ordinary projectile that could be brought to bear on her from the decks of a ship of war. Her decks will be made torpedo and shot-proof, and several arrangements will be applied, now that it is known that the torpedo system is a success. Such a vessel as the *Nina*, attacking an enemy's squadron on our coast some dark night, or entering an enemy's port, could destroy half the vessels in the harbor, and easily escape, as few vessels could overtake her. Such a vessel could, for instance, enter the harbor of Havana, and destroy every vessel of war in the port, under cover of darkness. A squadron supplied with such boats to be used to attack, after the fight began, and the ships were enveloped in smoke, would have a most decided advantage against an enemy not thus armed for torpedo warfare. It is reported that our torpedo navy will consist of twenty vessels, none of which will have a less speed than twelve knots, and the fastest of them will go seventeen knots."

SUGAR MAKING IN LOUISIANA.

The New Orleans *Times* contains, in a late number, an account of the manufacture of sugar as conducted on the Poychus estate, from which we extract portions containing the essential particulars of cane sugar making as conducted in the southern portions of the United States.

"Reaching the cane shed, the crop, dumped into piles, is received by a crowd of feeders, who place it (eight or ten stalks at a time) on the cane carrier. This is an elevator, on an endless band of wood and iron, which carries them to the second story, where the stalks drop between the rollers. An immense iron tank below, called a juice box, receives the liquid portion, and another elevator bears the bruised and broken fragments to the opposite side of the building, where they are dropped into the bagasse burner.

"This invention, at its introduction, caused more scientific inquiry and dispute, probably, than any other of the age, and settled beyond question the possibility of combustion, without the use of atmospheric air. The process consists in dropping the wet, spongy mass into a fire of wood or coal, and closing the furnace doors. The steam arising from the drying matter passes to a chamber in the rear, where, by the intense heat, it is decomposed. Oxygen and hydrogen (both strong combustibles) unite with the carbon, reaching there in the form of smoke, and a white heat is the result.

"Cane juice, as it escapes from the mill, could scarcely be considered inviting to either palate or vision. The sweet, slimy mass of fluid, covered with foam, and filled with sticks, has more the appearance of the water in a brewer's vat than anything which now suggests itself. A small furnace, containing a quantity of burning sulphur, sends through a tube a volume of its stifling fumes, and these, caught by jets of steam, thoroughly impregnate the contents of the juice box. Having received its first lesson in cleanliness, the liquid now rises through a tube to the series of clarifiers on the second floor. They are heated by a chain of steam pipes running along the bottom, and being filled, the juice slowly simmers. Much of the foreign substance rises in a scum to the surface and is skimmed off by the sugar maker. It is further purified by the addition of Thomaston or what is called sugar lime. About half a peck is considered sufficient for seven hundred and fifty gallons of juice, but much depends upon the quantity of saccharine matter it contains. Another set of pipes now permit the liquor to run into the evaporators, in the boiling room below. These are also heated by circles of steam pipes, and the liquid is first gently simmered, to enable any additional foreign substance to rise to the surface and be skimmed off.

"After that the steam is turned on fully, and the juice boils until it reaches the solidity of twenty-five degrees, as measured by the saccharometer. This point attained, more pipes conduct it to a series of square iron tanks called filterers. Each is provided with a false bottom, covered with thick woolen blankets, and through these the juice slowly drips into an immense iron vessel called a sirup tank.

"The process of cleaning has now been completed, and the

sirup is pumped into the covered vessel previously alluded to, called the vacuum pan.

"This is also heated by layers of steam pipes, and here the liquor boils until the process of crystallization is completed. This end achieved, another conductor permits the substance to slowly descend to a large square iron tank, called a strike-pan. The process of emptying the vacuum pan is technically called a "strike." We now find a reddish brown substance, having somewhat the appearance of soft mortar.

"Men are at hand with square wooden boxes, and while the sugar is still warm, it is placed in rotary cylinders, protected on the inside by wire guards, called centrifugals.

"Placed on a horizontal, they revolve with a velocity which frequently reaches 1200 a minute. The damp, dingy looking pile instantly spreads, a broad circle of yellow is first visible on the inner rim of the machine, and this slowly whitening finally becomes a shining ring of snowy sugar. To effect this result requires the aid of nine steam boilers, three steam engines, a vacuum pan, three large evaporators, five clarifiers, five filters, an immense sirup tank, the juice box, mill, bagasse furnace, and fifteen coolers.

"With the engineers, sugar makers, firemen, and laborers, thirty-eight persons are constantly on duty in this sugar-house.

"Doubling this number, to give each the necessary rest, swells the gathering to seventy-six souls, who, during the grinding season, find employment at the sugar-house alone. This of course does not include the laborers employed in gathering and bringing in the crop, and the great number occupied in odd jobs and the extensive repairs which are constantly going on."

Sticking, or Court Plaster.

This plaster is well known from its general use and its healing properties. It is merely a kind of varnished silk, and its manufacture is very easy.

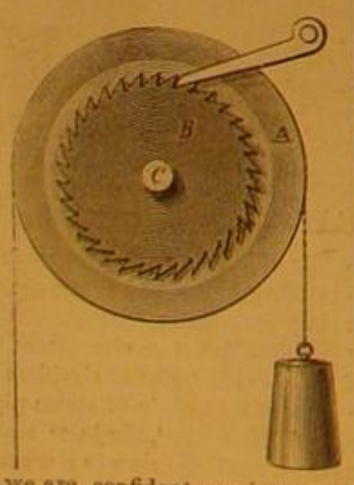
Bruise a sufficient quantity of isinglass, and let it soak in a little warm water for four-and-twenty hours; expose it to heat over the fire till the greater part of the water is dissipated, and supply its place by proof spirits of wine, which will combine with the isinglass. Strain the whole through a piece of open linen, taking care that the consistence of the mixture shall be such that, when cool, it may form a trembling jelly.

Extend the piece of black silk, of which you propose making your plaster, on a wooden frame, and fix it in that position by means of tacks or pack-thread. Then apply the isinglass (after it has been rendered liquid by a gentle heat) to the silk with a brush of fine hair (badgers' is the best). As soon as this first coating is dried, which will not be long, apply a second; and afterwards, if you wish the article to be very superior, a third. When the whole is dry, cover it with two or three coatings of the balsam of Peru.

This is the genuine court plaster. It is pliable, and never breaks, which is far from being the case with many of the spurious articles which are sold under that name. Indeed, this commodity is very frequently adulterated. A kind of plaster, with a very thick and brittle covering, is often sold for it. The manufacturers of this, instead of isinglass, use common glue, which is much cheaper; and cover the whole with spirit varnish, instead of balsam of Peru. This plaster cracks, and has none of the balsamic smell by which the genuine court plaster is distinguished. Another method of detecting the adulteration is to moisten it with your tongue *on the side opposite to that which is varnished;* and, if the plaster be genuine, it will adhere exceedingly well. The adulterated plaster is too hard for this; it will not stick, unless you moisten it on the varnished side.—*The Painter, Gilder, and Varnisher's Companion.*

AN IMPROVED HOISTING PULLEY WANTED.

A gentleman of this city has sent us the accompanying diagram of an improved hoisting pulley, for which he says he would be willing to pay any reasonable price provided he knew where to obtain it—the wheel, not the price. It is a pulley within a pulley, the friction of the outer one upon the inner one—the latter being held by a ratchet and pawl—acting as a brake in lowering weights, while both would turn together in elevating weights. The idea is rather an ingenious one, but we are confident our inventor can attain a like object by simpler means.



THE VACUUM METHOD OF MAKING ICE.—An ice and cold producing machine has been invented by Herr Franz Windhausen, Brunswick. The action of the machine is based on the principle of producing cold by the expansion of atmospheric air, which is accomplished by means of mechanical power. The machines require no chemicals, nothing being used in them but water and atmospheric air. They may be wrought by steam, water, or wind, and they produce from 100 to 1,000 lbs. of ice per hour, according to size, at a cost of from 2d. to 5d. per 100 lbs., this difference resulting from the varying prices of fuel and the mode of working chosen. One of their uses is to cool rooms, cellars, theaters, hospitals, compartments of ships, etc.—*Builder.*

FERDINAND DE LESSEPS---CHIEF PROMOTER OF THE SUEZ CANAL.

[From the Phrenological Journal.]

The scheme of re-opening the canal of the Pharaohs between the Mediterranean and Red seas, and thus connecting by a short cut across the Isthmus of Suez the commerce of Europe and Asia, though long entertained by the first Napoleon, may fairly be claimed for M. de Lesseps. His attention was doubtless first drawn to it by reading the memorable report of M. la Père, who was employed by Bonaparte to make a survey in 1798. The credit of designing and executing the great work belongs alike to him. With the general plan, progress, and purpose of the Canal, the American reader has, during the past few months, been made tolerably familiar.

He is the son of Jean Baptiste Barthelemi, Baron de Lesseps, who was born at Cette, a French port on the Mediterranean, in 1765. Jean Baptiste was for five years French Vice-Consul at St. Petersburg. In 1785 he accompanied La Perouse on a voyage to Kamtchatka, whence he brought by land the papers containing a description of the expedition. In 1788 he was Consul at Kronstadt and St. Petersburg. From St. Petersburg he was called, in 1812, by the Emperor Napoleon, to Moscow, as *intendant*. From the latter city, in 1814, he proceeded to Lisbon, and was stationed there as Consul until 1823. He died at Paris, May 6, 1834.

Ferdinand, the subject of this sketch, was born at Versailles in 1805, and is consequently in his sixty-fourth year, though his appearance is that of a man little past the meridian of life. Early in life he evinced peculiar aptitude for the diplomatic career in which he has since distinguished himself—a career as varied and romantic as it is brilliant. In 1825 he was appointed *attaché* to the French Consulate at Lisbon. Two years later found him engaged in the Commercial Department of the Minister of Foreign Affairs. During the latter part of 1828 he was *attaché* to the Consul-General at Tunis; and in 1831 he was dispatched by his Government as Consul to Alexandria. Hard work and rapid promotion for *le jeune diplomat!* But the most eventful period of his long and wonderfully active career lay yet before him.

Seven years subsequent to his appointment at Alexandria, and consequently when he was in his thirty-fifth year, he was sent as Consul to Rotterdam. From Rotterdam he proceeded to Malaga in 1839, to negotiate in behalf of French commerce with the Spanish Government. In the latter part of the same year he was transferred to the Consulate at Barcelona, where during the two subsequent years he was especially active, and signally distinguished himself against the reign of Espartero. In 1844 we again find him in Alexandria, whither he was sent to take the place of Lavalette. But the time for the development of his great project had not yet come. He did not long remain in the Egyptian capital. Returning to his former position in Barcelona he was witness to some of the scenes of the revolution of February. In 1848 he was appointed French Minister at the court of Madrid. Remaining in the Spanish capital about a year, he returned to Paris immediately after the revolution of '48, and in May of the following year was dispatched as Envoy of the French Republic to the Republican Government of Mazzini at Rome, where he took a leading part in the abortive negotiations which preceded the restoration of the Pope by a French army.

In 1854 he received a commission from the *Société d'études du Canal de Suez* at Paris to negotiate with Sâid Pacha for the construction of the canal projected in 1816. Accordingly, toward the close of that year, we again find him on the Isthmus, preparing for his great work. This time he came to conquer. His mission was crowned with success, and the necessary concession made in November of that year. A palace and a retinue of servants were assigned to his use, and he was treated, as a guest of the Viceroy, with the utmost respect. Great opposition followed, especially from England; and it was not till January, 1856, that the second and fuller concession was granted by Sâid Pacha, and a *Compagnie International* fully organized.

In 1858 M. Lesseps succeeded in raising two hundred millions of francs in France, and in 1859 he proceeded to Egypt and planted the Egyptian flag in the harbor of the ancient Pelusium, the great sea-port of Egypt thirty centuries ago, where Port Sâid now stands. He laid, at the same time, the foundation of a lighthouse, and proudly proclaimed the work commenced. Fresh difficulties—chiefly of a political nature—interposed, but the indefatigable Lesseps never despaired. In 1859 he had the satisfaction of seeing his company and work placed upon a firm footing, though the final decision of the French Emperor was not given till July, 1864. From that time to the present hour the Canal has steadily progressed toward completion.

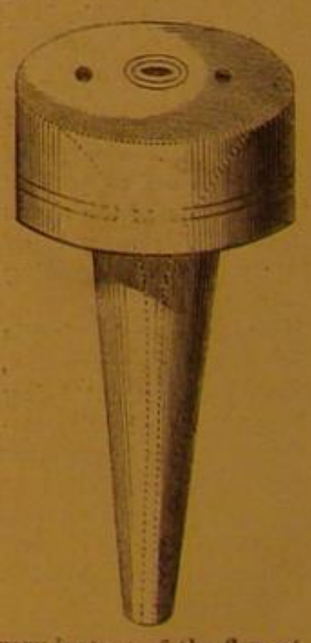
The personal appearance of M. de Lesseps is very striking. Though long past middle age, he has a fresh and even youthful appearance. Both face and figure are well preserved; his slightly curling gray hair sets off in pleasing contrast his bronzed yet clear complexion, his bright eye, and genial smile. He is somewhat over the medium stature, possessed of a compact and well-knit frame, carries his head erect, and moves about with a buoyancy and animation perfectly marvelous in one of his years and experience. His address is that of the well-bred, well-educated French gentleman that he is. His manner is winning, his voice clear and under most excellent control, as all those who have listened to his admirable lectures on the Canal at the late Paris Exposition cannot fail to remember. What is perhaps most remarkable in a man so bred and constituted, is that with great gentleness of speech and suavity of manner he combines a strength of will and fixity of purpose worthy of Napoleon or Cæsar himself. Beneath that calm exterior lay a power which needed but the stimulus of a great idea to develop.

Though beset by difficulties, laughed at, and maligned, he has never for a moment swerved from his purpose or relaxed his efforts to accomplish it. Neither the sneers of Stevenson and his associate engineers, the heavy broadside of the "Thunderer," or the squibs of *Punch*, ever made any visible impression on the purpose or action of Lesseps.—"My purpose from the commencement was to have confidence," said he.

How bravely he has maintained his principle and redeemed his pledge let the ceremonies which marked the completion and inauguration of his great work tell—when sea sent greeting to sea; and let the keels of richly laden argosies from Cathay and from Ind, which plow the waters of the Canal, declare.

AN INGENIOUS VENT PEG.

The engraving illustrates an English invention of value in that it provides a means of giving vent to casks from which liquids are to be drawn, at the same time excluding the air when the drawing is discontinued, and thus preventing deterioration in the liquid by undue exposure to air.



The principle on which it operates is that of admitting just so much air as may be required to fill the vacant space produced by the withdrawal of the liquor from time to time, and affording this air no egress, thus hermetically sealing the barrel. This is effected by means of a valve opening inward, at the upper portion of the peg, so long as the density of the exterior air is in excess of that within. This action takes place at the very instant of the flow of the liquid, and ceases with it; for at that instant all further supply is shut off, there being no further pressure.

THE LARGE TREES OF TEXAS.—The large court-house of Navarro county is said to have been covered with shingles made from a single cedar tree. The oaks, pecans, and cedars of that section of the country attain an immense size. A pecan tree in Navarro county, on the banks of the Trinity, measured twenty-three feet in circumference. The cedars are often more than 100 feet high.

ELECTRIC MESSAGES.—Although it may require an hour, or two or three hours, to transmit a telegraphic message to a distant city, yet it is the mechanical adjustment by the sender and receiver which really absorbs this time; the actual transit is practically instantaneous, and so it would be from here to China, so far as the current itself is concerned.

A New English Patent Pulley Block.

The following description of a new pulley block, which we take from the *Ironmonger*, does not give as clear an idea of the invention as could be desired, but it shows that invention in this field has not yet exhausted itself:

"The block is made on the differential principle. The lifting chain is passed over two sheaves, each of which is geared internally, the one having one or more teeth in excess of the other. Revolving around these internal teeth is a pinion, actuated by an eccentric, which is keyed on to a shaft passing through the center of the block, with a bearing at each end in the outside frame of the block. At one end of this shaft is a wheel with an endless hand chain passing over it; this gives the motion to the eccentric shaft. The teeth of the internal pinion are broad enough to gear into the teeth of both the sheaves, but as there is more teeth in one than in the other, they (the teeth) are not exactly opposite each other, and therefore will not admit the teeth of the revolving pinion without moving; but the tooth of the pinion, acting as a wedge, and entering with great power, pushes the one tooth forward and the other tooth back; and this continually occurring, a continual rotary motion is given to the sheaves, in opposite directions, with a power which is proportioned to the number of the teeth, the throw of eccentric, and the leverage gained by the diameter of the hand wheel. The lifting chain is passed over the one sheave, then down, and up over the other, the two ends being attached to a powerful cross bar, to which is connected the lifting hook. By this means the weight is distributed over the two sheaves and the two parts of the chain, increasing the safety and diminishing the friction of the block.

"The blocks are very simple in construction, and are not at all liable to get out of order; the construction being such that the weight cannot run down, though the men lifting let go the chain. They hang quite plumb when in action, and the men are able to stand clear away from under the load, as the hand-wheel chain can be worked at any angle."

Plants in Sleeping Rooms.

The following from the able pen of Dr. J. C. Draper, in the January number of the *Galaxy*, will answer some inquiries lately received on the subject, and is a brief, but clear exposition of the injurious effects of plants in sleeping apartments:

"Though the air is dependent for the renewal of its oxygen on the action of the green leaves of plants, it must not be forgotten that it is only in the presence and under the stimulus of light that these organisms decompose carbonic acid. All plants, irrespective of their kind or nature, absorb oxygen and exhale carbonic acid in the dark. The quantity of noxious gas thus eliminated is, however, exceedingly small when compared with the oxygen thrown out during the day. When they are flowering, plants exhale carbonic acid in considerable quantity, and at the same time evolve heat. In this condition, therefore, they resemble animals as regards their relation to the air; and a number of plants placed in a room would, under these circumstances, tend to vitiate the air.

"While the phanerogamia, or flowering plants, depend on the air almost entirely for their supply of carbon, and are busy during the day in restoring to it the oxygen that has been removed by animals, many of the inferior cryptogamia, as the fungi and parasitic plants, obtain their nourishment from material that has already been organized. They do not absorb carbonic acid, but, on the contrary, they act like animals, absorbing oxygen and exhaling carbonic acid at all times. It is, therefore, evident that their presence in a room cannot be productive of good results.

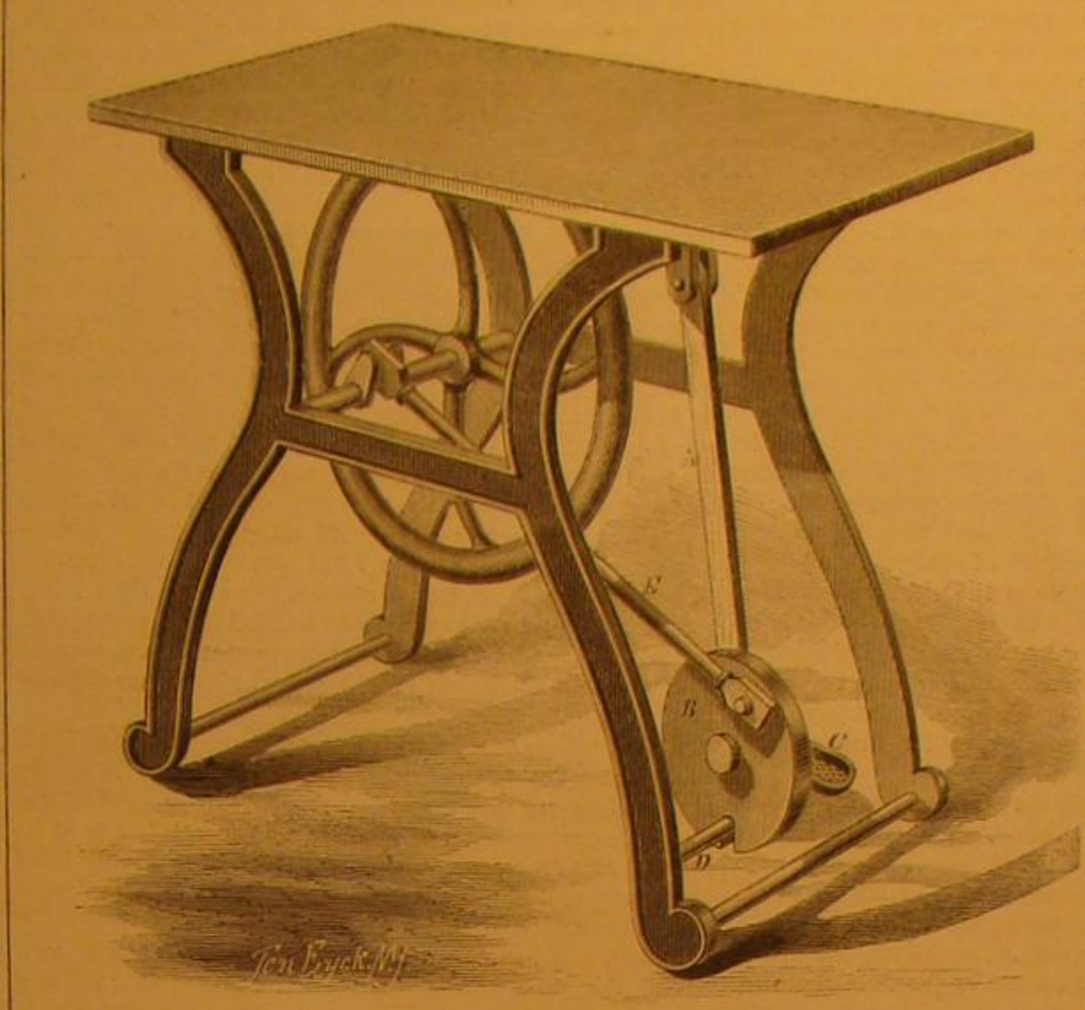
"Aside from the highly deleterious action that plants may exert on the atmosphere of a sleeping room, by increasing the proportion of carbonic acid during the night, there is another and more important objection to be urged against their presence in such apartments. Like animals, they exhale peculiar volatile organic principles, which in many instances render the air unfit for the purposes of respiration. Even in the days of Andronicus this fact was recognized, for he says, in speaking of Arabia Felix, that 'by reason of myrrh, frankincense, and hot spices there growing, the air was so obnoxious to their brains, that the very inhabitants at some times cannot avoid its influence.' What the influence on the brains of the inhabitants may have been does not at present interest us: we have only quoted the statement to show that long ago the emanations from plants were regarded as having an influence on the condition of the air; and, in view of our present ignorance, it would be wise to banish them from our sleeping apartments, at least until we are better informed regarding their true properties."

PATENT OFFICE ILLUSTRATIONS.—We are indebted to Messrs. Jewett & Chandler, of Buffalo, N. Y., for advance sheets of the illustrations designed to accompany the Report of the Commissioner of Patents for the year 1868. We have frequently had occasion to commend the skill and fidelity of these illustrations. They are most admirably done, and the value of our Patent Office Reports is much enhanced thereby. In fact without these illustrations the reports would be of little value.

Improved Treadle Motion.

It is well known that the ordinary means employed to propel light machinery by the foot are fatiguing in the extreme; and although the best of these is the rock shaft with foot pieces, employed almost universally in modern sewing machines, this requires the operator to sit bolt upright, a position very trying to the back, and one which has been shown to be productive of weakness and even permanent disease.

The device shown in the engraving employs only the swinging motion of the leg to generate the required power.



GOODES' IMPROVED TREADLE MOTION.

A pendulum, A, is pivoted to the underside of the table and carries a heavy disk, B. To the central pivot of B is attached a foot piece, C. The bottom of B is slotted, and through the slot passes a stationary rod, D, which holds the bottom of the disk from vibrating while it causes the upper part to reciprocate with the swinging of A.

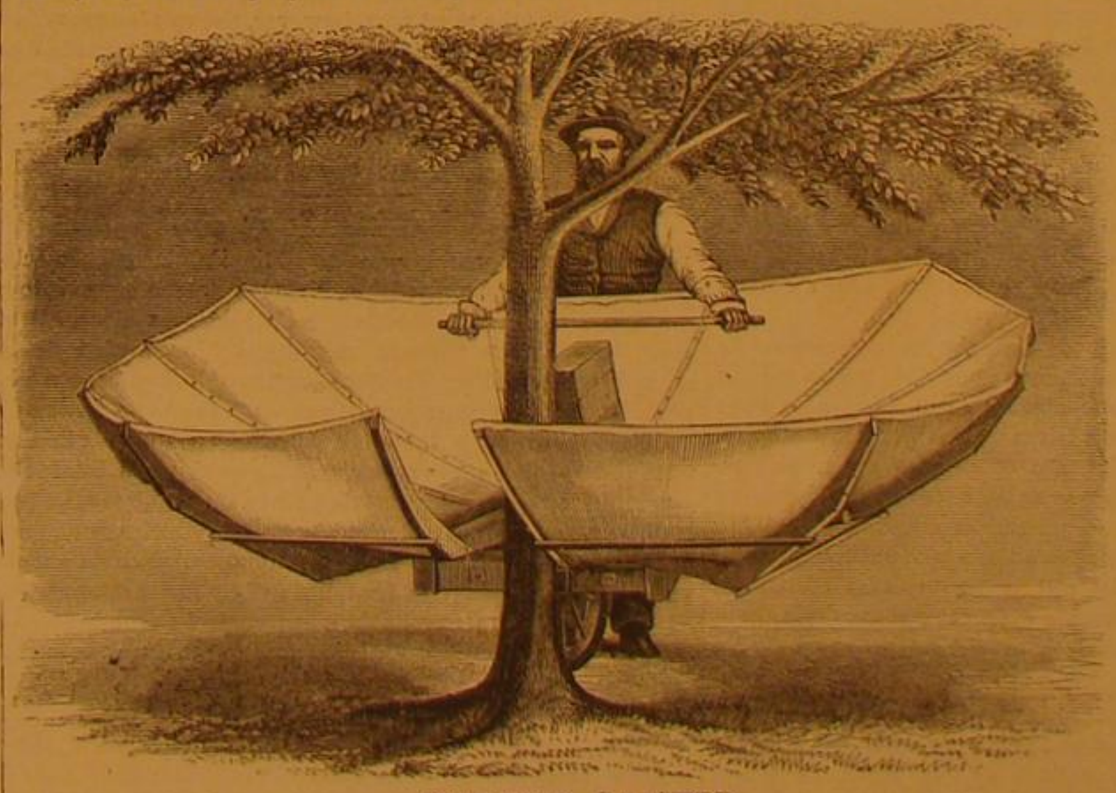
To the upper part of B is pivoted a pitman which actuates the crank as shown.

In operation the foot is placed upon the foot piece, and a swinging motion is imparted by it to the pendulum, which is ultimately converted into rotary motion by the crank as described. The heavy disk, B, gives steadiness to the motion, and acts in concert with the fly wheel on the crank shaft for this purpose; but it is not essential that this part of the device should be a disk; any equivalent may be substituted for the same purpose.

Patented, through the Scientific American Patent Agency, Oct, 26, 1869, by E. A. Goodes. For further information address Philadelphia Patent and Novelty Co., 717 Spring Garden street, Philadelphia, Pa.

Improved Method of Catching Curculios.

This is a novel and curious invention, made by Dr. Hull, of Alton, Ill., for the purpose of jarring off and catching the curculio from trees infested by this destructive insect. It is a barrow, with arms and braces covered with cloth, and having on one side a slot, which admits the stem of the tree. The curculio catcher, or machine, is run against the tree three or four times, with sufficient force to impart a jarring motion to all its parts. The operator then backs far enough to bring the machine to the center of the space between the rows, turns round, and in like manner butts the tree in the opposite row. In this way a man may operate on three hundred trees per hour.



CURCULIO CATCHER.

A bag and a broom are carried by the operator by which the insects are swept from the cloth and consigned to destruction.

Remains of a Megatherium in Ohio.

The Columbus *State Journal*, of Dec. 6, says "there is now on exhibition at the rooms of the State Board of Agriculture, or headquarters of the Geological Corps, a section of the femur or thigh bone of an animal of the mastodon species, the fossilized remains of which were recently discovered in Union county. These remains were found in a drift formation about three feet below the surface, and are similar to the remains of the Megatherium found in other parts of the State. Arrangements were made by Mr. Klippart, of the Geological Corps, to have the skeleton or the parts thereof removed with proper care. Before excavations had proceeded far bad weather set in, and work has been abandoned. The section of the femur, upper part, with socket ball, is about twenty inches in length, or about half the length of the thigh bone. This would make the aggregate length of the bones of the leg about ten feet. The ball is twenty-two inches in circumference, and the bone lower down, of course, much larger. From the part of the skeleton secured, it is estimated that the hight of the animal was twelve and a half feet, and the skeleton entire much larger than the specimen now in the British Museum. As this particular species, or remains thereof, have been found only in Ohio, this specimen has been named the *Megatharium Ohiocnsis*. The animals lived, it is supposed, in the period immediately preceding the human period, and were after the elephant type.

Exhuming operations will be resumed in the spring, and if the skeleton is removed in good shape or a good state of preservation, it will be set up in the Echo room at the Capitol, where the fossils collected by the Geolo gical Corps are now being arranged and stored.

Artificial Ivory.

A process for producing artificial ivory has been published in a German journal. The inventor makes a solution of india-rubber in chloroform and passes chlorine gas through it. After this, he heats the solution to drive off any excess of chlorine, and also the solvent, whereupon he has left behind a pasty mass with which it is only necessary to incorporate sufficient precipitated carbonate of lime or sulphate of lead, or, indeed, any other dense white powder, to obtain a material which may be pressed into molds to form whatever articles may be desired. The details of this process are obviously incomplete, and the success of it may be doubted. Only good and well masticated rubber could be employed, and even then a dilute solution must be made, and any earthy impurities allowed to deposit. In the next place, we are doubtful of the bleaching action of chlorine on rubber, and, moreover, chloroform is, under some circumstances, decomposed by chlorine. Lastly, it is clear that, to obtain a hard material at all resembling ivory, it would be necessary to make a "hard cure," for which a considerable proportion of sulphur would be required. The simple purification of india-rubber by means of chloroform, would, however, furnish a mass of a very fair color.

AN iron car made of cylindrical form is now used on the Bengal Railway, for the carriage of cotton and other produce. It is much lighter and safer than the ordinary car. We believe in iron cars.

ONE HUNDRED THOUSAND.—At the rate old subscribers are renewing, and new ones coming in, there is a prospect that our ambition to increase the circulation of this paper to one hundred thousand will be gratified.

AMERICAN AND ENGLISH RAILWAY PRACTICE CONTRASTED.

A paper on "American Locomotives and Rolling Stock," read before the Institution of Civil Engineers, in England, with an abstract on the discussion thereon, has been forwarded to us by the publishers, William Clowes and Sons, Stamford street and Charing Cross, London.

We have seldom met with a pamphlet of greater interest and value. The whole subject of American as contrasted with English railroad practice is reviewed, and the differences which exist, with the necessities for such differences ably discussed. Mr. Colburn shows these differences to be external rather than fundamental, and traces many of the peculiarities of American construction to the "initiative of English engineers." The cause for the adoption and retention of these peculiarities he attributes to "the necessities of a new country and the comparative scarcity of capital," and thinks that but for these causes "American railways and their rolling stock would have doubtless been constructed, as in other countries, upon English models, and worked, in most respects, upon English principles of management.

He reviews the origin and introduction of American features of railway practice, and points out as the distinguishing feature of American locomotives and rolling stock the bogie, or swiveling truck. "Keeping in mind the distinguishing merits of the bogie, the other differences between English and American locomotives are differences more of costume and of toilet than of vital principles of construction."

The author attributes the origin of the greater subdivision of rolling weight and consequent coupling of wheels on American roads to the comparatively weak and imperfect permanent way, estimating the maximum weight per wheel as being for many years four English tuns, while three tuns he considers, as more than the average for each coupled wheel of American locomotives.

To follow the author through the whole of his able paper, and the discussion which it elicited, would occupy more of our space than we can spare for the purpose. We will, however, give in the author's own language, an account of an experiment conducted by him in 1855 on the Erie Railroad.

"In the autumn of 1855, the author, at the request of Mr. (now General) M'Callum, the manager of the Erie Railroad, took charge of an experimental train, which he ran over the whole length of the line and back, a total distance of nearly 900 miles. The same engine was employed throughout the run, occupying in all nearly three weeks, making an average for each week day of about 50 miles. The line is divided into four divisions, varying considerably in respect of gradients, and the utmost load the engine could draw was taken in both directions over each division. The maximum inclinations were 1 in 88. The results of the experiments were so voluminous, that it will be sufficient to detail the particulars of what may be termed crucial tests of adhesion and resistance to traction.

"The engine had four coupled wheels and a bogie, the total weight in working trim being 29½ tuns, of which 17⅞ tuns rested on the coupled wheels available for adhesion. The coupled wheels were 5 feet in diameter; the outside cylinders were 17 inches in diameter, and the stroke 24 inches. The safety valves were set to blow off at 130 lbs., and the steam, as observed by a Bourdon gage, was seldom allowed to exceed that limit. No indicator diagrams were taken, nor was any measure taken of the wood burnt, all that could be consumed by the engine, in maintaining the requisite steam, being supplied. The tender, loaded, weighed 18¼ tuns. The train drawn consisted of eight-wheel wagons fully loaded with deals. The average weight of each wagon was 5 tuns 8 cwt. 3 qrs., and of each wagon with its load 15 tuns 5 cwt. 3 qrs. nearly. The wagons had cast-iron chilled wheels, each 2 feet 6 inches in diameter, with inside journals 3⅞ inches in diameter, and 8 inches long. All the wagons had been put in complete order, and the journals, fitted with oil-tight boxes, were kept well oiled. The gage of the line was 6 feet. The weather was most favorable, clear and dry, with the exception of a single day of heavy rain.

"Upon about one hundred miles of the line, forming a portion of the Susquehanna division, a train of one hundred wagons, weighing, with engine and tender, 1,572 tuns was taken. The train was a few feet more than half a mile in length.

"At one point it was stopped where the line commenced an ascent of 24 feet in four miles, averaging 1 in 880 up for the whole distance. There were also long and easy curves upon this portion. The train was taken up and purposely stopped on the second mile, to be sure of starting again with no aid from momentum. The average speed was 5 miles an hour, and neither was the pressure of steam increased nor sand used except in starting from the stops purposely made. The engine, even were its full boiler pressure of 130 lbs. maintained as effective pressure upon the pistons throughout the whole length of their stroke, could not have exerted a tractive force greater than $\frac{17^2 \times 130 \text{ lbs.} \times 2 \text{ ft.}}{5 \text{ ft.}} = 15{,}028$ lbs.; nor is it at all probable that the effective cylinder pressure could have approached this limit by from 10 lbs. to 15 lbs. per square inch. Supposing, however, for the sake of a *reductio ad absurdum*, that the full boiler pressure had been maintained upon the pistons for the whole length of their strokes, the adhesion of the coupled driving wheels, not deducting the internal resistances of the engine, would have been $\frac{15{,}028}{40{,}050} = \frac{3}{8}$ of the weight upon them. In any case there was a resistance of 4,011 lbs. due to gravity, and if even 120 lbs. mean effective cylinder pressure be assumed, corresponding to a total tractive force of 13,872 lbs., the quotient representing the rolling and other resistances, exclusive of gravity, would be but 6·27 lbs. per tun of the entire train; a resistance including all the internal resistances of the engine, the resistance of the curves, easy although they were, and the loss in accelerating and retarding the train in starting and stopping. This estimate of resistance would correspond, at the observed speed of 5 miles an hour (upwards of ⅓ of an hour having been consumed on the 4 miles), to 185 indicated H. P., which, with the driving wheels, making but 28 revolutions per minute, would be the utmost that an engine with but 1,038 square feet of heating surface could be expected to exert. This was the highest result observed during the three weeks' trial, but one or two others are worthy of mention. On the Delaware division of the same line, the train, of 1,572 tuns' weight, was run over 5 consecutive miles of absolutely level line, at a mean rate of 9·23 miles an hour, and during the same day, over 5 other consecutive miles of level at a mean rate of 9·7 miles per hour. On both levels there were 14½ chain curves of good length, and the speed, from 9 to 12 miles an hour, at which the train entered the respective levels, was not quite regularly maintained throughout the half hour expended in running over them. But if even 7 lbs. per tun of the total weight be taken as the resistance at these speeds, the tractive force will be 11,004 lbs., which is more than one fourth the adhesion weight of 40,050 lbs. On the next day, the same engine drew 30 wagons weighing 466½ tuns, or, including engine and tender, 514 tuns nearly, up a gradient of 1 in 117½, three miles long, at a mean speed of 10¼ miles an hour. The resistance due to gravity was 9,814 lbs., and supposing the other resistance to traction to amount to no more than 7 lbs. per tun, the total resistance would be 13,412 lbs., corresponding to a mean effective cylinder pressure of 117 lbs. per square inch, and to a co-efficient of adhesion of almost exactly one third.

"It is needless to repeat instances of much the same kind, as occurring during the experiment referred to. The author is bound to say that they were, no doubt, influenced by the favorable circumstances of weather, and something is to be allowed also for the great length of train drawn, very long trains having a less tractive resistance per tun on a level than short ones, and something, possibly more than is commonly supposed, may have been due to the use of oil-tight axle boxes, the saponaceous compound known as 'railway grease' being nowhere in use on railways in the States. It could not possibly be used, except in a congealed form, in the severe American winters; and Messrs. Guebhard and Dieudonné's experiments (*vide* "De la résistance des trains et de la puissance des machines." 8vo. Paris, 1868, p. 36) made in 1867, on the Eastern Railway of France, showed a very considerable diminution in the resistance of oil-boxed rolling stock as compared with that fitted with grease boxes. But, weighed upon the other hand, are the facts, first, that the line was of 6-feet gage, and, *pro tanto*, so much the worse for traction; secondly, that the wheels were comparatively small, and the inside journals of comparatively large diameter, the ratio of the former to the latter being as 7⅞ to 1, instead of 12 to 1 as on English lines. It is difficult to believe that the length and steadiness of the double bogie goods wagons, scarcely liable as they are to lateral vibrations, had not something to do with the result, which is in some respects unique in the history of railway traction. The result, although not absolutely showing the real resistance to traction, nor the real adhesion of the engine, presents this alternative; namely, that the resistance must have been unusually small, or the adhesion unusually large."

In the discussion which followed some doubts were expressed as to the accuracy of Mr. Colburn's conclusions, drawn from the experiments described; but it was conceded by some who took part in the discussion that some of the features of our practice might be advantageously copied in England. For the most part, however, the opinion prevailed that the features of our system, which are here regarded as almost indispensable, could not be introduced into English practice with advantage.

BOILER COVERING.

BY C. M. O'HARA, C. E.

At the regular weekly meeting of the Polytechnic Association of the American Institute, held on Thursday evening, the 25th ult., the subject of boiler clothing was discussed at some length, but without any decisive conclusion being arrived at respecting the most serviceable and economical material for that purpose. It appeared from the testimony adduced, that though there is a variety of substances in use, even those which are practically acknowledged as being the most efficient are far from coming up to the required standard of utility, and are characterized by defects which are at once forced upon us by a little close examination. Felt is an admirable non-conductor of heat, but owing to its combustible nature it is quite unreliable when subject to the heat of a high pressure of steam. A large fragment of this material which had been taken off the boiler of a North River steamboat was exhibited at the meeting, scorched and charred as if it had been exposed to the direct action of fire. For these reasons felt covering is, generally speaking, confined to boilers in which a comparatively low pressure of steam is maintained. But even under the most favorable circumstances of actual wear its durability is limited to a short period.

Powdered charcoal possesses the elements of efficiency as a non-conductor in an eminent degree; but its susceptibility of taking fire militates strongly against its adoption as a boiler covering.

Besides the materials above mentioned, there are some which come under the denomination of cements; but the use of such is somewhat at variance with what a dull world would call "facts." Employing them as a clothing for a vessel in which it is necessary to retain heat is certainly the wrong way of doing a right thing, if the evidence of distinguished experimenters be worth anything.

The researches of most well-informed physical philosophers go to prove that the conducting properties of bodies are augmented by cohesion, and that heat is conveyed profusely and energetically through all solid and ponderable substances. Thus gold, silver, and others of the most solid metals are the best conductors. Next to the pure metals in conducting powers are rocks, flints, porcelain, earthenware, and the denser liquids as the solutions of the acids and alkalies. As a further evidence to prove that the passage of heat through all substances is increased by cohesion, even some of those which are known to be among the best conductors are deprived of this property by a division or disintegration of their particles. Pure silica in the state of hard, rock crystal is a better conductor than bismuth or lead; but if the rock crystal be pulverized, the diffusion of heat through its powder is very slow and feeble. Heat is conducted swiftly and copiously through transparent rock salt, but pulverization converts the solid mass into a good non-conductor. Caloric has for the same reason a stronger affinity for pure metals than for their oxides.

Again, wood is known to be a better non-conductor when reduced to shavings or sawdust than when in the solid state. It is probably on this account that trees are protected by bark, which is not nearly so dense and hard a body as the wood. Wool, silk, and cotton are much diminished in conducting qualities when spun and woven, for the reason that their fibers are brought closer together.

Count Rumford discovered that hot water, at a given temperature, when placed in a vessel jacketed with a clothing of twisted silk, and plunged into a freezing mixture, cooled down to 135° Fah. in 917 seconds. But when the same vessel was clothed with an equal thickness of raw silk, water at the same heat and under the same process required 1,264 seconds before it reached the same decrease of temperature. It was also found by Sir Humphry Davy that even metals became non-conductors when their cohesion was destroyed by reducing them to the gaseous state.

It is now generally admitted that, heat being motion, anything, which, by the cohesion of particles, preserves the continuity of the molecular chain along which the motion is conveyed, must augment calorific transmission. On the other hand, when there is a division or disintegration of atoms, such as exists in sawdust, powdered charcoal, furs, and felt, the particles composing such bodies are separated from each other by spaces of air, which the instructed among us well know are good non-conductors of heat. The motion has, therefore, to pass from each particle of matter to the air, and again from the air to the particle adjacent to it. Hence, it will be readily seen, that in substances composed of separate or divided particles, the thermal bridge, so to speak, is broken, and the passage of heat is obstructed by innumerable barriers of confined air. The correctness of these assumptions has been so abundantly proved by experimental demonstrations, that every mind that is tolerably informed on the subject must be relieved of every shade of doubt respecting the greatly superior non-conducting powers which bodies consisting of separate atoms possess over those of a solid concrete nature.

The next matter of interest connected with the subject under notice is its relation to the philosophy of radiation. It has long been known that the emission of heat from a polished metallic surface is very slight, but from a surface of porcelain, paper, or charcoal, heat is discharged profusely. Even many of the best non-conductors are powerful radiators, and throw off heat with a repellent energy difficult to conceive.

"If two equal balls of thin, bright silver," says Sir John Leslie, "one of them entirely uncovered and the other sheathed in a case of cambric, be filled with water slightly warmed and then suspended in a close room, the former will lose only eleven parts in the same time that the latter will dissipate twenty parts." The superior heat-retaining capacity which a clean tin kettle possesses over one that has been allowed to collect smoke and soot, lies within the compass of the most ordinary observation.

The experiments of the eminent philosopher just mentioned furnish a variety of suggestions on the radiation from heated surfaces. He found that, while the radiating power of clean lead was only 19, it rose to 45 when tarnished by oxidation, that the radiating power of plumbago was 75, and that of red lead 80. He also discovered that, while the radiating power of gold, silver, and polished tin was only 12, that of paper was 98, and lamp black no less than 100. He further says: "A silver pot will emit scarcely half as much heat as one of porcelain. The addition of a flannel, though indeed a slow conductor, far from checking the dissipation of heat, has directly a contrary tendency, for it presents to the atmosphere a surface of much greater propulsive energy, which would require a thickness of no less than three folds to counterbalance."

It is safe to infer from this analogy that the felt covering of boilers should not only be of considerable thickness, but should be protected by an external jacketing of some sort; for, though felt is a good non-conductor, it is a powerful absorber and radiator, more especially when it has been allowed to contract soot and dust.

Various experiments have lead to the general conclusion that the power of absorption is always in the same proportion as the power of radiation. It must be so. Were any substance a powerful radiator and at the same time a bad absorber, it would necessarily radiate faster than it would absorb, and its reduction of temperature would continue

without limit. It has, furthermore, been proved that the absorptive property of substances increases as their reflecting qualities diminish. Hence, the radiating power of a surface is inversely as its reflecting power. It is for this reason that the polished metallic sheathing on the cylinders of locomotive engines, and on the boilers of steam fire engines, is not only ornamental but essentially useful. Decisive tests have also established the fact that radiation is effected more or less by color. "A black porcelain tea pot," observes Dr. Lardner, "is the worst conceivable material for that vessel, for both its material and color are good radiators of heat, and the liquid contained in it cools with the greatest possible rapidity; a polished silver or brass tea urn is much better adapted to retain the heat of the water than one of a dull brown, such as is most commonly used."

A few facts like those above stated afford more decisive information regarding the nature of heat than columns of theory or speculation. Yet it is rather strange that when so many learned and reliable men have experimented so much and commented with such persuasiveness upon the subtile agency of heat and the vast amount of waste that must accrue by injudicious management, comparatively few have availed themselves of the united labors of these indefatigable pyrologists; manufacturing owners and corporations still persisting in having their steam boilers painted black or dull red and leaving them exposed to the atmosphere. Some persons, who pass themselves off very satisfactorily as clever engineers, affect a contempt for the higher branches of science, and assert, in a very positive and self-sufficient manner that experiments made in a study or laboratory are on too trifling and small a scale to be practically relied upon; that a tin kettle or a saucepan is a very different thing to the boiler of a steam engine.

This may be so in one sense, but the same chemical forces which operate upon the one will be just as active in a proportionate degree in their action upon the other. It was said by Aristotle that the laws of the universe are best observed in the most insignificant objects; for the same physical causes which hold together the stupendous frame of the universe may be recognized even in a drop of rain. The same observation may be applied to the laws of heat in all their ramifications; for, after all, our experiments are, in many instances, but defective copies of what is continually going on in the great workshop of nature.

It would be needless to insist on the wasteful and destructive effects produced by the exposure of boiler surfaces to the open atmosphere. Such a practice can be neither supported by experience nor justified by analogy; and it is to be hoped that it may before long be consigned to the limbo of antiquated absurdities and be satisfactorily forgotten. Seeing that it cannot with any show of reason be affirmed that the boiler covering materials in present use possess the requirements necessary to recommend them; the question arises as to what is the best means of achieving the object required. This is an inquiry which it is the office of time alone to answer. As the problem is obviously one of primary importance, and well worthy of the attention of inventors, it is hazarding nothing to predict its satisfactory solution at no distant date.

The plain truth is, boilers have of late become gigantic foes to human life. Explosions have increased, are increasing, and should be diminished; and they are, in many instances, caused by boilers being strained and weakened by sudden contraction from having their surfaces exposed when the fire has been withdrawn from them. Boilers are also materially injured by the excessive furnace heat which it is necessary to maintain to compensate for the large amount of caloric which is dissipated from their surfaces, not only by radiation but from absorption by the surrounding atmosphere.

As the views here laid down are drawn exclusively from the region of fact and experiment, it is to be hoped that an enlightened sense of self-interest may prompt those whom the subject may concern, to give it that special attention which its importance demands.

Attachment of Saws to Swing-Frames.

To insure the efficiency of mill-saws, it is highly important to have them firmly secured in the frames by which they are reciprocated. Swing-frames for carrying saws are ordinarily of wrought iron or steel, and made up of several pieces mortised and tenoned together in the form of a rectangular frame or parallelogram, of which the longest sides are termed verticals and the shortest crossheads or crossrails. In the case of deal frames, the swing frame differs somewhat from that of a timber frame, in having two extra verticals, which separate it into two equal divisions. These are necessary in order that two deals may be operated upon simultaneously, each division being devoted to a separate deal, and likewise to enable the connecting-rod which works the frame to pass up the center and oscillate on a pin near the top, thereby avoiding the deep excavations and costly foundations required where the rod is engaged with the pin at the bottom. The rack that advances the deals to the saws passes through a "bow" in the connecting-rod and the middle of the frame, the deals are placed on either side of it, on rollers purposely provided. In sawing hard deals, the saws require to be sharpened about every tenth run or journey, and every twentieth for soft. Fifty runs, or one hundred deals, are reckoned an average day's work; this is inclusive of the time required for changing the saws, returning the rack for another run, and other exigencies. For attachment to swing-frames the saws have buckles riveted to them; these are by various modes connected to the crossheads. Each top buckle is passed through the crosshead, and is pierced with a mortise for the reception of a thin steel wedge or key, by whose agency the blade is strained and tightened. The edge of the crosshead upon which the keys bed is steeled to lessen the wear invariably ensuing from frequently driving up the keys. The distances between the blades are adjusted by interposing strips of wood, or packing pieces, as they are termed, of equal thickness with the required boards or leaves; the whole is then pressed together and held in position by packing screws. The saws themselves are subsequently tightened by forcing home the keys until a certain amount of tension has been attained; this is ascertained only by the peculiar sound which emanates from the blade on being drawn considerably tight and tense. Great experience is required to accustom the ear to the correct intonation, as in general the tensile strain on the saws approximates so closely to the breaking point that one or two extra taps on the keys are quite sufficient to rupture them.

Mr. Brunel, in the government saw-mills at Woolwich, adopted a method of hanging saws by means of a weighted lever, like a Roman steelyard. A cross-shaft affixed above the saws to the cornice of the main frame carried a lever, weighted at one end and provided with a hook or shackle at the other for engagement with the saw buckle. In using this apparatus the blades were strained one at a time by linking the lever to the buckle and then adjusting the movable weight until the desired tension was acquired, after which the key was inserted into the mortise and the lever released. This arrangement is not now in common use on account of the trouble attending its employment, and at present the saws are merely strained by hammering up the keys. The saw blades had usually a tensile strain of upwards of one ton per inch of breadth of blade. It is to be further observed that the cutting edges of the saws are not quite perpendicular, but have a little lead, or their upper ends overhang the lower about three eighths of an inch or one half of an inch, according to the nature of the material to be sawn. The object of this is that the saws may be withdrawn from the cuts in the ascending or back stroke, and allow the sawdust free escape. The eccentric actuating the mechanism for advancing the timber to the saws is generally set in such a manner that the feed commences just at the moment when the frame has attained half its ascending stroke, and continues until the entire stroke has been completed. By this regulation the saws are not liable to be suddenly choked, but come smoothly and softly into their work.—*Worssam's Mechanical Saws.*

PATENT DECISION.

In the matter of the application of William N. Bartholomew, assignor to J. Eckendorfer, for letters patent for a design for Rubber Eraser.—Letters patent for designs have increased in importance within the past few years. Formerly but few were granted, now many are issued. To this day they have made so little figure in litigation that but three reported cases are known in which design patents have come into controversy. With their increase, questions have arisen concerning their scope and character, which have given rise to dispute and to inquiry as to the correctness of the current practice of the office in this branch of invention. While on the one hand, it is insisted that the practice has always been uniform, and is therefore now fixed and definite: on the other, it is asserted, that there has never been, and is not now, any well-defined or uniform practice, either in the granting or refusal of design patents.

The act of 1836 made no provision for the patenting of designs. The earliest legislation upon this subject is found in the act of August 29, 1842, section 3; and the only legislation upon the subject is found in this section and in section 11, of the act of March 2, 1861. The definition of the subject matter, or, in other words, of a "design," is the same in both acts. It is as follows:

"That any citizen, etc., who, by his, her, or their own industry, genius, efforts, and expense, may have invented or produced any new and original design for a manufacture, whether of metal or other material or materials, any original design for a bust, statue, bas-relief, or composition in alto or basso-relievo, or any new and original impression being formed in marble or other material, or any new and useful pattern, or print, or picture, to be either worked into or worked on, or printed, or painted, or cast, or otherwise fixed on any article of manufacture, or any new and original shape or configuration of any article of manufacture not known or used by others, etc."

This definition embraces five particulars.

1. A new and original design for a manufacture.
2. An original design for a bust, statue, etc.
3. A new and original impression or ornament to be placed on any article of manufacture.
4. A new and useful pattern, print, or picture to be worked into or worked on, or printed, or painted, or cast, or otherwise fixed on any article of manufacture.
5. A new and original shape or configuration of any article of manufacture.

The first three of these classes would seem to refer to ornament only; the fourth to ornament, combined with utility, as in the case of trade marks; and the fifth to new shapes or forms of manufactured articles, which, for some reason, were preferable to those previously adopted.

The disputed questions which have thus far arisen under these definitions are:

1. What variations may be claimed or covered by the patent consistently with unity of design.
2. Is a new shape of an article of manufacture, whereby utility is secured, a subject of protection under this act; and
3. Is mechanical function of any kind covered by it.

As to the first of these questions, it seems to have been assumed that the design spoken of in all parts of the sections referred to covered a fixed, unchangeable figure; that the protection of letters patent did not extend to any variation, however slight, but that such variation constituted a new design, might be covered by a new patent, and might safely be used without infringement of the first. This, it is said, is the correct theory of the law, and has been the uniform adjudication of the Office.

Neither of these statements is absolutely correct. The law by no means defines a design with such strictness. The language is, "new and original design for a manufacture," "new and original impression or ornament," "new and original shape or configuration." It would seem to be too plain for argument, that the new design, or impression, or shape, might be so generic in its character as to admit of many variations, which should embody the substantial characteristics and be entirely consistent with a substantial identity of form. Thus, if the invention were of a design for an ornamental button, the face of which was grooved with radial rays, it would seem that the first designer of such a button might properly describe a button of five rays, and, having stated that a greater number of rays might be used, might claim a design consisting generally of radial rays, or of "five or more" rays; and, that it could not be necessary for him to take out a patent for each additional ray that could be cut upon his button. So, if the design were the ornamentation of long combs by a chain of pearls, it would seem that a claim for such a design might be maintained against one who arranged the pearls, either in curved or straight lines, or who used half pearls only, and that such modifications, if they had occurred to the designer, might properly have been enumerated in his specification as possible and equivalent variations. In short, I can see no reason, under the law, why designs may not be generic, why what are called "broad claims," may not be made to them, and why the doctrine of artistic or æsthetic equivalents may not be applied to them.

This has been recognized to a greater or less extent in the adjudications of the courts and in the practice of the Office.

One of the reported cases is that of Booth *ex.* Garelly 1, Blatch. 247. The design is described as consisting of "radially-formed ornaments on the face of the molds or blocks of which the button is formed, combined with the mode of winding the covering on the same, substantially as set forth, whether the covering be of one or more colors." The specification, in "substantially" setting forth the design, contained this language: "It will be obvious from the foregoing that the figures can be changed at pleasure by giving the desired form to the face of the mold by depressions and elevations which radiate from a point, whether in the center of the mold or eccentric thereto."

In the consideration of the case by the Court no objection was made to this statement or claim. In the case of Root *ex.* Ball, 4 McLean 180, the learned judge instructed the jury that "if they should find that the defendants had infringed the plaintiff's patent by using substantially the same device as ornamental on the same part of the stove they would, of course, find the defendant guilty. To infringe a patent right it is not necessary that the thing patented should be adopted in every particular; but if, as in the present case, the design and figures were substantially adopted by the defendants, they have infringed the plaintiff's right. If they adopt the same principle the defendants are guilty. The principle of a machine is that combination of mechanical powers which produce a certain result. And in a case like the present, where ornaments are used for a stove, it is an infringement to adopt the design so as to produce substantially the same appearance."

It has been the constant practice to grant patents for designs for fonts of type, for sets of silver plate, for a series of printers' flourishes, and the like. This class of cases has always passed without objection.

Two other cases which have arisen within the Office deserve notice. The first was for a series of miniature shoulder straps, with emblems denoting rank, provided with a pin, to be worn under an officer's coat, upon his vest, or as a lady's breastpin. The drawing shows eight of these pins with emblems of rank, varying from that of second lieutenant to major-general, specification describing the brooch for a second lieutenant goes on to say: "I propose to introduce, on some of them, the different ornaments showing the respective ranks of the army, from a major-generalship to a second lieutenancy. See Figs. 2, 3, 4, 5, 6, 7, 8."

The second case was that of an application for a monogram visiting card, on which the name was to be inscribed or printed in the form of a monogram. The applicant filed a drawing, showing a card upon which was a monogram of his own name. In his specification he gives certain rules for forming such monograms, and then says: "It is manifest that the form of the letters as well as the letters themselves can be changed as required by circumstances or the taste of the individual for whom the monogram is designed; and that the general form and outline of the monogram may be varied; and, indeed, must vary to be adapted to the particular name it is required to represent."

The claim was for "a monogram, visiting card, or visiting card upon which the name is inscribed or printed in the form of a monogram, substantially as herein specified."

This application was rejected by the Examiner and Board of Examiners-in-Chief, but was allowed by the Commissioner upon appeal.

It is true that, before and since this patent was issued, many patents have been refused for what I have called generic designs. One man having designed a tack head, ornamented with radial lines, was compelled to take out one patent for his tack with six radial lines, and another for the same tack with eight. There are other instances of like character, but they only serve to show that the practice of the Office has not been uniform, and that the true practice is still to be adopted and followed.

I have no hesitation in saying, in view of the premises, that a valid patent may be granted for a new genus or class of ornaments as well as for specific ornaments, though I do not doubt that, under the statute, every species, variety, and individual having distinct characteristics under such a genus might also be patented, the patent being subordinate and tributary to that which covered the class. From the nature of this subject-matter there must always be more latitude in the issue of patents for trifling changes, or form, or outline, since it is only necessary that such changes should constitute a new "design" to entitle them to a patent of this class.

The second question relates to the elements of utility in patents for designs.

Upon this point, it is said by my predecessor, in Jason Crane *ex parte* Commissioners, December—May, 1869, p. 1, that the construction which has been given to the act of 1842, by the Office, ever since its passage, is that it relates to designs for ornament merely; something of an artistic character as contradistinguished to those of convenience or utility.

The Board of Examiners-in-Chief, in the present case, say "The practice of the Office has been uniform from the beginning, and has always excluded cases like the present from the benefit of the laws relating to designs." And, again, "The general understanding has always been that the acts of 1842 and 1861 were intended to cover articles making pretensions to artistic excellence exclusively."

In thus denying that a new "shape or configuration" of an article, whereby utility or convenience is promoted, is the proper subject of a patent under the acts referred to, the Office would seem to have involved itself in the absurdity that if a design is useless it may be patented; whereas, if it be useful, it is entitled to no protection.

Fortunately no such "uniform practice" has existed, and the Office is relieved from so grievous an imputation. The practice seems to have been taken for granted by the appellate tribunals; and, so far from being as stated, is, as nearly as possible, the reverse of it. Articles have been, and are being, constantly patented as designs which possess no element of the artistic or ornamental, but are valuable solely because, by a new shape or configuration, they possess more utility than the prior forms of like articles. Of this character are designs for ax heads, for reflectors, for lamp shades, for the soles of boots and shoes, which have been heretofore patented as designs; and to this class might be added, with great propriety, that class of so-called "mechanical" patents, granted for mere changes of form, such as plowshares, fan blowers, propeller blades, and others of like character.

When, therefore, my learned predecessor in Crane's case added to this number a box so designed as to hold with convenience a set of furs, he did but confirm and not alter the practice of the Office, so far as it can be gleaned from the patented cases. I am of opinion that the class of cases named in the act as arising from "new shape or configuration" includes within it all those mere changes of form which involve increase of utility. This I take to be the spirit of the decision in Wooster *ex.* Crane, 2 Fisher 583. The design was of a reel in the shape of a rhombus. The learned Judge says: "In this case, the reel itself, as an article of manufacture, is conceded to be old and not the subject of a patent. The shape applied to it by the complainant is also an old, well-known mathematical figure. Now although it does not appear that any person ever before applied this particular shape to this particular article, I cannot think that the act quoted above was intended to secure to the complainant an exclusive right to use this well-known figure in the manufacture of reels. The act, although it does not require utility in order to secure the benefit of its provisions, does require that the shape produced shall be the result of industry, effort, genius, or expense, and must also, I think, be held to require that the shape or configuration sought to be secured shall, at least, be new and original as applied to articles of manufacture. But here the shape is a common one in many articles of manufacture, and its application to a reel cannot fairly be said to be the result of industry, genius, effort, and expense. No advantage whatever is pretended to be derived from the adoption of the form selected by the complainant, except the incidental one of using it as a trademark. Its selection can hardly be said to be the result of effort even; it was simply an arbitrary chance selection of one of many well-known shapes, all equally well adapted to the purpose. To hold that such an application of a common form can be secured by letters patent, would be giving the act of 1861 a construction broader than I am willing to give it."

It would seem from this language that if there had been "advantage," that is, utility in the adoption of the form of the rhombus, that it would have found more favor in the eyes of the Court.

This subject has been well discussed in the opinion of Commissioner Foote in Crane *ex parte*. I concur in that opinion, except as to the recital of the former practice of the Office, which a careful examination has shown to be erroneous.

The third question may be readily disposed of. Modes of operation or construction, principles of action, combinations to secure novelty or utility of movement, or compositions of matter, can hardly be said to be "shapes, configurations, or designs," but where the sole utility of the new device arises from its new shape or configuration, I think it may fairly be included among the subjects which the act of 1842 was designed to protect.

The present case may, in view of the foregoing consideration, be disposed of without difficulty. Letters patent are asked, by applicant, for a new design for a rubber eraser, which consists in giving to the eraser a cylindrical body, with ends beveled to an edge. The claim is for the "cylindrical rubber eraser provided with a wrapper or case, as herein shown and described."

In the body of the specification the applicant describes the mode of making the eraser, and he also enumerates its advantages over erasers of the ordinary forms.

The Examiner does not object to the application because of the utility of the eraser, although the Board of Examiners-in-Chief seem to base their decision upon that point alone, but he pronounces the form already old in its application to artists' stumps, and he insists that the mode of composition or construction can form no element for the claim for a design patent.

In the latter statement he is undoubtedly right. These patents are granted solely for new shapes or forms, and the form being new it is immaterial by what process that form is attained. The composition of matter or the mode of construction is neither "design," "shape," nor "configuration," and must be protected, if at all, under a patent of another kind. I cannot say that the presence of such matter in the specification would be objectionable if description merely, but it could in no way be allowed to enter into, or to modify the claim.

As to the first ground of rejection, I think the Examiner is in error. This purports to be a new form or shape of a distinct article of manufacture, to wit: rubber erasers. If it be new, as thus applied, it is immaterial whether pencils, or stumps, or pen holders, or anything else, may or may not have been made cylindrical. If they are not substantially the same article of manufacture as erasers, the old form applied to this new article is unquestionably entitled to protection.

The applicant has not defined his invention with entire accuracy. He should strike from his claim the words "provided with a wrapper or case," as those relate to construction and not configuration; and he should insert the words "having the ends beveled to an edge" in lieu of the phrase erased, or he should adopt the usual form of claim for designs, viz.: "The design for a rubber eraser, as shown and described."

As the claim stands, it ought not to be allowed, and the decision must be affirmed; but the applicant will be allowed to amend as suggested.

(Signed) S. S. FISHER,
Commissioner of Patents.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,301.—SEWING MACHINE.—H. A. House, Bridgeport, Conn. November 4, 1869.

3,311.—BORING TOOL.—Alexander Allen, New York city. November 5 1869.

3,315.—MODE OF AND DEVICES FOR SECURING STAIR RODS.—H. Uhry, New York city. November 6, 1869.

3,329.—TRANSPORTATION OF LETTERS, PARCELS, AND OTHER FREIGHT BY ATMOSPHERIC PRESSURE, AND IN APPARATUS CONNECTED THEREWITH.—A. E. Beach, Stratford, Conn. November 9, 1869.

3,503.—RELOADING CARTRIDGE SHELL.—R. J. Gatling, Indianapolis, Ind November 16, 1869.

3,542.—WOODEN PAVEMENT.—I. Hayward and J. F. Paul, Boston, Mass. November 20, 1869.

3,558.—MACHINERY FOR DISTRIBUTING TYPE.—O. L. Brown, Boston, Mass. November 20, 1869.

3,319.—WEIGHING MACHINE.—M. Kennedy, New York city. November 10, 1869.

3,260.—BRAN DUSTER.—W. Huntley and A. Babcock, Silver Creek, N. Y. November 12, 1869.

3,339.—RAILWAY CARRIAGE.—E. Robbins, Cincinnati, Ohio. November 19, 1869.

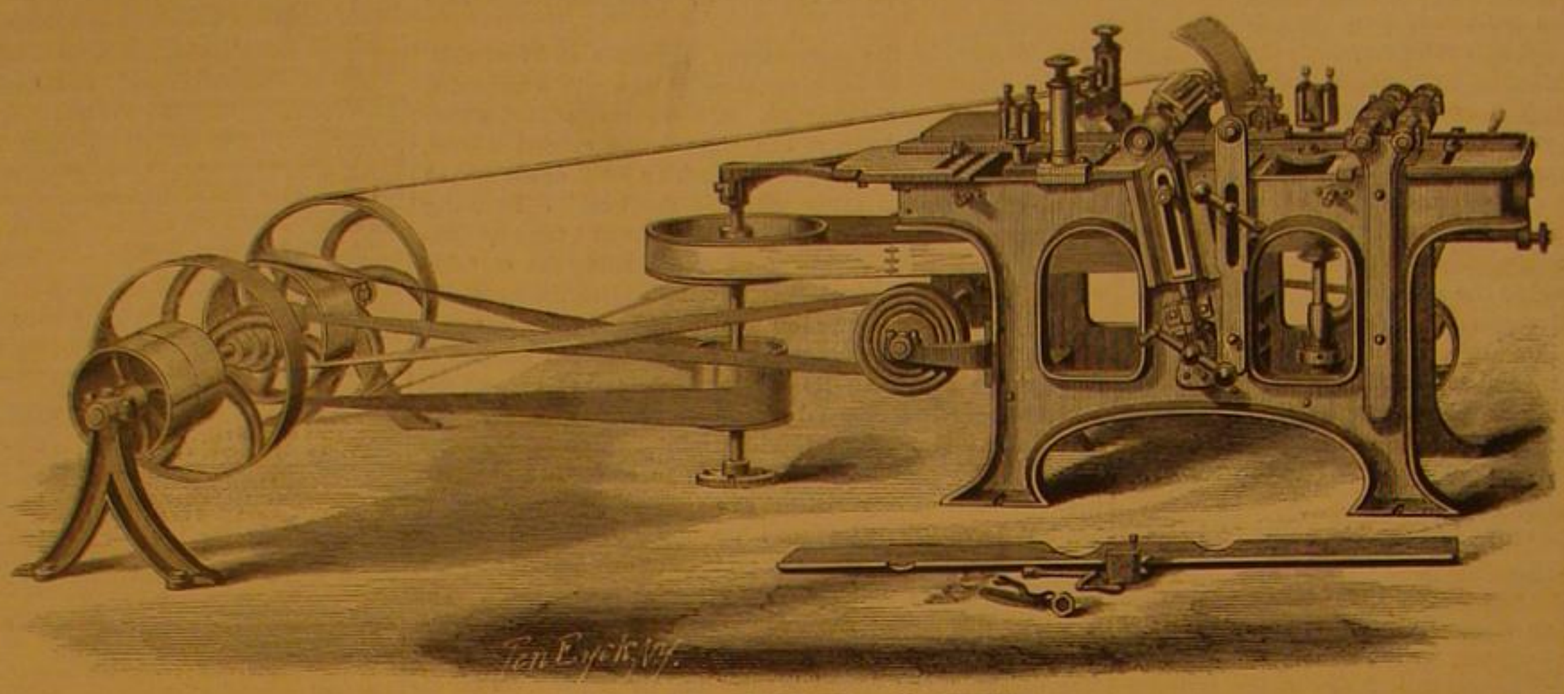
3,341.—REVOLVING BATTERY GUN.—R. J. Gatling, Indianapolis, Ind. Nov. 19, 1869.

3,350.—SASH FASTENER.—S. L. Loomis, South Byron, N. Y. November 29, 1869.

3,363.—MAGNETIC MACHINES AND MAGNETS.—J. Burroughs, Jr., Newark, N. J. November 29, 1869.

Russ' Improved Wood Molding Machine.

A comprehensive description of this excellent machine was given upon page 230, Vol. XVIII., of the SCIENTIFIC AMERICAN. We now present our readers with an engraving of it and a summary of its important features, which doubtless render it equal if not superior to any machine of the kind in market. The frame in which the feed rollers are arranged is so hung to the frame-work of the molding machine, that it can be raised or lowered at pleasure, in order to properly adjust the feed rollers for action upon the "stuff," and it is also so constructed as to permit the feed rollers to yield in case of variations in the thickness of the "stuff" passing under them. The spindle of the side cutter-heads is hung in a vertical frame arranged to be moved up and down, and laterally, to adjust the cutter-head for action, and is provided at its upper end with a box or bearing, whereby the bearing of the box is always kept upon the spindle instead of at different points of the same as in other machines, and this without interfering with the adjustability of the side cutter-head. Thus uneven wear is avoided.



RUSS' MONITOR MOLDING MACHINE.

The bed of the machine is formed with a series of slots or openings provided with bridge bars so that the cutters may act upon the edges of the stuff without danger of injury from striking the bed. The presser shoe is also made adjustable for different thicknesses of the "stuff" and self-yielding to variations in thickness, by a peculiar method of hanging the bar, which carries the presser shoe, to the framework of the machine.

The clamp which holds the press block which acts upon the "stuff" after it has passed through the cutter, is of novel construction, and the spindle of the side cutter-heads is so arranged in connection with a loose pulley and the pulley-drums, that both cutter-heads are driven by one belt and in the same direction.

The bed plate is provided with springs through which the side cutter-heads are arranged, to move laterally or transversely with a bridge-plate or plates, susceptible of adjustment independent of the cutter-heads, whereby an adjustable support to the "stuff" is given as it passes over the line of the openings in the bed.

Most machines have weighted pressure feed, but this having steel springs adjustable by a screw and hand wheel, a heavy or light pressure can be applied according to the work done or size of molding. The cutter-heads are square and slotted so that any style of molding can be stuck by putting cutters on all sides of the head, thus equalizing the cost and lessening the power. The pressure shoe is arranged to hold the "stuff" at the very point of contact with the cutters, and, as we have shown, is readily adjusted to a long or short cutter, so that a small molding can be made as smooth as a large one, and so as not to require any finishing with sandpaper or a hand tool.

The machine has also a bevel track very useful for picture frame molding, and a patent cap of great value for the cutters, and readily applied to any slotted head or common head. The wrenches that go with the machine, and the common malleable iron caps for the top cylinder, are shown in detail. These machines are now running in Worcester, Boston, and Fitchburg, Mass.; Chicago, Ill.; Philadelphia, Pa.; Brattleboro, Vt.; Whitesboro, N. Y.; Charleston, S. C., and other places, and, it is claimed, are capable of doing better work and more of it than any machine now in use.

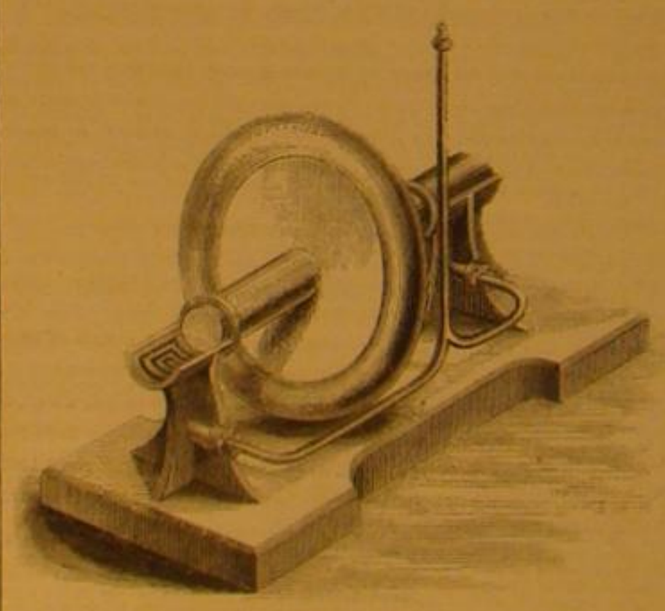
This machine is covered by several patents taken through the Scientific American Patent Agency. It is manufactured by R. Ball & Co., of Worcester, Mass, to whom write for further information.

A Lost Civilization.

At the last regular meeting of the American Geographical and Statistical Society at its rooms in the Cooper Institute, Professor Newberry, of Columbia College, delivered an address on the subject of his explorations in Utah and Arizona Territories. The speaker commenced by giving a short history of the circumstances under which the two government expeditions to which he was attached were organized. He then confined his remarks to the subject of the latter expedition, no account of which has yet been published. Its aim was principally to explore the region embraced by what is known as the old Spanish trail from Santa Fe to California. After giving an interesting account of the topography of the region traversed, he proceeded to speak of the traces which were found on every hand of a former occupancy by a numerous population now extinct. These were most numerous near the course of the San Juan river. There were found ruins of immense structures, a view of one of which he exhibited, built regularly of bricks, a foot in thickness, and about eighteen inches in length, with the joints properly broken, and as regularly laid and as smooth as any in a Fifth Avenue mansion. This structure he said was as large as the Croton reservoir. Inside were rooms nicely plastered as the walls of a modern house. There were also traces of extensive canals, which had been constructed to bring water to these towns, which were received into large cisterns. The lecturer also exhibited pieces of pottery which he said abounded everywhere, showing that in a former age all this vast region had been inhabited. He gave it as his opinion that the depopulation of this region was attributable to the fact that both to the north and the south were warlike hordes, and from the incursions of one and the other of these, the peaceable Aztecs, who had been the former denizens of the country, had been gradually wiped out. The only people left here now were the Mokies, who lived in towns inclosed within high, thick walls, and who were almost inaccessible. These people were visited, and the explorers were received by them with great hospitality. The speaker concluded by giving a short account of the manners of the people and their customs, as far as an opportunity was had to observe them.

GIRARD'S "PALIER GLISSANT."

The term "*palier glissant*," which does not admit of being very happily translated into an English term of equal brevity, is the name given by the inventor, Mr. Girard, to a frictionless support, or socket, designed to sustain the axes of heavy wheels in machinery. Since it is a contrivance deriving its efficacy from hydraulic pressure, it may, without impropriety, be considered here. The friction of axles in their supports is the occasion of a considerable loss of power in every machine.



The loss of power itself, though a real disadvantage, is nevertheless a matter of secondary consequence compared with the attendant elevation of temperature, which, were not means carefully provided for reducing friction to the lowest point possible, might soon be so great as to arrest the operation of the machine itself. It was stated in a public lecture delivered in May, 1867, before the Scientific Association of France, that, in a certain instance within the lecturer's knowledge, the screw shaft of a French naval propeller became absolutely welded to its support, though surrounded by the water of the sea, in consequence of the great heat developed by its revolution.

The ordinary means of reducing friction is to apply oil, or some other unctuous substance, to the parts which move upon each other. Some disadvantages attend this expedient, but till a better is suggested they have to be endured. The cost of the oil expended in maintaining in proper condition the axles of the machinery in a foundery, or of the rolling stock of a railroad, amounts to a large sum annually; while the want of neatness which its use makes, to a certain extent, inevitable, and the labor which must be constantly employed to prevent this want of neatness from becoming much greater than it is, are serious items to be set off against its positive usefulness.

The object of Mr. Girard is to get rid of all these drawbacks by the simple expedient of substituting water for oil. It would not avail to apply water precisely as oil is applied. Though any one's experience may tell him that two smooth pieces of metal will slide more smoothly on each other when they are wet than when they are dry, yet every one knows also that oil facilitates the movement much more perceptibly than water; and also, that in the case of oil there is no difficulty in maintaining the lubricating film, whereas water easily evaporates, and in case of the accident of even a moderate elevation of temperature, it would be expelled from the joint entirely. Mr. Girard proposes, therefore, to employ the water to act, first, by its pressure, to lift the journal to be lubricated; and secondly, by its fluidity, to form a liquid bed or cushion between the journal and its box, on which the journal may rest in its revolution, without touching the metal of the box at all.

The construction will be understood by referring to the figure. One of the journals is represented as removed, and in the cylindrical surface of the socket are seen grooves occupying a considerable part of the area exposed. These grooves communicate, by an aperture in the middle, with a tube which is represented externally, and which sends a branch to the other journal, through which water under a heavy pressure is introduced into the box beneath the journal. The effect of the hydraulic pressure is to lift the axle, opening a passage for the escape of the compressed water, which at the same time, because of its release from compression, loses the power to sustain the weight. If, therefore, by the first impulse, the axle is thrown upward to any sensible distance, it will immediately fall back again, once more confining more or less completely the water. After one or two oscillations, therefore, the axle will settle itself at length in a position in which, while the water will escape, it will escape but as a film of inappreciable thickness. In this condition the journal turns upon a liquid bed, and the resistance to its revolution is so excessively small that a slow rotation given by hand to a wheel sustained by it will be maintained for many minutes without perceptible retardation. In fact, the most striking illustration which can be given of the immense superiority of the *palier glissant* over a support lubricated in in any other way, is furnished by placing two precisely similar wheels or disks side by side, weighing five or six pounds each, with a diameter of seven or eight inches, and journals of half an inch in diameter; one of them furnished with *paliers glissants*, and the other with boxes lubricated with fine oil. Give each of them a velocity of rotation of about one revolution in a second; the one lubricated with oil will come to rest before the other begins to give evidence of any sensible retardation; but if at any moment the stop-cock which supplies the water to the second be turned, this one will also stop, and its stopping will be instantaneous.

It might be supposed that a journal supported in the manner above described would be unsteady and liable to injurious vibrations. This is not the case, and it is easy to see why not. When the journal is truly in the middle of the socket, that is to say when there is an equal distance between it and the wall of the socket on either side, it will be equally pressed from both sides. But if it is in the least displaced laterally, the pressure on the side toward which it moves will instantly increase, while that on the other side will correspondingly diminish: both causes transpiring to resist the displacement, and to maintain the journal in the position of true equilibrium.

The water pressure by which these "slippery supports" are supplied must be created by a force pump worked by the machine itself. The reservoir need not be large as the expenditure of water is very minute in volume. To the objection which may naturally be made, that the working of the pump must be a tax on the motive power without return, a reply at once simple and satisfactory is found in the experience of Mr. Girard, that the working of the pump does not consume so much as half, and sometimes not more than one one quarter, of the power which is lost in friction when the ordinary modes of lubrication are employed; so that by the adoption of this expedient the available power of the machine is very sensibly increased after deducting all that is expended in the performance of this additional work.

BEES BENEFICIAL TO FRUIT.—Dr. A. Packard, editor of the *American Naturalist*, replies to a query in regard to the effects produced upon fruit by the agency of honey bees, that all the evidence given by botanists and zoologists who have specially studied the subject, shows that bees improve the quality and tend to increase the quantity of fruit. They aid in the fertilization of flowers, thus preventing the occurrence of sterile flowers, and, by more thoroughly fertilizing flowers already perfect, render the production of sound and well developed fruit more sure. Many botanists think if it were not for bees, and other insects, many plants would not bear fruit at all.

STEAMBOATS on the American plan are to be introduced on Lake Geneva, Switzerland. This will add very greatly to the comfort and pleasure of tourists on that beautiful lake.

Scientific American,

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NEW YORK, SATURDAY, JANUARY, 1, 1870.

Contents:

(Illustrated articles are marked with an asterisk.)

*Engines of the Spanish Gunboats..... 1
The Torpedo Problem..... 1
Sugar Making in Louisiana..... 1
Sticking, or Court Plaster..... 2
*An Improved Hoisting Pulley Wanted..... 2
*Ferdinand De Lesseps — Chief Promoter of the Suez Canal.... 2
*An Ingenious Vent Peg..... 2
*A New English Patent Pulley Block..... 3
Plants in Sleeping Rooms..... 3
*Improved Treadle Motion..... 3
*Improved Method of Catching Curculios..... 3
Remains of a Megatherium in Ohio..... 3
Artificial Ivory..... 3
American and English Railway Practice Contrasted..... 4
Boiler Covering..... 4
Attachment of Saws to Swing-Frames..... 5
Patent Decision..... 5
Inventions Patented in England by Americans..... 5
*Russ Improved Wood Molding Machine..... 6
A Lost Civilization..... 6
*Girard's "Paller Glissant"..... 6
A Happy New Year..... 7
The Suez Canal not yet a Failure.. 7
Tubular Boilers and Boiler Explosions..... 7
Professor Fiske's Lecture at Harvard..... 7
The Brighter Side..... 7
The American Institute Prizes Awarded to Steam Engines.... 7
A Protest against the Canadian Patent Law..... 7
American Railway Management... 8
Scientific Lecture before the American Institute..... 8
The Battle Fields of Science..... 8
How French Bank Notes are Made..... 9
What the Newspapers Say..... 9
Chinese Method of Preserving Eggs..... 9
Steam Boiler Explosion..... 9
Editorial Summary..... 9
The Steven Breech - Loading Rifle..... 10
*A Novel Improved Hand Vise.... 10
The Mound Builders of Colorado 10
*The Woven-Wire Mattress..... 10
Flouring Mill Hazards..... 10
Fire-Proof Buildings..... 10
The Decline of American Shipping..... 10
Aerial Navigation—A Suggestion. 11
Putty Floors of Jewelers Shops and otherwise..... 11
Western Demand for Agricultural Implements..... 11
Economical Steam Engine..... 11
Friction and Percussion..... 11
Oiling a Preservative of Brown Stone..... 11
Interesting Correspondence from China..... 11
Communication Between Dea and Blind Mutes..... 12
Cheap Cotton Press Wanted..... 12
A Singular Freak of a Magnet..... 12
Preservation of Iron..... 12
The Bananas and Plantains of the Tropics..... 12
Putting Up Stoves..... 13
The Magic Lantern..... 13
The Largest well in the World—Capacity 1,000,000 gallons of water per Day..... 13
Paper for Building..... 13
*Improved Muzzle-Pivoting Gun.. 14
Stock Feeding by Clock Work..... 14
Milk, and What Comes of It..... 14
*Improved Hay Elevator..... 15
*Improvement in Lamp Wicks..... 15
Great Transformation..... 15
Answers to Correspondents..... 16
Recent American and Foreign Patents..... 16
New Books and Publications..... 17
List of Patents..... 18

A HAPPY NEW YEAR!

Is the heartfelt wish conveyed in this beautiful and unusually large number, to each and all of our friends and readers. This holiday number is worthy of note, not only on account of its size, its rich table of contents, and profuse illustrations, but because we publish this week the largest edition ever sent out from this office.

Our readers may be surprised at our publishing the title page of the volume again this week, but they will please observe it is the title page of Vol. XXII, which we are now commencing. The title pages will hereafter be published with the first instead of the last number of each volume, so as to bring it in its proper place for binding.

Subscriptions are pouring in from all parts of the country in the most encouraging manner. Many have already secured the prize engraving, by sending in the requisite number of names—but we feel obliged to confess that there is now a considerable want of vitality in the competition for the cash prizes. We expect, however, that as soon as the new year's greetings are fairly exchanged, that this opportunity to receive some purse money will attract the attention of our enterprising readers. The times may be a little close just now, but we are confident that the spring will open joyously, and we are quite sure that the people will still want to know what is going on in the GREAT WORLD OF INDUSTRY, which it will be our duty to chronicle.

All lists intended to compete for the cash premium must be marked "Cash prize list."

Once more we say a "Happy New Year" to all.

THE SUEZ CANAL NOT YET A FAILURE.

The daily press is giving currency to a great many facts in regard to the present incomplete condition of the Suez Canal, and some journals are arguing therefrom that it is a failure. As yet, ships of heavy draft are unable to get through it. Some disasters to shipping have occurred in the Red Sea after the canal has been passed, and it is not at all improbable that more troubles will arise before everything goes smoothly.

The Red Sea is comparatively unknown to navigators. It contains hidden rocks which must be charted and buoyed before its navigation can be rendered safe. Surely this ought not to take the world by surprise. As to the canal itself, we are only surprised that it has reached its present state of perfection, and we advise those who now make haste to prophesy ignominious defeat for one of the greatest enterprises of the century, to suspend judgment for a time. New York journalists might certainly call to mind with profit, the annual troubles attending the opening of the canals in this State. Frosts heave and rats undermine, and banks annually give way, yet these things are not regarded as surprising. But upon the opening of a work, to which all the minor canals in the world are like the rods of the magicians to Aaron's rod which swallowed them up, it is expected that everything shall move without difficulty, and that no oversight will have been committed. Truly this would be to attribute a power of prevision to M. Lesseps beyond what is human. The world can afford to wait a little till this huge machine gets oiled. Great enterprises move slow at the outset. We have yet unshaken faith in the ultimate success of the Suez Canal.

TUBULAR BOILERS AND BOILER EXPLOSIONS.

In our description of the novel steam boiler, published on page 209, last volume, we made a quotation from several eminent writers and experimenters on the subjects of heat and steam, to the effect that the tubular system in steam boilers was wrong in theory and unsafe in practice, and although this system has hitherto been extensively used on account of some advantages which it secures, it has long been a serious question with thinking men whether these advantages were not obtained at too dear a rate.

While not prepared to admit all the force of the objections made to the tubular system, there are arguments against it that it will not do to treat lightly and which seem to us more and more forcible the more we candidly reflect upon the subject. One of the most forcible of these which occurs to us is, that in the tubular system the disruptive force of unequal expansion is far more likely to become a cause of danger than in the plain cylinder boiler. In such boilers the tension of expanded tubes is transmitted to the shell, which are greatly strained without doubt, often nearly to the verge of rupture. When this occurs it is evident an unusual strain, caused by sudden generation of steam, would act in concert with the expansion of the tubes, and we have no doubt these causes combined have given rise to many an explosion when the steam, acting singly, could never have produced rupture.

But while we give due weight to this argument, there is one often referred to by our correspondents, and which we often see stated in newspapers, as ridiculous as the one we have noticed is forcible. It is that when, in such boilers, water, by carelessness or otherwise, is allowed to fall below any of the tubes, the steam which surrounds them is decomposed, and becomes an explosive mixture of hydrogen and oxygen gases, ready to explode with terrible violence whenever the temperature of the tubes shall have reached the proper point.

This argument is ridiculous, because it rests on no experimental basis. It is a flimsy theory, entirely unsupported by any facts. Never has it been proved that hot iron, at any temperature likely to be obtained in steam boiler tubes, decomposes steam except by itself appropriating the oxygen of the steam, and leaving the hydrogen, by itself no more explosive than any other heated gas.

The sole object of the tubular boiler is to increase the heating surface, without corresponding increase in other particulars. That it is not the only means whereby this object can be secured has already been demonstrated and we believe will hereafter be shown in divers ways. We have no more doubt that the next fifty years will witness the total abandonment of the tubular system, than we have that the world will last that length of time.

AMERICAN RAILWAY MANAGEMENT.

There seems a growing opinion among railway managers that the sole end and purpose of a railroad is to line the pockets of, if not its stockholders, at least its directors. In fact we not long since saw a statement in a widely-circulated journal, that, as the sole purpose of railroads is that the companies who own them should make money, it is absurd to suppose they would be content to manage them in any way whereby such a result would not be most likely to accrue.

The journal referred to, in making this statement a basis for an argument in favor of railway consolidation, entirely ignored the rights of the public from which railway corporations have obtained their charters. In these charters certain privileges were granted, not out of pure generosity, but with the understanding that certain benefits were to accrue to the public. Its safety and convenience were to be considered as well as the profits to the owners.

Every charter granted to these roads involves a contract on their part to do the public a certain service, and in a large majority of cases these contracts are to-day unfulfilled. Day after day sees the power to control more and more centered in a few unscrupulous wily managers, and the comfort and safety of passengers more and more disregarded; yet still the people submit.

But they do not submit without complaint. Now and then a newspaper correspondent grumbles, and the news of smashes that may be almost daily seen in the papers gives a text for an occasional editorial blast, as little heeded by the delinquent companies, as a zephyr is felt by an oak.

Thus the New York *Times*, on the occasion of a recent railway disaster, gives vent to a little mild denunciation. It says:

"The general rule in this country (to which there are indeed exceptions) in regard to the purchase of railway materials is simply this: buy the cheapest. First cost is the controlling and often the only question entertained. The nature of the materials and processes to be used in the manufacture of rails, for instance, are not mentioned. The buyers for some of our roads, especially new roads, never make the slightest allusion to quality, and never specify tests and inspections, but simply go about among the mills, comparing and beating down prices, and accepting the very lowest. More than one of our rail makers are to-day rolling, under protest, rails upon which they decline to put their trade-mark—rails made from the very cheapest materials, in the very meanest manner—for all that is required is that they shall stick together till they are laid. And if American makers will not roll them, Welsh makers will. The late report of the State Engineer of New York says: 'American railway managers, instead of offering anything like a reasonable price for good iron rails, have made themselves notorious by establishing as standard, a brand of rails known all over the world as "American rails," which are confessedly bought and sold as the weakest, most impure, least worked, least durable, and cheapest rails that can be produced.' The State Engineer refers, in confirmation of this opinion, to the statement of Mr. A. S. Hewitt, United States Commissioner to the Paris Exposition, a statement not yet controverted; and to a statement of Mr. Sandberg, an English engineer of note, in the London *Times*. A leading American railway president and reformer has publicly said: 'There is a fear on my part that railway companies will themselves tempt steel makers to send a poor article by buying the cheapest—first cost only considered—*as they did with the ironmasters.*'"

This certainly is a blessed state of affairs. We have given privileges to giant corporations, which they have improved so profitably, that they now can defeat, in our Legislatures, any attempt to revoke them, and can laugh at any demand for better management.

Disguise it how we may, the railroads have got the upper hand of the people, and they seem likely to keep it, unless, indeed, their rapacity shall react against themselves.

At the moment of this writing accounts reach us of the officers of a prominent railway line intrenching themselves against the officers of the law, and employing force to resist the service of precepts calling them to account for alleged frauds upon the stockholders.

That the Legislature of this State has the power to put a stop to these disgraceful proceedings, is certain; what it will do remains to be demonstrated.

THE AMERICAN INSTITUTE PRIZES AWARDED TO STEAM ENGINES.

If there is anybody satisfied with the action of the managers of the American Institute, in the matter of awarding prizes to the competing engines exhibited at the recent fair, we have yet to meet that complacent individual. Neither the exhibitors nor the general public could be expected to accept with equanimity such a report as the managers have made, because it is inadequate to give any real idea of the relative merits of the engines tested. The exhibitors, at a large expense, took their engines to the hall of exhibition, placed them in position, and with them drove the machinery exhibited there; and now, when in return they had a right to expect a decided, manly course on the part of the managers, the oyster is swallowed and the contestants are each politely handed a shell.

The conditions on which the general test was to be made contained, among other specifications, these: that "the water supplied to and evaporated in the boiler will be measured by means of a meter, and the coal burned may also be weighed."

Only one of the conditions quoted was properly complied with. The coal was weighed, but though a meter was used to measure the water, tests made, we are informed, *after the trial of the engines*, showed that the meter was so inaccurate as to completely invalidate any calculation based upon its record of the water supplied. Nevertheless this has, we are credibly informed, been made the basis of calculation; and the amount of coal consumed during each trial has been rejected either as a basis of calculation or a check on the inaccuracy of the meter.

Other prescribed regulations were observed with great care. The engines were indicated in a masterly manner by a gentleman of great experience, as the cards—tracings of which we have seen—bear ample testimony. The temperature of the feedwater was 47 degrees; it should, in our opinion, have been heated, but we waive this point. The state of the barometer and temperatures of engine room and fire-room were observed; but we respectfully submit, that with coal consumption left out of the calculation, and the water consumption an unascertained quantity, the question of relative economy, the vital point to be settled, is as uncertain today as it was before the test.

In the *Tribune* of December 20, appeared a statement of the test to ascertain the accuracy of the meter used, which showed that in an aggregate of twelve tests it varied nearly three per cent in its record from the actual quantity delivered, while at times it was so erratic that it varied in one instance over *ten per cent.*

Truly, considered in connection with this fundamental error, temperatures of engine and boiler rooms, and states of barometer, will not count for much with engineers.

An oversight like this would, however, never have been laid at the door of the managers, however it might invalidate the test; but when the utterly absurd decision announced in the papers, after a tedious delay had led the public to expect an exhaustive statement, gave rise to general disappointment and excited the utmost dissatisfaction, it became manifest that a manly, straightforward course on their part was not to be hoped for, and that any protest against the consummation of the farce would be vain.

It is not for us to decide on the merits of the engines submitted to test. It was for the judges to do this. We maintain that nothing that the public will accept as a decision has been reached, and on behalf of the public we protest that the managers have not only placed themselves in a very unenviable position by their action in the premises, but have done a lasting injury to the American Institute, the results of which will be disastrously felt in future exhibitions.

The studied ambiguity of the report which awards two first prizes to the competing engines, is no less apparent than the desire to shun responsibility.

A PROTEST AGAINST THE CANADIAN PATENT LAW.

In July, 1869, the New Dominion Patent Law went into operation, but it has not yet been approved by the Queen, and if rejected the Canadian Parliament will perhaps try its hand again. Although Canadians may freely go to all parts of the world and take out patents for their inventions, they

have always manifested a mean spirit and adopted a narrow policy, in reference to inventors of other nations. Their present patent laws are so framed as practically to debar all persons except Canadians from taking patents; and the result is that American and English inventions are pirated and patented in the Dominion, without so much as a "thank you, sir," to the *bona fide* originators.

A protest has been presented to her Majesty's Secretary of State for the Colonies, asking that the new law may be rejected, on the ground that it deprives the subjects of the Crown of their equal rights throughout the empire. There is force in this objection, and Lord Granville has promised that it shall be duly considered before the Queen is advised to sign the law.

The probable result will be a revision of the Dominion patent code so as to let in Englishmen but exclude the Yankees, from whom the Canadians derive whatever of improvement, progress, and energy they possess.

THE BRIGHTER SIDE.

Ingratitude seldom enters into the composition of a true inventor, and nothing in our business career has afforded us more pleasure than the frequent letters addressed to us by those who have, during more than twenty years, employed the Scientific American Patent Agency. We cannot find room for all the pleasant missives that come to us from our extensive list of clients, but we may give a few as samples of the many.

Mr. Daniel J. Gale, of Sheboygan, Wis., has recently secured through our Agency Letters Patent for a "Perpetual and Lunar Calendar Clock." In the fullness of his satisfaction he thus writes: "The fact is, I shall never be able to thank you sufficiently for what you have done for me. I sent you a copy of the paper printed here, which favorably notices my improvement and your great Agency. The fees charged me for my patent have been low enough. Already, by one of my own townsmen, I have been offered $4,000 for my interest in the patent. But I must not take up too much of your time. Please allow me to add that I regularly receive your valuable paper, the SCIENTIFIC AMERICAN, and that you may number me as one of its stanch friends."

Mr. Edwin Norton, of Brooklyn, N. Y., in a recent note, says: "Allow me to express my thanks for the promptness and efficiency with which the business of obtaining a patent for my 'Cinder and Dust Arrester' has been conducted through your Agency—and not only in this case but in several previous ones. This is the *fourth* patent obtained by me through your Agency within nine months. It gives me pleasure to add my testimony to that of many others, with respect to the very satisfactory manner in which your Patent Agency is conducted."

Mr. E. J. Marsters says, in reference to his improved "Field Press"—"I find everything correct. You certainly accomplished more than I expected after the first examination by the Primary Examiner. I hope soon to be able to give you another case."

Mr. S. P. Williams, an old client, writes as follows: "I received the patent on my 'Trace Lock for Whiffletrees,' and I am truly pleased with the prompt manner in which you have done the business. It is only a few weeks since I made the application, and I expected that it would be as many months before the patent could be granted."

PROFESSOR FISKE'S LECTURES AT HARVARD.

It certainly argues well for the intellectual character of the readers of the New York *World* that during the prevalent taste for sensational journalism, it has found the publication of a series of philosophical lectures acceptable. We thank our neighbor for thus making these lectures available to the general public. Their ability is unquestionable; and the calmness and candor which Professor Fiske brings to the treatment of the subject is such as to add greatly to the force of his logic.

The "positive philosophy" has been shown by Professor Fiske to be much misunderstood, misapprehension not being confined solely to the ranks of its opponents.

His exposition of some of the misconceptions on which Professor Huxley has based some criticisms upon the writings of Comte, strikes us as especially forcible; and the whole course of lectures proves Professor Fiske to be one of the clearest and most able of American thinkers.

These lectures are followed as they appear, with great interest, and their publication in the *World* we regard as a real and permanent benefit to the public.

SCIENTIFIC LECTURES BEFORE THE AMERICAN INSTITUTE.

The announcement of these lectures came to hand too late for our last issue, and the first has already been delivered. The course is as follows: Friday, Dec. 17, The Battle Fields of Science, by Andrew D. White, President of the Cornell University, Ithaca, N. Y. Friday, Dec. 24, How Animals Move, by Professor E. S. Morse, of the Peabody Academy of Science, Salem, Mass. Friday, Dec. 31, The Correlation of Vital and Physical Forces, by Professor G. F. Barker, of Yale College, New Haven. Friday, Jan. 7, The Air and Respiration, by Professor J. C. Draper, of the College of the City of New York. Friday, Jan. 14, The Connection of Natural Science and Mental Philosophy, by Professor J. Bascom, of Williams College, Williamstown, Mass. Friday, Jan. 21, The Constitution of the Sun, by Dr. B. A. Gould, of Cambridge, Mass. Friday, Jan. 28, The Colorado Plateau, its Cañons and Ruined Cities, by Professor J. S. Newberry, of Columbia College, New York.

The course is a good one, and ought to be, and doubtless will be, well attended. Abstracts of the lectures will appear as delivered, in the SCIENTIFIC AMERICAN.

THE BATTLE FIELDS OF SCIENCE.

LECTURE BY PROFESSOR WHITE, BEFORE THE AMERICAN INSTITUTE.

This lecture did not disappoint the expectations of those familiar with the subject of the discourse, which, considering the difficulty of restating familiar historical facts in such a manner as to clothe them in a garb of originality, is high praise. Many, however, found great difficulty in hearing the speaker at the back part of the hall, and some left the room on that account. This was unfortunate, as the lecture will scarcely be exceeded in interest by any subsequent one of the course. The speaker said that "In all modern history, interference with science in the supposed interest of religion—no matter how conscientious such interference may have been—has resulted in the direst evils both to religion and science, and *invariably*. And on the other hand all untrammeled scientific investigation, no matter how dangerous to religion some of its stages may have seemed, temporarily, to be, has invariably resulted in the highest good of religion and science. I say *invariably*—I mean exactly that. It is a rule to which history shows not one exception. It would seem, logically, that this statement could not be gainsaid. God's truth must agree, whether discovered by looking within upon the soul or without upon the world. A truth written upon the human heart to-day in its full play of emotions or passions, cannot be at any *real* variance even with a truth written upon a fossil whose poor life was gone millions of years ago. And this being so, it would also seem a truth irrefragable; that the search for each of these kind of truths must be followed out in its own lines, by its own methods, to its own results, without any interference from investigators along other lines by other methods. And it would also seem logically that we might work on in absolute confidence that whatever, at any moment, might seem to be the relative positions of the two different bands of workers, they must at last come together, for truth is one. But logic is not history. History is full of interferences which have cost the earth dear. Strangest of all, some of the most direful of them have been made by the best of men, actuated by the purest motives, seeking the noblest results. These interferences and the struggle against them make up the warfare of science. One statement more to clear the ground. You will not understand me at all to say that religion has done nothing for science. It has done much for it. The work of Christianity has been mighty indeed. Through these 2,000 years it has undermined servitude, mitigated tyranny, given hope to the hopeless, comfort to the afflicted, light to the blind, bread to the starving, life to the dying, and all this work continues. And its work for science, too, has been great. It has fostered science often and developed it. It has given great minds to it, and but for the fears of the timid its record in this respect would have been as great as in the other. Unfortunately, religious men started centuries ago with the idea that purely scientific investigation is unsafe—that theology must intervene. So began this great modern war."

Professor White next reviewed the battle between science and theology on the subjects of the "earth's shape, surface, and relations," "the position of the earth among the heavenly bodies," in which Copernicus and Galileo struggled so bravely and successfully for truth.

The lecturer said:

"The principal weapons in the combat are worth examining. They are very easily examined; you may pick them up on any of the battle-fields of science; but on that field they were used with more effect than on almost any other. These weapons were two epithets—the epithets 'Infidel' and 'Atheist.' These can hardly be classed with civilized weapons; they are burning arrows; they set fire to great masses of popular prejudices. Smoke rises to obscure the real questions. Fire bursts out at times to destroy the attacked party. They are poisoned weapons. They go to the heart of loving women; they alienate dear children; they injure the man after life is ended, for they leave poisoned wounds in the hearts of those who loved him best—fears for his eternal happiness, dread of the Divine displeasure. The battle-fields of science are thickly strewn with these. They have been used against almost every man who has ever done anything for his fellow-men. The list of those who have been denounced as Infidel and Atheist includes almost all great men of science—general scholars, inventors, philanthropists. The deepest Christian life, the most noble Christian character has not availed to shield combatants. Christians like Isaac Newton and Pascal, and John Locke and John Howard, have had these weapons hurled against them. Nay, in these very times we have seen a noted champion hurl these weapons against John Milton, and with it another missile which often appears on these battle-fields—the epithets of 'blasphemer' and 'hater of the Lord.' Of course, in these days these weapons, though often effective in disturbing the ease of good men, and though often powerful in scaring women, are somewhat blunted. Indeed, they do not infrequently injure assailants more than assailed. So it was not in the days of Galileo. These weapons were then in all their sharpness and venom. The first champion who appears against him is Bellarmine, one of the greatest of theologians and one of the poorest of scientists. He was earnest, sincere, learned, but made the fearful mistake for the world of applying direct literal interpretation of Scripture to science. The consequences were sad, indeed. Could he with his vast powers have taken a different course, humanity would have been spared the long and fearful war which ensued, and religion would have saved to herself thousands on thousands of the best and brightest men in after ages. The weapons, which men of Bellarmine's stamp used, were theological. They held up before the world the dreadful consequences which must result to Christian theology were the doctrine to prevail that the heavenly bodies revolve about the sun, and not about the earth.

"The next great series of battles were fought on those great fields occupied by such sciences as *Chemistry and Natural Philosophy*. Even before these sciences were out of their childhood—while yet they were tottering mainly towards childish objects and by childish steps—the champions of that same old mistaken conception of rigid Scriptural interpretation began the war. The catalogue of chemists and physicists persecuted or thwarted would fill volumes."

After alluding to many other battle-fields of science which might not for want of time be dwelt upon at length the lecturer reviewed the battle grounds of medicine and anatomy on which some of the severest warfare has been waged.

The speaker here remarked that "perhaps the most unfortunate thing that has ever been done for Christianity is the tying it to forms of science and systems of education, which are doomed and gradually sinking. Just as in the time of Roger Bacon excellent but mistaken men devoted all their energies to binding Christianity to Aristotle. Just as in the time of Reuchlin and Erasmus they insisted on binding Christianity to Thomas Aquinas, so in the time of Vesalius such men gave all efforts to linking Christianity to Galen. The cry has been the same in all ages. It is the same which we hear in this age against scientific studies—the cry for what is called '*sound learning*.' Whether standing for Aristotle against Bacon, or Aquinas against Erasmus, or Galen against Vesalius, or making mechanical Greek verses at Eton, instead of studying the handiwork of the Almighty, or reading Euripides with translations instead of Lessing and Goethe in the original, the cry always is for 'sound learning.' The idea always is that these studies are *safe*."

The speaker next proceeded to show that not alone in Catholic countries, has such warfare been waged, and that even now in Protestant America the fight is going on.

One of the fields on which the severest warfare had raged in Protestant countries was that of Geology. "From the first lispings of investigators in this science there was war. The early sound doctrine was that fossil remains were *lusus naturæ*—freaks of nature—and in 1517 Fracastor was violently attacked because he thought them something more. No less a man than Bernard Palissy followed up the contest, on the right side, in France, but it required 150 years to carry the day fairly against this single preposterous theory. The champion who dealt it the deadly blow was Scilla, and his weapons were facts obtained by examination of the fossils of Calabria, (1670). But the advocates of tampering with scientific reasoning soon retired to a new position. It was strong, for it was apparently based upon Scripture—though, as the whole world now knows, an utterly exploded interpretation of Scripture. The new position was that the fossils were produced by the deluge of Noah. In vain had it been shown by such devoted Christians as Bernard Palissy that this theory was utterly untenable; in vain did good men protest against the injury sure to result to religion by tying it to a scientific theory sure to be exploded—the doctrine that the fossils were remains of animals drowned at the flood continued to be upheld by the great majority as '*sound*' doctrine. It took 120 years for the searchers of God's truth, as revealed in nature—such men as Buffon, Linnæus, Woodward, and Whitehurst—to run under these mighty fabrics of error, and by statements which could not be resisted, to explode them.

"Strange as it may at first seem, the war on geology was waged more fiercely in Protestant countries than Catholic, and of all countries England furnished the most bitter opponents. You have noted already that there are generally two sorts of attacks on a new science. First, there is the attack by pitting against science some great doctrine in theology. You saw this in astronomy, when Bellarmine and others insisted that the doctrine of the earth's revolving about the sun is contrary to the doctrine of the Incarnation. So now against geology it was urged that the scientific doctrine that the fossils represented animals which died before Adam was contrary to the doctrine of Adam's fall, and that death entered the world by sin. Then there is the attack by the literal interpretation of texts, which serves a better purpose generally in arousing prejudice. It is difficult to realize it now, but within the memory of the majority of those before me, the battle was raging most fiercely in England, and both these kinds of artillery were in full play and filling the civilized world with their roar. Less than thirty years ago, the Rev. J. Mellor Brown was hurling at all geologists alike, and especially at such Christian divines as Dr. Buckland, Dean Conybeare, and Pye Smith, and such religious scholars as Professor Sedgwick, the epithets of 'Infidel,' 'Impugner of the Sacred Record,' and 'Assailant of the Volume of God.' His favorite weapon was the charge that these men were 'attacking the Truth of God,' forgetting that they were simply opposing the mistaken interpretations of J. Mellor Brown. He declared geology 'not a subject of lawful inquiry;' he speaks of it as 'a dark art,' as 'dangerous and disreputable,' as a 'forbidden province.' This attempt to scare men from science having failed, various other means were taken.

"To say nothing about England, it is humiliating to human nature to remember the trials to which the pettiest and narrowest of men subjected such Christian scholars in our country as Benjamin Silliman and Edward Hitchcock. But it is a duty and a pleasure to state here that one great Christian scholar did honor to religion and to himself by standing up for the claims of science despite all these clamors. That man was Nicholas Wiseman, better known afterward as Cardinal Wiseman. The conduct of this pillar of the Roman Catholic Church contrasts nobly with that of timid

Protestants who were filling England with shrieks and denunciations. Perhaps the most singular attempt against geology was that made by a fine specimen of the English Don, Dean Cockburn of York, to *abuse* its champions out of the field. Without apparently the simplest elementary knowledge of geology, he opened a battery of abuse. He gives it to the world at large by pulpit and press; he even inflicts it upon leading statesmen by private letters. But these weapons did not succeed. They were like Chinese gonga and dragon lanterns against rifled cannon. Buckland, Pye Smith, Lyell, Silliman, Hitchcock, Murchison, Agassiz, Dana, and a host of of noble champions besides, pressed on the battle for truth was won. And was it won merely for men of science? The whole civilized world declares that it was won for religion; that thereby has infinitely increased the knowledge of the power and goodness of God."

The lecturer classed the present opposition of the Catholics to the Free School system in this country among the long list of battles between science and theology and concluded his lecture as follows:

"But, my friends, I will not weary you with so recent a chapter in the history of the great warfare extending through the centuries. There are cheering omens. The greatest and best men in the churches—the men standing at centers of thought—are insisting with power, more and more, that religion shall no longer be tied to so injurious a policy—that searchers for truth, whether in Theology or Natural Science, shall work on as friends, sure that, no matter how much at variance they may at times seem to be, the truths they reach shall finally be fused into each other. No one need fear the result. No matter whether science shall complete her demonstration that man has been on the earth six thousand years or six hundred thousand. No matter whether she reveal new ideas of the Creator or startling relations between his creatures—the result, when fully thought out, will serve and strengthen religion not less than science. The very finger of the Almighty has written on history that science must be studied by means proper to itself, and in no other way. That history is before us all. No one can gainsay it. It is decisive, for it is this: There has never been a scientific theory framed for the use of Scriptural texts, which has been made to stand. This fact alone shows that our wonderful volume of sacred literature was not given for any such purpose as that to which so many earnest men have endeavored to wrest it. The power of that volume has been mighty indeed. It has inspired the best deeds our world has known. Despite the crusts which men have formed about it—despite the fetters which they have placed upon it—Christianity has blessed age after age of the past, and will go on as a blessing through age after age of the future. Let the Warfare of Science, then, be changed. Let it be a warfare in which religion and science shall stand together as allies, not against each other as enemies. Let the fight be for truth of every kind against falsehood of every kind—for justice against injustice—for right against wrong—for beauty against deformity—for goodness against vice—and the great warfare which has brought so many sufferings, shall bring to the earth God's richest blessings."

HOW FRENCH BANK NOTES ARE MADE.

When a new batch of French notes is to be printed, an equivalent number of the choicely prepared and preserved sheets of paper is handed over to the superintendent of the printing office. This office is among the inner buildings of the Bank of France, and is governed by very rigorous rules in all things. The operatives are all picked men, skillful, active, and silent. The sheets, the ink, and the matrixes of the plates are kept securely under lock and key until actually wanted. The printing is effected by steam-worked presses. The ink is blue, and its composition known only to a few of the authorities. An inspector goes his rounds during the continuance of the operations, watching every press, every workman, every process. A beautiful machine, distinct from the press, is employed to print the variable numbers on the note; fed with sheets of paper, it will number a thousand of them in succession, changing the digits each time, and scarcely requiring to be touched meanwhile; even the removal of one note and the placing of another are effected by automatic agency. At every successive stage the note is examined. So complete is the registration of everything that a record is always at hand of the number of sheets rejected ever since the Bank of France was established, be its defects in the paper, the printing, or the numbering. When the master-printer has delivered up his packets of printed and numbered sheets, each note is stamped with the signature of the Secretary-General and the Comptroller. This completes the *creation* of notes. The notes so created are kept in a strong box, of which the Secretary-General and the Comptroller have keys, and are retained until the day of *issue*. The chief cashier tells the Governor that he wants a new supply of a particular denomination of notes, the Governor tells the council, the council tell the secretary-general and the comptroller, and these two functionaries open their strong box, and hand over the notes demanded. The notes at this time are not really money; they do not become so until the chief cashier has put his signature to each, and registered its number in a book.

The life of a French bank note is said to average two or three years, and does not terminate until the condition is very shaky indeed—crimpled, pierced with pinholes, corner creases torn, soft, tarnished, decrepit while yet young. Some have been half-burned; one has been found half-digested in the stomach of a goat, and one boiled in a waistcoat-pocket by a laundress. No matter; the cashier at the bank will do his best to decipher it; he will indeed take an infinity of trouble to put together the ashes of a burned note, and will give the owner a new note or the value in coin, if satisfied of the integrity of the old one. The bank authorities preserve specimens of this kind as curiosities, minute fragments gummed in their proper position on a sheet of paper. Very few of the notes are actually and irrevocably lost. During the last sixty-seven years 24,000 bank notes of 1,000 francs each have been issued, and of this number 23,958 had been returned to the bank by the month of January 1869, leaving only 42 unaccounted for. Whether these 42 are still in existence, or have been burned into uncollected ashes, or are at the bottom of the sea, or elsewhere, is not known. Of 500-franc notes, 24,925 have been returned out of 25,000. The bank holds itself morally and financially responsible for the small number of notes unreturned, ready to cash them if at any time presented.

The bank sends the old notes again and again into circulation, if verified and usable; but they are examined first, and any that are found too defective are canceled by stamping a hole in them. These canceled notes pass from one official to another, and are grouped in classified bundles; the book that records the birth of each note now receives a notification of its civil death, and after three years incarceration in a great oak chest, a grand conflagration takes place. A huge fire is kindled in an open court; the defunct notes are thrown into a sort of revolving wire-cage over the fire; the cage is kept rotating; and the minute fragments of ash, whirled out of the cage through the meshes, take their flight into infinite space—no one knows whither. The Bank of France prints a certain number of notes per day, and destroys a smaller number, so as to have always in reserve a sufficient supply of new notes to meet any emergency; but the actual burning, the grand flare-up takes place only about once a month, when perhaps 150,000 will be burned at once. The French go down to lower denominations than the Rank of England, having notes of 100 francs and 50 francs, equivalent to £4 and £2. There must be a great deal of printing always going on in the Bank of France, seeing that in 1868 they issued 2,711 000 notes, of an aggregate value of 904,750,000 francs (averaging about £13 each), and burned 1,927,192, value 768,854,900 francs.

It *sounds* a very dreadful thing for 30,000,000 sterling in bank notes to be willfully burned in one year. But there is always a phœnix to rise from its ashes; the bank can regenerate as fast as it kills. The Bank of France, in 1846, put in circulation a beautiful crimson printed note for 5,000 francs; but the French people did not like notes of so high a denomination, and all but a very few of this kind have been returned and canceled. On one occasion, a superb individual, wishing to pay a dowry in handsome style, obtained twelve notes of 5,000 francs each for the purpose; but they were returned the very next day by the banker, who much preferred smaller notes for his general purposes. The notes now regularly kept in circulation in France are those of 1,000, 500, 100, and 50 francs.

WHAT THE NEWSPAPERS SAY.

A VALUABLE PAPER.—Of all the journals published in the United States, for the mechanic and scientific man, there is nothing that will in any way compare with the SCIENTIFIC AMERICAN, published by Munn & Co., of 37 Park Row, New York. Whether as a work of reference, a record of current scientific development, or as an organ and exponent of our inventors, it stands alone for the general ability of its conduct, the voluminousness and variety of its contents, the exactitude and extent of its knowledge, and the correctness of its information. The SCIENTIFIC AMERICAN is a credit at once to the press and our country, and the small price of a yearly subscription ($3), purchases, it is quite safe to say, the largest amount of solid value to be procured for a like expenditure in the world. With our more intelligent mechanics it has long been a great favorite, while to the inventor it is absolutely indispensable. It has had many imitators and competitors in its day, but they have nearly all died the natural death of a feeble inferiority.—*Argus* (Brooklyn, N. Y.)

THE GREAT JOURNAL OF ARTS AND SCIENCE.—There is a place in the periodical literature of America which is occupied by only one journal; namely, the well-known SCIENTIFIC AMERICAN.

It is almost indispensable to a well-balanced intelligence, that a certain proportion of its reading should be devoted to the industrial arts and sciences, those natural manifestations of the high mental development of the age. Every number of the journal has sixteen imperial pages, embellished with engravings, as illustrations, which are gems of art in themselves. It is most ably edited, and its usefulness is not impaired by technical terms nor dry details.—*Milwaukee Sentinel*

THE SCIENTIFIC AMERICAN.—This paper is the oldest in its peculiar province in the United States, and was, for many years, the only one. More recently others have arisen, and are following in its footsteps; but the SCIENTIFIC AMERICAN still maintains its position as the best American journal of the inventive arts. Its Patent Office department alone is invaluable to inventors, while its editorial articles, illustrations, etc., give not only information, but a constant stimulus to the productive faculty.—*Mobile Register.*

AMONG the papers which we could not very well do without is the SCIENTIFIC AMERICAN, issued from the well-known office of Munn & Co., 37 Park Row, New York. Carefully edited, nicely printed, well illustrated, it is not only a complete record of the progress of useful inventions, but a trustworthy guide to many of the scientific topics that enlist attention at the present day. No one can be a reader of this most valuable journal, without being kept well informed as to current matters of scientific discovery.—*Congregationalist* (Boston).

THE SCIENTIFIC AMERICAN.—In another column we publish the prospectus of this great paper, and would direct our readers to it. It should be on the work bench of every mechanic, and particularly the young men of our country, upon whose intelligence and mechanical skill depends the future dignity of labor and prosperity of American arts and sciences. —*Monitor* (Huntington, Pa.)

We could fill our pages with similar notices, but will close with the following from our cotemporary *De Hope*, published at Holland, Mich., which we doubt not will be read with interest:

Wij plaatsen in dit Nummer het prospectus van den SCIENTIFIC AMERICAN. Het is een zeer schoon blad, dat vooral behoort gelezen te worden door Handwerkslieden. Nieuwe uitvindingen, verbeteringen op het terrein van werktuigkunde, enz, worden daar steeds in vermeld en beschreven. De prijs is zeer matig voor zulk een blad; drie dollars per jaar. Dat belangstellenden de advertentie lezen.

Chinese Methods of Preserving Eggs.

As much has been said of late about the mode of preserving eggs, it may not be uninteresting to say a few words about the Chinese methods, as related by a French chemist, M. Paul Champion, who has lately visited that country, and published a very interesting book on the ancient and modern industries of that curious people. A very common method is to place the eggs in a mixture of clay and water; the clay hardens around the eggs, and is said to preserve them good for a considerable time. But another and much more elaborate method is also commonly practiced. An infusion of three pounds of tea is made in boiling water, and to this are added three pounds of quicklime (or seven pounds when the operation is performed in winter), nine pounds of sea-salt, and seven pounds of ashes of burnt oak finely powdered. This is all well mixed together into a smooth paste by means of a wooden spatula, and then each egg is covered with it by hand, gloves being worn to prevent the corrosive action of the lime on the hands. When the eggs are all covered with the mixture, they are rolled in a mass of straw ashes, and then placed in baskets with balls of rice—boiled, we presume—to keep the eggs from touching each other. About 100 to 150 eggs are placed in one basket. In about three months the whole becomes hardened into a crust, and then the eggs are sent to market; the retail price of such eggs is generally less than a penny each. These eggs are highly esteemed in China, and always served in good houses; but they have undergone a strange transformation, which certainly would not recommend them to English palates; the yolk has assumed a decidedly green tinge, and the white is set. When broken, they emit that unpleasant sulphurous smell which would certainly cause their instant banishment from our breakfast-tables. However, the Chinese are admitted, even by Frenchmen, to be great *gourmets;* and we can only say, therefore, that in questions of eating there is certainly no disputing about tastes.

Steam Boiler Inspection.

Mr. Alfred Guthrie, U. S. Inspector, informs us that the following resolution was recently adopted by the Board of Supervising Inspectors:

Resolved, That a special committee be appointed, to whom shall be referred the subject-matter of steam boiler explosions, who shall be requested to take up the subject in all its varied complications, and present the result of their inquiries, with their opinions of the real causes of such explosions, accompanied by such information as may be of practical benefit and general interest, to be reported at the next annual meeting of the board for its consideration.

Mr. Guthrie, whose address will be at Washington, D. C. until January 10, desires to receive suggestions from practical engineers upon the subject of boiler explosions.

Editorial Summary.

DARKNESS of complexion has been attributed to the sun's power from the age of Solomon to this day. "Look not upon me because I am black, because the sun hath looked upon me." And there cannot be a doubt that, to a certain degree, the opinion is well founded—the invisible rays in the solar beams, which change vegetable color, and have been employed with such remarkable effect on the daguerreotype, act upon every substance on which they fall, producing mysterious and wonderful changes in their molecular state, man not excepted.

THE three companies under whose protection Chinese are brought into California, keep an accurate account of the condition and employment of the persons they import. From these books it appears that 138,000 Chinese have been brought into California. Of these, 10,426 have died, 57,823 have returned to China, and about 91,000 still remain on the Pacific coast. But only 41,000 live in California. Of these 41,000, 9,300 are women, children, old and decrepit, or criminals confined in the jails. The California authorities have at length decided to admit Chinese testimony in the courts.

ONE of our subscribers residing in Maine has read our article "How to Spend the Winter Evenings," and writes to us that up in his section they have no trouble on that score. As soon as the day's work is over the inhabitants commence the job of trying to get their rooms warm, and as soon as a comfortable temperature is reached it is time to go to bed.

DESIGN PATENT DECISION.—We publish elsewhere a recent elaborate decision of Commissioner Fisher, in which he reviews the laws and former practice of the office in regard to applications for patents for designs, with the view to the establishment of a uniformity of practice in regard to design patents. The decision is one of much interest to inventors and agents, and fully warrants its publication.

A MECHANICS' FAIR.—George Wood, proprietor of Wood's Museum in this city, advertises in another column that he has fitted up extensive apartments, furnished with steam power, for the purpose of exposing for trial and sale the useful inventions of the country; thus affording a good opportunity for inventors to exhibit their machines.

THE STEVENS BREECH-LOADING RIFLE.

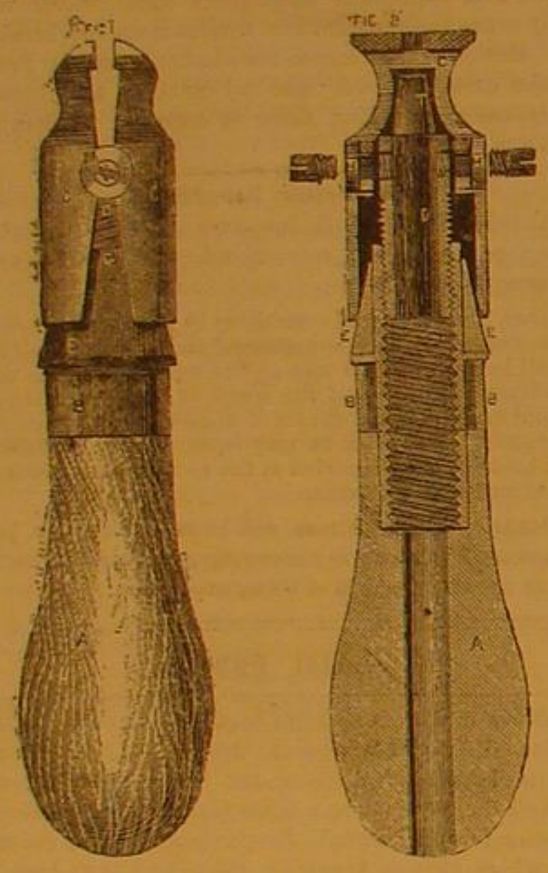
This new arm, a patent on which was obtained through the Scientific American Patent Agency, June 11, 1867, is destined, in our opinion, to become a formidable rival to the breech-loading rifles which have already attained popularity. It is one of the most simple and effective guns we have yet seen. Only three motions are required to load, discharge the piece, and throw out the shell of the cartridge. The breech-block is side-hinged, and it is opened and the shell is thrown out by simply bringing the gun to half cock. The gun may, however, be cocked without opening the breech by pressing the trigger while cocking.

The gun, when held in position, may be fired at the rate of forty shots per minute. All the movements of the parts are directly backward and forward; in our opinion the best that can be employed for this purpose, and the least liable to get out of order. In short, the gun possesses all the essentials of a first class rifle, and has advantages which we think are not ordinarily met with in arms of this character.

A NOVEL FRENCH HAND VISE.

In using ordinary hand vises several inconveniences are met with. For instance, if it is desired to work a piece of metal of a certain length, it must necessarily be presented obliquely on the side of the jaw of the vise, because of its screw, which is horizontal and forms a knob in the axis of the vise. The consequences are, first, that on tightening the nut of the horizontal screw vise the pressure is only exerted on the side, and greatly tries the vise itself while obtaining an irregular pressure; secondly, that as the piece to be worked is held obliquely, however skilled the workman may be, he always finds himself cramped in the execution of his work, particularly if of a delicate nature.

To avoid these inconveniences a Parisian mechanic has designed and lately patented in England the neat form of hand vise of which we annex illustrations, Fig. 1 being an elevation and Fig. 2 a longitudinal section. In these views, A, is a wooden or metal handle pierced throughout its length; this handle of metal may be made in one piece, with the nut, and the conical ferrule. B is the ring or ferrule of the handle;



and C are the jaws of the vise worked by the adjusting screw, D, and the springs, *r r*. E is a conical ferrule or shoulder, fixed or movable, and serving to open or close the jaws of the vise according as the handle is turned right or left; this conical shoulder is protected from wear by a tempered steel washer, *v*. G is a nut with collar carrying the conical ferrule or shoulder, E, and the steel washer, *v*, while H H are the joints of the jaws of the vise held by a screw, I, which serves as a support to the adjusting screw.

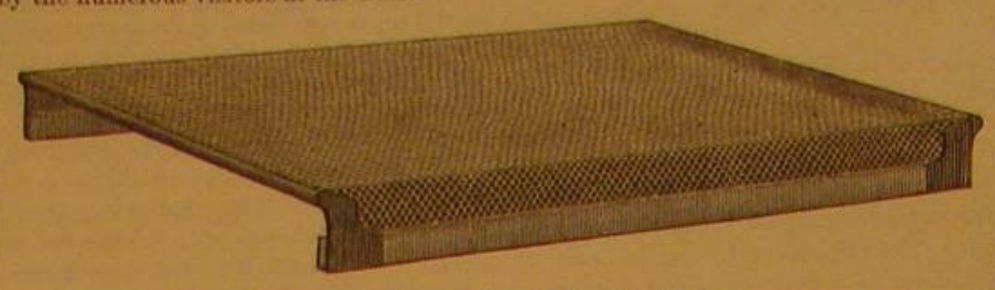
This hand vise may be applied to a number of uses, and among others it may be readily converted into a haft or handle for any kind of tailed or shanked tool, such as files, wrenches, olive bits, chisels, or screwdrivers, and may also serve as pincers or nippers. It is of very simple construction.

The Mound-Builders in Colorado.

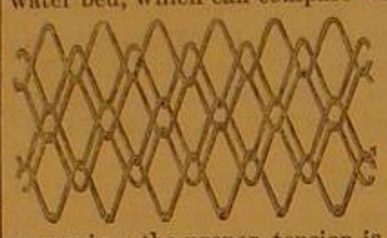
New evidence of the existence of the Mound-Builders in the mountain ranges of Colorado, similar to those in Montana, Utah, and Nevada, have recently been discovered by Mr. C. A. Deane, of Denver. He found upon the extreme summit of the snow-range structures of stone, evidently of ancient origin, and hitherto unkown or unmolested. Opposite to and almost north of the South Boulder Creek, and the summit of the range, Dr. Deane observed large numbers of granite rocks, and many of them as large as two men could lift, in a position that could not have been the result of chance. They had evidently been placed upright in a line conforming to a general contour of the dividing ridge, and frequently extending in an unbroken line for one or two hundred yards. The walls and the mounds are situated three thousand feet above the timber line. It is, therefore, hardly supposable that they were built for altars of sacrifice. They were not large enough for shelter or defense. The more probable supposition is that, like the large mounds in Montana and elsewhere, they were places of sepulture.

THE WOVEN-WIRE MATTRESS.

Most of our readers who attended the last Fair of the American Institute, will recall an article in the furniture department, which attracted much attention on account of its novelty and utility. We refer to the wire mattress, or bed, manufactured by the Woven Wire Mattress Company, of Hartford, Conn. To the ordinary mind a new invention is interesting or not, in proportion to the probability of its coming into every-day use, and many a good housewife lingers in admiration over an improved sewing machine or cooking stove, to whom a new steam engine has no attraction. For this reason it was that the wire mattress was sat on and lain on by the numerous visitors at the Fair.



The engraving presented herewith will give the reader, who has not seen the article, a good idea of its appearance. It consists of a fabric represented below, half an inch thick, composed of fine wire springs, each one the length of the bed; all the three hundred spirals, being so woven and braided together, in a double "weave," by machinery, that a sort of wire cloth is produced. It differs from any other material hitherto made, in that it has great strength and elasticity. There is, in fact, no other device, except the air or water bed, which can compare with it in its elastic properties.



We are informed that nine hundred pounds of dead weight of wire were placed on it for nearly five days, without injurious effects. This fabric is stretched on a frame, as seen in the first engraving, the proper tension is secured to suit the fancy, and the mattress is ready for use. It is then set into the bedstead, like the ordinary spring bed, except that only two slats are used to support it. Thus, with a slight covering in summer, and a thin hair mattress for warmth in winter, a most perfect sleeping arrangement is secured.

The first adaptation of the wire mattresses was for private houses, but they have been found to have special advantages for hospital use. They have been largely introduced into the Hartford Hospital, the Bellevue Hospital, New York, and the Marine Hospital, Brooklyn, and have proved to be, after months of the severest use, with all classes of patients, a very great success for such purposes. The elastic flexible mattresses yield to every motion and part of the body, much to the relief of the suffering patient.

Another very great advantage is, that when carefully painted they are always clean.

Pillows of the same materials are made soft and pliable by using a fine wire and small coil. They are always cool, and afford the opportunity of placing bags of ice under the head in case of sickness.

One of these mattresses and a bedstead and pillows complete—all of which the Company make—furnish, with the addition of a folded blanket or comfortable, a perfect outfit for hospital use.

They are particularly useful for ships' berths, as they dispense with the ordinary bottom, and the sacking and thick mattress. Shippers know this.

We are assured that a coating of paint, carefully applied to the well-tinned wires will protect them from rust.

There can be no question but that these beds, with a light covering—scarcely more than a sheet—are especially adapted for hot climates. The Company have already orders for them for the Brazilian market, and they have been introduced into many of the Southern States.

This wire fabric is adapted to other articles of furniture, and is used in place of the ordinary springs in chairs, sofas, etc. For out-door settees, lounges, car seats, and other like purposes, it is well adapted.

Three patents have been issued to the Company on the wire mattress, through the Scientific American Patent Agency. [See advertisement of the Woven Wire Mattress Company on another page.]

Flouring Mill Hazards.

A correspondent, in discussing the causes of fires in flour mills, gives the following facts and queries:

"F. Bertchey's mill, at Milwaukee, burned in September last. The fire originated from a candle held near a bran or feed spout, reaching from the upper to a lower floor. The ignition was instant, and attained different points of the building at about the same moment.

"On November 20, 1868, Schmidt & Co's mill, at St. Louis, burned in a similar manner, the light in this case being in a globe lamp, but the conflagration was, nevertheless, quite as sudden and general as in the first case cited. Other instances of like character have occurred quite recently. And now the query is, What caused the disaster? Whence the combustion?

"It has been conjectured that the bran-dust, or fine and dry powder, passing down or up these conductors, may be the kindling cause of the fire in these cases; but bran is not over combustible in itself, nor do we know why it should become so when thus reduced to an impalpable powder.

"Another theory is that a gas arises from the transmuting grain, which, excluded from surrounding atmosphere in these close conduits, becomes inflammable, and hence the results, as recited above, whenever a lighted flame is brought in contact therewith.

"Be the cause gas or dust, the disaster is the same: and is it not a phenomenon worth studying and remedying, so far as within the province and control of those most interested?"

Some similar instances came under our personal observation while adjuster for the Ætna at its western branch. The Star Mills at Mascoutah, Ill., burned about the year 1864. They were grinding middlings. About three o'clock in the morning the miller in charge went up to the chamber (a large box extending through several stories), as he had often done before, to jar the middlings down, they having clogged. He carried a small, open oil lamp, which he placed on a beam, just behind and above his head. He then opened a slide and thrust in a shovel, which started the middlings down with a thump, raising a great dust. As this dust issued in a thin cloud from the slide, it approached and touched the lamp, when instantly, as if it had been coal gas, it flashed, burning the millers, hair and beard, and filling the middlings box with a sheet of flame, which spread with great rapidity and destroyed the mill.

A mill at Dover, Ky., had accumulated a large quantity of middlings in an upper story, when the weight caused some sagging, and a man was sent up with a shovel to "even" the bin. His pressure was the "last straw," and the floor under the man broke through, pouring out a cascade of middlings, which flowed down from story to story, filling the mill with its dust. In a very few minutes it reached the boiler room, and the instant it touched the fire it ignited with a flash, and the mills was in flames instantly. It was totally destroyed.

In this last named case the gas theory will not apply. The dust was not confined in a spout, but was floating free in the air throughout the mill. The phenomenon was like the others mentioned, and seems to indicate that the fine dust itself, when floating in the air, is the fatal incendiary.

The subject is worthy of a scientific analysis, such as we have never seen bestowed upon it. The facts are well authenticated, but the philosophy of such ignition is not generally understood.—*Insurance Monitor.*

Fire-proof Buildings.

"It has long been a vexed problem with architects and builders, how to make a building completely fire-proof without the enormous expense of iron beams and girders, and even this has sometimes failed to prove a complete protection. In the building of the National State Bank, the architect estimated that it could not be made fire-proof in the ordinary style for less than $6,000, and while hesitating as to the expense and seeking to provide some remedy against the dampness incident to iron beams, Mr. Fowler learned from the SCIENTIFIC AMERICAN that Edwin May, of Indianapolis, the well-known architect of our county jail, had taken letters patent on a fire-proof lath for ceilings and inside partition walls, together with a concrete floor for the protection of the upper edge of the joist which by actual test had been demonstrated to be fire-proof. After a critical examination of the invention upon its merits, it was adopted, and the workmen are now engaged in putting it in. Our citizens engaged in, or contemplating building, will be interested in an examination of the work while in progress."

[We copy the above from the *Lafayette* (Indiana) *Courier*, and in this connection we make the following extract from a letter just received by us from Mr. May, the inventor:

"You will see by the above notice one result of my advertisement in the SCIENTIFIC AMERICAN. This is only a *mite*. I have more than I can do, and I would say to inventors who are not realizing what they expected from their patents, that one *illustrated advertisement* in the SCIENTIFIC AMERICAN will effect more than a notice in all the newspapers in the United States. This is saying a good deal but such is my belief."

The Decline of American Shipping.

At a meeting of the New York Chamber of Commerce, held December 16, to consider means for reviving American commerce, the following resolutions were adopted:

Resolved, That this Chamber recommend to the Congress of the United States, about to assemble, the modification of existing laws, so that

I. Foreign-built steamers may be imported free of duty, and privileged to carry the American flag, provided they are American owned and not to be employed in our coastwise trade.

II. That iron plates and such other material for the construction of steamers as may be deemed advisable, be admitted free of duty.

III. That on all ship stores procurable in bond, drawback be returned, as upon goods shipped for sale to foreign lands and

Finally, That ample subsidies be granted to lines of steamers built in American yards, to the end that competition with powerful foreign organizations may be successfully inaugurated and sustained.

The Chamber ordered the resolutions engrossed, accompanied by a memorial forwarded to Congress.

These resolutions, in our opinion, embody the solution of the question under consideration, and we trust they may be speedily and favorably acted upon by Congress.

Correspondence.

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

Aerial Navigation---A Suggestion.

MESSRS. EDITORS:—As a constant reader of your invaluable paper, many subjects of deep interest come under my observation, and doubtless no journal throughout the land contains more instructive reading—that which tends to accelerate the progress of scientific investigation, and promote the general interest of the people—than the SCIENTIFIC AMERICAN. The series of articles under the head of "Aerial Navigation," commenced on page 309, volume XXI., has, perhaps, been read with as much pleasure and interest as anything published in your valuable journal. I say with pleasure—because it is really gratifying to mark the advancing steps which inventors are making in this branch of science; and with interest—because every new idea set forth, calculated to further the success of aerial navigation, should be, and no doubt will be, regarded as of great importance by every one. And, as the more suggestions placed before the minds of those working for the improvement of any invention, the greater number will they have from which to choose or experiment upon, I would like to make one suggestion here, which may be of some importance in the construction and operation of the "Aeroport," under the supervision of Mr. Porter, of your city, a description of which is given on pages 346-7, volume XXI., of your paper.

I suggest that the propelling wheels be placed in some other position than that given in the said description. From what little knowledge I possess of aerial navigation, I am persuaded that it would take less power to propel the "Aeroport" at a given speed, if the wheels were placed at the rear or front portion of the flying ship. My reason for being thus persuaded is, that as the forward and aft halves of the float are cone-shaped—the center being the base, and the front and rear ends being the vertexes—there must be an increased velocity of the atmosphere from front to aft as the aeroport advances. Consequently the driving wheels being placed under the center or largest diameter of the float, they must evidently revolve with greater rapidity in the current of air passing between the float and the saloon, going in opposite direction to that in which the aeroport is flying at a given speed, than they would were they placed in front or behind where the atmosphere is comparatively at rest. I take this view from the fact that steamboats and other vessels proceed with greater speed, with a given power, *down* stream than they do *up* stream, mostly on account of the paddles striking against the current flowing in the same direction in which the vessel is rowing. The propelling wheels placed either at the front or rear may have the axle extended through the end of the float to the center, and the cog-wheel, for the chain, placed on the inner end of the axle, and the chain descending through the bottom of the float, and connected to the engine in the same manner as given in your paper. The chain should be inclosed from the float to the saloon below, with a pipe of the same material as the float, and sufficiently large to insure the free action of the chain, and the axle of the propellers should be made tight with suitable packing to prevent the escape of gas. However there may be different arrangements employed for connecting the engine to the wheels. A shaft extending directly under the float, and reaching from the center to the axle supporting the propellers, and connected therewith by means of side cog-wheels, might be used; and as the shaft would necessarily diverge from a straight line with the said axle, the shaft having the chain-wheel on the end directly over the engine and connected therewith in the manner proposed by Mr. Porter, I would suggest further that it would, perhaps, be preferable to place the wheels at the front end, that the rudder might remain in its original position, and the aeroport could swing behind the propellers on encountering side currents of air, and could thus be more easily guided. I firmly believe that Mr. Porter has taken "the right step in the right direction" to accomplish that which has been so long sought, and which evidently will be accomplished at some future time. The air will yet be navigated by numerous flying ships, going from one city to another like those that now cover the broad bosom of our oceans.

HIRAM VAN METER.

Macomb, Ill.

Puttying Floors of Jewelers Shops and Otherwise.

MESSRS. EDITORS:—I am a reader of your valuable paper and find in it much to interest, and many practical hints that are useful in my vocation; I would not be without it for any consideration and I think every mechanic in the land should take it, read it, and profit by the reading.

I notice, in Vol. XXI, page 371, a communication headed, "Watch Repairers' Shop," in which directions are given to fill the chinks in the floor around the work-bench with soft pine and putty, etc., etc.; this is all well enough, but will not prevent the breaking of pivots should a balance wheel be dropped, neither will it prevent the wheel being stepped upon and so rendered useless, as often happens.

I am a watch-maker and jeweler, and I never drop a wheel or part of a watch on the floor. I have an apron about one yard wide, and in the corners of it are eyelet-holes, so that I can pin it to the bench when I am working; I have strings to it, but do not generally tie them around me, but let it be loose in my lap as I have to jump up, to attend to customers in the shop. In the shop where I learned my trade (in London, England), every workman was *compelled* to wear an apron, and so much waste of property and valuable time was saved; the saving of *time* in *one week* will more than pay the cost of the aprons.

Sidney Plains, N. Y. GEO. C. L. KENT.

Western Demand for Agricultural Implements.

MESSRS. EDITORS:—I often think, on perusing your very valuable journal of science, and the numerous mechanical and scientific problems it unfolds, that the tendency of the age is to supersede all manual labor by machinery. Whether such a thing is possible is not the question for me to consider; I only know that the tendency of universal human genius seems directed to that end.

I make the above observation casually, in order to introduce a few ideas on the subject of improvement in agricultural implements—the great *desideratum* of the West at this moment. Here nature has opened her stores so munificently, that all the husbandman has to do is to plow, sow, and garner the fruits of his labor. But two great improvements are needed to enable the western farmer to keep pace with improvements in the mechanic arts and other kindred employment. Indeed, we at the West, particularly, need a good, cheap, steam plow that can be made practicable for at least the better grade of farmers. The English plan of moldboards, that overcome all possible traction and necessitate the duplex stationary engines, with the cumbrous "artillery of attachments," may do for sluggish people but will never meet the wants of the Yankee nation.

The steam plow suited to the genius of our people, must, to use a vulgarism, "get up and go." It must possess sufficient power of propulsion and traction to pulverize the ground better, deeper, and more rapidly than the "old way." Such is the want of the great West in reference to preparing the soil for crops. I do not know of such a machine in use, nor do I believe in the theory of Dr. Brainard, that the moldboard is the only plan for properly pulverizing the soil; for I am satisfied that such plan is wholly inadmissible in steam plowing in this country, for want of sufficient traction for self-propulsion, and observation has taught me that a self-propelling plow is the only steam plow our people will tolerate.

I have lately examined the drawings of a steam plow invented by a gentleman of this city (which I am not at liberty to explain in detail) that seems to meet the great want I have spoken of. The invention consists in a very simple device, by which the whole force of pulverizing the ground is applied to propel the machine, and if this be not sufficient, an independent force may be applied, so arranged as to govern the speed of the machine at the will of the operator. You will, no doubt, in due time hear more of this machine, which seems to me to meet the great want so long experienced in Western cultivation.

The next great want of the West is a practical grain binder, that shall securely bind the grain as cut. The scarcity and high price of labor renders such a machine an absolute necessity. The efforts to supply this great want have been numerous, but with no flattering success so far as I am able to learn, except the machine invented by a citizen of this place, which has already made its mark by demonstrating that automatic machinery can and does bind the grain as fast as cut. The machine I speak of is yet in a chrysalis state, so to speak, but it has been worked two years in the field, the last season without missing a bundle, though not without the usual difficulties of all new machines in respect to the workings of some parts—too weak, etc. It is believed that the coming harvest will witness its triumphant success. If so, the production of our staple cereal will be greatly cheapened. I shall be glad to renew "old acquaintance," by a more detailed statement hereafter.

I send enclosed the pay for another year of the SCIENTIFIC AMERICAN, which I can no more do without than my accustomed dinner.

C.

Madison, Wis.

Economical Steam Engine.

MESSRS. EDITORS:—Permit me now to make a few remarks in regard to an article on page 344, last volume of the SCIENTIFIC AMERICAN, entitled "Which is the Most Economical Steam Engine?" The principles laid down in that article, I think are correct.

I run a saw-mill with an engine which fills those conditions nearer than I ever saw, and I would like to give your readers a brief description of it. The cylinder is 10-inch bore, and 14-inch stroke; steam chest extends enough beyond the ends of the cylinder so that the steam travels only 2¼ inches, the shortest distance possible, after leaving the valve before it reaches the piston-head, and the space between the piston-head and cylinder-head is only one-fourth of an inch, the bolt heads being counter-sunk until even. Other things about this engine are in proportion. With this engine attached to a direct acting circular mill, I can saw 2,000 feet of hard-wood inch boards in one hour.

If any of your readers can beat this, I would like to hear from them.

JOHN CARNES.

Friction and Percussion.

MESSRS. EDITORS:—In reply to "Spectrum," page 358, of last volume, I will be brief. In his third paragraph he claims that he has merely *suggested* that friction and percussion may often be one and the same thing; and immediately claims that in the case of the polished button rubbing a planed pine board, the force which overcomes and levels the undulations of the wood, is percussion, and that percussion is also the cause of the heat; the microscopic hills and hollows on the shining brass button skipping and jumping along the pine, produces little infinitesimal bumpings, and so pound out the heat. This *little* theory should be known to the homeopaths—they could illustrate infinitesimal quantities by it!

"Spectrum" treats my hammered horsenail illustration shabbily. After indirectly acknowledging that there is a point where hammering will no longer produce heat, he puts it on the grindstone, subjects it to friction, and when it burns his fingers, throws his hat in the air and shouts "Hurrah for *percussion!*" We agree perfectly, except that he calls hammering, *condensation;* calls friction, *percussion;* and drops friction from the mechanical dictionary altogether.

A railway car axle often heats and sets fire to the packing, when the journal is smooth as polished glass; but I never heard of those parts of the car which are constantly undergoing percussion, even getting uncomfortably warm. The natives of the South Pacific produce fire by rubbing pieces of dry wood together, but I never heard of their rapping sticks for the same purpose. I have seen a new, sharp knife made hot enough to raise a blister, whittling a clean dry stick of pine, and I would like to have "Spectrum" tell us, if in all the above cases percussion is the cause of the evolution of of heat, and what is friction doing in the mean time.

New Albany, Ind. C. C. H.

Oiling a Preservative of Brown Stone.

MESSRS. EDITORS:—I have read the article entitled, "What is to Become of our Brown Stone Fronts," and have waited to see what others have to say. But with so much at stake, no body seems to know what to do or say. Being a practical painter, it has been my lot to oil some of the best fronts in New York, namely corner of 23d Street and 5th Avenue, No. 2, West 23rd Street, also No. 1, West 30th Street; also the residence of E. S. Higgins, the carpet manufacturer, done by other journeymen.

They were very dark in color for a few weeks, but now after two years, they are bleached almost as light as they were at first.

These fronts were cleaned whenever necessary, and then oiled with fresh raw linseed oil from the press, put on pretty much as carefully as in ordinary varnish work. No second coat or lapping over of the oil. All was put on at once that it would take without running down in streams.

The result: the oil penetrates into good dry stone probably 1½ inches, making the stone hard and flinty, as any stone cutter will soon find out if he tries to trim it.

It keeps the damp and therefore the frost out of the stone, as will be seen any foggy day, the damp running down in streams on the oiled stone, and the unoiled stone absorbing the dampness. It is therefore necessary to oil during dry weather.

The oil is especially beneficial to balustrades and carvings, as they are generally got out of soft stone. It is also beneficial underneath balconies and porches, as the sun never has a chance to dry the stone in such situations before the frost flakes it.

This I send in part payment for the great deal I have learned from your paper.

T. H. RILLEY.

New York City.

Interesting Correspondence from China.

MESSRS. EDITORS:—Your paper seems to increase in interest. I brought the back volumes from Madras to Pekin, and am glad to refer to them here where I must depend upon myself.

I have been building and repairing premises since I came here last year. I find the carpenters and masons are very much delighted with our tools, especially our saws, planes, borers, vise, and hammers. Our lathe is a wonder. They use only the ancient spindle turned backwards and forwards by a treadle or by the left hand while the right guides the chisel or turning-tool, which cuts only half the time. They use only the turning saw, which often fails them because it cannot be used in splitting wide boards in the middle, and in many other places. They are great sawyers, however. They stand heavy pine spars on end, if rather short, say 8 feet, the common length of many intended for making coffins, and cut them up into three-eighths or half-inch stuff with great patience. A longer one they will lean over and prop up, raising it towards the perpendicular as they advance. They must have some hard jobs. I have just measured a poplar plank in front of a coffin manufactory, which I found to be 5 ft. 3 in. at the butt, 3 ft. 10 in. at the top, 8 feet long, and about 8 inches thick. For a crosscut saw they rig one like our woodsaw. I am sure it would deeply interest you to make a visit to Pekin and see how this ancient, patient, and industrious people do their work. It is truly painful to see how much time they spend in making the simplest tool for want of at least a few labor-saving appliances. Doubtless you have their tools on show in New York. They are to me an interesting study, though I have been long familiar with the rude tools of the Hindoos. It is constantly suggested to me that we must have got many hints from the Chinese, or else indeed they have taken hints from the West; or again, which is perhaps the true solution, implements like words have a common origin. I should think from what I have observed in a short time, that the Chinese resemble the Europeans in their tools more than the Hindoos—a thing I did not at all anticipate. A clever man could write you an interesting chapter on the ways of the Pekinese, the Chinese Manchus, Mongols, and the rest mixed together, though the Chinese are confessedly the workers in wood, iron, and everything else. The Manchus are mostly hangers on of the government, living mainly upon a miserable monthly stipend.

The reading of your unequaled journal makes me interested in you as if you were personal friends, and so I have run away with these pointless remarks. I am sure you will excuse me, and not wonder that one wishes to breathe now and then.

I was an old subscriber in Madras, and hope to be till I can read no longer. My son, who perished at Andersonville, was a subscriber to the SCIENTIFIC AMERICAN till the day of his capture by Mosby.

Pekin, China. P. B. HUNT.

Communication Between Deaf and Blind Mutes.

MESSRS. EDITORS:—In a recent number of the SCIENTIFIC AMERICAN I notice an ingenious method of teaching deaf and dumb persons to converse in the dark, which is also applicable to blind mutes, and it brings to my recollection a method which was in use among the "telegraph boys" some years ago when I was one of them. Sometimes when we were visiting and asked to communicate to a "brother chip," anything that it was not advisable for the persons around us to know, a slight tap-tapping on the table or chair would draw the attention of the party we asked to talk to, and then by his watching the forefinger of the writer, if across the room, or if near enough, by placing the hand of the writer carelessly on the shoulder of the party we desired to communicate with, the communication was written out in the telegraph alphabet or by taking hold of his hand and writing upon the finger.

I think this method will be found much less complicated, if not quite as rapid, as the method with both hands, and much more convenient, as it is only necessary to have hold of one hand of the person communicated with, and is more rapid than writing with a pen.

For the benefit of those not acquainted with the telegraph alphabet, I give it:

A	B	C	D	E	F	G	H	I
.—	—...	—.—.	—..	.	..—.	——.	....	..
J	K	L	M	N	O	P	Q	
.——.	—.—	.—..	——	—.	———	.——.	——.—	
R	S	T	U	V	W	X	Y	
.—.	...	—	..—	...—	.——	—..—	—.——	
Z								
——..								

The uninitiated will observe that O differs from I in the distance between the dots, made thus: I by two quick strokes of the forefinger; O by one quick stroke, slight pause, and another quick stroke; the dashes are made by holding the finger down for a short space: thus SCIENTIFIC AMERICAN would be written:

S	C	I	E	N	T	I	F	I	C
...	—.—.	..	.	—.	—	..	..—.	..	—.—.
A	M	E	R	I	C	A	N		
.—	——	.	.—.	..	—.—.	.—	—.		

In a very short time any one can learn to read by the sight or by the touch. Anything which can add to the pleasure or comfort of these unfortunates is of importance.

MAGNET

[Nothing can compensate for want of rapidity in a language designed for colloquy. Although our correspondent found the Morse telegraph alphabet a resource on occasion, he would scarcely be content to use it, and it only for life, even if emancipation from it involved months of labor. The motions required to spell SCIENTIFIC AMERICAN by the telegraph alphabet are thirty-nine, but as the short dashes occupy the time of two dots for each dash, and there are eight of these, eight more ought to be counted in a comparison of it with an alphabet composed wholly of dots, this would make forty-seven. To spell the same words in full by the mute alphabet referred to would require only twenty-three motions. A still greater disparity in rate would, we think, be found in an entire colloquial sentence. Thus the sentence "Hand me an apple" would require, by the mute alphabet, the time of fourteen dots, while with the telegraph alphabet it would require the time of thirty-nine.—EDS.

Cheap Cotton Press Wanted.

MESSRS. MUNN & CO.:—Please give us any information of cheap cotton-presses, such as small neighborhoods, or single planters, in the South could own. In particular, a press that will put 40 pounds cotton into each cubic foot. We want cotton better handled, and to that end may want small bales, say 150 pounds each. But these must be put into three or four cubic feet, or they will cost too much for covering, ties, etc. Perhaps you can furnish us with a wood-cut of some, or several, presses worked by hand, or by horse-power, that will do good service, not cost too much, be simple in operation, not require too much power, and be effective as above. It may be for the interest of some of your clients or correspondents to give us the facts, as we shall put them into a report for circulation amongst the entire cotton interest of the country.

Yours very truly. WALTER WELLS, *Sec'y.*

National Association of Cotton Manufacturers and Planters, No. 11, Pemberton Square, Boston, Mass.

A Singular Freak of a Magnet.

MESSRS. EDITORS:—In my library hangs a powerful horse-shoe magnet which has a keeper and a weight attached of about three ounces. This weight is sustained firmly by the attracting power of the magnet, and is not easily shaken off by any oscillating motion, yet through some (to me) unknown cause during each of the last ten nights the magnet has lost its power, and the keeper and weight lie in the morning on the bottom of the case where the magnet has hung for many years without a like occurrence, except once on the occasion of a severe shock of an earthquake which took place December 17, 1867.

There is no possible way for this magnet to be disturbed except by the electric current; then why should its power thus return without the aid of a battery or keeper? Will some one explain?

FLOYD HAMBLIN.

Madrid Springs, N. Y.

SPEAKING makes the ready man, writing the correct man, and reading the full man.

PRESERVATION OF IRON.

BY PROF. HENRY E. COLTON.

"What is wanted is something equally applicable to large or small pieces of iron, and which will answer to ward off the attacks not only of the common atmospheric oxygen, but also remain unaffected by acids or salt waters."

The above from a late number of the SCIENTIFIC AMERICAN states not only the writer's ideas but also one of the greatest wants of the age. Iron is daily being put to more and more varied uses. On land the great question is what will prevent rust; on water, what will prevent rust and fouling of bottoms of iron vessels. We will briefly summarize the many patents granted for this purpose.

Eight are for sheathing of various kinds put on in varied modes. The most practicable of these is a system prepared by Daft. Most iron vessels are now constructed by every other plate lapping the edges of the one between. He proposes, instead of having the plates all the same width, to have one wide and one very narrow plate. This would leave a trough between the two wide plates of the depth of the thickness of the plates. He proposes to force into this trough very tightly pieces of teak, and to the teak, thus embedded, he nails a sheathing of zinc. The zinc is kept clean by slowly wearing away of its surface from action by contact with the iron and salt water.

There are four patents, in which various, so-called, non-conducting coats are put on the iron, and copper pigment in some form put on over them. These have been specially condemned in England, as no matter how good the non-conducting substance —and many are so only in name—it will become rubbed off at some points, and there the bottom will be eaten both by salt water and action of copper.

Coal tar and asphaltum are the subjects of patents in various forms.

One patent claims rubber or gutta-percha dissolved in linseed oil as a vehicle in which to grind the pigment; another the same dissolved in naphtha or bisulphide of carbon as a pigment; another hard rubber, ground.

Enameling with different materials is proposed by some, while one proposes to glaze the bottoms so that barnacles and grass would find a slippery foothold.

Combinations of tallow, resin, and tar—mineral and pine—are patented mostly to use over other paints.

Coal tar, sulphur, lime, and tallow, are the subject of one patent; guano, red lead, and oil of another; while sulphur and silica are claimed by a third.

Paints containing mercury, arsenic, and even strychnine, are the subjects of several patents. A mixture of coal tar and mercurial ointment of one.

Galvanism is proposed to be used in various ways—strips of copper and zinc, or by galvanizing the plates before use. Black lead finds a place in many compositions.

One patent, by a complicated process, effects a union of metallic zinc and iron; this, granulated and ground fine, then mixed with red lead and oil, makes the paint. It is said to be the best of all the patented stuffs.

It is astonishing how many use oils derived from coal, peat, or resin, and tars of the same.

There are about fifty patents for this object and with all of them before their eyes, the British Society for the Advancement of Art still hold the $5,000 reward for a pigment or covering which will perfectly protect from rust and fouling. However they may puff their products for selling, no one has the temerity to claim that they deserve the reward.

We think it would be difficult to find so many expedients ever before adopted for the accomplishment of any one object. These are all English patents, England having necessarily been obliged to use iron for vessels from its cheapness as well as its consequent first introduction there. In the United States no patents worth mentioning have been granted.

The first requisites for a pigment or coating for iron are, that it should not contain any copper—the corrosive action of that metal on iron being intense. Then if for work exposed to air it should form such a coating as to be impervious to that gaseous fluid, and be so constituted chemically as not to be oxidizable by it; if under water—especially sea water—to be impermeable to moisture, so elastic as not to crack, so insoluble as not to chloridize; to form a perfect, apparently hard, coating: and yet wear just enough to keep off incrustation, barnacles, or growth of grass. In fact, this slow wearing away is the only preventive of fouling in iron vessels. Wooden bottoms may be poisoned by solutions of copper—and that metal has no superior for such uses, especially when it is combined in mixture with mineral or resinous tars and spirits—these compounds, however, are not only useless on iron bottoms, but also injurious. What then is *the* substance: 1st. One of the oxides of lead (red lead). 2d. The purest oxide of iron to be found. If properly made these articles can be carried to no higher state of oxidation, and respectively, as to order named, they have no superiors for body and durability. By preference, 1st, red lead, either out of or under water; 2d, Prince's oxide of iron only, out of water. The color of these paints—the first red, the latter brown, may be hidden by a coat of white or tinted color. If there were to be had in combination as a white paint, an oxide of lead and an oxide of zinc, it would be immensely superior to either, but that such has not been produced is rather the fault of carelessness than of possibility. Zinc protects iron with great effect, but it is too rapidly worn in the effort to be of lasting value. Hence the great desideratum, the yet to be, the coming pigment is a white oxide of lead or a combined white oxide of lead and white oxide of zinc, without sulphates or chlorides.

Those materials answer very well for work exposed to atmospheric air, and perhaps nothing will ever be found better; but a different need is that for salt water. No mere protector of the iron from rust can be found superior to pure red lead and linseed oil. We have seen a natural combination of zinc, lead, and iron, which, in our experience, ranks next; but the zinc is acted on by the chloride of sodium, and wears away too much of the material. Red lead, however, while covering the iron perfectly and effectually preventing rust, and also having but little disposition to chloridize, when it does, will foul both with grass and barnacles. Hence, the first desideratum being obtained, how shall we accomplish the other. The prevention of fouling may be accomplished in two ways: First, cover the vessel's bottom with two or even three coats of red lead, and give each time to dry hard. Then melt in an iron pot a mixture of two parts beeswax, two parts tallow, and one part pine resin; mix thoroughly, and apply hot one or two coats. This mixture may be tinted with vermilion or chrome green. It is not necessary to use any poisonous substance, as it is only by its softness and gradual wear that it is kept clean. Second, mix red lead and granular metallic zinc, ground fine, or such a mineral as we have mentioned—crystalline and granular in its character. Put on two or three coats, and allow each to set—they will never dry hard. The zinc will slowly wear off, keeping the whole surface clean, while there will be left enough coating of the lead to preserve the iron from rust. The oil I would urge for these pigments is linseed—as little boiled as possible, to be thinned with spirits of turpentine. There seems to have been a mania for mixtures of tar and resins, their spirits and oils; my experience fails to show me any advantage for them on an iron bottom. They have neither elasticity nor durability, while linseed oil has both in a pre-eminent degree, and is no more likely to foul than they, when in a combination that does not dry hard. Besides they are difficult to grind, inconvenient to transport, and offensive to use.

Perhaps we have not, in the opinion of some, answered the want expressed in the first paragraph. No pigment with the requisites of durability and cheapness will resist the attacks of strong acids on iron. The first we have mentioned will—all such as may float in our air from factories or chemical works. Chemically it is converted by nitric acid and chlorine into an insoluble substance—plumbic acid or the cyanide of lead. An experience of more than three years, with almost unlimited means at our command for experiment, demonstrates to us that we have indicated the means of filling the other requisites asked for. It may be that something new will be discovered, but we doubt it. Let any one tread the road we have trod, investigate and experiment where and as much as we have, and, if that place is, where we have not, and their experience will be the same as ours.

THE BANANAS AND PLANTAINS OF THE TROPICS.

[For the Scientific American.]

Poets have celebrated the banana plant for its beauty, its luxuriance, the majesty of its leaves, and the delicacy of its fruit; but never have they sufficiently praised the utility of this tropical product. Those who have never lived in southern countries are unable to fully appreciate its value. Some look even with indifference upon the gigantic clusters of this fruit, as they are unloaded from the steamers and sailing vessels; and yet they deserve special attention and admiration, for they are to the inhabitants of the torrid zone, what bread and potatoes are to those of the north temperate zone.

The banana tree is one of the most striking illustrations of tropical fertility and exuberance. A plant, which in a northern climate, would require many years to gain strength and size, is there the production of ten or twelve months. The native of the South plants a few grains, taken from an old tree, in a moist and sandy soil, along some river or lake; they develop with the greatest rapidity, and at the end of ten months the first crop may be gathered, though the cluster and bananas are yet small; but the following year one cluster alone will weigh some sixty or more pounds. Even in the South they are always cut down when green, as they lose much of their flavor when left to ripen or soften on the tree.

The trunk of the tree, if it may be so called, and which grows to a hight of some fifteen feet, is formed only by the fleshy part of the large leaves, some of which attain a length of eighteen feet, and are two and a half feet in width. While from an upper sprout you perceive the large yellow flowers, or already formed fruits, you see underneath a cluster, which is bending the tree by its weight.

The plantain tree is much the same as the banana, with the difference, however, that its fruit cannot be eaten raw, like the banana's, and that it is much larger in size. Almost every portion of the banana tree is useful. First of all, the nutritious fruit. The plantains when green and hard, are boiled in water or with meat like our potatoes, or they are cut in slices and fried in fat, when they are soft and ripe. There is a singularity about the boiled plaintain, worthy of being mentioned. Pork especially, and other meats are so exceedingly fat in the tropics that they would be most disgusting or even impossible to eat with either bread or potatoes, but the plaintain seems to neutralize or absorb all the greasy substance, and the fattest meat is thus eaten by natives and foreigners without the least inconvenience.

Ripe bananas are mashed into a paste, of which the natives bake a sort of bread, which is very nourishing, though somewhat heavy. This paste, which contains much starch, can be dried, and thus kept for a length of time, which is often of great service to mariners. The young sprouts are used and prepared like vegetables, and the fibrous parts of the stalks of the majestic leaves are used like manilla for ropes and coarse cloth.

The utility of the leaves is a theme rich enough to fill a volume; they are used to cover the huts, for table-cloths and

napkins, or wrapping paper. The dough of bread, instead of being put in a pan, into the oven, is spread on a piece of plantain leaf; it will neither crisp nor adhere to the bread when taken out. The Indians of America carry all their products, such as maize, sugar, coffee, etc., in bags made of this leaf, which they know how to arrange so well, that they transport an "arroba," or twenty-five pounds any distance without a single grain escaping, and without any appliance other than a liana or creeper to tie it up with. As to the medicinal qualities of the leaves, they are numerous. Indeed, a book has been written upon them. I speak, however, from my own experience. The young, yet unrolled leaves are superior to any salve or ointment. If applied to an inflamed part of the body, the effect is soothing and cooling, or if applied to a wound or ulcer, they excite a proper healthy action, and afterwards completely heal the wound. Decoctions made of the leaves are used among the natives for various diseases

Since the beginning of the world this plant has ranked among the first in the Flora of Asia. The Christians of the orient look upon it as the tree of Paradise which bore the forbidden fruit, and they think its leaves furnished the first covering to our original parents. According to other historians, the Adam's fig was the plant, which the messengers brought from the promised land to Moses, who had sent them out to reconnoitre. "It is under the shade of the *musa sapientium*, that," as recorded by Pliny, "the learned Indians seated themselves to meditate over the vicissitudes of life, and to talk over different philosophic subjects, and the fruit of this tree was their only food." The Oriental Christians, up to the present date, regard the banana almost with reverence; their active fancy beholds in its center, if a cut is made transverse, the image of the cross, and they consider it a crime to use a knife in cutting the fruit.

In the holy language of the Hindoo, the Sanscrit, the Adam's fig is called "modsha," whence doubtless, the word "musa" is derived. It is generally believed that the plant came from India to Egypt in the seventh century; it still forms a most important article of commerse in the markets of Cairo and Alexandria. In the year 1516, the banana was brought to the West Indian Islands by a monk, since which time it has rapidly spread over the tropics of America, and is found to the twenty-fifth degree north and south of the equator. It is equally indispensable and is appreciated by the immigrant and by the native as a beautifier of the landscape; affording shelter from the sun and rain, and giving bread to the children; for if every other crop should fail, the hungry native looks up to the banana tree, like a merchant to his well-filled storehouse.

PUTTING UP STOVES.

BY MARK TWAIN.

We do not remember the exact date of the invention of stoves, but it was some years ago. Since then mankind have been tormented once a year, by the difficulties that beset the task of putting them up, and getting the pipes fixed. With all our Yankee ingenuity no American has ever invented any method by which the labor of putting up stoves can be lessened. The job is as severe and vexatious as humanity can possibly endure, and gets more so every year.

Men always put their stoves up on a rainy day. Why, we know not; but we never heard of any exception to this rule. The first step to be taken is to put on a very old and ragged coat, under the impression that when he gets his month full of plaster it will keep the shirt bosom clean. Next, the operator gets his hand inside the place where the pipe ought to go, and blacks his fingers, and then he carefully makes a black mark down the side of his nose. It is impossible to make any headway, in doing this work, until this mark is made down the side of the nose. Having got his face properly marked, the victim is ready to begin the ceremony.

The head of the family—who is the big goose of the sacrifice—grasps one side of the bottom of the stove, and his wife and the hired girl take hold of the other side. In this way the load is started from the woodshed toward the parlor. Going through the door, the head of the family will carefully swing his side of the stove around and jam his thumb nail against the door post. This part of the ceremony is never omitted. Having got the family comfort in place, the next thing is to find the legs. Two of these are left inside the stove since the spring before. The other two must be hunted after, for twenty-five minutes. They are usually found under the coal. Then the head of the family holds up one side of the stove while his wife puts two of the legs in place, and next he holds up the other while the other two are fixed, and one of the first two falls out. By the time the stove is on its legs he gets reckless, and takes off his old coat, regardless of his linen.

Then he goes for the pipe and gets two cinders in his eye. It don't make any difference how well the pipe was put up last year it will always be found a little too short or a little too long. The head of the family jams his hat over his eyes and taking a pipe under each arm goes to the tin shop to have it fixed. When he gets back, he steps upon one of the best parlor chairs to see if the pipe fits, and his wife makes him get down for fear he will scratch the varnish off from the chairs with the nails in his boot heel. In getting down he will surely step on the cat, and may thank his stars that it is not the baby. Then he gets an old chair and climbs up to the chimney again, to find that in cutting the pipe off, the end has been left too big for the hole in the chimney. So he goes to the woodshed and splits one side of the end of the pipe with an old axe, and squeezes it in his hands to make it smaller.

Finally he gets the pipe in shape, and finds the stove does not stand true. Then himself and wife and the hired girl move the stove to the left, and the legs fall out again. Next it is to move to the right. More difficulty now with the legs. Move to the front a little. Elbow not even with the hole in the chimney, and the head of the family goes again to the woodshed after some little blocks. While putting the blocks under the legs, the pipe comes out of the chimney. That remedied, the elbow keeps tipping over, to the great alarm of the wife. Head of the family gets the dinner table out, puts the old chair on it, gets his wife to hold the chair, and balances himself on it to drive some nails into the ceiling. Drops the hammer on wife's head. At last he gets the nails driven, takes a wire swing to hold the pipe, hammers a little here, pulls a little there, takes a long breath, and announces the ceremony concluded.

Job never put up any stoves. It would have ruined his reputation if he had. The above programme, with unimportant variations, will be carried out in many respectable families during the next six weeks.

THE MAGIC LANTERN.

The invention of the magic lantern dates back to 1650, and is attributed to Professor Kircher, a German philosopher of rare talents and extensive reputation. The instrument is simple and familiar. It is a form of the microscope. The shadows cast by the object are, by means of lenses, focussed upon something capable of reflection, such as a wall or screen. No essential changes in the principles of construction have been made since the time of Kircher; but the modern improvements in lenses, lights, and pictures, have raised the character of the instrument from that of a mere toy to an apparatus of the highest utility. By its employment the most wonderful forms of creation, invisible, perhaps, to the eye, are not only revealed but reproduced in gigantic proportions, with all the marvelous truth of nature itself. The success of some of the most celebrated demonstrations of Faraday, Tyndall, Doremus, Morton, and others, was due to the skillful use of the magic lantern. As an educator, the employment of this instrument is rapidly extending. No school apparatus is complete without it; and now that transparencies are so readily multiplied by photography upon glass, and upon mica, or gelatin, by the printing press or the pen, it is destined to find a place in every household; for in it are combined the attractive qualities of beauty, amusement, and instruction.

The electric light affords, probably, the strongest and best illumination for the magic lantern: then comes the magnesium light; but their use is a little troublesome and rather expensive; next to these in illuminating power is the oxy-hydrogen or Drummond light. The preparation of the gases and the use of the calcium points involve considerable skill.

Need has long been felt for some form of the magic lantern, having a strong light, but more easily produced than any of those just mentioned; and this has at last been accomplished, after several years' study and experiment, by Prof. L. J. Marcy, 632 Arch St., Philadelphia, Pa.

The "Sciopticon," is the name of his new instrument, and from actual trial we find that it possesses many superior qualities. Its lenses are excellent, and in illuminating power its light ranks next to the oxy-hydrogen. The sciopticon light is produced from ordinary coal oil by an ingenious arrangement of double flames, intensifying the heat and resulting in a pencil of strong white light. Prof. Marcy's instrument is the perfection of convenience, simplicity, and safety. Any one may successfully work it and produce the most brilliant pictures upon the screen. It is peculiarly adapted for school purposes and home entertainment. Those who wish to do a good thing for young people should provide one of these instruments. Photographic transparencies of remarkable places, persons, and objects, may now be purchased at small cost; while there is no end to the variety of pictures which may be drawn by hand at home upon mica, glass or gelatin, and then reproduced upon the screen by the sciopticon.

The Largest Well in the World---Capacity 1,000,000 Gallons of Water per Day.

One of the grand necessities of the Prospect Park, Brooklyn, N. Y., that of providing for a continual supply of water for all the purposes of the Park developed itself, as the Commissioners progressed with their stupendous undertaking. Mr. Stranahan, the President of the Board, after carefully weighing the cost, the practicability, and importance, of having an independent water supply for the Park, advised the Commissioners of the plan which had suggested itself, and the calculations which had been made by the engineers relative to the project, and the work was commenced, the first idea being to secure at least a partial supply of water by means of a well constructed in the Park. The subject was thus treated in the last annual report of Mr. C. C. Martin, the engineer in charge:

"This well has been located on the south side of Lookout Hill, near the lake, and work was commenced upon it late in the season. After a careful consideration of various methods for sinking the well, it was decided to build the wall and then to excavate the material from within, trusting to the weight of the wall to force it down. Sixteen feet of the wall were laid securely bolted together, before the excavation was commenced. A derrick with a boom fifty-five feet in length was set up near the wall, so that the sweep of the boom commanded the interior of it. Iron buckets containing fourteen cubic feet each were obtained, and a six-horse power hoisting engine purchased. With these appliances the excavation was commenced, and carried on with slight interruption until the work was suspended on account of the frost."

The well is now completed, and is one of the most important features of the Park. It is worthy to rank as a feat of engineering skill with any of the great works of modern times. The Commissioners decided to put its powers to the test yesterday afternoon, but owing to the unpropitious weather of the forenoon the trial was postponed. Nevertheless, Commissioners Stranahan, Fiske, and Haynes, with Mr. Martin, engineer in charge, and Mr. John Y. Culyer, his assistant, were at the well. During the last summer some difficulties were encountered in the sinking of the wall, which were set down by superficial observers as the utter failure of the enterprise. Mr. Stranahan received but little encouragement from his fellow Commissioners, some of whom had never seen greater works of engineering than the construction of street sewers. He assumed the responsibility of seeing the work through, feeling that the whole thing depended entirely upon the ability of the engineers, in which he had abundant faith. All obstacles were surmounted; the work proceeded and the well is now finished, and so far as is known, is understood to be the largest one in the world.

The outer wall is fifty feet in diameter, two feet thick, and fifty-four feet high. The inner curb, or wall, is thirty-five feet in diameter and two feet thick, having a depth of ten feet. The masonry, as seen from the top of the structure, is a marvel of neatness and solidity. The water surface in the well is thirteen feet above high-tide level, and the depth of water in the well is fourteen feet. The pump foundations are entirely independent of the walls. This plan was adopted so as to obviate any possible difficulty which might arise from displacement. The pump is the Worthington patent, and, with a pressure of forty pounds, is capable of raising one million gallons of water every twenty-four hours a hight of 176 feet, and is competent to a lift of 180 feet.

The boiler house is a neat, pressed-brick structure trimmed with Ohio stone, standing on the surface near the mouth of the well. The interior of the well is reached by a spiral stairway built in the wall, and commencing in the boiler house. In this way the engineer is able to reach the pump. It is a fact worthy of notice in connection with the construction of the wall, or rather the sinking of it, that the outer wall rests upon four feet of wooden cribwork, two feet thick, and having an iron shield. The inner wall is built upon a similar crib only two feet deep, also shielded with iron.

The Commissioners were led to the construction of this well in presence of the danger at any time of some accident taking place in connection with the Brooklyn Water Works which would render it necessary for the Water Board to cut off the Park supply so as to secure the citizens from suffering. This well has more than the necessary capacity to supply the Park abundantly with water, yielding most when most is needed. This is established by the discovery that the time of drought from which the well is, or may be, likely to suffer, occurs in the Fall. Besides these facts, it further appears that in order to furnish the supply of water to the Park the Water Board would have to go through the process of pumping their water twice to convey it to the required elevation, equal to 225 feet from its original level.

The work of the well will be to supply the pools at an elevation of 133 feet. From the pools the water is conducted to the lake. Besides this, there is an independent connection with the lake by which, as necessity may suggest, the water can be directed to the lake, a lift of only seventy feet. The lake, when completed, will occupy an area of fifty acres, which will be kept continually supplied with fresh water, the arrangements being such, or to be such, as will insure a permanent change of water, and prevent any of the evils that may arise from stagnancy. The well is fed from the earth, consisting of a circuit of two miles, with a fall of five feet to the mile. For this reason it does not appear easy to exhaust the supply, as when the water is pumped out to four or five feet from the surface of the well it is replaced at a rate equal to the demand. Every allowance has been made for evaporation from the lake and pools, and the supply is regarded as inexhaustible. Another important fact here suggests itself; that is, that sufficient rain falls during the season in the area of two miles around the well to make the supply perennial. The Prospect Park well is a credit to Brooklyn.—*New York Times.*

PAPER FOR BUILDING.

Our readers will find in another column an advertisement of this new building material which is now attracting much attention in the West, and of which we have received very favorable reports. It has been recently tested in Chicago with the result we are informed of fully establishing its utility. It is said that a house twenty-two feet long, sixteen wide, and fourteen high, can be covered on the outside for less than $9; and a house thirty-six feet by twenty-two, and twenty feet high, for $20. The building can be done at any season, and can be finished with great speed, and there are said to be numerous other advantages connected with the use of the paper. It differs from ordinary paper in consistency, compactness and solidity. In the manufacture it is subjected to a pressure of hundreds of tuns, which squeezes out the liquid matter, leaving a substance of the right thickness. It is said to be proof against damp and gnawing of vermin, and it being an excellent non-conductor of heat, must make a warm dwelling in winter and a cool one in summer. It is used in the place of plastering for inside walls.

THE Prussian Government has military maps of every foot of its territory so complete that every hill, ravine, brooklet, field, and forest is delineated with perfect accuracy. It is a common boast of Prussian military men, that within the space of eight days 848,000 men can be concentrated to the defense of any single point within the kingdom, and every man of them will be a trained and well-equipped soldier.

Improved Muzzle-Pivoting Gun.

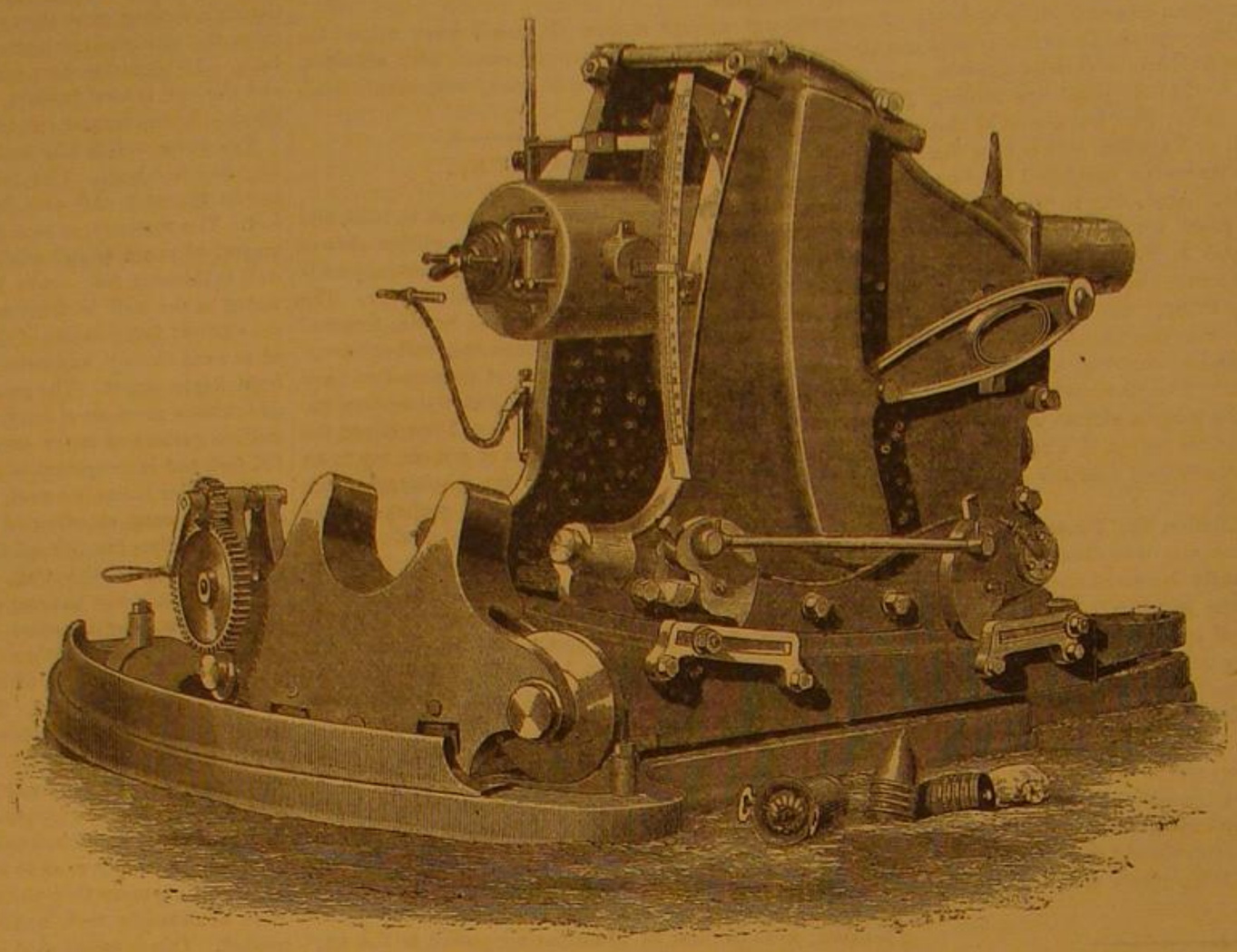
We are indebted for the following able description and criticism of this Prussian gun to our able cotemporary, *The Engineer*.

Viewed as a piece of mechanism, nothing can well be more beautiful in mutual adaptation of parts to the fulfillment of given and rather recondite movements, and in point of execution, than this muzzle-pivoting arrangement of Herr Gruson's; but having said this we are compelled to add, as impartial engineering critics, that it is nothing more.

A very few words of description, aided by the very clear engraving annexed, will suffice to make the arrangement plain to every mechanical reader. The entire structure is metallic, chiefly of cast iron or of steel. Upon the platform of the casemate, or deck of the ship, or turret, is laid the heavy bed or traverse plate, cast hollow in iron, holding the vertical pivot at its forward end, on which the gun slide traverses in azimuth, and at its rear end the segment plate, bolted down and separately adjustable as to position upon the bedplate. The slide is also a ponderous hollow casting, the upper surfaces of which, on which the gun carriage runs forward or recoils, are curvilinear in a vertical plane, so that the inclination to the horizon is greatest at the rear end. At the rear end of the slide it traverses upon two heavy cast-iron turned conical rollers, which are geared together and actuated by the winch handle and spur gear, seen in our engraving; by these the slide is practically held fast in any position on the bedplate. The gun itself—in the model, a steel breech-loader, on the Prussian regulation system, very slightly modified—is sustained between two high and ponderous cheek plates of cast iron, which constitute the sides of the carriage, and which are connected together strongly at the lower edges by a heavy base or bottom plate, and at the top by two light cross distance bolts. The muzzle and breech extremities of the piece project well beyond those cheeks. Along the bottom of the trough of the carriage, directly under the gun, lies a nearly horizontal hydraulic press cylinder, the pump and handle actuating which are seen in the figures to the proper left of the gun, and the supply of water for which is contained in the hollow bottom of the carriage. On each side cheek of the carriage is formed, by curved planing, a circular segmental race, opening inward or toward each other, rectangular in cross section and into each of which is fitted a segmental block just filling it up, and occupying a portion of its length so as to slide easily up or downward through the whole range of the arc or segment.

The center point of the length of each of those blocks carries one side of the gun, which is connected also with the two heavy radius bars seen outside the cheeks, and pivoted close to the segment races on the outside, and with a system of link work between the gun itself and the crosshead of the ram of the hydraulic cylinder, which gives motion to the gun in elevation or depression, through a vertical arc, the imaginary center of which, and of the segments of the side cheeks, is situated in the horizontal diameter across the muzzle of the gun. This is in brief the muzzle-pivoting part of the arrangement, of which, were it worth while to go into its details, we should need some further diagrams to make it quite clear. Nor is it worth while to go into the description of various minor points of refinement about the gun mounting, such as the very exposed long tangent scale seen in the figure, by which the elevation or depression is read off, nor the still more exposed and rather ricketty arrangement by which the rear sight is arranged to rise and fall with the gun, and allowance for dispart avoided. The recoil of the gun is resisted through and by the segment blocks in the side cheeks, and by the heavy radius bars, etc., and thus transferred to the carriage itself. This moves upon four eccentro-concentric rollers, in all respects identical with those brought before the Ordnance Select Committee of Woolwich by Mr. Mallet, in 1858—then rejected, after some time adopted, and brought into use in our own service, where they are now universal, and from which they have been adopted into every artillery in the world, and, we understand, without the slightest recognition of the inventor's rights. On the axle of each of these rollers is keyed a circular eccentric cam plate, those at the same side being connected together by a linking bar so as to move in concert. Adjustable tripping plates attached to the sides of the slide, are so arranged that when the loaded gun has been run forward its carriage base rests hard down, with its full weight upon the top faces of the slide, and thus the recoil is made under the full resistance due to the friction of the entire load. Arrived at the highest point, it rests there until loaded. The cam plates being then given a slight motion of rotation by the help of socket levers—the rectangular projections to be received by which are seen on the top edges of the cam plates in the figure—the carriage, by its own commenced descent, gets again upon its rollers, and runs forward upon these at once into firing position. The two elevated horns which are seen standing up at the rear part of the slide above the roller frame are designed to receive the thump of the two short buffer-blocks—seen at the rear part of each carriage cheek—in the event of the recoil not being wholly expended in raising the weight of gun and carriage, etc., along the curved racers of the slide. These buffer-blocks bear against plugs of vulcanized india-rubber secured in the bottoms of the buffer cylinders.

We have thus, though very briefly, described the whole of this mounting. As a carefully thought out and elaborated



GRUSON'S SYSTEM OF MUZZLE-PIVOTING APPLIED TO MONITORS.

piece of elegant mechanical complication Herr Gruson's muzzle-pivoting carriage attracted much attention at Paris, in 1867, and its merits were regarded as great by those whose thoughts went little further perhaps. We should have been glad had it been in our power to have joined in its praise. We are, however, obliged honestly to say that, however highly creditable to its designer as an ingenious and capable mechanism, it shows that he has never realized to himself as a practical artillerist the primary, most absolute, and indispensable conditions of construction for a serviceable muzzle-pivoting gun for either land or sea service.

As to the general merits, or general conditions, of muzzle-pivoting, however, once in doubt at first, these are admitted now by all; and the latter resolve themselves almost into this—that system of muzzle-pivoting must be best which, while preserving the essential point of leaving the muzzle of the gun free of any direct attachment, *i.e.*, with an imaginary, not an actual, pivot of vertical arc motion, shall be *the simplest possible* in its parts, have the least details, the fewest parts capable of being struck by splinters or shot, and all its parts of such materials and character as to receive the smallest amount of injury if so struck. In every one of these aspects Herr Gruson's mounting is at fault. With parts and movements far more ingeniously adapted than those of the crude and unskillfully designed muzzle-pivoting carriages of Captain Heathorn, also exhibited at Paris, and much exhibited and exposed since, the Gruson mounting is even more complicated, expensive, and liable to injury of every sort to which a gun carriage can be conceived liable. We may even venture to affirm that ponderous as was the mass of cast iron, etc., in the Paris model carrying only a 12-pounder gun, were it all enlarged in such ratio as might appear to suit for a 10-inch 25-ton rifled gun of the British type, the almost proverbial relations, between weight, velocity of impulse, and brittleness of cast iron, would show themselves, in the whole machine going to pieces within a very few rounds.

Stock Feeding by Clock Work.

Mr. F. B. Robinson, of North Haven, Conn., has invented a very neat arrangement, whereby horses or stock can be fed at any time required with certainty and without personal attention at the time of feeding. His invention consists of a hopper with a drop bottom in which the provender is placed. A latch secures the drop bottom, the latch engaging with a spring catch. A simple arrangement of clock work on the principle of the alarm clock, may be set to release the spring at any hour or minute desired, when the drop falls and the provender falls through a chute into the feeding trough. This invention may be adapted to feeding any number of horses or cattle, only one clock being required. We regard the invention as one of much value. By its use much neglect of careless attendants may be obviated, and a farmer without help, might leave home for an evening's entertainment, or absent himself on business, without fear that his stock would suffer. Besides being so convenient the cost of the apparatus is a mere bagatelle.

Milk, and What Comes of It.

Orange County has long been a land flowing with milk and —butter. Three or four of these most beautiful autumn days were spent by us, says a writer in *Harper's Weekly*, among the farmers which are supposed to butter our New York city bread, and qualify our tea and coffee. Recent mechanical improvements have taken away much of the traditional romance of the farm, but, on the whole, the loss is more than made up by the gain of perfect system and wonderful adaptation. Instead of four or five cows, known by such names as Brindle, Bess, and Sukey, milked by rosy-cheeked maidens, we have now droves of fifty or a hundred, milked by men, who know them only as "good" or "poor milkers."

In some fine farms a large and luxuriant pasture, with running brooks and border of woodlands, affords, with the herd feeding in it, a beautiful picture; and the substantial barns constructed to keep the cattle comfortably cool in summer and warm in winter, with ample drinking troughs and stalls for fastening up at night, are indicative of the good shelter at hand when winter storms drive the cows indoors. To the farm-yards the cows are brought night and morning, in summer, to be milked. The strained milk is put into large cans holding forty quarts, such as the milkmen use in distributing it through the city. These cans are then put into tanks made in some cool running stream, where the water comes nearly to the top of the can. Frequent stirring is necessary until the animal heat is quite gone. The milk is then fit to be sent to the cars. This process can never safely be omitted for, paradoxical though it may seem, milk is "fresher" and sweeter when it reaches the consumer if it is delayed at the farm for at least twelve hours. Even in hot weather, it is more certain to keep sweet when twenty-four or thirty-six hours elapse between the milking and the using in the city.

There has been much discussion as to the best means of cooling milk for market, and patent pails have been tried in which the milk passes directly from the cow through small, coiled tubes surrounded by ice. But this rapid cooling does not work well, and practical experience indicates that the old simple process is the best. Every well-appointed farm must have, therefore, a cool and unfailing stream of water. There are two such streams in one of the farms we visited. One passes through the barn, furnishing drinking troughs for the cattle, and a tank for cooling milk in winter. The other, running through the pasture, supplies a trout-breeding pond, and furnishes a tank for summer use. In a little hut under the trees, the milk cans are kept in a stream, which even the severe drought of last summer did not dry, nor the heat raise to a temperature of 60°.

We are assured most positively that none of the spring water finds its way over the mouth of the can into the milk. Its dilution, of which there is so much just complaint, must be done, if at all, in the city, for the wholesale buyer is said to have such means of testing the milk as effectually protects him against the farmer. May the man be busy at work who is to give each family such a protection. We have heard it said that one end of a small piece of common tape placed in a pan of milk will carry from it all the water into another vessel in which the other end of the tape should be placed; but we have never found this a safe test.

Strange to say, no butter is made on these large milk farms. The supply for the family is obtained from market, or, more rarely, from a neighbor who churns all his milk for the accommodation of those who send all theirs to the city. Our notions of the way to make butter were decidedly overturned on going to such a dairy. No setting of the milk in shallow pans for cream to rise; no skimming and putting away in jars until "churning day," when the thick cream was agitated by a strong arm until the butter came, then worked and salted. Instead, there is a daily pouring of the unskimmed, soured milk into a common churn, perhaps somewhat larger than ordinary. The dasher is fastened to a shaft, which is moved by a crank. The crank is turned by means of a nearly horizontal wheel some eight or ten feet in diameter, which is kept in motion by a dog, sheep, or calf standing on it, something after the manner of the old tread-mill.

When taken from the churn, the butter is worked by hand, as of old. The farmer with whom we have talked said he was about determined to send his milk to the creamery, since butter-making made it so hard for the women. Surely woman is less a drudge than she used to be. If, after being relieved from the labor of churning, the remaining working of the butter is considered too hard for the farmer's wife, the day of a woman's redemption must be near at hand.

Only one butter farm have we been able to find, and not

enough is made there to supply the immediate neighborhood Where, then, does all the Orange county butter come from? Mostly from the West. Farmers buy from the vicinity of the Alleghenies, and even further west, large quantities, which they sell in the original package or repack in pails. Since railroads have become so numerous, New York drinks up all the milk in Orange county, and must butter her bread elsewhere.

The largest institution for the disposition of milk is the Creamery, which is, in other words, a cheese factory. Here is brought the milk which the farmers themselves are unable properly to prepare for market, for want of cool springs or sufficient help. Received here, it is placed in deep but narrow tin pails holding twelve or fourteen quartz. These are floated in large tanks of water. From these pails the cream is carefully taken and sent to market. The skimmed milk is then placed in a large vat and heated, by means of steam pipes to about 80°. Then the rennet is put in. From twenty to thirty minutes suffices for curdling, and the mass is then stirred to separate the curd from the whey. After which it is heated still more; and then the whey, passing off through a strainer, goes to feed hogs, while the curd remains in the vat, to be salted and worked before putting into the presses. In two or three hours the curds become hard enough for the canvas to be put upon them ready for the shelves. Very carefully they must then be watched, lest the fly lying in wait for them makes in them a snug house for her family. Greasing and turning must be a daily labor, and some weeks must pass before they are sufficiently cured for market.

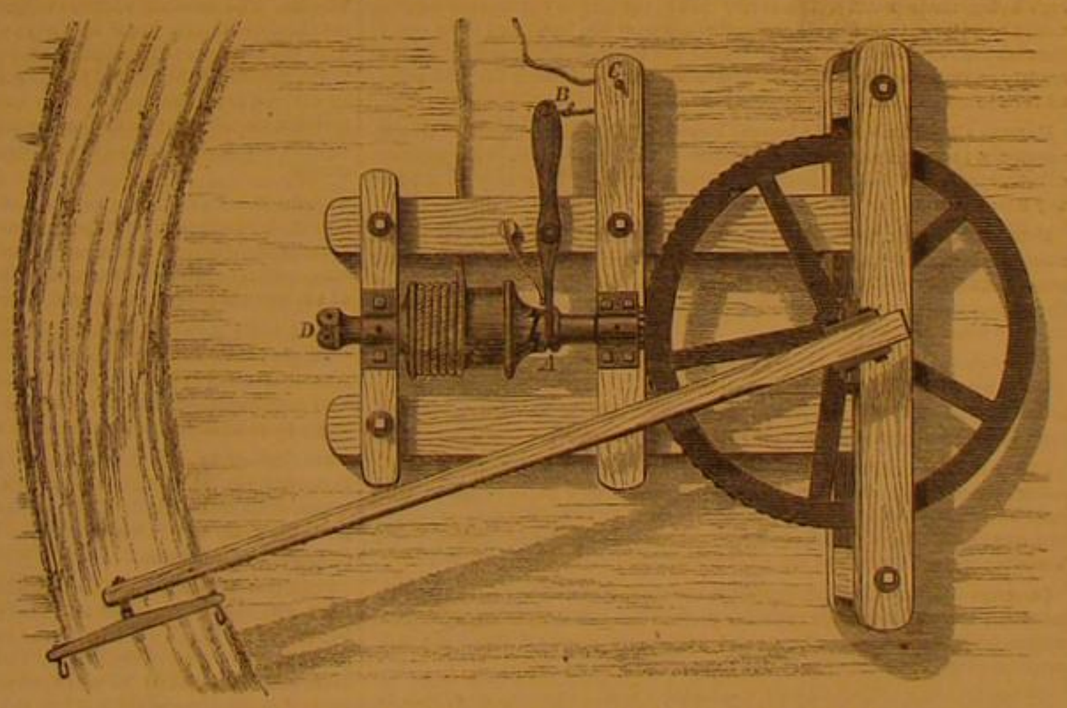
For the benefit of city consumers, who are paying ten and twelve cents a quart for milk, from a tenth to a quarter of which is not infrequently pure Croton, we may add that the highest price the farmer ever gets for his milk is seven cents a quart; and he sometimes sells it for as low as two cents and a half. Our friends, the milkmen, have, therefore, it will be seen, a pretty good margin for freight and profit.

Improved Hay Elevator.

The method most generally used for elevating hay is evidently not the most economical application of the power of horses for the accomplishment of the purpose desired. The tackle involves a great deal of friction, and as the quantity which can be thus raised at once is, probably, on the average, not more than from 150 to 200 lbs., much more time is employed in re-adjusting the fork, than would be the case if a larger quantity were elevated.

The invention under consideration supplies a means whereby it is claimed hay may be unloaded with far greater facility than heretofore, with less labor to the team and with fewer hands than are at present employed.

A primary gear wheel is propelled horizontally by a lever worked by a horse. The primary gear impels a pinion keyed to the shaft of a windlass, upon which is wound the elevating rope, whenever the clutch, A, is made to operate through the cord and lever, B. This cord runs over a pulley on the under side the wood framework at C, and its further end may be held in the hand of the workman on the hay load, who, when he has properly adjusted the fork, pulls the cord which operates the clutch, and the "fork-full" of hay is at once elevated. The cylinder of the windlass, not being keyed to the shaft, only operates when the clutch is closed by the cord.



DERR'S CAPSTAN FOR ELEVATING HAY FORKS.

The horse, or horses which furnish power to the machine, may, therefore, keep on traveling in the same direction, and no time is lost in stopping and backing, as in the method in general use.

There is no doubt but that this is a cheap, durable, and desirable machine, and one that can be used to great advantage, not only for the elevation of hay, but for many other purposes. We think it would be found a decided improvement in discharging cargoes of coal from barges, and for handling coal in storage yards.

The inventor claims that twice as much hay can be raised in a given time by its use, as can be done by the old method; and it dispenses with one hand at the barn or stack.

A coupling at D, enables attachments to be made, which extend the usefulness of the machine very much. It may be used as a power for driving wood saws, cutting fuel, thrashing, and other work where a simple horse power is desirable.

Address for further information, Wm. Derr, Tiffin, Ohio.

COMPETITORS FOR PRIZES.—The interest that our friends have taken in obtaining additional names to send with their own subscriptions to the SCIENTIFIC AMERICAN for the coming year, is without a parallel. The clubs sent by competitors for the cash prizes are not so many or so large as we expected, but the number of applicants for the steel plate engraving exceeds our expectation.

THE Emperor of France is said to be interested in the art of flying and to have given money to fledge some inventions.

IMPROVEMENT IN LAMP WICKS.

Our engravings show a novel substitute for the cotton lamp wick. The wick, two forms of which are shown in Figs. 1 and 2, are made of glass, and are filled preferably with pulverized gypsum, although any finely-ground stone, mineral, or metal may be employed. The bottom of the glass tube is closed by wire gauze, or other suitable strainer, through which the fluid flows; and is carried by the capillary attraction of the pounded material to the top of the wick.

Thus a permanent wick is obtained, which may be employed with any form of lamp, and will last for an indefinite

time. It may also be used in connection with an open cup, which the inventor terms a poor man's lamp. A perforated card is laid upon the top of the cup or tumbler as a support to the wick.

It may be used either with or without a chimney, and it is claimed that with good kerosene oil it is perfectly safe, and consumes less of it, while it may be also used as a candle.

Patented through the Scientific American Patent Agency, September 14, 1869, by Edward D. Boyd, of Helena, Ark.

Address for rights, etc., the patentee, as above, or Jos. P. Branch, 277 Fulton street, Brooklyn, N. Y.

Great Transformation.

Seven years ago, says the Port Said correspondence of the London *News*, there was nothing to distinguish Ismailla or the smiling lake before you from the rest of the desert, and all was sand. It is the canal which has raised up the numerous handsome villas and fine gardens. Fresh water is all that is needed to turn the arid desert into a fruitful soil; and the supply of this is provided by the subsidary canal which the company has formed side by side with that broad salt one which now unites two worlds. Wonderful stories are told of the productiveness of the gardens, and a walk through any of those belonging to the leading officials stationed at Ismailla is to verify them all. Vines with large bunches of grapes pendent from their branches; orange trees with green fruit just showing a golden tint; ivy, roses, geraniums from England, and an endless variety of rich tropical plants are all flourishing. In the centre of the town is a square with trees and a building clothed with rich creepers in its midst. Everything here looks French. A handsome boulevard runs down to the point of embarkation, the streets and squares are on the true Parisian model, and there are *cafes*, billiard rooms, and *cafe chantants* which might easily belong to Nantes or Lyons. There are of course huge gaps where the houses and shops will be; the roads are, many of them, still of sand; camels draw carts, and generally pervade the place in long strings; but with all this you are kept in a state of wonder during your stay at Ismailla at the marvelous conversion which has taken place under your eyes.

AMERICAN agricultural implements are highly praised in newspaper reports of the Metropolitan Cattle Show, held recently in London.

Answers to Correspondents.

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

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

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

C. H. G., of N. Y.—To make pure nitrate of silver, dissolve pure silver in pure nitric acid, evaporate the solution to dryness, or, if crystals are preferred, evaporate until the solution is sufficiently concentrated to form crystals. If you can not get pure silver, you may purify it by dissolving coin in nitric acid, filtering the solution and precipitating the silver in the form of a chloride by hydrochloric acid. Next wash the precipitate with hot water until the washings cease to redden litmus paper. Next mix the pure chloride of silver while yet moist with its own weight of pure crystallized carbonate of soda, place the mixture in a covered porcelain crucible and heat very gradually until the fusing point of silver is reached. The reduced silver will be pure and may be removed by breaking the crucible. Wash the button thoroughly with hot water to remove the flux. In dissolving the pure silver thus obtained in nitric acid, it is better to use an excess of acid; the excess will be driven off by heat in evaporaton.

G. B., of Iowa.—Nominal horse power is merely a conventional expression for diameter of cylinder and length of stroke, and does not apply to the actual power of the engine. It is found by multiplying the cube root of the stroke in feet by the square of the diameter in inches and dividing the product by 47. This rule is based upon the postulate established by Watt, that the speed of a piston with two feet stroke is 100 feet per minute, and that for longer strokes the speed varies as the cube roots of the length of the stroke. It is needless to say this rule is not observed in modern practice, yet the expression, nominal horse power, is like many other relics of past time still retained. The above rule does not apply to high pressure engines. For such engines Bourne has given the following rule: Multiply the square of the diameter of the cylinder in inches by the cube root of the stroke in feet, and divide by 15·6. The real power of an engine is estimated from the mean effective pressure in the cylinder—not the boiler—and the speed of the piston. Your data are insufficient to determine the horse power of your boiler. The horse power of boilers is estimated from the extent of heating surface when the grate and all other things are correctly proportioned, but with them as with engines, only actual test will positively determine it. The pipe you mention ought to be enlarged as proposed.

W. H. R., of Mass.—Pressure acts independently of the mode of application. A ton laid upon the head of a wedge would produce the same effect as though it were applied through toggles. When, however, a weight is dropped its effect increases as the square of its velocity.

J. B., of N. Y.—We recommend you to get "Appleton's Dictionary of Mechanics." Also send for descriptive catalogue to Henry Carey Baird, Philadelphia, from which you will be able to judge for yourself what works are suited to your requirements.

T. D. H., of Mass.—Ammonia, in a weak solution, may be used to cleanse the scalp, but is not recommended for the purpose. Borax in solution is better. The supposed preservation of the color of the hair by its use is a mistake.

F. B. H., of Ill.—So far as we know, nothing better than the flax seed bag has been discovered for packing the lower end of tubes in artesian wells. We have never heard of any trouble arising from the method and think you will have none.

L. G., of Mass.—Express the decimal ratio of the diameter of a circle to the circumference to which you refer, as a mixed vulgar fraction, and you will have what you ask for, if we understand your query.

A. H. S., of Sandwich Islands.—We know of no substance that in our opinion, could be used advantageously to paint the interior of sheet-iron evaporating pans for concentrating cane juice.

L. B., of Wis.—We would be glad to assist you but the data you furnish are not sufficient. The accurate solution of such a problem involves the higher mathematics.

A. H. M.—All animal and mineral oils are destructive to rubber. Linseed oil will not dissolve it. Oils should not be allowed to get on rubber belting.

T. W. J., of Pa.—For your rollers try some emery mixed in a solution of gum shellac in good alcohol.

E. B., of Mass.—The patent can be corrected by reissue.

J. M. T., of Ind.—To find the proper area for a safety valve port, when the evaporating surface is properly proportioned to the engine power, multiply the square of the diameter of the piston in inches by the speed in feet of the piston per minute, and divide the product by 375 times the pressure on the boiler per square inch. Having decided upon the length of the lever, the distance of the valve stem from the fulcrum, and the point from which the weight will be suspended, the weight necessary will be found by multiplying the area of the valve port in inches into the pressure per square inch in the boiler in pounds, and this product into the distance of the center of the valve stem from the fulcrum in inches, and dividing the product thus obtained by the distance from the fulcrum to the point of suspension of the weight in inches. The quotient will give the weight in pounds.

A. K. S., of Ohio.—The inclination of the poles of a planet to the plane of its orbit, determines its zones and also its seasons. The inclination of the earth's axis is twenty-three and one half degrees. This places the tropics the same distance each side of the equator, and the polar circles the same distance from the poles. The torrid zone is therefore forty-seven degrees wide, and the temperate zones each forty-three degrees wide. As the planets vary in their inclination of their axis to the planes of their orbits, it follows that their zones and seasons differ from those of the earth.

W. H. C., of Texas.—The teeth of a circular wood saw to be driven by foot-power, should be not larger than those of the ordinary hand crosscut. The fly-wheel ought to have a rim weighing from eighty to one hundred pounds, and it should be, for a 12-inch saw, not less than a foot in diameter. It should be placed on the saw arbor. The belt should not run on the fly-wheel, but on a special pulley, and the treadle and crank motion should be so adjusted that the foot will move through an arc of from 10 to 12 inches.

A. H. B., of Pa.—We advise you to use a battery in coating the small gray castings, of which you write, with copper. It will be all the more satisfactory in the end. The best polishing material to put in with them in the tumbler we think would be leather cuttings and sweepings. They will not need returning to the tumbler after being coppered. We recommend you to get "Byrne's Practical Metal-workers Assistant," published by Henry Carey Baird, Philadelphia.

J. H. G., of Tenn.—Don't put oil in your boiler to prevent incrustation. It will not probably do any good, and it will cause much foaming, while besides that it is a waste of heat, it is injurious to engines.

S. S. R., of Tenn.—No ammoniacal engines are, so far as we are aware, running in this country.

C. E. C., of Ohio.—The varnish for patterns is common shellac varnish. It is sometimes made black by lampblack.

Recent American and Foreign Patents.

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

MOP.—Philip Cook, Jr., Sioux City, Iowa.—This invention relates to a new and useful improvement in mops, whereby they are so arranged that they may be wrung or freed from water when in use by moving the slides connected with the handle and head of the mop.

VENTILATING HORSE COVER.—Charles P. Eager, Boston, Mass.—This invention relates to a new horse cover, which is so arranged that it will be entirely waterproof, and nevertheless permit a free escape of air from the body of the animal.

CAR COUPLING.—S. O. Campbell, Tipton, Mo.—This invention relates to a new car coupling, which is so arranged that it will be self-coupling, and retain the coupling pin ready to lock as long as the link is not inserted.

GAS STOVE.—Wm. J. Hays, New York city.—This invention has for its object to construct a gas stove, with an extender radiating surface, and with proper air channels, so that, with a comparatively small amount of heat, the air in an ordinary-sized room can be properly warmed.

SCRIBE HOOK FOR WEATHER-BOARDING.—John Nester, Portland, Oregon.—This invention relates to a new scribe hook for weather-boards, which will be generally useful and adaptable to the purposes for which it is intended and to provide an adjustable spur and marker.

RAILROAD SMOKE CONVEYER.—Lemuel Powell, Milford, Conn.—The object of this invention is to prevent the smoke and ashes, issuing from the smoke stack of a locomotive, from entering the cars of the train and from thereby preventing the proper ventilation of the cars.

DRILL FOR BORING POLYGONAL HOLES.—J. C. Broadley, Franklin, N. J.—This invention relates to a new implement for boring polygonal, oval, star-shaped, or holes of other suitable form, in metal, wood, or other material. The invention consists chiefly in arranging the pattern, which regulates the shape of the hole to be bored, on the upper part of the drill shank, and in having the bit shanks, which are pivoted to the lower part of the drill shank, held by means of springs against the inner edges of the inverted cup-shaped pattern.

ROOFING.—H. G. Noble, Selma, Ala.—This invention relates to improvements in roofing, and consists in covering roofs with sheet metal, laid on the rafters and nailed down at the edges, so as to be considerably concaved between them, the joints on the rafters being covered by inverted caps or troughs. The concave form of the sheet is designed to prevent the sheet metal from cracking, to which it is subject by expansion and contraction when laid on flat.

WASHING MACHINE.—John J. Kimball, Naperville, Ill.—This invention relates to improvements in washing machines, and consists in an improved arrangement of operating mechanism for revolving a vertically-suspended shaft with a crank at the top, and carrying within the tub a corrugated or roughened rubber, for action on the clothes. The invention also comprises an improved arrangement of the rubber, whereby it is made capable of sliding up or down on the shaft, according to the amount of clothes to be acted on.

BOLT CUTTER.—O. E. Butler and S. P. Dunham, Marshalltown, Iowa.—This invention relates to improvements in hand instruments for cutting bolts, and consists in the combination with the handles of an instrument, such as patented to the inventors, January 19, 1869, as an improved instrument for sharpening horseshoes, of a cutting pin of peculiar construction, whereby the said tool is adapted, when this cutter is applied in substitution of the cutter and jaw, as used for sharpening horseshoes, to cut off the ends of bolts with great facility.

SHAFT TUG LUGS FOR HARNESS.—T. J. Magruder, Marion, Ohio.—This invention relates to improvements in the construction and application of shaft tug lugs for harness, and consists in forming the said lugs with broad and long plates, properly curved to suit the curve of the pad, and connecting the latter to the under sides of the skirts and to the pads in a way to stiffen the skirt and to hold the stud securely from breaking loose, the said lugs being made solid with a screw nut at the end to confine the bearing straps, or hollow, with female screw threads near the base, and bolts screwing into the said female threads to secure the bearing straps and to admit of readily applying or removing the straps so that the harness may be adapted for use either as single or double harness.

HARNESS BUCKLE.—J. W. Burch, Fayette, Miss.—The object of this invention is to provide buckles for harness and other uses, with tongues constructed in the form of leather punches, whereby they may be used at any time required for punching holes.

HUMMING-WHEEL TOY.—A. F. Able, New Orleans, La.—This invention relates to improvements in humming wheel toys, having for its object to provide an improved holding apparatus for supporting and maintaining the proper tension on the cords, and designed to support the cords of two or more wheels at the same time.

COMBINED CLOTHES IRONING TABLE AND CLOTHES DRYER.—William P. Adams, Brooklyn, N. Y.—This invention relates to a new and useful improvement in an article for the laundry, and consists in an adjustable ironing table, and in combination therewith a clothes dryer.

SEED AND GRAIN STRIPPER.—J. F. King and H. A. Rice, Louisiana, Mo.—The object of this invention is to provide a seed and grain stripper, with light and strong fingers, capable of adjustment as to hight, and arranged in a way to vary the spaces between the teeth at the point of stripping the heads for straw of different sizes.

CLOTHES WRINGER.—M. M. Follett, Lake City, Minn.—This invention relates to a new apparatus for applying pressure to the rollers of a wringer with an object of obtaining equal and adjustable power without any danger to the rubber of the rollers or to the articles to be dried.

AUGER HANDLE.—James Swan, Seymour, Conn.—The object of this invention is to provide a cheap, simple, and durable handle for augurs for boring in wood, one which shall require no fitting except to make the augur enter the socket, and which shall be of such size and shape that the shanks of ordinary augurs shall enter without any fitting at all.

CANDLESTICK.—H. Zahn, San Francisco, Cal.—This invention relates to a new and useful improvement in candlesticks, and consists in the use of a thumb screw in combination with the candlestick tube, whereby the candle is kept steady, and in a perpendicular position in the stick, and firmly held without the use of springs or other attachment.

WASHING MACHINE.—J. S. Merchant, Hopedale, Ohio.—This invention relates to new and useful improvements in machines for washing clothes.

PACKING CASES FOR OIL CANS.—John McLeod Murphy, New York city.—This invention consists of an arrangement especially adapted for use with cans provided with an improved cut-off nozzle, which is the subject of an application for a patent, made by the same inventor and bearing even date herewith, which said improvement comprises the application to the ordinary vertical nozzles of a lateral spout connected to the side, and arranged to open an escape passage for the contents when the said spout is turned with the right position, which position is that best adapted for pouring from the can into another vessel, and in which the said spout projects through a slot in the side of the packing case in closing it, the said case being provided with an opening and a door for closing the same adapted for it.

WASHING MACHINE.—Edward Heim, Pittsburgh, Pa.—This invention relates to a new machine for washing clothes, and consists in the introduction of several improvements whereby the machine is adapted to thoroughly clean coarse as well as fine articles without injury to the same, and in a comparatively short time.

PADLOCK.—John S. Rankin, Ann Arbor, Mich.—The object of this invention is to provide a simple, cheap, and efficient construction and arrangement of the locking and operating parts of padlocks. The invention consists in an improved and simple compound tumbler bolt and relative arrangement thereof with the bow and bow spring.

GRAIN DRILL.—Jacob F. Gibson, Chestnut Level, Pa.—This invention relates to a seed tube pivoted in its drag bars, in such manner that it may yield to an immovable obstruction.

PROPELLING MACHINERY OF COTTON GINS.—Wm. L. May, Linwood, Ala.—This invention has for its object to effect such an arrangement of machinery as will enable a cotton gin to be run at a materially reduced expense.

SNOW PLOW.—Thomas L. Shaw, Omaha, Nebraska.—This invention relates to a snow plow, for a locomotive engine, which takes up a load of snow, is then borne back out of the cut by the engine, and dumps its load when arrived at a clear space.

BEEHIVE.—W. T. Kirkpatrick, Tamarva, Ill.—This invention relates to improvements in beehives, and consists in the combination with beehives in a peculiar way, of a moth box, and moth passage thereto, calculated to entice the moths away from the bee passage and prevent them from entering therest.

SEEDING MACHINE.—M. F. Lowth and T. J. Howe, Owatonna, Minn.—This invention relates to that class of seeders which employ a revolving cylinder, having pockets in its periphery, and placed at the bottom of the hopper which contains the seed, the function of the pockets being to receive seed, when right side up, and drop it when inverted.

UPRIGHT PIANO.—Geo. C. Maaner, New York city.—This invention consists in placing the strings of an upright piano in an inclined position in the frame instead of a perpendicular one, as heretofore, for the purpose of enabling the hammer handle to be pivoted so near the strings that when the hammer head is driven up against them, it shall necessarily fall back again by its own weight.

CARPET CLEANER.—Alexander Stevenson, New York city.—This invention relates to new and useful improvements in carpet cleaning devices, having for its object to provide a simple and efficient apparatus consisting of a yielding bed, brushing rollers, moving rollers, and a beating apparatus, whereby the carpet, being bound upon a roller, or rollers, may be moved along, from time to time, over the said yielding bed and brushing rollers, and be beaten and brushed.

COTTON CULTIVATOR.—I. W. Burch, Fayette, Miss.—This invention comprises a pair of plows suspended from the frame of a truck so as to work on both sides of the row, for "barring off" or scraping the weeds and earth away from the row; also, a pair of rotary cutters having oblique blades for throwing away from the plants, and designed, also, to work on both sides of the rows, and closer to the plants than the plows, both sets of devices having vertical vibration.

WATER WHEEL.—Geo. W. Cressman and Burt Pfleger, Barren Hill, Pa., and Nice Keely Roxborough, Pa.—This invention relates to improvements in turbine wheels designed to produce an arrangement of the gates within the bucket rim (the water being secured from below, and the wheel being made hollow, for the reception of the water, and to provide space for the said gate), in a manner calculated to relieve the wheel of pressure from the water, either in an upward or downward direction.

ATTACHING FLY AND MOSQUITO BARS TO WINDOWS, DOORS, ETC.—James Hebron, Buffalo, N. Y.—This invention relates to improvements in attaching fly and mosquito bars to window sashes or frames, doors, or other light frames to be used in combination with window frames or doors, and consists in attaching one edge of the cloth to a round or other shaped bar or rod of wood or metal, by binding thereon and sewing, passing the thread spirally around the bar or rod, and then securing the rod to the sill or frame, either on the surface thereof, or in a groove formed therein, then stretching the cloth across the window and securing it by clamping another rod down upon it by staples, either in a groove or not, and, in some cases, securing the ends in a similar way. It is also proposed to stretch the cloth over or under these rods.

ADJUSTABLE STOVEPIPE THIMBLE.—H. N. Bill, Willimantic, Conn.—This invention relates to improvements in thimbles for the passage of stovepipes through the walls into flues, and consists in providing a vertically-sliding thimble plate in a metallic frame, having a long opening, and adapted for insertion in an opening through the wall, so as to support the thin plate at or about the line of the face of the flue wall, so that the plate may be drawn up or down to vary the hight of the thimble for pipes of different vertical lengths. The invention, also, comprises an improved mode of attaching the thimbles to this plate by means of radial studs at the rim, separated from the main part of the rim and bent inward so as to pass through slots in the thimble plate around the hole, to engage behind the edge of the plate by turning the thimbles on their axes a short distance after being passed through the slots, while the main part of the rims of the said thimbles bear against the front face of the thimble plate and cover the slots when so turned.

COMBINED HAY RAKE AND TEDDER.—John C. Mills, Palmyra, N. Y.—This invention relates to a new and useful improvement in combining two important agricultural machines in one (or combining a tedder with a hay rake), and it consists in the construction of the tedder and the arrangement of the same in combination with the rake. Patented Dec. 7, 1869.

POST-HOLE AUGER.—Geo. Seeger and Chas. H. Shaffer, Clark's Hill, Ind.—This invention relates to a post-hole boring apparatus, mounted upon a wheelbarrow, and the invention consists in providing the barrow with legs that may be either turned up out of the way or adjusted at any required angle so as to keep the barrow level when on uneven ground.

SELF-DROPPER FOR REAPERS.—T. F. Lippencott, Conemaugh, Pa.—This invention has for its object to furnish an improved self-dropper for reapers, which shall be so constructed as to operate automatically, to fall and deposit the grain and to rise to receive another supply, making the gavels all of about the same size.

PLOWING MACHINE.—Albert Bondell, Philadelphia, Mo.—This invention has for its object to furnish an improved machine for preparing the ground to receive seed, and which shall be so constructed and arranged as to prepare the ground more thoroughly and put it in better condition to receive seed, and which shall be so constructed and arranged as to prepare the ground more thoroughly and put it in better condition to receive the seed than when the ordinary plows are used.

EXPANDING TRIPLE SHOVEL PLOWS.—Edward Wiard, Louisville, Ky.—This invention has for its object to furnish an improved triple shovel plow, which shall be so constructed and arranged that the shovels may be conveniently expanded and contracted, or set at any desired pitch, and, at the same time, in such a way as to be securely held in any desired position.

SEWING MACHINE.—L. W. Lathrop, Nyack, N. Y.—This invention relates to improvements in sewing machines, and consists in certain improvements in mechanism for forming the loop, and for conveying the binding thread through the same, in a manner to prevent the contact of the binding thread spool, or its carrier, with the thread of the needle, and thereby to avoid wearing the same, and to produce more easily operating parts; also, a secure, permanent, and reliable arrangement of apparatus, and calculated also to be more certain to form the stitch.

PORTABLE DERRICK.—J. R. Hammond, Sedalia, Mo.—This invention has for its object to furnish an improved derrick, simple in construction, effective in operation, and easily moved from place to place, designed especially for use in connection with the improved rake, thrasher, loader, and stacker, patented by the same inventor Nov. 30, 1869, but equally applicable for other uses.

WAGON SEAT FASTENER.—Charles Collins, Vernon Centre, N. Y.—This invention relates to improvements in means for holding detachable wagon or sleigh seats to the boxes, and consists in the application to the seat risers of hooks with spring stops, adapted for engaging staples in the boxes below the said hooks, and for being held in such engagement by the spring stops, until disengaged by the operator for removing the seats.

VELOCIPEDE.—William Volk, Buffalo, N. Y.—This invention relates to a new three-wheeled velocipede, which is so arranged that the driving wheels, although mounted on separate axles, will make equal numbers of revolutions, as long as the machine is to be kept in a straight direction, while they can be disconnected when the device is to be turned in a circle.

COFFIN HANDLES.—Clark Strong, Winsted, Conn.—This invention relates to new and useful improvements in coffin handles, and consists in the construction, arrangement, and combination of parts.

LOOM.—Lyman Stone, Nelson, N. H.—This invention relates to improvements in power looms, and has for its principal object to provide an arrangement and construction of the same, calculated to furnish looms of equal or greater efficiency than those now in use, but occupying very much less space, so as to economize materially in room, where large numbers are used on a floor, as is the case in factories; not only in respect of the space occupied by the loom itself, but also in respect of the space required for the passages or aisles between the rows of looms. The invention also comprises improved let-off and take-up mechanisms; also, an improvement in cloth beams; also, an improved picker motion, inducing a novel adjusting arrangement for the picker operating cams; also, an improved construction of treadle cams, whereby an equal capacity of throw is obtained with less size and friction, and with less power, and whereby they are guarded to prevent accidents to the attendant while cleaning when the loom is in operation.

PAPER FILE.—C. W. West, Shiloh, N. J.—This invention relates to a new paper file, which is a compound of two bars that can be tied together so that the paper will be securely clasped between them; the strings for tying them being arranged in a peculiar manner to draw them firmly together.

ROLLING BLOTTER.—C. A. Gale, Demopolis, Ala.—This invention has for its object to provide an improved rolling blotter, which shall be so constructed and arranged that the blotting pads may be conveniently removed when required, and replaced with new ones.

DUMP WAGON.—Daniel Willson, Ishpeming, Mich.—This invention has for its object to furnish a simple, strong, and convenient dump wagon, which shall be so constructed and arranged that it may be dumped when equired, by backing the team.

SEWING MACHINE SOAP HOLDER.—Mary Dewey, New Albany, Ind.—This invention relates to a new device for soaping the cloth that is fed under the needle of a sewing machine, and consists in the attachment of a tubular soap holder to the presser foot of a sewing machine.

MONKEY WRENCH.—Samuel Zarley, Niantic, Ill.—This invention has for its object to furnish an improved monkey wrench, which shall be simple in construction, strong, durable, and easily and quickly adjusted to the nut to be unscrewed.

ANIMAL TRAP.—Adam Brown, Bridgeport, Oregon.—This invention relates to improvements in traps for rats, squirrels, and other animals, and consists in the application through an opening in the side of a box, of a detachable chute extending some distance into the box, forming a passage thereinto the walls of which are armed with spring points arranged in the usual way to permit ingress and prevent egress; the floor of the passage is elevated to form a chamber below for inclosing the bait, so that it cannot all be readily devoured. The invention also comprises in connection with the above, the application to the side walls of the box, which is open at the top, of projecting sheets of metal to prevent the animals from climbing out; also, the application to the top of tilting shelves, for discharging any animals that may climb up the outside of the box, and on to the same.

SHINGLE PACKER.—Robert Taylor, West Pensaukie, Wis.—This invention relates to improvements in apparatus for pressing and holding the bunches of shingles for binding them, and consists of the arrangement on a suitable bench, having end walls for gaging the piling of the shingles at the thick ends, of a pair of vertically sliding bars, a transverse passing bar, and a set of gear wheels, shaft, and hand lever, the said wheels gearing with the vertically sliding bars, which are toothed for the purpose, in such a way that the hand lever may be used to force the transverse bar, which is connected to the upper end of the sliding bar, down upon the bundle of shingles across the center, pressing and holding the bundle till fastened.

REGISTERING APPARATUS FOR VEHICLES.—Thomas Ollis, Netherfield road, South Liverpool, England.—This invention consists in the application of apparatus similar to that used for stamping or indorsing purposes for registering or indicating the number of passengers that have traveled by an omnibus or other vehicle.

STEAM AND CALORIC ENGINES.—Alexander Hendry, Victoria, British Columbia.—This invention consists in an improved arrangement of jacketed cylinders, and jacketed furnace, constituting a water space, for generating steam by the radiating heat of the furnace, and arranged to envelope the cylinders with water to prevent injury by the gases and heat; also, an improved arrangement of chambered pistons, for keeping the same filled with water to counteract the action of the heat upon the same; also, certain improvements in chambered valves, and valve operating devices, the said chambered valves and rods being supplied with water, also to prevent injury by the heat and the gases, and the invention also comprises an arrangement of the furnace calculated to separate and distribute the gases and effect the most perfect combustion.

COTTON BASKETS.—R. S. Myers, Washington, N. C.—This invention relates to improvements in baskets for carrying cotton, especially when ginned, and consists in providing the cotton baskets of the ordinary form and construction with large holes through the center of the bottom, whereby in emptying the said baskets the operator may insert his hand and push the cotton out by one effort in a mass, whereas, by the present arrangement it must be pulled out from the mouth, which takes much more time, as in this way it only comes out in small quantities.

NOTE CASE.—Alphonzo Button, Dunkirk, N. Y.—This invention relates to improvements in note or paper cases or files for inclosing notes, papers, bills, etc., in a simple, cheap, and convenient portable package for the use of bankers and other business men. It consists of a cylindrical case of leather or other light suitable material having an opening from end to end covered by a flap, a central revolving spool, and a web of flexible substance connected to and wound on the spool, so as to be drawn out through the opening, and wound up again, on which web any suitable arrangement of narrow flaps folding over from the edges and connected by elastic bands, in a way to secure papers, notes, etc., in different and separate sections, may be arranged as now arranged in pocket books.

PUMP.—A. C. Judson, Grand Rapids, Ohio.—This invention consists in the arrangement of two dish-shaped metal disks with a diaphragm of leather between them, and another leather diaphragm above, adapted for the better support of the water in lifting; it also consists of an arrangement for operating the pump rod without lateral vibration, so that it may be packed tightly in the tube to prevent foul matter and vermin from getting in.

PANELING, MOLDING, AND CARVING MACHINE.—A. S. Gear, New Haven, Conn.—This machine performs all of the work of the well-known Variety Molding Machine, and in addition molds and carves any desired pattern of panel work, and simultaneously dovetails both mortise and tenon. The wood to be carved is fastened firmly to the bed of the machine, by movable clamps adjustable to suit any required size of wood, and the cutters are fastened to a spindle moved by a universal joint in any direction upon the bed of the machine. The cutter is guided by hand; the guide resting against the pattern. The carving can be gaged to any required depth, and made to conform to any required pattern. A fan blows away chips as fast as they are produced, leaving the work constantly in view of the operator. The same tool which cuts the mortise also cuts the tenon, the two pieces of work to be dovetailed being clamped together to the end of the table. Every kind of finish hitherto made upon the edges of lumber, and which has heretofore been mitered and glued upon the face to create a finish, is planed, beaded, and molded upon the piece itself by this machine.

WASHING BOILERS.—John P. Sherwood, Fort Edward, N. Y.—This invention has for its object to improve the construction of that class of washing boilers in which the clothes are washed by the water as it boils being projected down upon the clothes to percolate through them, and thus remove the dirt. And it consists in the construction and combination of the various parts.

TOY VELOCIPEDE.—H. C. Alexander, New York city.—This invention has for its object to furnish an improved toy velocipede.

BRICK MACHINE.—Thomas Smurdt, Davisville, Mich.—This invention has for its object to furnish an improved brick machine, which shall be strong, durable, simple in construction, and effective in operation, making the bricks rapidly and well.

TRUNKS, ETC.—Thomas B. Peddle, Newark, N. J.—This invention has for its object to improve the construction of trunks, valises, portmanteaus, pelleseirs, traveling bags, etc., so as to adapt them to receive and carry a portfolio in such a way that while carrying it safely, it may be conveniently removed when required for use.

SEED PLANTER.—David C. Woods, Waxahatchie, Texas.—This invention has for its object the construction of a seed planter, which will deposit the seeds in the requisite quantities and the proper distances apart, and which will cover and mark the hills, so that a plowman will not be at a loss where to start at the commencement of a new row, and after having passed around tree stumps or other obstructions, as he can always see the marks on the preceding rows.

WASHING MACHINE.—Joseph Baisley, Bedford, Ind.—This invention has for its object to improve the construction of the machine known as the "Egyptian Washing Machine," so as to make it more convenient in use and more effective in operation.

DENTAL IMPRESSION CUP FOR LOWER JAW.—Robert V. Jenks, Paterson, N. J.—This invention has for its object to furnish an improved impression cup for use in taking a cast of the lower jaw, to form a model of said jaw to fit the plate upon, which shall be so constructed as to enable the dentist to take a more perfect cast than is possible with impression cups constructed in the ordinary manner.

SHOW CARD SUSPENSION RING.—H. S. Griffiths, New York city.—This invention has for its object to furnish an improved suspension ring for suspending show cards, which shall be simple in construction and easily attached to the cards, and which shall, at the same time, be so formed as to take a firm hold upon the card, and not be liable to tear out.

REFRIGERATOR.—Samuel Ayres, Danville, Ky.—This invention relates to improvements in refrigerators, and consists in certain improvements in the construction and arrangement for excluding the external atmosphere, distributing the cold by means of the ice, and also the water resulting therefrom; for economizing space, and for providing convenient access to all the different parts.

CINDER AND DUST ARRESTER FOR CAR WINDOWS.—Edwin Norton, Brooklyn, N. Y.—This invention relates to improvements in apparatus for preventing the cinders and dust from being blown into the cars, when in motion, through the open windows, and consists in the application to the cars at the sides of the windows, on the exterior, by hinging thereto or by other equivalent connection, small guard plates of wood or other substance to project outwardly in a right or other suitable or preferred angle, at the side of the window, to arrest the cinder and dust moving rearward alongside of the car, and conduct it below the windows, the said guard plates being arranged so that those on the side of the windows in the direction of the movement of the train may be adjusted to the operating position while the others are folded back against the side of the car.

HOSE COUPLING.—William J. Osbourne, New York city.—This invention relates to a new and useful improvement in couplings for hose pipe, whereby the parts of a hose are united in a more perfect manner than by the ordinary hose coupling.

SAW GUIDE.—John Trunick, Muscatine, Iowa.—This invention relates to a new and useful improvement in means for guiding circular saws and keeping them to the true saw line.

SQUARE, GAGE, AND LEVEL.—Josiah Potts, Milwaukee, Wis.—This invention relates to a new and useful improvement in a tool for mechanics' use and consists in combining with a try square, a spirit level and a surface gage.

EXTENSION MUFF BLOCK.—C. F. Butterworth, Troy, N. Y.—This invention relates to a new and useful improvement in blocks for forming and stretching muffs in the process of manufacturing that article.

HAY AND GRAIN ELEVATOR.—John Dennis, Oswego, N. Y.—This invention has for its object to furnish an improved device, to be used in connection with the improved hay and grain elevator, patented by the same inventor, September 21, 1869, and numbered 95,006, for the purpose of moving the whole load of hay or grain when elevated to any desired part of the barn before unloading it.

MILLER TRAP FOR BEEHIVES.—T. L. Gray, Thomasville, Tenn.—This invention relates to a device for catching millers, or other insects, in their attempts to gain entrance into beehives.

VALVE GEAR.—Thomas E. Evans, William R. Thomas, and Joshua Hunt, Catasauqua, Pa.—This invention relates to a new and useful improvement in the mode of operating valves of steam engines, more especially designed for pumping engines, but applicable to other purposes or to valves of steam and water engines generally.

WATER WHEEL.—Henry W. McAuley, De Soto, Wis.—This invention consists in certain improvements in the form and arrangements of the buckets and in chutes for delivering the water thereto.

SELF-LOADING HAY WAGON.—James Capen, Charlton, Mass.—This invention relates to improvements in hay loaders, and consists in the application to the rear end of a hay wagon of an endless elevator case and rake, the latter having spring teeth, and arranged for adjustment by means of a hand lever at the front and suitable connecting devices; and the elevator is connected with one or both of the hind wheels of the wagon by machine chains or belts for operation.

ELEVATOR.—Francis Stein and Henry Haering, New York city.—This invention consists in the application to a pair of vertical ports or ways with toothed racks, of a carriage or platform having a shaft provided with a gear wheel at or near each end, and gearing into the toothed rack; also, having in suitable cases sliding on the posts a set of hoisting gears, gearing with the toothed racks and operated by hand cranks, and provided with ratchet wheels, holding pawls, and friction apparatus, arranged in a peculiar way for elevating the platform, holding it in any desired position or governing its descent.

FOLDING AND EXTENSION TABLE.—C. Mayer, Sullivan, Ill.—This invention relates to improvements in tables, and consists in arranging the side rails of the top of the frame, which are enlarged at the center and hinged to the posts for folding against the cross rails, when the top, which is detachably connected, is removed, for economy of space and convenience, in packing for transportation or storage; also in arranging the legs for folding up against the under edge of the cross rails; also in an improved arrangement of the side rails for extension.

MANUFACTURE OF SCOOPS.—S. Geo. Knapp, Woodhaven, N. Y.—This invention relates to an improved mode of manufacturing sheet-metal flour, grain, and other scoops, and consists in forming the bowls in one piece of metal, without seams or joints, by stamping up sheets of metal into the form of a trough, with a flange around the top, and cutting the same transversely in the center, with blanks for the bowls of two scoops, to be finished by trimming or shaping the cut ends, turning down the flange at the top, for stiffening either over wire or not and attaching the handle; the object being to produce scoops with bowls formed in one piece, and shaped at the base or in the part where the handles are connected, and to smoothly effect an economy of labor by stamping two blanks at one blow of the drop press, and also to control the metal under the action of the drop better in shaping the deep curved part of the base so as to upset and stiffen the blanks thereat.

BORING MACHINE.—E. C. Barton, Bloomsburg, Pa.—This invention relates to improvements in wood-boring machines, whereby it is designed to provide a simple and efficient arrangement of frame operating devices and feeding table for boring light articles to be presented to the machine by hand.

HASP LOCK.—E. R. Colver, New London, Conn.—This invention relates to improvements in that class of locks where the locking devices are incased within a hasp, and a hook is used in connection with the hasp for locking, or independently for fastening the door without locking.

WATER WHEELS.—W. J. Thompson, Springfield, Mo.—This invention relates to improvements in that class of horizontally running wheels, which receive the water from above or below on curved buckets taking the water at one side and discharging it at the other, and it consists of an improved arrangement of vertically oscillating gates, which, when open, form chutes for the water; it also consists of an improved means for working the gates.

PIPE COUPLING.—J. D. Ware, Savannah, Ga.—This invention relates to improvements in pipe couplings, and consists in forming a dovetailed groove across the end of one part, with an annular recess in the bottom around the bore for a packing ring, and fitting on the other part a dovetailed projection for engaging in the groove, and in arranging on one of the parts an eccentric ring to work against the head of the projection and force it tightly into the groove.

FIRE GRATES.—G. W. Everhart, Louisville, Ky.—This invention relates to improvements in that class of fire grates used for heating rooms, and consists in so arranging them as to provide a clear air space between the basket and the walls of the fire-place, both at the back and ends, for the admission of air more directly at these parts, for the better combustion of the coal and the gases arising therefrom; it also consists in providing a recess in the hearth or bottom of the fire-place under the grate, for the reception of ash pans of greater capacity than can be contained on the top of the hearth, whereby a much larger quantity of cinders and ashes may be received and retained, so that less frequent removals of the same will be required.

APPARATUS FOR SEWING SADDLERY AND OTHER LEATHER, OR STRONG MATERIALS.—Auguste Jacques Hurtu and Victor Joseph Hautin, Paris, France.—This invention relates to apparatus more especially applicable for sewing leather, saddlery, harness, and other similar work with waxed thread, and consists first, in the improved apparatus of this invention, two needles are employed, the one sewing as an awl, and the other carrying the thread; the two needles have at the same time a vertical movement and also an adjustable horizontal movement. The needles are operated alternately, so that the needle may pass the thread through the hole made just previously by the awl, before the leather has been moved forward. By this means the sewing may be carried on with great regularity, and the material be turned in any direction in order to execute small designs. Secondly, the invention relates to improvements in the arrangement of the shuttle, whereby it is caused to pass through the loops formed by the waxed thread without touching it.

PACKING AND ATOMIZING CAN.—F. L. Palmer, Sr., New York city.—This invention relates to improvements in cans for packing insect powder and other like finely powdered substances which, in use, require to be delivered in atomic jets for penetrating crevices where insects secrete themselves, and it consists in providing such cans with stoppers having nozzles, through which stoppers or nozzles the passages are temporarily closed in a way to be readily opened for use; also, in providing the cans with nozzles at or near the bottom temporarily plugged, in which tubes may be connected so that the powder may, when required for use, be readily blown out in atomic jets, whereby the said cans are made to subserve the uses of packing cans and discharging atomizing cans, with but trifling additional expense, whereas, at the present time, users of such powders are compelled to buy expensive atomizing cans, to which the powder must be transferred from the packing cans, before it can be properly used, or in the absence of such cans the powder is scattered in an ineffectual and wasteful way in or about the resorts of the insects.

REMEDY FOR RHEUMATISM.—H. H. Munroe, Louisville, Ky.—This invention relates to a new and useful improvement in a remedy for rheumatism.

NEW BOOKS AND PUBLICATIONS.

ELOCUTION AND ORATORY. Giving a Thorough Treatise on the Art of Speaking and Reading. With numerous Selections of Didactic, Humorous, and Dramatic Styles.

The author of this valuable treatise is Prof. Charles A. Wiley, of Fort Plain, N. Y. The instructions are valuable, and the selections admirable; and we can very cordially recommend it to all who would improve either in speaking or reading. Such a book is worthy a place in every family.

SPECIMENS OF FANCY TURNING EXECUTED ON THE HAND OR FOOT LATHE. With Geometric, Oval, and Eccentric Chucks, and Elliptical Cutting Frame. By an Amateur. Illustrated by Thirty exquisite Photographs. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street.

The beauty of these photographs is indescribable; they must be seen to be appreciated. The designs from which they were taken were executed by a gentleman well known to us, and who is undoubtedly one of the most expert turners on this continent. The price of the work by mail, free of postage, is $5·00.

THE NATIONAL WAGES TABLES, Showing at a glance the Amount of Wages, from Half an Hour to Sixty Hours at $1 to $37 per Week, also from One Quarter of a Day to Four Weeks, at $1 to $37 per Week. By Nelson Row, Publisher, No 149 Fulton street, New York.

This little work, which our readers will find advertised in another column, must prove an almost indispensable help in the counting rooms of establishments employing large numbers of workmen at varying rates of wages. It is one of the best things of the kind we have ever seen, and we give it earnest commendation.

DIRECTIONS FOR COOKING. By Miss Leslie. Price, by mail, $1·50.

Henry Carey Baird, of Philadelphia, has just published a new edition of Miss Leslie's "Old Standard and Renowned Cookery," being the sixtieth edition of a book which has stood the test of time and practice, and is a valuable aid in every household.

BENNY.

S. R. Wells, of this city, has published in pretty form "Benny," a Christmas ballad, by Annie Chambers Ketchum, a poem which has already appeared in the *Phrenological Journal*.

The prospectus of EVERY SATURDAY, for 1870, by Fields, Osgood & Co of Boston, promises to give us that excellent journal in a new and enlarged form, with the additional attraction of illustrations, engraved from designs by leading European artists. This publication will therefore hereafter present weekly, not only the cream of European literature, but the cream of European art. The high character of the publishers of this journal is an ample guarantee that this promise will be fulfilled in the most satisfactory manner.

LIPPINCOTT'S MAGAZINE, for January, also presents a varied and select bill of fare, containing among other things, Part XIII. of Robert Dale Owen's novel "Beyond the Breakers," "The Fairy and the Ghost," a Christmas tale, with six amusing illustrations; a curious and interesting article on "Literary Lunatics," by Wirt Sikes, "Our Capital," by William R. Hooper, and very much more excellent matter in the way of stories poems, and essays.

The "Mobile Weekly Register," the oldest Democratic paper in the South, is said to have reached a larger circulation than was ever attained by any journal South of Mason and Dixon's line. It is full of interesting varied matter, having an able agricultural department, presided over by the veteran editor and successful agriculturist, Hon. C. C. Langdon. Its general literature, poetry, stories, etc., make it highly acceptable to the ladies. The year will open with a new continued story, of deep interest, by one of the most distinguished writers of the day. The price was recently reduced to $3·00 per year, which, for so large a paper (12 pages), is extremely cheap.

WE have received the January number of "Demorest's Mirror of Fashions," a work that interests the ladies. Also "Demorest's Young America," a fine magazine for boys and girls. Both these serials are well published by Mr. and Madame Demorest of this city.

Official List of Patents.

Issued by the United States Patent Office.

FOR THE WEEK ENDING DEC. 14, 1869.

Reported Officially for the Scientific American

SCHEDULE OF PATENT OFFICE FEES:

On each caveat	$10
On filing each application for a Patent (seventeen years)	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
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

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

For copy of Claim of any Patent issued within 30 years $1
A sketch from the model or drawing, relating to such portion of a machine as the Claim covers, from $1
upward, but usually at the price above-named.
The full Specification of any patent issued since Nov. 20, 1866, at which time the Official Copies of Drawings of any patent issued since 1836, we can supply at a reasonable cost, the price depending upon the amount of labor involved and the number of views. $1 25
Full information, as to price of drawings, in each case, may be had by addressing MUNN & CO.,
Patent Solicitors, No. 37 Park Row, New York.

97,751.—FLUTING MACHINE.—Henry B. Adams, New York city.

97,752.—ELASTIC WASHER FOR CARRIAGES, ETC.—George W. Billings, Chicago, Ill. Antedated December 4, 1869.

97,753.—ADJUSTABLE WAGON BOTTOM AND CHUTE.—Abraham Bitner, Jr., Lancaster, Pa.

97,754.—MODE OF TREATING CONGLOMERATES OF CAST IRON.—Thomas Schoenberger Blair, Pittsburgh, Pa.

97,755.—ANIMAL TRAP.—John Blume, Mount Pleasant, Md.

97,756.—ELECTRO-MAGNETIC ADVERTISING FRAME.—Joshua Brooks, (assignor to himself and Benjamin E. Corlew), Boston, Mass., Antedated December 1, 1869.

97,757.—LAMP EXTINGUISHER.—Wm. I. Bunker, Yankton, Dakota Territory.

97,758.—MACHINE FOR POLISHING THE EDGES OF BOOT AND SHOE SOLES.—Robert F. Burns, Albany, N. Y.

97,759.—BEEHIVE.—Peter Campbell, Carrolltown, Pa.

97,760.—RAILWAY GATE.—Peter Campbell, Carrolltown, Pa.

97,761.—REDUCING ORES.—Thomas J. Chubb, Williamsburg, N. Y. Antedated June 14, 1869.

97,762.—MACHINE FOR BENDING AND FOLDING SHEET METAL.—James B. Clark and Lucas C. Clark, Plantsville, Conn.

97,763.—SAW SWAGE.—Joseph S. Clark, New York city.

97,764.—SASH HOLDER.—Nelson C. Cole (assignor to himself and Leverett H. Marvin), Beaver Dam, Wis.

97,765.—MACHINE FOR CRIMPING AND FORMING THE FRONT OF BOOTS.—Christopher Day, Mineral Point, Wis. Antedated November 30, 1869.

97,766.—WATER HEATER FOR CULINARY PURPOSES.—Royal E. Deane, Brooklyn, N. Y.

97,767.—PUMP.—Joseph W. Douglas, Middletown, Conn., assignor to W. & B. Douglas.

97,768.—DEPURATOR.—S. C. Frink and L. D. Harlan, Indianapolis, Ind.

97,769.—SHUTTER FASTENER.—Charles B. Goodrich, Jr., Boston, Mass.

97,770.—Suspended.

97,771.—MANUFACTURE OF GLUE.—George Guenther, Chicago, Ill., assignor to himself and E. H. Heymann, New York city.

97,772.—SHADE RINGS FOR LAMP BURNERS.—Hiram W. Hayden (assignor to Holmes, Booth & Haydens), Waterbury, Conn.

97,773.—LAMP.—Hiram W. Hayden (assignor to Holmes, Booth & Haydens), Waterbury, Conn.

97,774.—FLUTING MACHINE.—Frederick Hewitt, Bloomfield, N. J.

97,775.—WAGON BRAKE.—Abram C. Jaques, Levenworth, Kansas.

97,776.—WICK-TRIMMER FOR LAMPS.—E. C. Jenkins, Jr., Worcester, Mass. Antedated December 11, 1869.

97,777.—LUMBER DRYER.—Jesse B. Johnson and Thomas E. Johnson, Indianapolis, Ind.

97,778.—TURBINE WATER WHEEL.—Julius H. Jones, Charlton, Mass.

97,779.—HYDRAULIC ENGINE.—Henry J. King and Benton L. Beebe, Middletown, N. Y.

97,780.—BREECH-LOADING REVOLVING FIREARMS.—François Alexandre Le Mat, New Orleans, La., assignor to Charles Pietroni, London, England.

97,781.—COMPOSITION FOR COVERING STEAM BOILERS AND FOR OTHER PURPOSES.—Ferdinand Leroy (Ferdinand Leroy, administrator), of Commercial Road, London, England, assignor to himself and P. A. Victor Le Lubez, England.

97,782.—WINE AND CIDER MILL.—Edward C. Lewis, Benton Harbor, Mich.

97,783.—EXCAVATOR.—John R. Lewis, Piper City, Ill.

97,784.—BAND TIGHTENER.—Francis M. Lottridge, Portland, Ind., assignor to himself, James M. Templer, and James C. Jay. Antedated December 14, 1869.

97,785.—CLOD FENDER.—Francis M. Lowden and John D. Lowden, Lawrence, Ind.

97,786.—SHAFT TUG LUG FOR HARNESS.—T. J. Magruder, Marion, Ohio.

97,787.—SHIPS OR VESSELS FOR CARRYING LIQUID CARGO.—John W. Marshall, Gilman Joslin, and Nelson Curtis, Boston, and Oliver Edwards, Brookline, Mass.

97,788.—FASTENING FOR CORSETS.—Frank W. Marston, Boston, Mass. Antedated November 30, 1869.

97,789.—CART SADDLE.—W. B. McClure, Alexandria, Va.

97,790.—POTATO DIGGER.—Philip C. McManus, Troy, N. Y. Antedated December 7, 1869.

97,791.—WASHING MACHINE.—J. S. Merchant, Hopedale, Ohio.

97,792.—RAILWAY RAIL.—James Montgomery, Croton Landing, N. Y.

97,793.—WASHING MACHINE.—Wm. Morgan, Middlebrook, Va.

97,794.—COMPOUND FOR TREATING RHEUMATISM.—H. H. Munroe, Louisville, Ky.

97,795.—SCRIBE HOOK.—John Nester, Portland, Oregon.

97,796.—ROOFING.—H. G. Noble, Selma, Ala.

97,797.—DEVICE FOR FASTENING PISTONS TO PISTON RODS.—Anthony T. Norgan, Palo Alto, Pa. Antedated December 7, 1869.

97,798.—ATTACHABLE AND REMOVABLE CALKS FOR HORSESHOES.—G. S. Norris, Baltimore, Md.

97,799.—HARNESS FOR HORSES.—John Palen, Lockport, assignor to Nathan T. Healy, Medina, N. Y.

97,800.—RAILWAY CAR BRAKE.—Thomas Payne, Detroit, Mich.

97,801.—SAW MILL.—A. Perin, Paris, France.

97,802.—SPOKE SHAVE.—Joseph A. Perley (assignor to himself and Wm. H. Perley), Lynn, Mass.

97,803.—ORGAN BELLOWS.—J. R. Perry, Wilkesbarre, Pa.

97,804.—APPARATUS FOR SETTING CAPS IN METALLIC CARTRIDGES.—William C. Pickeregill (assignor to Providence Tool Company), Providence, R. I.

97,805.—CAP-EXTRACTOR FOR CARTRIDGES.—William C. Pickeregill (assignor to Providence Tool Company), Providence, R. I.

97,806.—APPARATUS FOR SETTING BULLETS IN CARTRIDGES.—William C. Pickeregill (assignor to Providence Tool Company), Providence, R. I.

97,807.—SMOKE AND SPARK CONVEYER FOR RAILROAD TRAINS.—Lemuel Powell, Milford, Conn.

97,808.—CONVERTIBLE END-BOARD AND PLATFORM FOR WAGONS.—Thomas T. Powell and John F. Burroughs, Lawn Ridge, Ill.

97,809.—MACHINE FOR MAKING FLY NETS.—A. Prutzmann, Canton, Ohio.

97,810.—BURGLAR PROOF SAFE.—George W. Putnam, Boston, Mass. Antedated November 27, 1869.

97,811.—HORSESHOE BEVELER.—Ephraim Quinby, Comstock, Mich. Antedated Dec. 1, 1869.

97,812.—PADLOCK.—J. S. Rankin, Ann Arbor, Mich.

97,813.—SHIP WINDLASS.—Elisha R. Ritch, South Boston, Mass.

97,814.—REIN-GUIDE FOR HARNESS.—Lemuel Richmond, Derby, Vt.

97,815.—CHURN.—Stacy Risler, Locktown, N. J.

97,816.—PAPER-CUTTING MACHINE.—T. C. Robinson, Boston, Mass., assignor to G. H. Sandborn, New York city.

97,817.—STONE-POLISHING MACHINE.—Henry Schofield (assignor to himself and C. D. Clarke), Philadelphia.

97,818.—TWIST DRILL.—Socrates Schoffield, Providence, R. I.

97,819.—SMOKE-CONSUMING FIRE BOXES.—G. H. Smith, Galesburg, Ill.

97,820.—CHURN.—Samuel Smith, Yohogany, Pa.

97,821.—REPEATING FIRE-ARM.—William Sidney Smoot, Washington, D. C.

97,822.—PNEUMATIC ENGINE.—Robert Spear, New Haven, Conn.

97,823.—MACHINE FOR POLISHING WOOD.—W. F. Spear, Worcester, Mass.

97,824.—CARPET BEATER AND CLEANER.—Alexander Stevenson, New York City.

97,825.—MODE OF FORMING "BURNER CONES" OF LAMPS.—C. St. John and C. E. Marston, Charlestown, Mass.

97,826.—LOOM.—Lyman Stone, Nelson, N. H.

97,827.—COFFIN HANDLE.—Clark Strong, Winsted, Conn.

97,828.—PLOW.—Z. W. Sturtevant, Dunstable, Mass.

97,829.—SAFE.—T. J. Sullivan, Albany, N. Y.

97,830.—AUGER HANDLE.—James Swan, Seymour, Conn.

97,831.—STOVE SHELF.—G. L. Swett, Leominster, Mass.

97,832.—RAILWAY RAIL.—J. F. Tallant, Burlington, Iowa.

97,833.—TOOL FOR CABINET MAKERS.—R. W. Tanner (assignor to himself and Samuel J. Davenport), Albany, N. Y. Antedated Dec. 11, 1869.

97,834.—TICKET BOX FOR RAILROAD PASSENGER TRAINS.—Asahel Todd, Jr., Pultneyville, N. Y.

97,835.—HYDRANT.—T. Van Kannel, Cincinnati, Ohio.

97,836.—RETICULE WICKER BASKET.—Joseph Venet, New York city.

97,837.—VELOCIPEDE.—Wm. Volk, Buffalo, N. Y.

97,838.—SILVERING GLASS, AND PROTECTING THE SAME.—H. B. Walker, New York city.

97,839.—STEELYARD.—P. H. Walker (assignor to himself and J. L. Trowbridge), Boston, Mass.

97,840.—BARREL.—D. H. Waters, Grand Rapids, Mich.

97,841.—BARREL.—D. H. Waters, Grand Rapids, Mich.

97,842.—CAR SPRING.—Cyrenus Wheeler, Jr., Auburn, N. Y.

97,843.—METALLIC CARTRIDGE.—Rollin White, Lowell, Mass.

97,844.—APPARATUS FOR PURIFYING IRON.—S. M. Wickersham, Allegheny, Pa.

97,845.—MAKING PIANO LEGS.—Henry Willoghs, New York city.

97,846.—DUMPING WAGON.—Daniel Willson, Ishpeming, Mich.

97,847.—HARVESTER KNIFE GRINDER.—Edwin L. Yancey, Batavia, N. Y.

97,848.—CANDLESTICK.—H. Zahn, San Francisco, Cal.

97,849.—MONKEY WRENCH.—Samuel Zarley, Niantic, Ill.

97,850.—HUMMING-WHEEL TOY.—A. F. Able, New Orleans, La., assignor to himself and A. D. Finley.

97,851.—IRONING TABLE AND CLOTHES DRYER.—W. P. Adams, Brooklyn, N. Y.

97,852.—SAWSET.—Daniel Agnew, Vincennes, Ind.

97,853.—MODE OF PROTECTING THE ENDS OF VULCANIZED RUBBER HOSE.—H. A. Alden, Matteawan, N. Y.

97,854.—LAMP BURNER.—Joseph Bell Alexander, Washington, D. C.

97,855.—GATE FOR SWINGING BRIDGES.—Lauritz Anderson, Chicago, Ill.

97,856.—BUTTONHOLING ATTACHMENT FOR SEWING MACHINES.—S. J. Baird, Staunton, Va.

97,857.—OIL BLACKING FOR LEATHER.—J. L. Baumer, Columbus, Ohio.

97,858.—HEAD BLOCK FOR SAW MILLS.—C. B. Beall, Hamilton, Ohio.

97,859.—CHURN DASHER.—A. Belt, Newton, Iowa.

97,860.—COMBINED SHOVEL AND SIFTER.—F. S. Bidwell, Mystic Bridge, Conn.

97,861.—STOVEPIPE THIMBLE.—Horatio N. Bill, Willimantic, Conn.

97,862.—DIVING BELL.—H. C. Billings, Brooklyn, N. Y.

97,863.—HOE.—Lewis Billings, Gallipolis, Ohio.

97,864.—STEAM GENERATOR.—Edward Bourne, Pittsburgh, Pa.

97,865.—STEAM GENERATOR.—Edward Bourne, Pittsburgh, Pa.

97,866.—RIVETS AND WASHERS.—Edward Bourne, Pittsburgh, Pa.

97,867.—WAGON BRAKE.—William H. Bradt, New Scotland, N. Y.

97,868.—DRILL FOR BORING POLYGONAL HOLES.—J. C. Broadley (assignor to himself and Jas. Stout), Franklin, N. J.

97,869.—WATER WHEEL.—J. D. Bryson and J. H. Hartsuff, Newcastle, Pa.

97,870.—COTTON CULTIVATOR.—I. W. Burch, Fayette, Miss.

97,871.—BUCKLE.—I. W. Burch, Fayette, Miss.

97,872.—CLAMP.—Mathias Burkhardt, Cincinnati, Ohio.

97,873.—DINNER PAIL.—N. C. Burnap, Argusville, N. Y.

97,874.—BOLT CUTTER.—O. E. Butler and S. P. Dunham, Marshalltown, Iowa.

97,875.—PADLOCK.—S. G. Cabell (assignor to F. B. Cabell), Quincy, Ill.

97,876.—RAILWAY CAR COUPLING.—S. O. Campbell, Tipton, Mo.

97,877.—WRENCH AND SAW SET COMBINED.—G. J. Capewell, West Cheshire, Conn.

97,878.—MACHINE FOR DRESSING MILLSTONES.—J. S. Carr, Alliance, Ohio.

97,879.—CAR TANK COVER.—L. C. Cattell, Cleveland, Ohio.

97,880.—MANUFACTURE OF RUBBER SPONGE.—Edwin Chesterman, Tremont, N. Y. Antedated Nov. 17, 1869.

97,881.—VALVE FOR WATER ENGINES.—Abraham Coates (assignor for one half, to James Martin Hunt), Watertown, N. Y.

97,882.—SHUTTLE FOR LOOMS.—John H. Coburn, Lowell, Mass.

97,883.—WAGON SEAT FASTENING.—Charles Collins, Vernon Centre, N. Y.

97,884.—HARVESTER.—Robert Conarroe (assignor to himself, H. Young, and A. C. Stauffer) Camden, Ohio.

97,885.—MOP.—Philip Cook, Jr., Sioux City, Iowa. Antedated Dec. 10, 1869.

97,886.—RAILWAY SWITCH.—J. B. Cox, James O'Connor, and Michael Cahalan, Columbus, Ga.

97,887.—SLIDE VALVE.—Isaac Craft (assignor to himself, T. J. Williams, and C. M. Greve), Cincinnati, Ohio.

97,888.—WATER WHEEL.—G. W. Cressman, and Bert Pfleger, Barren Hill, and Nice Keely, Roxborough, Pa.

97,889.—TREATING WHISKY AND OTHER ALCOHOLIC SPIRITS.—J. C. Crossman and Obadiah Marland, Boston, Mass., assignors to themselves and A. E. Tilton, New York city.

97,890.—DISINTEGRATING MILL.—G. B. Davids (assignor to himself and Talbot Denmead), Baltimore, Md.

97,891.—MACHINE FOR COMPOSING AND DISTRIBUTING TYPE.—Isidore Delcambre, Paris, France.

97,892.—SOAP-HOLDING ATTACHMENT FOR SEWING MACHINES.—Mary Dewey, New Albany, Ind. Antedated Dec. 10, 1869.

97,893.—CONCRETE FOR PAVING AND FOR OTHER PURPOSES.—J. E. Dotch, Washington, D. C. Antedated Oct. 14, 1869.

97,894.—APPARATUS FOR EXTINGUISHING FIRES BY MEANS OF CHEMICAL AGENTS.—J. W. Douglas (assignor to W. Douglas and B. Douglas), Middletown, Conn.

97,895.—LOOM TEMPLE.—Warren W. Dutcher (assignor to Dutcher Temple Co.), Hopedale, Mass.

97,896.—VENTILATING HORSE COVER.—C. P. Eager (assignor to P. B. Eager), Boston, Mass.

97,897.—MANUFACTURE OF IRON AND STEEL.—Wm. Ennis, Philadelphia, Pa.

97,898.—SEEDING MACHINE.—James Finlayson, Albany, Oregon.

97,899.—CLOTHES WRINGER.—M. M. Follett, Lake City, Minn.

97,900.—BLOTTING PAD.—C. A. Gale, Demopolis, Ala.

97,901.—MANUFACTURE OF NUTS.—J. W. Gaskill and Jas. Christie, Phillipsburg, N. J.
97,902.—FIRE PLACE.—E. H. Gibbs, New York city.
97,903.—GRAIN DRILL.—Jacob F. Gibson, Chestnut Level, Pa.
97,904.—CARTRIDGE MACHINE.—Jabez H. Gill, Philadelphia, Pa.
97,905.—FIELD ROLLER.—Robert Glover, Tonawanda, N. Y.
97,906.—CORN PLANTER.—Henry Gortner, Nashport, Ohio.
97,907.—HINGE.—D. R. Gould (assignor to himself and O. H. Green), Chestertown, N. Y.
97,908.—RADIAL DRILLING MACHINE.—G. A. Gray, Jr., Cincinnati, Ohio.
97,909.—BUCKLE.—F. F. Greenwood, Horsney, England. Patented in England, Sept. 16, 1869.
97,910.—TOOL FOR CARVING WOOD.—L. L. Gunther, Chicago, Ill.
97,911.—PORTABLE DERRICK.—James R. Hammond, Sedalia, Mo.
97,912.—COAL STOVE.—B. R. Hawley, Normal, Ill.
97,913.—GAS STOVE.—W. J. Hays, New York city.
97,914.—CONDENSING COLUMN FOR STILLS.—A. Hazzard, St. Louis, Mo.
97,915.—STOVEPIPE DRUM.—W. Hearle, Beamsville, Canada, assignor to C. L. Spencer, trustee, assignor to Wm. Hearle and A. B. Johnson.
97,916.—MEANS FOR ATTACHING MUSQUITO BARS TO WINDOW BLINDS, DOORS, ETC.—James Hebron, Buffalo, N. Y.
97,917.—WASHING MACHINE.—Edward Heim, Pittsburgh, Pa.
97,918.—RAILWAY CAR COUPLING.—Noah Hill, Leavenworth City, Kansas.
97,919.—FIFTH WHEEL FOR CARRIAGES.—Richard Hoadly, Toulon, Ill.
97,920.—FRUIT JAR.—D. I. Holcomb, Henry county, Iowa.
97,921.—CORN CULTIVATOR.—J. C. Holmes, Wyoming, Pa.
97,922.—FRUIT JAR.—Thos. Houghton and H. H. Houghton, Philadelphia, Pa.
97,923.—CONDENSER.—John Houpt, Springtown, Pa.
97,924.—PROPELLING APPARATUS. — Robert Hunter, New York city.
97,925.—HEDGE TRIMMER.—A. H. Hussey, Mount Pleasant, Ohio.
97,926.—FENCE.—Daniel Johnson, Cranberry, Ohio.
97,927.—SAW SET.—J. M. Jones, Commerce, Mo.
97,928.—RUBBER SPRING FOR USE IN SHIPS, CARS, AND FOR OTHER PURPOSES.—J. A. Joyner, New York city.
97,929.—CARPET STRETCHER AND TACK HOLDER.—F. W. Judd, New Britain, assignor to himself and E. M. Judd, New Haven, Conn. Antedated Dec. 9, 1869.
97,930.—PUBLIC URINAL.—William M. Kepler, Cincinnati, Ohio.
97,931.—WASHING MACHINE.—John J. Kimball, Naperville, Ill.
97,932.—GRAIN STRIPPER.—J. O. King and Hiram A. Rice, Louisiana, Mo.
97,933.—BEEHIVE.—W. T. Kirkpatrick, Tamarva, Ill.
97,934.—LATCH.—G. W. Large, Yellow Springs, Ohio.
97,935.—SEWING MACHINE.—L. W. Lathrop, Nyack, N. Y.
97,936.—MANUFACTURE OF DRY WHITE LEAD.—G. T. Lewis, Philadelphia, and E. O. Bartlett, Birmingham, Pa.
77,937.—CHURN.—F. A. Lindal, Stockton, N. Y.
97,938.—SEEDING MACHINE.—M. F. Lowth and T. J. Howe, Owatonna, Minn.
97,939.—FERTILIZER OR GUANO.—Orazio Lugo, Baltimore, Md.
97,940.—FURNACE FOR THE MANUFACTURE OF ULTRAMARINE.—H. A. Ludwig, New York city.
97,941.—MANUFACTURE OF ULTRAMARINE.—H. A. Ludwig, New York city.
97,942.—WARDROBE.—A. G. Mack (assignor to himself and George Shelton), Rochester, N. Y.
97,943.—UPRIGHT PIANO.—G. C. Manner, New York city.
97,944.—BOOT CRIMPER. — F. P. Marcy, Keokuk, Iowa. Antedated Dec. 4, 1869.
97,945.—MECHANISM FOR DRIVING COTTON GINS.—Wm. L. May, Linwood, Ala., assignor to W. J. May.
97,946.—MEAT CHOPPER.—Arthur McCarter, Salem, Ohio.
97,947.—GATE.—F. H. McGeorge, Corning, N. Y.
97,948.—CONSTRUCTION OF BUILDINGS.—Alexander McPherson, Santa Cruz, Cal.
97,949.—GALVANIC BATTERY.—J. R. McPherson, Beloit, Wis.
97,950.—GAGE FOR CIRCULAR SAW TABLE.—R. N. Meriam, Worcester, Mass.
97,951.—SEWING MACHINE FOR SEWING BOOTS AND SHOES.—Daniel Mills, New York city, assignor to Charles Goodyear, Jr., New Rochelle, N. Y.
97,952.—PROPELLER.—S. B. Morey, San Francisco, Cal.
97,953.—CAST-STEEL TUBE OR INGOT.—C. B. Morse, Rhinebeck, N. Y. Antedated Dec. 8, 1869.
97,954.—PACKING CASE FOR OIL CANS.—J. McLeod Murphy (assignor to J. L. Graham), New York city.
97,955.—TIGHTENING AND GUIDING BELT.—C. K. Myers (assignor, for one half, to Peter Weyhrich), Pekin, Ill.
97,956.—FIRE-PLACE FUEL MAGAZINE STOVE.—J. J. Myers, (assignor to B. C. Bibb), Baltimore, Md.
97,957.—CORN PLANTER.—J. B. Parker, Knob Noster, Mo.
97,958.—SAWING MACHINE.—Archibald Perry (assignor to himself and Jacob Fisher), Richland, Ind. Antedated Dec. 3, 1869.
97,959.—MECHANICAL MOVEMENT.—Osgood Plummer, Worcester, Mass.
97,960.—TEACHERS' REGISTER.—W. S. Poulson and W. N. Poulson, Cadiz, Ohio.
97,961.—SIDE-SADDLE TREE.—J. H. Preston, Jefferson City, Mo.
97,962.—PROCESS OF PREPARING PLANTS TO BE USED IN CIGARS, SNUFF, ETC.—P. V. Ramel, Paris, France.
97,963.—PIPE COUPLING.—L. W. Reed, East Cambridge, Mass.
97,964.—FRUIT JAR.—S. B. Rowley, Philadelphia, Pa.
97,965.—CLOTHES WRINGER.—E. P. Russell, Manlius, N. Y.
97,966.—COAL STOVE.—Watson Sanford, New York city. Antedated Sept. 3, 1869.
97,967.—BASE BURNING STOVE.—Watson Sanford, New York city. Antedated Sept. 15, 1869.
97,968.—JOURNAL BOX.—A. H. Sassaman, Scranton, Pa.
97,969.—HOOK AND LADDER TRUCK.—Jacob Schmidlapp, New York city.
97,970.—Suspended.
97,971.—SNOW PLOW FOR RAILWAYS.—T. L. Shaw, Omaha, Nebraska.
97,972.—COMPOSITION METAL FOR TUBING, PIPES, AND SHEETING.—W. A. Shaw (assignor to Peter Naylor), New York city.
97,973.—PRUNING SHEARS.—J. H. Shehan, Lima, Ind., assignor to himself, G. W. Edgecomb, and T. J. Bull.
97,974.—PRICE-CALCULATING DEVICE.—Albert Sinclair, West Waterville, Me.
97,975.—CONSTRUCTION OF BRIDGES.—C. S. Smith, C. H. Latrobe, and F. H. Smith, Baltimore, Md.
97,976.—CHURN.—Simon Smith, Clarksburg, N. Y.
97,977.—COTTON BALE TIES.—W. M. Smith, Augusta, Ga.
97,978.—GRAIN MEASURING ATTACHMENT TO THRASHING MACHINES.—W. A. Workman, Fairfield, Iowa.
97,979.—SCAFFOLD FOR GATHERING FRUIT, AND FOR OTHER PURPOSES.—A. J. Wright, Cleveland, Ohio.
97,980.—REVOLVING CUPBOARD.—Wendell Wright, Bloomfield, N. J.
97,981.—BARRACK OR HOSPITAL BEDSTEAD.—Chas. S. Snead, Louisville, Ky.
97,982.—PIANO FORTE.—C. F. Th. Steinway, New York city.
97,983.—WATER-PROOFING FABRICS.—John Stenhouse, 17 Rodney street, Pentonville, London, England, assignor to Arthur Cheney and Alonzo Milliken, Boston, Mass. Patented in England, Jan. 8, 1862.
97,984.—RAILS FOR ORNAMENTAL FENCE.—Elizabeth Mary Stigale, Philadelphia, Pa.
97,985.—LATCH FOR DOUBLE DOORS.—J. W. Still, San Francisco, Cal.
97,986.—LATHE FASTENING.—J. G. Stowe, Providence, R. I.
97,987.—VINEGAR APPARATUS.—A. D. Strong, Ashtabula, Ohio.
97,988.—WRENCH.—G. C. Taft, Worcester, Mass.
97,989.—BARK MILL.—William Tansley, Salisbury Centre, assignor to "Starbuck Brothers," Troy, N. Y.
97,990.—CLEVIS FOR PLOWS.—J. H. Tarpley, Greensborough, N. C.
97,991.—HANDLE FOR KNIVES.—A. L. Taylor, Springfield, Vt.
97,992.—MAKING BRICKS, TILES, ETC.—Daniel Thackara, Woodbury, N. J.
97,993.—FOOT AND KNEELING STOOL FOR CHURCHES.—J. P. Tibbits, New York city.
97,994.—RAILWAY CARRIAGE WHEEL AND AXLE.—C. D. Tisdale (assignor to himself and J. H. Clepp), Boston, Mass.
97,995.—SUSPENDERS.—C. Van Hoesen, Catskill, assignor to himself, J. H. Burtis, Brooklyn, and M. W. Staples, Catskill, N. Y.
97,996—BUTTONHOLE CUTTER.—F. H. Walker, Boston, Mass.
97,997.—BED BOTTOM.—C. E. Walkes, Elyria, Ohio.
97,998.—STILL FOR OIL, ETC.—John Warner, Flushing, N. Y.
97,999.—PAPER FILE.—C. W. West, Shiloh, assignor to himself and O. A. Douglas, Bridgeton, N. J.
98,000.—HOISTING APPARATUS.—T. A. Weston, Ridgewood, N. J., assignor to William Sellers and John Sellers, Jr., Philadelphia, Pa. Patented in England, Aug. 28, 1868.
98,001.—COKE WAGON.—Corydon Wheat and Alfred Catchpole, Geneva, N. Y.
98,002.—MACHINE FOR MAKING CARRIAGE CLIPS.—Darius Wilcox and R. McChesney (assignors to D. M. Bassett and Darius Wilcox), Derby, Conn.
98,003.—DOOR FOR FIRE-PLACE STOVE.—W. E. Wood, Baltimore, Md.
98,004.—INTERCHANGEABLE BOOT AND SHOE HEEL.—J. C. Woodhead, Pittsburgh, Pa.
98,005.—CAMEL FOR RAISING VESSELS.—Samuel Woolston, Vincentown, N. J.

REISSUES.

60,192.—STEAM ENGINE GOVERNOR.—Dated Dec. 4, 1866; reissue 3,759.—R. K. Huntoon, for himself and J. A. Lynch, assignee, by mesne assignments, of R. K. Huntoon, Boston, Mass.
72,114.—VARIABLE CRANK FOR BORING MACHINES.—Dated Dec. 10, 1867; reissue 3,760.—Theodore Mace, New York city, assignee of G. C. Taft.
68,782.—SLIDE FOR EXTENSION TABLE.—Dated Sept. 10, 1867; reissue 3,761.—H. Olds, Syracuse, N. Y.
89,167.—NOZZLE FOR CANS.—Dated April 20, 1869; reissue 3,762.—Charles Pratt, New York city.
84,766.—HORSE POWER.—Dated Dec. 8, 1868; reissue 3,763. —Cyrus Roberts and J. A. Throp, Three Rivers, Mich.
44,117.—COMPOSITION FOR CONCRETE PAVEMENTS.—Dated Sept. 6, 1864; reissue 3,764.—Edward Seeley, Scranton, Pa.
49,207.—CARPET BAG LOCK.—Dated Aug. 1, 1865; reissue 3,765.—Bernard Steinmetz, Paris, France.
91,800.—STEAM GENERATOR FURNACES.—Dated June 22, 1866; reissue 3,766.—A. J. Warren and D. W. Wilson, assignors to themselves and Noah Shaw, West Eau Claire, Wis., and U. M. Stone, Augusta, Wis.

DESIGNS.

3,784.—STOVE.—D. P. Beckwith, Dowagiac, Mich.
3,785.—PLOW CLEVIS.—Geo. Johnson, administrator of the estate of G. P. Darrow, deceased, (assignor to J. L. Hayen & Co.), Cincinnati, Ohio.
3,786.—STOVE.—S. S. Jewett and F. H. Root, Buffalo, N. Y.
3,787.—MASONIC ORNAMENT.—Daniel Keefer, Attica, Ind.
3,788.—PAPER COLLAR.—W. F. Mosely, Brooklyn, N. Y.
3,789.—FLOWER STAND.—C. H. Waters, Groton, Mass.

EXTENSIONS.

CLOTH-STRETCHING ROLLERS.—Seth Simmons, of Providence-R. I., administrator of Nathan Simmons, deceased.—Letters Patent No. 13,888; dated Dec. 4, 1855.
BUCKLE.—S. E. Booth, of Orange, Conn., administrator of S. S. Hartshorn, deceased.—Letters Patent No. 13,907; dated Dec. 11, 1855.

PATENTS ISSUED FOR THE WEEK ENDING DEC. 21, 1869.

98,006.—MANUFACTURE OF THE METALLIC PARTS OF FIRE ARMS.—Isaac Adams, Jr., Boston, Mass, assignor to United Nickel Company.
98,007.—TOY VELOCIPEDE.—H. C. Alexander, New York city.
98,008.—MACHINE FOR MAKING WROUGHT NAILS.—Daniel Armstrong, Chicago, Ill.
98,009.—WASH BOILER.—James Armstrong, Bucyrus, Ohio.
98,010.—REFRIGERATOR.—Samuel Ayers, Danville, Ky.
98,011.—HYDRANT.—G. C. Bailey, Pittsburgh, Pa.
98,012.—WASHING MACHINE.—Joseph Balsley, Bedford, Ind.
98,013.—SAW MILL.—A. P. Barlow, Kalamazoo, Mich.
98,014.—BORING MACHINE.—E. C. Barton, Bloomsburg, Pa.
98,015.—PADLOCK.—Thomas Bernhard, Hartford, Conn.
98,016.—FENCE.—Inmon Blackaby, Civer, Ill.
98,017.—PLOWING MACHINE.—Albert Bondeli, Philadelphia, Mo.
98,018.—CARRIAGE BRAKE.—A. S. Boyer, Bernville, Pa.
98,019.—LOW-WATER INDICATOR.—William A. Bradford, Cincinnati, Ohio, assignor to C. G. Pease, trustee for Malone Safety-Valve Company.
98,020.—MACHINE FOR MAKING FERRULES.—Robert Briggs, Philadelphia, Pa.
98,021.—STEAM GENERATOR.—M. S. Bringier, Ascension parish, La.
98,022.—FIRE AND WATER-PROOF PAINT.—Theodor Brinkmann, Greeneville, Tenn.
98,023.—ANIMAL TRAP.—Adam Brown, Bridgeport, Oregon.
98,024.—HAIR-SPRING ADJUSTMENT FOR WATCHES.—Augustus Brown, Dryden, N. Y.
98,025.—EXPANDING MUFF BLOCK.—C. F. Butterworth, Troy, N. Y.
98,026.—SAP SPOUT.—G. L. Cady, Lowell, Mass.
98,027.—HAY LOADER.—James Capen, Charlton, Mass.
98,028.—GRINDING MACHINE.—George T. Chattaway, Brooklyn, E. D., and John Dickinson, New York city, assignors to G. S. Chattaway.
98,029.—COOPERS' TOOL.—John Christy, Clyde, Ohio.
98,030.—NAIL AND PEG DRIVER.—F. O. Claflin, New York city. Antedated Dec. 18, 1869.
98,031.—SELF-CANCELING POSTAL AND REVENUE STAMP.—S. M. Clark, Washington, D. C.
98,032.—CAPSTAN WINDLASS.—D. N. B. Coffin, Jr., Newton, assignor to himself and I. D. Spaulding, Boston, Mass.
98,033.—METAL-CLAD ARTIFICIAL STONE.—François Coignet, Paris, France.
98,034.—MAKING ARTIFICIAL STONE AND CONCRETE.—François Coignet, Paris, France.
98,035.—MALAXATOR FOR THE PREPARATION OF PLASTIC MATERIALS FOR ARTIFICIAL STONE, AND FOR OTHER PURPOSES.—François Coignet, Paris, France.
98,036.—HASP LOCK.—E. R. Colver, New London, Conn.
98,037.—DEVICE FOR CONVEYING SAWDUST FROM SAWS.—W. S. Colwell, Pittsburg, Pa.
98,038.—COMBINATION OF PIANOFORTE AND CABINET.—Edward Cotter, Boston, Mass.
98,039.—CURTAIN FIXTURE.—J. P. Crawford, Carmichaels, Pa.
98,040.—VISE. — Edwin Crawley and T. L. Baylies, Richmond, Ind.
98,041.—CLOD FENDER.—W. L. Dearth and G. P. Rondebush, Jefferson, Ind.
98,042.—HAY AND GRAIN ELEVATOR.—John Dennis, Oswego, N. Y.
98,043.—DYNAMOMETER.—J. Emerson, Lowell, Mass.
98,044.—DUMPING WAGON.—John Esch, Milwaukee, Wis.
98,045.—FIREPLACE GRATE. — George W. Everhart, Louisville, Ky.
98,046.—VAPORIZING PETROLEUM, ETC.—H. R. Foote, Boston, Mass.
98,047.—TOY GUN.—C. T. Ford and E. Trask, Salem, Mass. Antedated Dec. 7, 1869.
98,048.—SHIFTING RAIL FOR BUGGY.—Harlow French and Robert Meyer, Buffalo, N. Y.
98,049.—RAILWAY-CAR TRUCK.—Perry G. Gardiner, New York city.
98,050.—CAR SPRING.—P. G. Gardiner, New York city.
98,051.—RAILWAY SWITCH.—M. J. Gaskill, Wm. Yost, and John Ferris, Pleasant Plain, ohio.
98,052.—MILLER TRAP FOR BEEHIVES.—T. L. Gray, Thomasville, Tenn.
98,053.—STUFFING BOX.—Chas. Green, Philadelphia, Pa.
98,054.—SUSPENSION CLIP.—H. S. Griffiths and J. C. Cary, New York city.
98,055.—TOY SAFE OR BANK.—John Hall, Watertown, Mass. Antedated Dec. 7, 1869.
98,056.—LOUNGE AND BEDSTEAD.—A. R. Harper and C. B. Dake, Robart, Ind.
98,057.—MACHINE FOR UPSETTING TIRE.—A. S. Hart, San Francisco, Cal.
98,058.—RAILWAY CAR COUPLING.—A. S. Hart, San Francisco, Cal.
98,059.—STOVE GRATE.—David Hathaway, Troy, N. Y.
98,060.—HOLDING DEVICE FOR LAMP CHIMNEYS.—John F Hechtle, Waterbury, Conn.
98,061.—STEAM AND CALORIC ENGINE.—Alexander Hendry, Victoria, British Columbia.
98,062.—REIN HOLDER.—Davis Hurd, Lockport, N. Y.
98,063.—SPRING SEAT FOR WAGONS.—A. L. Hurtt, Monticello, Ind.
98,064.—SEWING MACHINE.—A. J. Hurtu and V. J. Hautin, Paris, France.
98,065.—ROOFING COMPOUND.—C. B. Hutchins, Ann Arbor, Mich.
98,066.—DENTAL IMPRESSION CUP.—R. V. Jenks, Paterson, N. J.
98,067.—PUMP.—A. C. Judson (assignor to himself and E. O. Judson), Grand Rapids, Mich.
98,068.—LEATHER-SPLITTING MACHINE.—Charles Keniston, Somerville, Mass.
98,069.—SPRING BED BOTTOM.—E. S. Kimball, Springfield, Mass.
98,070.—WHIP SOCKET.—C. P. Kimball, Portland, Me.
98,071.—FLOOD GATE.—A. L. King, Farmersville, Ohio.
98,072.—MANUFACTURE OF SCOOPS.—J. Geo. Knapp, Woodhaven, N. Y., assignor to the Lalance & Grosjean Manufacturing Co., New York city.
98,073.—DRIVE WELL TUBES.—D. R. Knight, Akron, Ohio.
98,074.—DEVICE FOR PREVENTING LEAKAGE ABOUT CHIMNEYS.—Abraham Lang, Buffalo, N. Y.
98,075.—HARVESTER DROPPER.—T. F. Lippencott, Conemaugh, Pa.
98,076.—CAR COUPLING.—Joseph Long, Mechanicsburg, Pa.
98,077.—HEAD REST.—C. B. Loveless, Syracuse, N. Y.
98,078.—BURGLAR ALARM. — Moses Lunt, Cambridgeport, Mass.
98,079.—FOLDING AND EXTENSION TABLE.—G. Mayer, Sullivan, Ill.
98,080.—LANTERN.—I. C. Mayo, Gloucester, Mass.
98,081.—WATER WHEEL.—H. W. McAuley, De Soto, Wis.
98,082.—LET-OFF MECHANISM FOR LOOMS.—Ephriam McDaniel, Lowell, Mass.
98,083.—LAMP.—J. K. Mentzer, New Holland, Pa.
98,084.—SURVEYOR'S MARK.—C. C. P. Meyer, Yankton, Dakota Territory.
98,085.—TAILOR'S CRAYON SHARPENER.—R. R. Miles, Wabash, Ind.
98,086.—COOKING STOVE.—J. H. Mitchell and T. S. Mitchell, Pittsburgh, Pa.
98,087.—PRINTING PRESS.—Charles Montague (assignor to C. C. Child), Boston, Mass.
98,088.—PRINTING PRESS.—Chas. Montague (assignor to C. C. Child), Boston, Mass.
98,089.—STEAM GENERATOR.—Jas. Montgomery, Sing Sing, N. Y. Antedated Dec. 17, 1869.
98,090.—HARVESTER DROPPER.—Ephraim Myers, Creagerstown, Md. Antedated Dec. 4, 1869.
98,091.—COTTON BASKET.—R. L. Myers, Washington, N. C.
98,092.—VELOCIPEDE. — Robert Neale, Brooklyn, N. Y. Antedated Dec. 4, 1869.
98,093.—STOVEPIPE THIMBLE.—Thomas Newell, Oskaloosa, Iowa.
98,094.—CURTAIN AND SHAWL STRETCHER.—James Nicklin, Cleveland, Ohio.
98,095.—RAILROAD CAR VENTILATOR.—E. Norton, Brooklyn, N. Y.
98,096.—ILLUMINATING STOVE. — Benjamin Nott, Albany, N. Y.
98,097.—HAY ELEVATOR.—J. W. Odaniel, Cloverdale, Ind.
98,098.—PASSENGER REGISTER FOR VEHICLES.—Thos. Ollis, Netherfield Road South, Liverpool, England. Patented in England, March 31, 1868.
98,099.—RAILWAY CAR WHEEL.—J. T. Owen, Philadelphia, Pa.
98,100.—HARROW.—George Paddington, Springville, Iowa.
98,101.—PACKING AND ATOMIZING CAN FOR INSECT POWDER.—F. L. Palmer, Sr., New York city.
98,102.—COMBINED OYSTER KNIFE AND ICE PICK.—Wm. Pattberger, Philadelphia, Pa.
98,103.—Suspended.
98,104.—TRUNK.—T. B. Peddie, Newark, N. J.
98,105.—BOLT CLAMP.—Charles E. Phillips, South Deerfield, Mass.
98,106.—COMBINED SQUARE AND CALIPER.—Josiah Potts, Milwaukee, Wis.
98,107.—METAL ALLOY FOR HARNESS TRIMMINGS, ETC.—A. A. Randall, South Braintree, assignor to himself and C. F. Whitcomb, Boston, Mass.
98,108.—CARPENTER'S PLOW.—Royal B. Rice, Williamsburgh, Mass.
98,109.—CUT-NAIL MACHINE.—Levi Richards (assignor, by mesne assignments, to himself, O. A. Washburn, G. S. Perkins, and F. S Roscoe), Providence, R. I.
98,110.—ELECTRO-PLATING WITH BRASS AND OTHER ALLOYS.—Samuel Rust, Jr., Cincinnati, Ohio.
98,111.—INDICATOR FOR SAW MILL HEAD BLOCKS.—George Selden, Erie, Pa.
98,112.—CULTIVATOR.—J. B. Skinner, Rockford, Ill.
98,113.—HARVESTER.—A. L. Smith, Bristol Centre, N. Y.
98,114.—ELECTRO-MAGNETIC LOCK.—J. C. Smith, Brooklyn, N. Y.
98,115.—BRICK MACHINE. — Thomas Smurfit, Davisville, Mich.
98,116.—FLOOR CLAMP.—Joseph B. Spencer, Norwich, Conn. Antedated Dec. 17, 1869.
98,117.—CHURN DASHER.—Aurelius Sperry, Tremont, Ill.
98,118.—GAS GENERATOR AND CARBURETER.—Amos Stevens (assignor to E. A. Whitney), Fitchburg, Mass.
98,119.—ROCKING AND EASY CHAIR.—A. W. Stewart, Boston, Mass.
98,120.—PLOW.—R. E. Strait, Galesburg, Mich.
98,121.—MACHINE FOR SCOURING, SETTING-OUT, AND FINISHING HIDES OR SKINS.—John Taggart, Melrose, assignor to himself and W. N. Brink, Boston, Mass.
98,122.—VARIABLE CUT-OFF FOR STEAM ENGINES.—M. C Taylor, Grass Valley, Cal. Antedated Dec. 17, 1869.
98,123.—SHINGLE PACKER.—R. B. Taylor, Pensaukie, Wis.
98,124.—CUTTER-HEAD.—Hiram Thompson (assignor to R. Ball & Co.), Worcester, Mass.
98,125.—WATER-WHEEL.—W. J. Thompson, Springfield, Mo.
98,126.—WHEEL FOR STEAM CARRIAGE—R. W. Thomson, Edinburgh, Great Britain. Patented in England, April 21, 1868.
98,127.—CIRCULAR SAW MILL.—John Trunick, Muscatine, Iowa.
98,128.—CLOD FENDER.—J. W. Tull, Zionsville, Ind.
98,129.—NECKTIE AND COLLAR COMBINED.—James Varley, Hudson, assignor to himself and D. M. Smyth, Orange, N. J.
98,130.—EYE FOR RAILWAY CAR BELL-ROPE.—W. M. Walton (assignor to J. J. Walton), Newark, N. J.
98,131.—PIPE COUPLING.—J. D. Ware, Savannah, Ga.
98,132.—GAGE COCKS.—G. L. Watson, Nesquehoning, Pa.
98,133.—LUBRICATOR FOR THE BOLSTERS OF VERTICAL SHAFTS.—J. W. Wattles, Canton, Mass.
98,134.—BRICK KILN, ETC.—E. V. Wingard, Williamsport, Pa.
98,135.—MACHINE FOR SPINNING AND CURLING HAIR.—Philip Wisdom, Brooklyn, N. Y., assignor to John Sickles, trustee, and John Sickles, trustee, assignor to John Wisdom and J. H. Wilcox, New York city.
98,136.—SEED PLANTER.—D. C. Woods, Waxahatchie, Texas

98,137.—HARROW.—George Workman, Rochester, N. Y.

98,138.—RAILROAD SWITCH.—Edmund Yardley, Pittsburgh, Pa.

98,139.—APPARATUS FOR THE MANUFACTURE OF IRON AND STEEL.—Charles Adams (assignor to himself and Charles Sharpe), Philadelphia, Pa.

98,140.—RAILWAY CAR SPRING.—William Barry and George Franklin, Philadelphia, Pa.

98,141.—FOLDING CHAIR.—Burroughs Beach, Meriden, assignor to himself and E. I. Pyle, Bridgeport, Conn.

98,142.—HAIR RESTORATIVE.—Ann K. Benson, Allegheny City, Pa.

98,143.—MACHINE FOR LAYING OUT SASH.—Alpheus Bigony, Winchester, Ohio.

98,144.—DEVICE FOR SECURING PULLEYS TO SHAFTS.—J. H. Buckman (assignor to himself and P. W. Reinshagen), Cincinnati, Ohio.

98,145.—POCKET BOOK.—Alphonzo Button, Dunkirk, N. Y., assignor to M. O. Wilber for one half of said patent.

98,146.—SPRING BED BOTTOM.—J. P. Chamberlin, Abington, Mass.

98,147.—SAFETY HARNESS BUCKLE.—John Chestnut, Jr., Hustontown, Pa.

98,148.—WASHING MACHINE.—A. P. Cindel and Martin Vogel, Jacksonville, Ill.

98,149.—OPERATING DEVICE FOR WATER CLOSETS.—B. R. Cole, Buffalo, N. Y.

98,150.—TURBINE WATER-WHEEL.—E. F. Cooper, Mount Gilead, Ohio.

98,151.—SEWING MACHINE FOR SEWING BOOTS AND SHOES.—C. O. Crosby, New Haven, Conn.

98,152.—CHURN DASHER.—Theophilus Crutcher, Edgefield, Tenn.

98,153.—WATER CLOSET VALVE.—J. N. Deck (assignor to himself, B. R. Cole, and G. F. Deck), Buffalo, N. Y.

98,154.—CARD HOLDER.—C. R. Doane, Brooklyn, E. D., N. Y.

98,155.—PROCESS OF TREATING WINES, BEER, AND LIQUORS.—J. O. Donner, Jersey City, N. J.

98,156.—VALVE GEAR.—T. E. Evans, W. R. Thomas, and Joshua Hunt, Catasauqua, Pa.

98,157.—CORN PLANTER.—D. Fitzpatrick and John Knull, St. Paris, Ohio.

98,158.—PAINT BRUSH.—F. P. Furnald, Jr., R. W. Champion, and I. N. Davies, New York city.

98,159.—GRUB HOOK.—J. W. Goodall, Eldred, Pa.

98,160.—WASH BOARD.—B. F. Gott, Brooklyn, E. D., N. Y.

98,161.—CHURN.—G. H. Gregory, North Wilton, Conn.

98,162.—HYDRO-PNEUMATIC GOVERNOR.—Andrew Harris, Philadelphia, Pa.

98,163.—MUSICAL INSTRUMENT.—C. F. Hill, New York city.

98,164.—SECURING THE LASH IN FLY-NETS.—J. S. Huston, Mechanicsburg, Pa.

98,165.—PROCESS OF PURIFYING AND DECOLORING ALBUMEN FROM BLOOD.—Pierre Jacques, Paris, France.

98,166.—WIRE HANDLE FORMER.—W. C. Jones, Quincy, Ill.

98,167.—MECHANISM FOR RAISING AND LOWERING BOARDS.—Cheney Kilburn and Artemas Kilburn (assignors to Hale, Goodman, & Co.), Philadelphia, Pa.

98,168.—EGG BEATER.—Linn Laurie, Washington, D. C.

98,169.—WIRE BALE FASTENING.—E. S. Lennox, New Brighton, N. Y.

98,170.—INSOLE FOR BOOTS AND SHOES.—Calvin A. Leonard, Rochester, N. Y.

98,171.—GLOBE VALVE.—Hippolite Levasseur, Brooklyn, N.Y.

98,172.—LUBRICATING SLEEVE.—G. A. Lloyd, San Francisco, Cal., assignor to himself and Anthony Rosenfeld.

98,173.—COMPOSITION FOR PREVENTING INCRUSTATION IN STEAM BOILERS.—G. W. Lord, Philadelphia, Pa.

98,174.—GAS GENERATOR AND BURNER.—C. B. Loveless, Syracuse, N. Y.

98,175.—EXTINGUISHING FIRE IN BUILDINGS.—Orozi Lugo, Baltimore, Md.

98,176.—APPARATUS FOR DISPENSING SODA-WATER SIRUPS.—John Matthews, Jr., New York city.

98,177.—SIRUP-DISPENSING APPARATUS.—John Matthews, Jr., New York city.

98,178.—SIRUP RESERVOIR FOR SODA-FOUNTAINS.—John Matthews, Jr., New York city.

98,179.—SOAP.—C. P. McGimsey, Memphis, Tenn.

98,180.—METHOD OF HEADING SCREWS.—Daniel T. Munger (assignor to himself and Rufus E. Hitchcock), Waterbury, Conn.

98,181.—BRICK MOLD.—Matthew Newlove (assignor to himself and Samuel Gilbert), Burlington, Iowa.

98,182.—HARVESTER CUTTER.—Theodore Neys, Menomonee, Wis., assignor to himself and Alexis I. Brunell.

98,183.—COTTON SEED PLANTER.—A. R. Nixon, Memphis, Tenn.

98,184.—HOSE COUPLING.—William J. Osbourne (assignor to himself, Gideon B. Massey, and William F. Shaffer), New York city.

98,185.—FARM GATE.—Christopher Ostrander, Lodi, Wis.

98,186.—RAILWAY RAIL CHAIR.—S. N Park, Bloomsbury, N.J.

98,187.—NUT LOCK.—Morgan Payne, Cardington, Ohio.

98,188.—SHUTTLE-CHECK FOR LOOMS.—David Pickman (assignor to himself and Stuart Bishop), Lowell, Mass.

98,189.—SAW GUIDE.—C. Purdy, Bedford, Ohio.

98,190.—GRAIN BIN.—Fitch Raymond and August Miller, Cleveland, Ohio.

98,191.—BOOKBINDING.—Ira Reynolds (assignor to "Reynolds & Reynolds"), Dayton, Ohio.

98,192.—VAPOR BURNER.—Wm. H. Rudolph, St. Louis, Mo.

98,193.—CORN PLANTER.—C. B. Ruth, Doylestown, Pa. Antedated December 11, 1869.

98,194.—GATE.—Charles Saxton, Fredonia, Ohio.

98,195.—FARM GATE.—Samuel Scott, Yane, Ohio.

98,196.—POST AUGER.—George Seeger and Charles H. Shaffer, Clark's Hill, Ind. Antedated December 11, 1869.

98,197.—PAVING BLOCK.—Reuben Shaler, Madison, Conn.

98,198.—CARTRIDGE FEEDER FOR GUN HAMMER.—Thomas Shaw, Philadelphia, Pa.

98,199.—WASH BOILER.—John P. Sherwood (assignor to himself and Benjamin S. Burnham), Fort Edward, N. Y.

98,200.—BOOKBINDING.—David Shive, Philadelphia, Pa.

98,201.—RAILROAD CAR VENTILATOR.—Oliver Slagle, London, assignor to himself and Thomas H. Foulds, Cincinnati, Ohio.

98,202.—CULTIVATOR.—S. T. Spaulding, North Cohocton, N. Y.

98,203.—ELEVATOR.—Francis Stein and Henry Haering, New York city.

98,204.—TIRE COOLER.—Edward Stodtmeister, Cape Girardeau, Mo.

98,205.—DYNAMOMETERS.—John W. Sutton, Portland Oregon.

98,206.—MACHINE FOR SAWING AND SPLITTING WOOD.—John A. Taplin, Carthage Landing, Fishkill, N. Y.

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23,033.—HOSE COUPLING.—Dated February 22, 1859; reissue 3,768.—William H. Bliss, Newport, R. I., assignee of himself and Robert H. Lawton.

52,135.—SEEDING MACHINE.—Dated January 23, 1866; reissue 3,769.—Henry Bundel, Dayton, Ohio.

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3,792.—COFFEE OR TEA FILTER.—George M. Bull, New Baltimore, N. Y.

3,793.—CARPET PATTERN.—Robert R. Campbell (assignor to Lowell Manufacturing Company), Lowell, Mass.

3,794.—CAR VENTILATOR.—Robert Hitchcock, Springfield, Mass.

3,795 to 3,797.—WARDROBE HOOK.—Morton Judd, New Haven, Conn. Three patents.

3,798 to 3,802.—CARPET PATTERN.—Elemir J. Ney, Dracut, assignors to Lowell Manufacturing Company, Lowell, Mass. Five patents.

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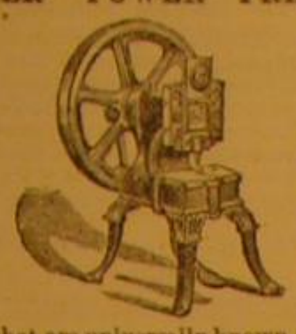

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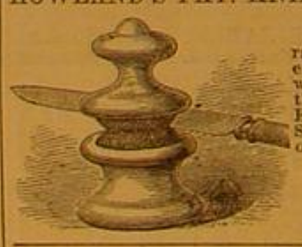

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