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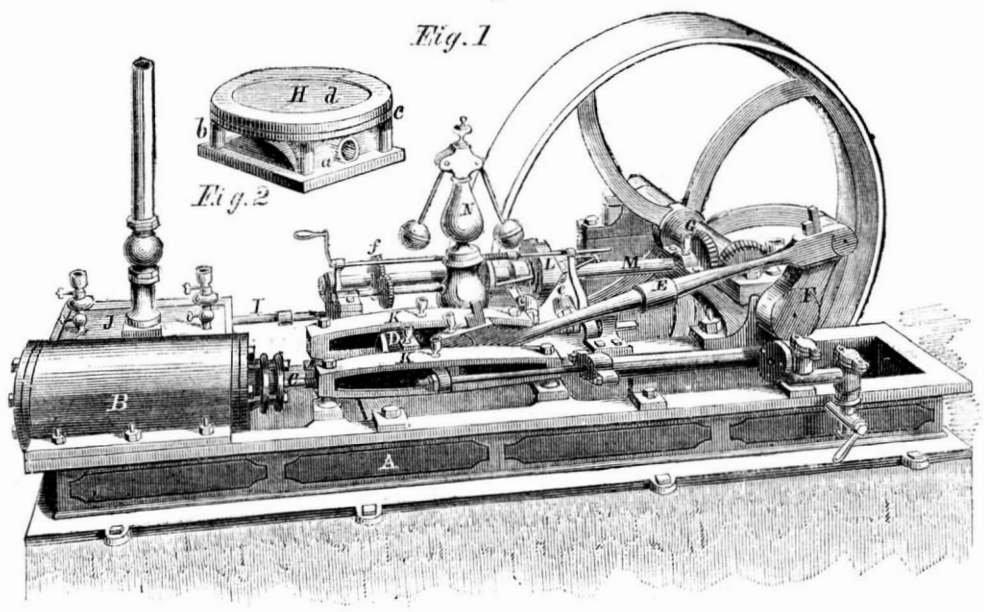
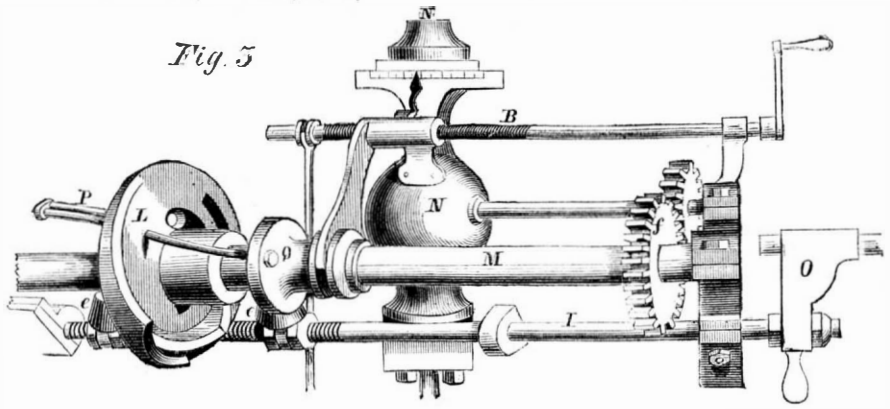
IMPROVEMENT IN STEAM-ENGINES.

The steam-engine, as it is the most useful machine of the present day, receives its due and proper share of attention from the inventor, and is continually having changes made in its construction, some of which are for the better and others cause simply additional expense without giving any improvement or saving. When therefore a real improvement is placed before the reader for consideration it should be carefully examined and criticised, and the subject of the accompanying illustrations will bear this close scrutiny. It is the invention of C. A. Schultz, of New York City, and will be seen in perspective in Fig. 2; Fig. 3 being a view of the back of the other side of the engine, also exhibiting the working parts of the invention on an enlarged scale.





A is the framing, B, the cylinder, and C, the piston-rod, attached to a cross-head, D, which works in slides, K K. To the cross-head the connecting-rod, E, that gives motion to the crank, F, on the shaft, G, to which the fly-wheel is secured, is attached. J is the steam-chest in which a balance slide valve, H, (the subject of a separate patent) is placed. This valve is seen separate in Fig. 2. The body, *a*, is the same as the ordinary slide valve, and four columns, *b*, rise from it, supporting a plate, *c*, and cap, *d*, which is so placed as to allow *c*, to move freely up and down; springs in the upright columns keep the face, *a*, against the cylinder, and the plate, *d*, against the top or cover of the steam-chest, and no steam can enter between the cap and the cover of the steam-chest.

I is a valve-rod, which has two friction rollers, *e*, placed in a suitable position on it, and between which a double cam-wheel, L, rotates, so as to give the valve rod the back and forth motion by the action of the cam on the friction rollers as it rotates. The wheel L, is placed on a shaft, M, that is placed in suitable bearings on the side of the frame, A, and derives its motion from the bevel gearing on its end and the shaft G. A gear wheel also placed on it gives motion to the horizontal shaft that causes the governor, N, to rotate. The rod, I, can be connected or disconnected with the valve-rod, I′, by means of the simple clutch or holder, O, or by any other convenient means.

Each cam-wheel has a slot and a small hole in it, the hole of one being opposite to the slot of the other, so that the bent V-shaped yoke, P, can pass through the holes and be free to move in the slots. This yoke is attached to a collar, Q, that can slide on the shaft, M, and that has a nut provided with a pointer through which the screw rod, R, passes, connected with it; so that by turning the rod, R, the yoke can be made to pass in the holes to distend the cams, and thus give the engine more steam, or can be retreated to bring the cams more together to cut off at any desired point to give the engine less steam. An index attached to the governor pillar allows the exact number of inches at which it is desired to cut off to be exactly obtained. This rod, R, is also operated from the governor by a rod, S, and a bell-crank connection (not seen), so that the governor instantly corrects any variation in the speed of the engine from work being put on or thrown off, or from other causes.

SCHULTZ'S IMPROVED STEAM-ENGINE.

The inventor has built an engine and it is now on exhibition at the Fair of the American Institute at the "Palace Garden" in this city. We have seen it work and have seldom seen any engine which ran so smoothly and economically, as the steam can be used with any amount of expansion of which it is capable, and any required speed steadily and continuously kept up. We would state that the engine may be reversed at will by the engineer, and operated in either direction as the work requires.

The patent on the main part of the engine is dated October 26, 1858, and the patent on the slide valve is dated April 19, 1859. The inventor will be happy to give any further information upon being addressed at the Neptune Iron Works, foot of Eighth-street, East river, New York.

PHOTOGRAPHY AND LITHOGRAPHY.

Lithographic printing has also been pressed into the service of the photographist, as yet with but moderate success; although a specimen now before us, obtained by a process, the invention of Messrs. Cutting & Bradford, of Boston, Mass., and introduced into this country under a patent, in the name of Newton, bearing date February 23d, 1858, gives great promise of success, chiefly on account of the effective rendering of the middle tints. The idea of taking photographic images on stone, with the view to their re-production by ordinary lithographic printing, was broached so long ago as 1852; but a description of the process above referred to will suffice to give a correct notion of the present state of invention in this direction. To re-produce a line-engraving the lithographic stone may have a polished surface; but to obtain a landscape, where gradations of shade are required, the surface should be grained. This grained surface is coated with a solution of gum-arabic, sugar and bichromate of potassa; the sugar preventing the immediate fixing of the gum upon the stone, and the chromic salt causing it to become more firmly fixed, or much less soluble, on exposure to light. When the coating is dry, the stone may be exposed in the camera a sufficient time to fix the gum at those parts of the picture where the lights are to appear. The stone is next to be washed with a solution of soap, which attacks the stone, removing the unfixed portions of the coating, and taking the place of these on the surface of the stone. After this, it is to be washed with clean water and dried. An inking roller is now to be passed over the stone, to ink the soapy portions of the surface and give an additional body to the picture (the fixed parts of the coating having been previously damped to enable them to resist the ink), and when brought up to color, the printing-off of impressions may be proceeded with.—*Newton's London Journal.*

BABBITT METAL.

Joseph Baker & Son, No. 820 Rachel and 821 North Second streets, Philadelphia, Pa., manufacture and sell large quantities of Babbitt metal at various prices. It is chiefly used for making the journal-boxes of axles and shafts of machinery. This firm have been manufacturing it for fifteen years, and have acquired a high reputation for the superior quality of their metal, as it requires great experience and good judgment to mix the metals forming the alloy, to suit the different pressures to which the journal-boxes will be subjected.

A NEW AERIAL SHIP.

PREPARATIONS FOR A TRANS-ATLANTIC VOYAGE—THE AIR-SHIP "CITY OF NEW YORK."

[From the New York Daily Times.]

An experiment in scientific ballooning, greater than has yet been undertaken, is about to be tried in this city. The project of crossing the Atlantic ocean with an air-ship, long talked of but never accomplished, has taken a shape so definite that the apparatus is already prepared, and the aeronaut ready to undertake his task. Whether successful or not, the enterprise merits mention from its magnitude, and the energy and fertility of resource displayed in its prosecution.

The work has been conducted quietly, in the immediate vicinity of New York, since the opening of spring. The new air-ship, which has been christened the *City of New York*, is so nearly completed that but few essentials of detail are wanting to enable the projectors to bring it visibly before the public.

The aeronaut in charge is T. S. C. Lowe, a New Hampshire man, who has made 36 balloon ascensions. His last public appearance was at Portland, during this year's celebration of the Fourth of July. Since that time he has given his undivided attention to the perfection of the air-ship designed for his trans-atlantic voyage, and has devised various improvements in its construction, by which he claims to have overcome the more serious impediments to aerial navigation.

The dimensions of the *City of New York* so far exceed those of any balloon previously constructed that the bare fact of its existence is notable. The spot where its huge envelop is now undergoing the final process of oiling is an open piece of grass-land, four or five miles distant from the city. The profane have not yet been admitted to the knowledge of the mystery which surrounds the mighty heap of cloth and cord, and the jealous eye of a faithful watchman has kept at bay the inquisitive stranger. As remarkable events are prepared most carefully in the dark, so Mr. Lowe has reserved the surprise of this biggest of balloons until the last moment, when the immensity of its measurements can be palpably distinguished. Briefly, for so large a subject, the following are the dimensions:—

Greatest diameter, feet	130
Transverse diameter	104
Hight, from valve to boat	350
Weight, with outfit, tuns	3½
Lifting power (aggregate), tuns	22½
Capacity of gas-envelop, cubic feet	725,000

The *City of New York*, therefore, is nearly five times larger than the largest balloon ever before built. Its form is that of the usual perpendicular gas-receiver, with basket and life-boat attached. The introduction of valuable improvements, however, leads to the conviction that its general arrangement is greatly superior. Mechanical power is to be applied; the aeronautic party will keep the cold away from their marrow by the use of a lime stove; a new arrangement of revolving fans has been devised; and the material of which the envelop is composed is covered with a peculiar varnish, the invention of Mr. Lowe.

Six thousand yards of twilled cloth have been used in the construction of the envelope. Reduced to feet, the actual measurement of this material is 54,000 feet, or nearly 11 miles. Seventeen of Wheeler & Wilson's sewing-machines have been employed to connect the pieces, and the upper extremity of the envelop, intended to receive the gas-valve, is of triple thickness, strengthened with heavy brown linen, and sewed in triple seams. The pressure being greatest at this point, extraordinary power of resistance is requisite. It is asserted that 100 women, sewing constantly for two years, could not have accomplished this work, which measures by miles. The material is stout, and the stitching stouter.

The varnish applied to this envelope is a composition, the secret of which rests with Mr. Lowe. Three or four coatings are applied, in order to prevent leakage of the gas. Mr. Lowe is daily engaged in the personal superintendence of the process of manufacture. We found him yesterday hard at work in an open field, assiduously testing the progress of certain gallons of a villainously-smelling compound, which boiled furiously at a temperature of 600°.

The netting which surrounds the envelop is a stout cord, manufactured from flax expressly for the purpose. Its aggregate strength is equal to a resistance of 160 tuns; each cord being capable of sustaining a weight of 400 or 500 pounds.

The basket, which is to be suspended immediately below the balloon, is made of rattan, is 20 feet in circumference, and four feet deep. Its form is circular, and it is surrounded by canvas. This car will carry the aeronauts. It is warmed by a lime stove, an invention of O. A. Gager, by whom it was presented to Mr. Lowe. A lime stove is a new feature in air-voyages. It is claimed that it will furnish heat without fire, and is intended for a warming apparatus only. The stove is one and a half feet high and two feet square. Mr. Lowe states that he is so well convinced of the utility of this contrivance that he conceives it to be possible to ascend to a region where water will freeze, and yet keep himself from freezing. This is to be tested.

Dropping below the basket is a metallic life-boat, in which is placed an Ericsson engine. Capt. Ericsson's invention is therefore to be tried in mid-air. Its particular purpose is the control of a propeller, rigged upon the principle of the screw, by which it is proposed to obtain a regulating power. The application of the mechanical power is ingeniously devised. The propeller is fixed in the bow of the life-boat, projecting at an angle of about 45 degrees. From a wheel at the extremity, twenty fans radiate. Each of these fans is five feet in length, widening gradually from the point of contact with the screw to the extremity, where the width of each is 1½ feet. Mr. Lowe claims that by the application of these mechanical contrivances, his air-ship can be readily raised or lowered, to seek different currents of air; that they will give him ample steerage-way, and they will prevent the rotary motion of the machine. In applying the principle of the fan, he does not claim any new discovery, but simply a practical development of the theory advanced by other aeronauts, and partially reduced to practice by Charles Greene, the celebrated English aeronaut. Mr. Lowe contends that the application of machinery to aerial navigation has been long enough a mere theory. He proposes to reduce the theory to practice, and see what will come of it. It is estimated that the raising and lowering power of the machinery will be equal to a weight of 300 pounds; the fans being so adjusted as to admit of very rapid motion upward or downward. As the loss of three or four pounds only is sufficient to enable a balloon to rise rapidly, and as the escape of a very small portion of the gas suffices to reduce its attitude, Mr. Lowe regards this systematic regulator quite sufficient to enable him to control his movements, and to keep at any altitude he desires. It is his intention to ascend to a hight of three or four miles at the start, but this altitude will not be permanently sustained. He prefers, he says, to keep within a respectable distance of mundane things, where he "can see folks." It is to be hoped his machinery will perform all that he anticipates from it. It is a novel affair through out, and a variety of new applications remain to be tested. Mr. Lowe, expressing the utmost confidence in all the appointments of his apparatus, assured us that he would certainly go; and, as certainly, would go into the ocean or deliver a copy of Monday's *Times* in London on the following Wednesday. He proposes to effect a landing in England or France, and will take a course north of east. A due easterly course would land him in Spain; but to that course he objects. He hopes to make the trip from this city to London in 48 hours; certainly in 64 hours. He scouts the idea of danger, goes about his preparations deliberately, and promises himself a good time. As the upper currents, setting due east, will not permit his return by the same route, he proposes to pack up the *City of New York* and return home.

The air-ship will carry weight. Its cubical contents of 725,000 feet of gas suffices to lift a weight of 22½ tuns. With outfit complete its own weight will be 3½ tuns. With this weight 19 tuns of lifting-power remain, and there is accordingly room for as many passengers as will care to take the venture. We understand, however, that the company is limited to eight or ten. Mr. Lowe provides sand for ballast, regards his chances of salvation as exceedingly favorable, places implicit faith in the strength of his netting, the power of his machinery, and the buoyancy of his life-boat, and altogether considers himself secure from the hazard of disaster. If he accomplish his voyage in safety, he will have done more than any air-navigator has yet ventured to undertake. If he fail, the enterprise sinks the snug sum of $20,000. Wealthy men, who are his backers, sharing his own enthusiasm, declare failure impossible, and invite a patient public to wait and see.

The precise time for the ascension has not been fixed. The ship is so near completion that the event will not probably be delayed beyond three or four weeks. Proper notice of the time and place will be given.

PRESERVING RAILROAD TIMBER.

Our attention has been directed to this very important question by a pamphlet sent to us by its author, Mr. F. Hewson, C. E. It is stated in this pamphlet that the renewal of the timbers of bridges and other superstructures of railroad tracks, is the most expensive item of repairs. The life of a "sill" seldom extends beyond eight years, and the rate of annual depreciation on bridges and other structures equally exposed to atmospheric influences, amounts to 12½ per cent. Upon 25,000 miles of railroad track in the United States, it is estimated that 3,125 miles of timber superstructure are renewed annually at an expense of no less than $3,500,000. The great question is, can this rapid depreciation be prevented by so treating railroad timbers that they will acquire the property of greater durability, and thus effect a great saving, not only in the cost of timber, but for the labor necessarily involved in removing the decayed, and putting in the new materials? The chief obstacle to the attainment of such a result is stated in Mr. Hewson's pamphlet to be the great outlay required in the outset, for the apparatus which is usually employed for such purposes. Thus in practicing the processes for treating timber, at Lowell, Mass., as described on page 93, Vol. XII, SCIENTIFIC AMERICAN, it is stated to be so inconvenient for railroads as to preclude its use. The apparatus for this process consists of a large iron tank, like a steam boiler, in which the timber to be impregnated is placed, the air exhausted by a pump, and the preservative solution then forced in under pressure. In the Kyanizing, Burnetizing, and Bethelizing processes, (so-called) similar apparatus may be employed; the above names are merely derived from those of the persons who patented certain solutions for treating the timber. Thus, Mr. Kyan used corrosive sublimate; Sir Wm. Burnet, chloride of zinc; and Mr. Bethel, pyrolignite of iron. Railroad timbers impregnated with any of these substances are used on most of the railroads in England, with very satisfactory results.

The laudable object of Mr. Hewson's pamphlet is to bring to the notice of railroad companies a very simple, inexpensive and convenient method of treating their timbers with antiseptic substances. It consists in placing them (railroad sill, for example) with their butt ends down in an open rectangular wooden tank, then filling it up to the top with a solution of the pyrolignite of iron. For sills seven feet long, a column of liquor of this depth expels the sap of the wood, and the preserving solution takes its place. A tank for treating 100 sills costs only $70, and it weighs but two tuns. It can therefore be easily transported from one station to another on a railway, whereas another expensive apparatus is fixed, and all the timber has to be taken to one locality for treatment. A number of experiments conducted in this manner have given satisfactory results. By immersing white, red, rock, and black oak, and chestnut and hemlock sills, for seven days, in a solution of one part of pyrolignite of iron to one of water, the average gain of the six specimens was 3·3 lbs. per cubic foot. Some specimens absorb their solutions more slowly than others, chestnut and hemlock require much longer steeping than oak. Some kinds of timber also absorb different substances in variable proportions. Thus while a stick of white oak gained 6·8 per cent in weight while steeped in a solution of chloride of zinc, 7·9 per cent in a liquid of blue vitriol, and 10·7 in pyrolignite of iron, a hemlock stick gained 9·7 in the chloride of zinc, 10·1 in the blue vitriol, and 7·6 in the pyrolignite solution. Heavy timbers, for bridges, were also treated in this manner, in a tank 27 feet deep, sunk in the ground, a hoisting crane being used to put in and take out the sticks. Timber freshly cut absorbed the solution readily, the sap being pressed out by the column of the pyrolignite. The process of Mr. Boucherie, illustrated on page 386, Vol. XII, SCIENTIFIC AMERICAN, is also illustrated in this pamphlet and favorably noticed, but it is principally designed for treating newly-felled trees in the forest, and is not so convenient for railroad purposes.

The expense of impregnating railroad timbers by the method advocated by Mr. Hewson is quite small, but it is not claimed for it that the timber is superior to that treated by other methods. As it has been practically demonstrated that timbers charged with the antiseptic substances described, have had their durability increased to double the number of years of similar timbers in an unprepared condition, this question is one which deserves the earnest attention of all persons connected with railroads. The great reason why so many of our railroads have proved failures, so far as payment of dividends on the original stock is concerned, is owing to the vast amount involved in wear and tear of the materials, and for paying the working-expenses. One great item of expense is the rapidly-decaying timbers; therefore every dollar saved in this department by treating them as described above, will tend to advance the interests and increase the prosperity of the railroads.

OUR RAILROADS.

The progress and condition of our railroads forms an instructive chapter in *Stow's Capitalists' Guide and Railway Annual.* It would appear that in nine years, or from 1850 to 1859, the railroads of the United States increased from 7,355 to 27,944 miles in length. In this period the increase in the New England States amounted to 62.74 per cent, while in the eight of the western States the increase was 2,201.41 per cent. At the same time the former gained in population 16.12 per cent, and the latter 46.22. The total cost of the roads, up to 1859, amounted to $365,451,070, of which large sum it is supposed one-third had been wasted in construction; yet by their influence, lands have been advanced in value and the speed of internal communication greatly augmented, and the whole country benefited. There are at this time 28,000 miles of finished roads in the United States, and about 16,000 miles either under construction or projected, requiring $400,000,000 for their completion. It is estimated, however, that many years must elapse before sufficient capital can be diverted from other objects to carry them through. In the meantime, many projected in a spirit of rivalry to other roads will be abandoned. It is calculated that 20,000 miles of railroad are sufficient to do all the business of the country at the present time, and that 8,000 miles have been constructed, in part, in rivalry to other roads, which have proved a dead loss to stockholders, and in the main will pass into the hands of the bondholders. The average cost of railways per mile has been $36,328. In the middle States, $40,919; in the southern States, $22,906; and in the western States, $36,333.

The reason assigned for the cheapness of construction of railroads at the south is that they were built on the cash plan. Among the net earnings, the Panama shows the largest returns, being $29,564 per mile; and those earning the least, or nothing to stockholders, were found in Maine, Vermont, Mississippi, Missouri, Iowa, Illinois, New York, &c. The list of dividend-paying roads comprises 78; among which, two pay annual dividends of 12 per cent; nine, 10 per cent; two, 9 per cent; ten, 8 per cent; six, 7 per cent; thirty, 6 per cent; five, 5 per cent; one, 4 per cent; one, 2½ per cent; and one, 2 per cent. The list of delinquent companies on stock or bonds amounts to 33. The total bonded debts of the American railroads, all of which mature between 1859 and 1874, amount to $411,199,702.

STEAM-ENGINES FOR CITY RAILROADS.

We learn by the Philadelphia *Ledger* that the directors of one of the railroads in that city are now making arrangements for running their cars with a steam-engine. For this purpose one of four horse-power is being built by A. L. Archambault, and is nearly ready. It will be 10 feet long, 4 feet 8 inches wide and weigh about 2 tuns. It is intended to drive the truck of the engine by a belt passing round the pulley on the engine-shaft, thence around another on the hind axle of the truck. It is purposed to throw the wheels in and out of gear with the engine by a shipper, so that, when the signal is given to stop, the belt may be thrown off and the engine still kept in motion, and *vice versa*. At present we do not see the advantages of this roundabout arrangement, but probably it may have merits which have been carefully studied out by its projector. The railroad company are having a handsome car made to run with this engine, and its practicability will be fully tested.

MAGNETISM ON RAILROADS.

MESSRS. EDITORS.—In your valuable paper of the 3d inst. (page 153, present volume of the SCIENTIFIC AMERICAN) you kindly noticed my efforts to introduce a substantial improvement in our railroad economy, for which accept my acknowledgements. You made one remark however, which it is perhaps well to refer to. You say: "The increased adhesion of a magnetized locomotive wheel is caused by inducing polarity in the rail, and it must take as much power to break the magnetic contact between the wheel and the rail as that which induced their mutual attraction. According to this view, whatever is gained by increased adhesion is at the expense of steam-power."

You are perfectly right in this, that whatever adhesive force exists must take a corresponding power to neutralize it. But as this is produced by chemical decomposition in the battery, it is not at the expense of the steam power of the engine. Again, whatever increase of adhesion there may be, it is concentrated at the point of contact between the wheel and rail by the curved form of the helices, and there operates continuously, and the contact has not to be made and broken as you evidently suppose, and therefore the forces are balanced exactly; although it requires much more force to lift or to *slip* the wheel when magnetized than when it is not, it requires no more to *roll* it in one case than the other, which has been determined on a four and a half-feet diameter wheel, the rationale of which you will readily see. A weight of 20 pounds at either end of a scale-beam may be vibrated as easily as 10 pounds similarly placed, if the fulcrum is not crushed, excepting the power necessary to overcome the inertia, and as the magnetic attraction is equally in front and behind, the point of greatest magnetic effect, which coincides with the point of contact between the wheel and rail, and as their is no appreciable inertia or vis-inertia in magnetism, it follows that the wheel will roll as easily when magnetized as when it is not, provided the point of maximum magnetic effect is continued at that point where the wheel and rail touch, whether at rest or in motion, which is the case with the arrangement of mechanism under discussion. The whole idea is concisely comprised in this: magnetic teeth to the wheel, and cogs to the rail.

EDWARD W. SERRELL.

Greenfield, Mass., Sept. 5, 1859.

The following is another letter on this subject:—

MESSRS. EDITORS:—I have been much edified by reading your ablé article in the edition of September 3d, on the subject of magnetizing the driving-wheels of locomotives; but I have ventured to address you again (as briefly as possible) as I believe you have overlooked the point upon which the value of the application of that power depends, both as regards my theory, and the results of Mr. Serrell's experiments, which latter go to show a gain of 75 per cent in tractive powers by the employment of an imponderable agent. An engine weighing 20 tuns, with the wheels magnetized will draw as much freight with the same amount of steam, as an engine weighing 35 tuns, can draw without magnetism; in other words, we obtain 15 tuns adhesion, by using an influence weighing nothing, and, it must appear obvious, that, if the depreciation of railroad structure be $26,000,000 annually, and caused principally by the use of heavy locomotives, a reduction of 75 per cent in their weight, without detracting from their efficiency or increasing their running expenses, must necessarily diminish this $26,000,000 in the same proportion. In my former letter, I stated it was my belief, that the slop and mess of coils and batteries could be dispensed with, by a peculiar construction of the driving wheels, rendering them powerful permanent magnets.

O. H. NEEDHAM, M.D.

New York, September 7, 1859.

[In our article referred to, we gave some reasons why the economy of magnetized wheels may not be so great as has been estimated; we want more experiments to test them under different conditions of speed, load carried, the expenditure for fuel, &c. The steel tires of driving wheels may be so contructed as to be made into permanent magnets, but we could not expect any benefit from their use; nevertheless we go for testing all these things by experiments.—EDS.

LEVER POWER IN PLACE OF STEAM OR WATER.

"Mr. E. Harris, of Princeton, in this State, who is one of the most ingenious and successful inventors in the West, has recently obtained a patent for a new contrivance for the propulsion of machinery, which, if successful, is destined to supercede steam or water power. It is lever power, operated by means of a heavy, swinging weight, attached to a pendulum that is fastened above to each end of a horizontal iron beam resting on a cylinder, which, by means of cog-wheel 'dogs,' operates a great overshot wheel that connects with and operates the general machinery. This is the entire arrangement, simple and apparently effective. Mr. Harris has his invention only in model form as yet, but designs to apply it practically as soon as possible. He feels confident of its practicability, and we see no difficulty in the way. The invention will be of the utmost importance if successfully put into practice, inasmuch as it can be as easily applied to steamboats, railroad cars, and common carriages as to saw-mills or any other kind of mills or machinery. We shall expect to hear of its entire success."

The *Wisconsin Cultivator* copies this from an "exchange," name not given. The writer of the extract is evidently not acquainted with mechanics. Levers are mere mechanical devices for applying steam, water, and animal power; they possess no vital energy for moving machinery, because they are machines themselves. It would just be as sensible to say, Mr. Harris has invented a machine to drive a machine, as to say this is "a new contrivance for the propulsion of machinery." For want of a very little accurate knowledge of mechanics, many men have spent years in contriving useless machines for affecting an impossible result, namely, gaining power by levers.

MOLDING PARAFFINE CANDLES.—If paraffine is run into molds and heated in the usual way for making candles like those of wax, it becomes cloudy, mottled on the surface and full of cracks and indentations. An improved method of rendering paraffine candles smooth on the surface and semi-pellucid in appearance, was patented by Horatio Leonard, on the 8th of February last. The invention consists in first heating the molds to 212° Fah., then pouring in melted paraffine at this temperature into them, then dipping them into cold water at about 34° in which they are kept for seven minutes. After this they are placed in a chamber containing cool air (varying from 32° to 40°) until they are quite cold, when they are removed in the usual way from the molds, which are of the trip-matrix kind. It is when the paraffine is passing from the liquid to the solid state, that it is liable to become cloudy and full of fissures. The cooling of it quickly in the mold by cold water prevents the cracks and indentations being formed on the surface, and the cooling of it gradually afterwards in the air-chamber renders the candle beautiful and clear in appearance, free from cracks and mottled blemishes. The inventor resides at New Bedford, Mass.

TO EXAMINE A DEEP TANK OR A WELL.—It is scarcely possible to see the bottom of a well by looking down in the common manner, but it is perfectly practical to do so with a reflector. When the sun is shining brightly, hold a mirror so that the reflected rays of light will fall into the water. A bright spot will be seen at the bottom, so light as to show the smallest object very plainly. In the same way one can examine the bottom of ponds and rivers, if the water be somewhat clear, and not agitated by winds or rapid motion. If a well or cistern be under cover, or shaded by buildings, so that the sunlight will not fall near the opening, it is only necessary to employ two mirrors, using one to reflect the light to the opening and another to send it down perpendicularly into the water. Light may be thrown fifty or a hundred yards to the precise spot desired, and then reflected downwards.

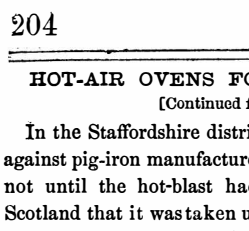
OILING HARNESS LEATHER.—Oils, when applied to dry leather, invariably injure it, and if to leather containing too much water, the oil cannot enter. Wet the harness over night, cover it with a blanket, and in the morning it will be damp and supple; then apply neats-foot oil in small quantities, and with so much elbow grease as will insure its disseminating itself throughout the leather. A soft pliant harness is easy to handle, and lasts longer than a neglected one. Never use vegetable oils on leather, and among the animal oils, neats-foot is the best.

HOT-AIR OVENS FOR IRON FURNACES.

[Continued from page 188.]

In the Staffordshire district, a strong prejudice existed against pig-iron manufactured with hot-blast; and it was not until the hot-blast had been in use some years in Scotland that it was taken up in Staffordshire. In 1834, Messrs. Lloyds, Fosters & Co., of Wednesbury, erected an apparatus at their works for heating the blast; and, singularly enough, at that early period, proposed to apply the waste gases from the tunnel-head for this purpose. This is believed to be the first attempt at utilizing the waste heat in that portion of the furnace; and, as such, is deserving of special notice. The apparatus constructed at these works consisted of a circular wrought-iron heating-chamber, placed within the brick-work of the tunnel-head, the flame from the furnace rising up through the center of the chamber; the blast was supplied into it from the cold main through several small apertures, which distributed the air against the plates of the chamber on the side exposed to the action of the flame, and the hot-blast was conveyed in a pipe down to the tuyeres. This apparatus was very expensive in its first construction, and constantly required repairs; and it produced a heat of only about 360° Fah., so that a small supplementary oven was required near the tuyere to raise the temperature of the blast still further previous to its entrance into the furnace. This plan has long since been abandoned for more perfect arrangements.

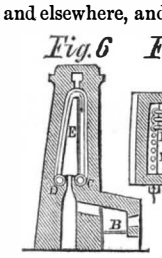
About the same period Mr. Neilson's plan of hot-blast was introduced by Messrs. Firmstone, at the Lays Works, near Dudley. The first experimental oven erected at these works was on the plan as that last described as erected by Mr. Neilson, "by which apparatus," Mr. Firmstone states, "a supply of hot-blast at 600° was with difficulty maintained, and never long without great damage to the semi-circular arch pipes; the pressure on the blast was seriously reduced by its friction in passing through the small arch pipes; but the effect in the reduction of the ores used was astonishing." To remedy these difficulties, both Mr. Neilson, at Calder and elsewhere, and Mr. Firmstone, at the Lays, proceeded to construct ovens on a plan similar to that shown in Figs. 6 and 7, which show the permanent oven erected, in 1833, at the Lays Works. In order to overcome the difficulty that had occurred previously from the arch tubes, E, being burned down, they were elongated into the form of a siphon, in some instances carried to a hight of 10 feet above the main; and, as an additional safeguard, the grate, B, was placed in a separate compartment, and the oven heated by the gases passing from the burning fuel through small apertures, as shown in Fig. 7. At this stage, also, the previous plan of having a separate oven to each tuyere was abandoned, and the general heating capacity was so much increased, that one oven like that shown in Figs. 6 and 7 was found to be capable of heating the blast for three tuyeres to a temperament of 600° Fah. The dimensions of the oven are as follows:—



Length of longitudinal mains	7 ft. 6. in.	
Number of siphon pipes	9	
Area of direct heating surface, total	240	sq. ft.
Do. per tuyere	80	"
Area of fire-grate, total	9	"
Do. per tuyere	3	"

Fracture of pipes, however, and leakage of joints still took place, but to a much more limited extent than formerly; and these were found good ovens for the requirements of the furnaces of that period.

Another oven worthy of notice is shown in Figs. 8 and 9, erected at the Monkland Works, near Airdrie, Scotland. It consisted of two main vertical pipes, E E, of a horse-shoe pattern, with numerous sockets, cast on one face, erected opposite to each other, at a distance of about six feet apart; small, straight cast-iron tubes, F, 15 in number, were then inserted into the sockets, and the horse-shoe mains having been drawn together to close the sockets on the pipes, the joints were well rammed in with iron cement. This arrangement is interesting principally as giving the first example of the curved main; but, as erected, it was a comparative failure. It was subject, also, to the serious objection that, in the event of one pipe becoming burnt or damaged, either the sockets must be stopped up at each end, or the whole apparatus taken down to insert a single new pipe.

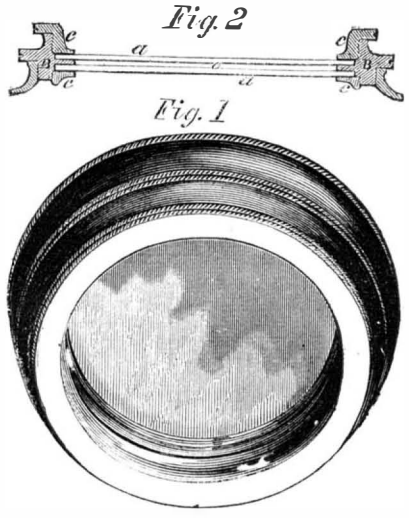


In addition to the above, a great number of other modifications of these principles were constructed at various works, involving different arrangements of the tubes, and different modes of setting, too numerous to admit of notice in the present paper. It may be well to add, however, that, with a view of obviating the repeated fracture of pipes and joints, Mr. G. Firmstone made a further trial of wrought-iron in the construction of ovens at the Lays Works, having the connecting arch pipes made of that material; but, although this oven, while in operation, raised the temperature of the blast to 800° Fah., and on this ground was declared by Mr. Neilson to be the most perfect apparatus he had then seen, the old defects of wrought-iron in this position arising from oxydation and want of durability, as previously pointed out, soon became apparent, and the apparatus had to be abandoned.

[To be continued.]

GOULD'S IMPROVED WINDOW FOR SUBMARINE HELMETS.

Walking about on the bottom of the ocean is not a very agreeable pastime, but when it results in the recovery of large amounts of treasure, men are found willing to practice it. Encased in suits of water-tight armor, with which a pipe communicates leading above the surface for the supply of air, the hardy explorers conduct their labors at the bottom of the sea. The helmet of the armor is of course furnished with a window in front of the eyes, to furnish light to the encased operator. But it seems that this window is liable to be obscured by moisture being condensed upon it, and Mr. Gould, of Worcester, Mass., has invented a device to obviate the difficulty. His plan is simply to form the window of two plates of glass with an air space between them.



In the annexed engraving, Fig. 1 represents a perspective view of the whole, and Eig. 2 the several parts. B B, is the common bezel, *a a*, the plates, *e*, the space that separates them, and *c c*, the screws by which they are pressed firmly to their beds. They are packed water-tight by rings of india-rubber cloth, and a ring of india-rubber cloth is interposed between them at the edge.

The patent was granted to Charles M. Gould, of Worcester, Mass., and is dated July 26, 1859.

JAMES' RIFLED CANNON AND PROJECTILE.

A new projectile, invented by Hon. Charles T. James, of Rhode Island, and which is intended to be used in connection with a rifled cannon, is a cast-iron cylinder surmounted by a solid conical (canoid) head. The diameter of the cylinder is .02 of an inch less than the bore of the gun; its length is nearly equal to the calibre of the gun; while the length of its conical head is about one inch greater than that of the cylinder. The cylinder retains its full diameter for a quarter of an inch of its length at each end; then, for its intermediate length, its diameter is shortened one-half an inch, forming a recess in its body, which loss of diameter and external surface of the cylinder is replaced by a compound filling of canvas, sheet-tin and lead.

The rings at the end of the cylinder, formed by shortening its diameter, constitute the bearings of the projectile, when introduced into the gun for loading. The solidity of the canoid is continued into and thereby forms the solid portion of the head of the cylinder. The base of the cylinder has a central cavity or opening of 1.95 inches in diameter, which extends into the body 1.5 inches, and from which (like mortises in the hub of a wheel for spokes) there are eight rectangular openings, enlarging as they approach the circumference, in the recess of the body of the cylinder.

When the charge is fired, the gas evolved by the burning the powder, in its effort to expel the projectile and to escape from the gun, is forced into the cavity and through the rectangular openings against the compound filling, which is thereby pressed into the grooves of the bore, and by its firm hold in them, the rifle motion is imparted to the projectile. The canvas and tin, in the order named, constitute the exterior of the filling, and are molded in the recess to the body of the cylinder. This is done by enveloping with canvas the strip of tin, which must be equal in length to the greater circumference of the cylinder, and in width equal to the length of its recess. The strip of tin, when covered with canvas, is formed around the cylinder opposite the recess, and firmly secured there by an iron collar clamp, after which the space between its inner surface and the body of the cylinder is filled with melted lead, which, readily adhering to the tin and iron, forms a compact mass in the recess around the cylinder body.

The following are some of the results of practice with an ordinary six-pound gun (rifled, 15 grooves, and carrying the new projectile), recently made at Chicopee, Mass., under the direction of a Board of officers attached to the Ordnance Department of the United States army, Major W. A. Thornton, chairman.

The gun was first placed at a distance of 674 yards from the target. The quantity of powder used at each firing was one and one-fourth pounds, the service charge for a six-pound round ball, while the weight of the new projectile was over 12½ pounds. Eighteen shots were fired at a cloth target four feet square, fastened on a board frame eight feet square. The shots varied from the center, from three and a half inches to four feet, 14 of them entering the boards. The gun was carried back to 867 yards, or nearly half a mile from the target, elevated at such an angle as should carry a six-pound round ball to the center of the target, and fired. The shot passed over the top of the board frame at an elevation of about 20 feet, cut off four pine trees (one six inches in diameter) without deviating apparently from a direct line, and was lost. This shows the greater range of shot from rifled guns. This charge of one and a fourth pound of powder would carry, by calculations in engineering, a round shot of six pounds weight to the target, and no more; but in this case a shot of more than double weight goes over the target at such a hight and force as to probably double the distance to the target. The gun was then lowered, and five shots fired, two of which entered the board within about two feet of the center. A 12-pound rifled gun was then placed in the same position (867 yards distant), and 19 shots fired. Five of these entered the board at from three and a half to four feet of the center. Great difficulties were encountered in arriving at exactness, inasmuch as the guns had no sights perfectly adapted to them.

At a subsequent trial, with the same weight of powder, projectile, and gun as in the first-described experiments, a range of at least 3½ miles was attained; beyond this point the course of the ball was lost, but the entire range was supposed to be as great as 4½ to 5 miles. A like result with the same conditions of powder and weight of projectile, has probably never been equaled.

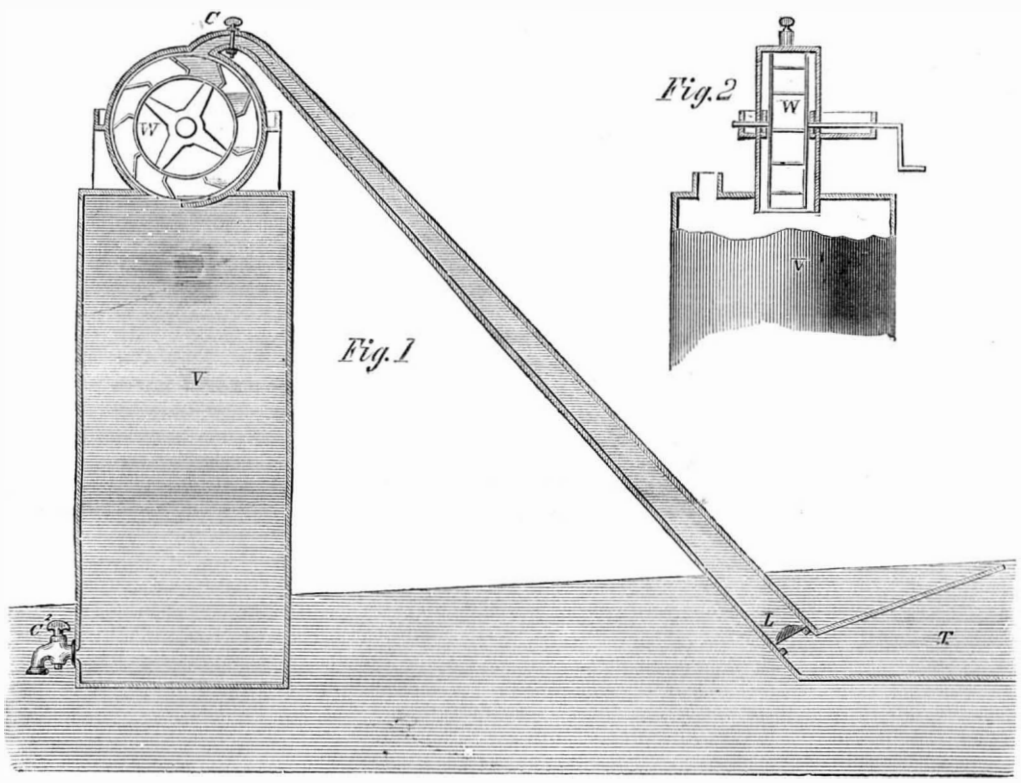
In a report on the above experiment, officially submitted to the Secretary of War, the Board say:

"The depth of the grooving in Mr. James' gun is so shallow, as in no case to materially impair the strength of the gun; while it is sufficient to firmly hold the projectile and compel it to take the rifle flight. The perforation of the largest in all instances, and the obtaining of the projectiles after firing, freely indicate that they invariably impinged point foremost; and further, in having one imbedded in damp earth, its spiral motion was plainly indicated in the sand to the close of the flight. The grasp of the rifling is further shown by the increased range obtained while using the same charge of powder and elevation, in projecting masses of double the weight of the usual spherical balls. The

merits of the projectiles consist in their answering fully the expectations desired of them—their ready fabrication and adaptation to guns, their ease of loading, as it required but little more force to send the projectile to the bottom of the bore, than is needed to move a body of like weight, on a smooth surface; the certainty of the expansion of the filling, and its firm true hold in the grooves of the gun; the greased canvas wipes the rifling clean and leaves the bore in a condition to receive readily the next charge, and which is also a sure protection to the bore from injury in loading and when the gun is discharged. These conditions commend the guns and projectiles to the favorable considerations of the government."

IMPROVED HYDRAULIC MOTOR.

The use of hydraulic power has been a broad field for inventors, and the ideas on the subject do not seem yet to be exhausted. The accompanying engravings represent a plan for using the momentum of water in swiftly-running streams, for which Letters Patent were granted to Morrill A. Shepard, of Orio, Illinois, July 19, 1859.



SHEPARD'S HYDRAULIC MOTOR.

T represents a tapering tube placed in the water, with its largest part up stream. As the water rushes into this tube, it is carried by its momentum, on to the wheel, W, to which it imparts motion by filling the buckets on one side of the wheel. The vacuum cylinder, V, is to be made air-tight, and the ends of the axle of the wheel should be enclosed in water jackets, so as to encompass the wheel in an air-tight case. The wheel is to be started and stopped by opening and closing the cocks, C and C2. The valve, L, prevents the water from reflowing out of the tube back into the stream, when the wheel is stopped.

The object of this invention is to use the power of rapid streams in a way that will save the expense of damming.

The inventor, Morrill A, Shepard, will be happy to furnish any information in regard to his novel improvement. His address is Parkersburgh, Richland county, Illinois.

THE HEAT-CONDUCTING POWER OF METALS.

As there are many erroneous ideas afloat regarding the qualities of different metals for conducting heat, Messrs. F. Grace Calvert and R. Johnson—distinguished English chemists—have lately reported to the Royal Society the results of a series of experiments performed by them to exterminate all the perplexities connected with this subject. These experiments were conducted by placing bars of a certain size of the pure metals, also alloys, in a box so constructed as to prevent radiation, and then applying the heat to them through hot water in such a manner as to secure very accurate results. From these the conductibility of the pure metals have been arranged as follows:—Silver (standard), 1,000; pure gold, 981; rolled copper, 845; cast, 811; mercury, 677; aluminum, 665; rolled zinc, 641; cast, 608; cadmium, 577; malleable iron, 436; tin, 422; steel, 397; platinum, 380; sodium, 365; cast-iron, 359; lead, 287; cast antimony, 215; bismuth, 61. These results are entirely different from those which are usually appended to works on the conducting power of metals. Gold is set down in common tables at 1,000 and silver at 973; here the case is nearly reversed. Platinum is usually set down at 981 (the same as the gold above), while, by the experiments of Calvert and Johnson, it is placed as low as 380—far beneath that of malleable iron. The latter metal is placed in common tables at 347, while above it is ranged at 436. These are very important differences, and should not be overlooked by mechanics and chemists in choosing metals for their conducting powers in any of their operations.

It was also found in these experiments that the molecular condition of the metals greatly affected their conducting powers. Thus, rolled copper, compared with silver at 1,000, was 845, while that of cast was but 811; and while cast-iron was but 359, malleable iron was 436. It is probable that, as the particles of rolled metal are in closer contact, they may thus conduct the heat more rapidly, according to Joule's theory of heat traveling by the vibrations of matter. It was also found that there was a difference in the conducting powers of bars cast vertically and horizontally. Zinc cast vertically was as 628 to 608 of a bar cast horizontally. There is a very great difference in the crystallization of bars cast in different positions, a fact which deserves the attention of all machinists who use cast metal for any purpose. Those bars cast vertically had their crystals more closely arranged, and better disposed for strength and conduction. The higher conducting power of wrought iron over steel and cast-iron shows how much superior it is for boilers and all articles for transmitting heat.

A very remarkable result, developed by these experiments, was the inferior conducting power of alloys—the pure metal always giving the best results. Thus, an alloy of gold, with one per cent of silver, is inferior to pure gold in the proportions of 840 to 981. In making brass, composed of copper and zinc, for boiler tubes, it has always been considered the conducting power of the alloy was in proportion to the copper it contained. This is not so, according to the experiments referred to. Instead of the superior metal (copper) elevating the conducting power of the inferior, the latter brings down the former nearly to its lower standard. Thus, in a brass alloy, containing 49.32 copper and 50.68 zinc, the calculated power is 718; but its actual power, obtained from experiment, was only 688. Again, by increasing the quantity of copper to 66.06, the zinc being 33.94, the calculated power of which brass is 748, it was found by experiment to be about 621. Common yellow brass is composed of 64 parts of copper, zinc, 56, and has a a conducting power of 558, which is higher than that of iron for the tubing of boilers; all other alloys, however, of copper and zinc in other proportions; also, the bronze alloys, containing copper, tin and zinc, possess no higher conducting powers than wrought and cast-iron.

A brass composed of equal parts of copper and zinc is of a beautiful gold color, and crystallizes in prisms. Experiments were made to discover, if possible, whether alloys are simple mixtures of metals or definite chemical compounds; but they were not able to determine this question. When suffered to cool slowly, several alloys have a tendency to form crystallizable compounds, differing in composition in various parts of the cast bars. The less fusible are found on the exterior, the most fusible in the interior of the mass. This will afford an explanation of phenomena sometimes witnessed in rolled iron bars and tubes, namely, that one part will be quite fibrous, while another, not over 18 inches from it, will be highly crystalline.

SEA-WATER AND MARINE AIR.

The density of sea-water is greater than that of ordinary soft water; it varies between the extreme limits of 1.02 in the case of the waters of the Dead Sea, and of 1.00057 in that of the waters of the Frozen Ocean; and M. Aime has ascertained the density of the water of the Mediterranean to be precisely the same at the depth 1750 yards, which it is at the surface. As to the temperature of the ocean, the surface is exposed to the action of local disturbing causes, but there is a zone, of course at a depth varying with the latitudes in which the temperature is constant; below this zone, the tempera- decreases, and at the bottom of the ocean the temperature is notably less than it is upon the line of the average. Much has been written upon the subject of the source of the mineralization of sea-water, but, the whole of this question is involved in such mystery that no solution hitherto presented can be considered satisfactory. The presence of the chloride of sodium in such large proportions, and with such strange permanence over the face of the globe, must be considered to be one of the original conditions of matter; and all the attempts hitherto made to account for its presence upon secondary causes only substitute effects for cause. It has been ascertained that the mineralization of sea-water increases with the depth from the surface, but the distance from the equator has little influence upon its composition: in its normal state, sea-water appears to contain 35 parts of solid residue in every 1,000, of which the chloride of sodium constitutes 81 per cent. It is singular that, with the exception of Bouis, no chemist has yet been able to detect iodine in sea-water, although it is notorious that sea-weeds derive their supply of this metalloid entirely from this source. Is analytical chemistry, then, so incompetent to discover the real constitution of a body so universally diffused as sea-water?

It has been ascertained that sea air contains not only the chloride of sodium in a highly comminuted state, but also the hydro-sulphuric acid, the hydro-iodic, and the hydro-bromic acids, combined with ammonia and lime; and in addition to these substances, it also contains at times organic substances. The influence of these agents upon the human frame is great; but their mode of action has hitherto escaped analysis. It is hardly so with their influence upon building materials; for the decay of the latter in so many instances when exposed to the sea air has been traced in its chemical and mechanical bearings with considerable success.

GRAPE JELLY.—Put the grapes into a jar and place the jar in an oven, or on the top of a stove, to draw out the juice; then squeeze them through a cloth, and to every pint of juice add one pound of loaf sugar, and boil nearly an hour; after which, pour it into the pots, and let it stand till next day; then cover with paper and tie up tight.

PREVENTION OF PITTING FROM SMALLPOX.—A new remedy against this result has been recently communicated to the Glasgow Medical Society, by Mr. Branton, clerk to the Infirmary, as having been used repeatedly with success. It consists of glycerine, nitrate of silver and collodion.

STRAW BRAID AND BETSY BAKER.

An exceedingly interesting incident occurred at one of the meetings last year of the Rhode Island Society for the Encouragement of Domestic Industry, an account of which we have just received in the published transactions of the society. The incident of which we speak was the presentation to the society, by Governor Dyer, of a fine portrait of Mrs. Betsy Baker. This old lady, 61 years ago, in 1798, when she was 12 years of age, invented the art of braiding straw. She was not the first inventor, but she was an *original* inventor of the art. The facts have been collected by Judge Staples, the learned and able secretary of the society, and there is no doubt that Betsy Metcalf (as her name then was) invented, out of her own head, the art of straw-braiding; and that it was from her instructions that this branch of industry spread into Dedham, Wrentham, and the adjoining towns of Massachusetts, where it has grown up into its present gigantic dimensions, giving employment to 10,000 people. Judge Staples requested a relative of Mrs. Baker to write to her at Dedham, where she is now residing, and he had the satisfaction to receive, in reply, the following most interesting letter from the old lady herself, giving her own account of the invention. It will be seen that, with the exception of the word "learned," which is inaccurately used for "taught," the letter could not be improved. It presents the facts with a direct and simple brevity, which makes it a model for this sort of composition:—

"In compliance with your request, I will write an account of my learning to braid straw.

"At the age of 12 I commenced braiding. My father, Joel Metcalf, brought home some oat straw, which he had just moved, in June 1798. I cut the straw, and smoothed it with my scissors, and split it with my thumb nail. I had seen an imported bonnet, but never saw a piece of braid, and could not tell the number of straws. I commenced the common braid with six straws, and smoothed it with a junk bottle, and made part of a bonnet, but found that it did not look like the imported ones. I added another straw, and then it was right. An aunt, who resided in the family, encouraged me, while most of my friends said I should never learn. She would sit and hold the braid while I braided many yards, thus keeping it straight and in place.

"We could not make it white by exposing it to the sun, and knowing that brimstone would whiten other things, she put some in a pan, with some coals of fire, and set it out in the garden; then standing to the windward, she held the braid in the smoke, and thus bleached it.

"I then braided all sorts of trimming, but it was difficult to ascertain the number of strands. The first bonnet I made was of seven braid, with bobbin put in, like open work, and lined with pink satin. This was very much admired, and hundreds, I should think, came to see it.

"Soon after, I visited Dedham, and learned the ladies here, and made bonnets for several of them. There has been a story reported that I braided enough in the stage to defray my expenses. I did braid several yards, but not enough to pay my fare.

"After I returned to Providence, I learned Sally Richmond, a near neighbor, to braid all kinds. She went on a visit to Wrentham the next spring, I think, and learned them there.

"It has been published that they first began to braid in Wrentham, but it is a mistake. Mrs. John Whipple, after she was aged, told some one that she thought it was Hannah Metcalf who first braided; but this was a mistake, for she never braided. I learned them to braid from nearly all the towns around Providence, and never received any compensation for it. I learned all who came to make bonnets, free of expense. Many said I ought to get a patent, but I told them I did not wish to have my name sent to Congress.

"I could easily earn one dollar per day, and sometimes one dollar and fifty cents, for several weeks at a time. It became a very profitable business for several years.

"BETSY BAKER.

"West Dedham, Mass., Feb. 11, 1858."

The portrait of Mrs. Baker was painted for Governor Dyer by the best portrait-painter of the city, and the Society for the Encouragement of Domestic Industry may well regard it as a most valuable and useful ornament for their rooms.

THE WAY GERMAN MECHANICS WORK AND LIVE.

There are two brothers, Germans, manufacturers of cutlery, one of whom superintends the manufacturing operations in Solengen (Prussia), and the other sells the articles at his warehouse, No. 18 Cliff-street, in this city. From the latter, William Kind, Esq., we have received the following account of the mode in which the manufacture of cutlery in Germany is conducted. It gives us a striking view of German life, showing not only in industrial organization, but in social habits and arrangements, some curious contrasts to those which prevail in this country.

Solengen is a town of some 7,000 inhabitants, and the mechanics who make Mr. Kind's knives and scissors live in small villages scattered round the town at a distance of from two to four miles. The Germans all live in villages; they are so social that they could not bear to live alone, in scattered houses, as the Americans do. From one of these villages a blacksmith sends his wife to Mr. Kind's establishment in Solengen, for a quantity of iron and steel, to be forged into scissors. The material is weighed and delivered to the woman, who puts it upon her head and carries it home. After the blacksmith has forged it all into scissors, of sizes and forms according to directions, his wife puts them into a basket, and carries them back again, on her head, to the warehouse, and receives the pay for the work. From some other village a mechanic, whose trade is grinding and polishing, sends his wife to the town to procure a quantity of scissors to be ground and polished. After the return from the polisher's, they go to a third village to receive the screws and rivets; and sometimes to a fourth for an extra polish. On the roads leading out from Solengen may be seen these stout German women, with necks as straight as an arrow, trudging along three or four miles, with their ponderous burdens on their heads. The iron, from the time it leaves the warehouse for the blacksmith's, till the time that the scissors are finished, is carried on the top of women's heads an average distance of 12 miles.

This plan of operations for manufacturing differs somewhat from the course pursued in England and the United States. Here, a large building is erected in which all the workmen are collected together, all convenient tools and engines are provided; the scissors are forged by one man and passed directly to another who hardens and tempers them, another does the grinding, another the polishing, and another the riveting; thus great division of labor is secured, and all distant transportation of the material during the process of manufacture is avoided; all the heavy work, such as driving trip-hammers and turning grind-stones, being done by steam or water-power. The result is, that a given number of mechanics will make several times as many scissors in America as the same number will in Germany. When the scissors are sent into the market of the world, those made by the Germans will bring no more than those made by the Americans, being worth no more. As the American produces several times as many in the course of the year as the German does, the American realizes several times as much for his year's labor, as the German does for his. This matter is so plain, that it is astonishing that there are people yet who cannot understand that the tendency of labor-saving, or rather, labor-doing machinery, is to raise the wages of labor. The German mechanics engaged in the manufacture of which we have been speaking, are paid by the dozen, and earn from 25 to 40 cents per day.

Another feature in the case, from which the Americans might extract a profitable lesson is, that the German will obtain more pleasure for his 30 cents than the American will for his dollar and a half, or two dollars.

While the Americans, in fierce rivalry, are struggling to outshine one another in foolish display, the Germans, content in their mutual equality, pass their lives in friendly commune and social enjoyment.

TINNED AND ZINCED TUBES.

At the last monthly meeting of the Franklin Institute, Philadelphia, two tubes, taken from the Pirsson's fresh-water condenser of the steamer *Keystone State*, were laid upon the exhibition table, for the inspection of the members. Six months ago, after a use of several months, many of the original tubes were found to be much injured by the action of sea-water, owing to an impure copper having been used in their manufacture. The builders of the *Keystone's* machinery determined to coat the new tube with either zinc or tin, giving zinc the preference, on account of its superior conducting power, though more subject to the chemical action of sea water. However, some of the tubes were coated with tin, and the balance with zinc; and were put into the condenser side by side. The tube heads were of copper, and the external casing of cast-iron. A tube of each sort was placed before the meeting. The one coated with tin was perfect as when first put in, with the tin still remaining; whilst that coated with zinc was much corroded, particularly near the ends where it approached the tube heads; and the heads themselves were eaten away at the places of contact: thus, the coating of tin seems to be the best preservative of the tubes.

TO CHEMISTS—A DESIDERATUM.

For propelling carriages on common roads, for plowing, and for countless other purposes, we want an engine far less heavy in proportion to its power than the steam-engine. This can only be accomplished by getting rid of the boiler. It is true that our mechanical and philosophical inventors, who are going over the old field of reaction and percussion engines, may succeed in slightly reducing the weight of the steam-engine; but for any large step in this direction, we must look to the chemists. What we require is the combination of two substances, solid or liquid, which, on being brought into contact, will assume the gaseous form. It would seem that the place to look for this is among the organic products. In these the compound is not generally very permanent, but is disposed, as soon as the vital force which drew it together is removed, to decompose into its original elements. The organic products are so numerous that the field is a broad one, but success would reward almost any amount of research and experiment.

PUMPING WATER FOR IRRIGATION.

MESSRS. EDITORS:—Permit me, through the columns of your paper, to say a few words to your correspondents S——, of Canada West (page 85, present volume of the SCIENTIFIC AMERICAN), and W., of Elmira (page 151), relative to pumping water from great distances.

To S——, I would say his plan is practicable, notwithstanding W. says "your Canadian correspondent would find it impossible to irrigate his grounds on the plan proposed by him." The only drawback, if any, would be the cost. The objections brought by W. on account of water being a solid, and the consequent damage to reciprocating pumps, may be entirely overcome, so that there would be no difference, practically, in drawing water through a half-mile of pipe to an elevation of 25 feet or from a pump-well to the same hight, except the greater amount of friction and momentum due to the longer pipe. I speak advisedly and from some experience, and would guarantee the erection and efficient working of a reciprocating pump under the circumstances. Of course, I am assuming the pipe to be perfectly air-tight, and I assume this also to be practicable with a lead pipe, but with no other pipe that I am acquainted with.

The cost of a two-inch lead pipe one half mile in length, and the laying of it in the trench after it was dug, would amount to about $1,200. The power required to discharge the same amount of water as from a pump-well, would have to be increased in proportion to the increase of friction and momentum in the long pipe. The greatest objection to the plan is its expense, and S—— must determine as to the practicability of that matter and of its payability to him. J. D. R.

Philadelphia, Sept. 3, 1859.

THE IRON FURNACES OF OHIO.—The *Cincinnati Times* refers to a chart comprising a list of iron furnaces in the vicinity of Portsmouth, Ohio, published by Mr. McFarland of the Portsmouth *Tribune*. The entire number of furnaces is set down at 45. It also contains a list of 17 furnaces in Kentucky, making a total of 62. The yearly aggregate of pig-iron turned out from there is estimated at 155,000 tuns, with a value of $4,650,000. The number of hands employed at these furnaces is estimated at 6,200, receiving the total sum of $155,000 per month. The iron trade is quite a feature in the Scioto Valley and its neighborhood.

THE LARGEST WATER-WHEEL IN THE WORLD.

MESSRS. EDITORS:—In the course of a very interesting article entitled "India-rubber and its Manufactures," published in No. 11 of the present volume of the SCIENTIFIC AMERICAN, mention is made of a water-wheel at the works of the "New York Belting and Packing Co.," on Potatook river, and you state that this wheel is "50 feet in diameter, and is said to be the largest in the in the world." There is at least one larger. In "Quiggan's Illustrated Guide to the Isle of Man" (Douglas, 1858), page 168, will be found a description of the village of Laxey and its neighborhood, and we read as follows:—

"About half-way up the glen is the Laxey mine; the vein, running nearly north and south, contains copper ore, lead ore rich in silver, varying from 80 to 120 ounces in the tun of lead, and a great body of black-jack or blende. Of late years the mine has been worked with great vigor, and very extensive machinery erected. A water-wheel, believed to be the largest in the world, was started (in 1855) by Hon. Charles Hope, the lieutenant-governor, and named after his lady, who assisted in the ceremony, the 'Lady Isabella.' This wheel is a great object of attraction, and is certainly a proud triumph of engineering science. Situated towards the northern extremity of the valley, on a lofty elevation, it arrests immediate attention on entering the glen. It is supported in its bearings by a massive, yet elegant structure of masonry and iron, arranged in open arches and galleries. The first gallery admits of an inspection of the under portion of the wheel, and the second is on a level with and supports the bearings of the shaft. At the extremity of the second gallery, in front of the masonry, is a colossal entablature of the familiar armorial bearings of the Isle in high relief. The ascent from the first gallery to the other points of elevation is effected by winding staircases round a massive white pillar. Up the center of this pillar the water rises, and is carried by a duct under a projecting balcony and over the very summit of the wheel, which there receives it. This arrangement is effected by having the reservoirs of water at a considerable elevation above the wheel on the neighboring hills, and the water is conveyed from thence in pipes two feet in diameter, underground, to the pillar. The staircases conduct to the balcony, which is surrounded by iron railings, from whence a magnificent view of the valley is obtained; but to those unaccustomed to great elevations, it has for a time a dizzy and confusing effect. The wheel is properly an 'overshot,' though moving in the reverse direction to the stream of water, which, so to say, enters the wheel at that portion of the circle indicated by 'twelve o'clock.' The water is stopped at pleasure by a neatly constructed hydrant on the second gallery; and the connecting rods for working the pumps at the mine are carried on a long viaduct of arches from the wheel to the mine shaft, which is about 200 yards distant. This great wheel is of the following dimensions:—Diameter, 72 feet, 6 inches; circumference, 217½ feet; breadth, 6 feet; length of shaft (malleable or wrought iron), 17 feet; diameter, 21 inches; weight, 10 tuns; length of crank, 5 feet; stroke, 10 feet; stroke of beam at the mine pump, 8 feet; revolutions per minute, 2 (can be increased to 4½); estimated horse-power, 200. It pumps 250 gallons per minute from a depth of 400 yards, but its capacity in this respect can be materially increased." A. M. G.

Albany, N. Y., Sept. 8, 1859.

[At Burden's Nail Works, near Troy, N. Y., there is one of the most peculiar and majestic water-wheels in the world. It is 50 feet in diameter, 22 feet in breadth, has 30 buckets, and is built on what is called the "suspension principle;" that is, the shaft is carried by the soling through suspension rods. It will repay a long journey to witness this wheel in operation. Its great mass in revolution excites the same feelings in the mind as the sight of a huge steamboat in motion, or a large body of water flowing over a high fall.—EDS.

WORK OF WATER-WHEELS BY NIGHT AND DAY.

MESSRS. EDITORS:—In the course of my business of building and putting in the "Blake" wheel (of which there are about 900 built, all giving full satisfaction), I have often heard it asserted, by mill-owners and others, that water-wheels will do more work in the night than in the day-time. To demonstrate the fallacy of such an assertion by actual and scientific experiments, I have, with great care and with the use of very perfect apparatus for testing water-wheels, observed their performance in several successive days and nights, namely, five experiments in the middle of the day and three in the middle of the night, on a wheel of 18 inches diameter, running without resistance under a fall (H) of eight and more feet; running the wheel for 2,000 revolutions at each experiment; and the time being calculated by noting the seconds for every 100 revolutions, by the bell-hammer attached to the wheel-shaft, which is a good time-keeper.

I give below the results of each experiment opposite the fall (H) which actuated the wheel, in revolutions per second; and I then reduce the revolutions to what they would have been had the fall (H) been the same in every experiment, having one in each series, night and day, equal to 8.41′ feet. I reduce R to that H by the formula as $\sqrt{H} : R = \sqrt{8{\cdot}41'} : R'$.

DAY EXPERIMENTS.

H	Revolutions.	H′	R′.
8.410 feet,	4.901960	8.41 feet,	4.90196
8.515 "	4.962230	"	4.93154
8.290 "	4.889975	"	4.92524
8.422 "	4.926108	"	4.92260
8.4216 "	4.950544	"	4.94713

Mean revolution, 4.92569; mean temperature of water, 70.7°; barometer (mean hight), 29.93 inches.

NIGHT EXPERIMENTS.

H	Revolutions.	H′	R′.
8.41 feet,	4.88997	8.41 feet,	4.88997
8.61 "	4.98753	"	4.93949
8.42 "	4.93827	"	4.93533

Mean revolution, 4.93159; mean temperature of water, 70.7°; barometer (mean hight), 29.91 inches.

On comparing the results of the two series of experiments, it will be seen that there was a difference of 0.00410 in favor of the wheel's revolution during *day-time*. L. W. B.

East Pepperell, Mass., Sept. 5, 1859.

MODEL TURBINE WHEELS FOR PHILADELPHIA.—Some time since the Committee on Water, of Councils, invited the inventors and constructors of turbine water wheels to compete for the erection of two at the new wheel-house in course of erection at Fairmount, stating that working models would be required to be sent to this city for trial before any contract would be given out. Letters were received from engineers in various parts of the country of their intention to send models as soon as they could be constructed, and two have already been sent on, one from Reading, Pa., and the other from New Jersey. Each will weigh about 1,500 pounds, and are capable of passing 200 cubic feet of water per minute. As soon as the other models arrive, the trial will take place at Fairmount, works having been already constructed for this purpose. The coffer-dam, so as to allow of the construction of the foundation for the new wheel-house, is now completed, and a direct-acting steam-pump, built by Mr. Rich, at Sixteenth and Hamilton streets, to work for the purpose of keeping it clear of water. Mr. Rich has also one of his pumps in operation at the big culvert, now building in Twenty-fourth-street, and with its aid the workmen are enabled to continue their operations without interruption.—*Philadelphia Ledger*.

[This notice refers to the experiments to be undertaken in Philadelphia, as mentioned in the letter of Chief Engineer H. P. M. Birkenbine, on page 67 of the present volume of the SCIENTIFIC AMERICAN.—EDS.

SEALING-WAX FOR FRUIT-CANS.—Don't buy any sealing-wax for your bottles of fruit, or fruit juice called wine, or anything else that you want to seal up for future use. Make it yourself. "How?" We will tell you. The seare the ingredients. Beeswax, ½ oz; English vermillion, 1½ oz; gum shellac, 2½; rosin, 8 oz. Take some cheap iron vessel that you can always keep for the purpose, and put in the rosin and melt it, and stir in the vermillion. Then add the shellac, slowly, and stir that in, and afterward the beeswax. When wanted for use at any after time, set it upon a slow fire and melt it so you can dip bottle-nozzles in. Recollect that the vemillion is only put in for the looks of the thing, and if you want to use it for any purpose where color is no object, as for instance sealing over wounds upon trees, you may leave the color out. The ingredients for the above, bought in this city, cost only 25 cents, for which and a little trouble you can have three quarters of a pound of good sealing-wax for any common use. For any purpose, such as an application to trees, where you want it tougher than the above preparation will make it, add a little more beeswax, and leave out the vermillion. *N. Y. Tribune*.

[If the vermillion is left out in the above, the wax will be all the better for it, as this is a sulphur of mercury and is merely used for coloring purposes.

A COLUMN OF INTERESTING VARIETIES.

A Californian walking along the streets of New York, and seeing thrown out from a cellar-excavation some of the red gravel which is so common in this city, is always tempted to stop and "prospect" it by washing out a pan-full of dirt; it resembles so closely the gravel among which a large portion of the gold of California is found. The gold-bearing rocks all over the world are of the same geologic formation as the gneiss (pronounced *nise*) or stratified granite of Manhattan Island. These are the metamorphic rocks which were deposited in layers in water, and were afterwards crystallized by heat; they exhibit both the crystalline and the stratified structure. .....The aurora of the 28th ult. was seen as far south as Galveston, Texas, where it was visible at 8½ o'clock in the evening. It lasted about 15 minutes. This phenomenon is rarely seen in that locality, and it was at first quite generally attributed to fires on the prairies. .....The Saxons first introduced archery, in the time of Voltigeur. It was dropped immediately after the conquest, but revived by the Crusaders, they having felt the effects of it from the Parthians. Bows and arrows, as weapons of war, were in use, with stone cannon-ball, as late as 1640. It is singular that all the statutes for the encouragement of archery were framed after the invention of gunpowder and fire-arms. Yew trees were encouraged in church-yards, for the purpose of making bows, in 1742. Hence their generality in church-yards in England at the present time.....Geological formations are going on at the present day, the same as in ages past. Large swamps of vegetable matter are changing into peat, peat is hardening into lignite, and lignite is being transformed into coal. In some places, rocks are being formed by deposits at the bottom of the ocean; in other places rocks are being slowly raised above the level of the sea.....There as 245 gas-light companies in the United States, with an aggregate capital of $40,000,000. The price of gas ranges from $2.50 to $7 per thousand feet. There are but comparatively few instances, however, where the price exceeds $4.....The Russian empire contains 7,906,397 square miles; the British empire contains 7,568,821 square miles; the United States (before the purchase of Arizona) contained 2,963,460 square miles. The population of the Russian empire is 65,331,568; that of the British empire, 161,501,034; and that of the United States (census of 1850), 23,363,327.....Twenty and one-fourth pounds of sulphurous acid consist of 10¼ pounds of sulphur, and 10 pounds of oxygen.....Among the sovereigns of Europe to whom Columbus applied for aid in his enterprise, was Henry VII., of England. This is a convenient fact to connect in the memory the dates of English and American history.....The invention of bells is attributed to Polonius, Bishop of Nola, Campania, about the year 400. They were first introduced into churches as a defence against thunder and lightning; they were first put up at Croyland Abby, Lincolnshire, in 945. In the 11th century, and later, it was the custom to baptize them in the churches before they were used. The curfew bell was established in 1078. It was rung at eight in the evening, when people were obliged to put out their fires and candles. The custom was abolished in 1100. Bellmen were appointed in London in 1556, to ring the bells at night and cry out, "Take care of your fire and candle; be charitable to the poor, and pray for the dead!".....It is the opinion of persons acquainted with the character and circumstances of Louis Napoleon's mother, that there is not a drop of the Bonaparte blood in his veins. The marriage of Josephine's daughter, Hortense Beauharnais, with Napoleon's brother, Louis Bonaparte, was contracted for state purposes; and was intensely repugnant to the feelings of the beautiful girl, who was in love at the time with another man.....In our revolution around the sun, we are not *carried* by the earth, but revolve by the direct attraction of the sun upon ourselves. If the earth could be annihilated, with everything upon it except one man, he would, of course, immediately die for want of air; the body, in the course of half an hour, would be frozen solid by the intense cold which prevails in space, and would continue its flight with a velocity 60 times that of a cannon-ball, in its long, curved track around the sun, and would thus revolve forever.....Forty pounds of sulphuric acid consist of sixteen pounds of sulphur and 24 pounds of oxygen.

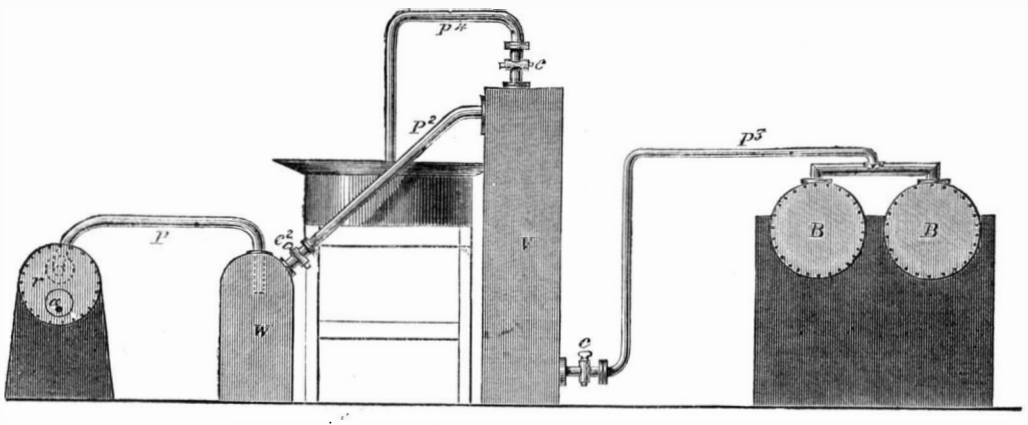
APPARATUS FOR C ARIFYING CANE JUICE.

The production of sugar is the foundation of the greatest social problem which is engaging the attention of the world at the present day—the supply of labor for the tropics—for it is mainly for this production that the supply is demanded. At this time, long-tailed Chinese are yawning away the monotonous hours of a sea-voyage on their long journey from China to Cuba; natives of India, who have emigrated from their own country, where wages are two cents and a half per day, are rejoicing in their increased pay on the plantations of Mauritius; and the ship-carpenters at the Brooklyn navy-yard are busy on the propellers for our African squadron, all in connection with this great question.

The whole labor problem has been greatly modified in the last few years, by the improvements which have been made in the manufacture of sugar. There is not probably one of the arts which has occupied a larger share of the attention of the highest class of inventors, men of science, than this manufacture. The evaporation of the juice has enlisted an amount of study and ingenuity which is almost inconceivable; but the clarifying department has been the greatest field for investigation and contrivance. After all the complicated and costly methods which have been adopted or proposed, Richard A. Stewart, of Louisiana, has produced a process (which was patented August 23, 1859) so simple and efficient that it is rapidly going into general use. His plan consists in forcing the vapor of sulphuric acid into the cane juice. He does this by an exceedingly simple apparatus. Sulphuric acid is one of the six combinations of sulphur and oxygen ($S. O.^2$), and is the product of the combustion of sulphur in atmospheric air. To produce this sulphuric acid, therefore, Mr. S. has simply to burn roll-brimstone, which he does in a close vessel, admitting the air slowly to regulate the rapidity of the combustion.

An end view of this vessel is represented at *r*, in the annexed cut; *a* representing the small adjustible hole, about an inch in diameter, through which the air is admitted. The cylinder, *v*, is 12 feet in length and three in diameter, made of iron, and lined with some substance which sulphuric acid will not corrode. A pipe, P, four inches in diameter, leads from the cylinder or retort, *r*, into the top of the tight iron vessel, W, of the size of a barrel, which is partly filled with water, the pipe, P, extending down below the surface of the water. Another pipe, P^2, leads from the vessel, W, into the top of a tight iron cylinder, V, 10 feet in length and three in diameter, called the vacuum cylinder. A third pipe, P^3, conducts the steam from the boilers, B B, to the bottom of the vacuum cylinder. A fourth pipe, P^4, communicates with the top of the vacuum cylinder, and a series of tubes coiled in the bottom of the cane-juice receiver.

The operation is as follows: The brimstone (pulverized) is spread from end to end along the bottom of the retort, *r*, and ignited at the end nearest the pipe, P, the admission of air being very slow. Sulphuric acid gas is constantly produced, with, perhaps, a small quantity of sulphuric acid, all of which remains in the retort until allowed to pass forward. When it is allowed to pass forward to the vacuum cylinder, it first goes through the water vessel, when any sulphuric acid which may have been formed in the retort will be principally absorbed; the juice-receiver is filled with cane juice, and the stop-cocks, *c* and *c'*, are opened, whereby the steam passes into the vacuum cylinder, expelling the air therefrom. The cocks, *c* and *c'*, are then closed, and the condensation of the steam in the vacuum cylinder produces a partial vacuum therein; the stop-cock, c^2, is then opened, and the sulphurous gas presses forward to fill the vacuum cylinder. The stop-cock, c^2, is then closed, and *c* and *c'* are opened, when the steam rushes into the vacuum cylinder, forces the sulphurous gas therein through the pipe, P^4, and perforated pipes throughout the cane juice in the receiver.



STEWART'S CANE JUICE CLARIFIER.

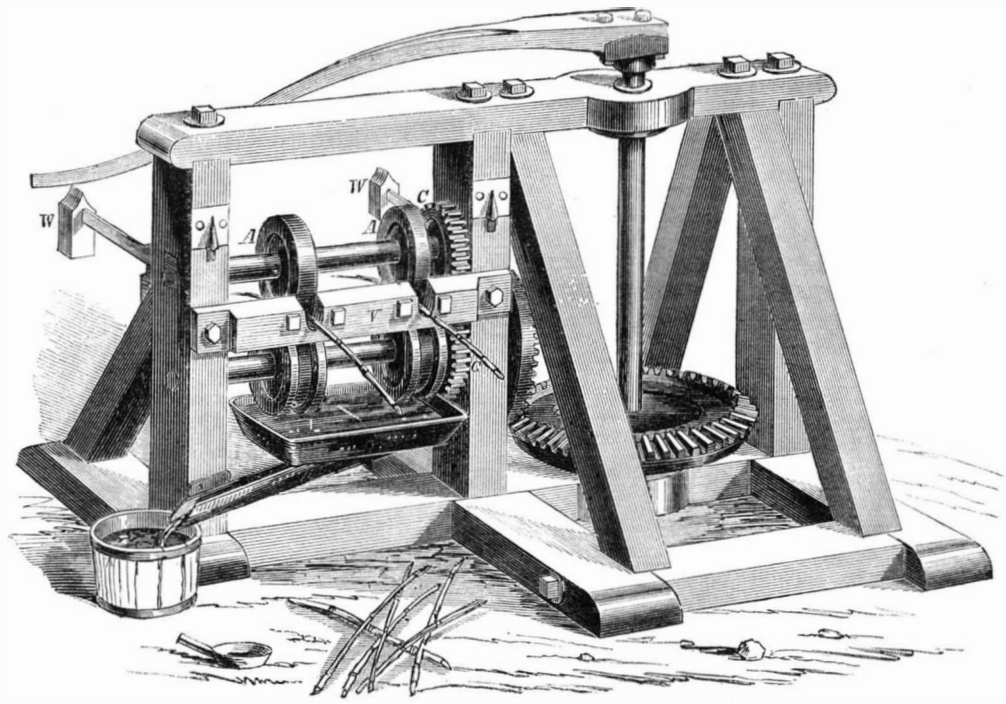
The inventor states, in his specification, that, if necessary, successive charges of the gas may be passed through the saccharine liquid. The process occupies but a few minutes, and the expense is a few cents to the hogshead of sugar. This improvement entirely dispenses with the necessity of using either bone-black or bi-sulphate of lime. An apparatus of the dimensions here described is sufficient for the largest sugar-house.

The claim of the patentee is to "the defecation and clarification of cane juice, and other liquid or semi-liquid forms of saccharine matter, by disseminating throughout the same sulphurous gas or sulphurous acid gas, for the purposes set forth."

THE CHALLENGE CANE CRUSHER.

Another invention in the manufacture of sugar! It seems that the introduction of the Chinese sugar cane is calling forth a series of contrivances for making sugar from it, adapted to the use of scattered farmers who raise but little of the cane, and who, of course, require an apparatus entirely different from the great mills on our southern plantations. A large business has already grown up in the manufacture and sale of mills for crushing the cane. Hundreds of these have been sent from this city to the West. But the active minds of the western people, coming into actual contact with the matter, are busy trying to make improvements over everything imported from elsewhere. The annexed engraving represents a mill for crushing cane for which a patent was granted to Daniel Bassett, of Whitewater, Wis., August 2, 1859.

A simple inspection of our illustration will give a very good idea of the machine without any description whatever. The principal feature of the invention is the combination of the tongues and grooves of the crushing rollers. The upper rollers, A A, are either provided with projections or tongues to fit loosely into the lower rollers, or they are made of the proper thickness to constitute these tongues themselves without any projection.



BASSETT'S CHALLENGE CANE CRUSHER.

The cog-wheels, C C, mesh into each other, and being of equal size, secure a uniform motion to the rollers in opposite directions. The shaft of the upper rollers is so placed in boxes at either end as to permit a vertical movement; and is pressed down by levers at each end, on which levers are placed weights, W W, by means of which the pressure upon thie rollers s adjusted at the pleasure of the operator.

A second feature of the invention is the packing or wiper, to prevent the expressed juice from spreading. This consists of two separate portions of leather, india-rubber, or any similar elastic substance, attached by metal plates to the inside of the bar, V, at each side of the interior aperture, and is placed closely in contact with that portion of the sides of the tongued roller which runs in the channel of its opposite roller, and also closely in contact with the edges or periphery of the lower channeled roller, its form being such as to adapt it to this position, and to prevent the lateral discharge of the expressed juice.

The manufacturers of this machine say:—"In plain rollers, if a large cane is passing at each extremity, the intermediate space on a *plain* roller would press a *small* cane only partially. Now, in our mill, the pairs of rollers are placed near each extremity of their shafts, and so constructed as to press in each channel respectively, according to the pressure of the weighted levers, whether the cane be large or small. The cane is confined in a small space, the pressure localized, and a great velocity may be attained with safety, as there can be no clogging. The speed is only limited by the ability of the feeder to supply the rollers."

For further particulars, address the inventors or Messrs. Winchester, DeWolf & Co., Whitewater, Wis. The latter have an equal interest in the invention with the patentee.

STEAM CARRIAGES FOR COMMON ROADS.—The Newark (N. J.) *Mercury* says, that J. K. Fisher, of Paterson, has constructed his steam carriage, which was tried on the common road to Acquackanock, a few days ago, when it went on the level 15 miles an hour, with 12 passengers. One mile was run in three minutes. This is the engine mentioned in Mr. Fishers' letter published on page 67, this volume of the SCIENTIFIC AMERICAN.

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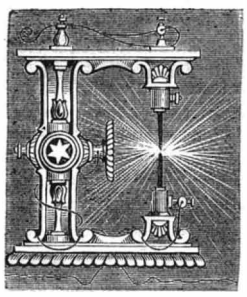
VOL. I., No. 13.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 24, 1859.

TELEGRAPHIC SCIENCE.



EVERY science in its history and progress may be compared to the flowing of a noble river. At its fountain-head it may be seen as a slender rill trickling down the hill side; then, as it pursues its devious course through meadow and valley, stream after stream mingles with its waters and augments its volume, until it becomes the majestic river floating great navies, and forming fertile deltas by its alluvial deposits; then—like the Nile—it finally discharges into the ocean through several channels. This comparison is particularly applicable to electric science. Its fountain is the little rill witnessed by the Greeks, 600 years before the Christian Era, in the electron or amber, which when excited attracted feathers and straw. For 2,600 years this little rill of electric science flowed on without receiving a single tributary; but in the 16th century, the important discovery was made that, by friction, a vast number of bodies besides amber possessed like properties. In the next century, the first electric machine was invented by Otto Guericke, and from it the first sparks were obtained. In 1727 it was discovered that wire could conduct electricity to a considerable distance; and soon after this, the fluid was condensed in the famous Leyden jar. Twenty-five years subsequently, Dr. Watson found that both the earth and water could be used as conductors, and (in 1752) Franklin proved the identity of electricity with the lightning of the thunder-cloud. In this way electrical knowledge flowed along through a long course of years, gradually augmenting in volume until it became an important science, and was taught in colleges as a branch of natural philosophy.

Up to the beginning of the present century, the whole science was based upon tension electricity obtained by friction, and its application to what are called "the useful arts" was unknown, At this time, the Voltaic pile was discovered and electricity was obtained by chemical decomposition, instead of mechanical friction. The science afterwards assumed the proportions of a great river, by the application of the galvanic current to several of the arts, and it now flows on in several distinct branches each forming a separate practical science in itself. This is especially the case with the electric telegraph, as is fully evinced by quite a large number of works published on the subject, among which, the latest and most copious is the volume of Tal. P. Shaffner, our countryman, who is now on an exploring expedition on the northern seas for the purpose of laying out a new course to connect America and Europe by a series of short submarine cables.

Prior to 1837 fifteen telegraphs had been invented, most of which were impracticable for common purposes. In that year Professor Morse exhibited his telegraph and operated it through a circuit of 10 miles; and in 1843 Congress appropriated $30,000 to construct a line between Washington and Baltimore. It was first attempted to make it subterranean, by laying two copper wires covered with resin and placed in a leaden tube in the ground. Nine miles of this were laid and proved a perfect failure; not a mile of it could be worked, because a short earth circuit was formed. Professor Morse after consultation with some friends, lifted these wires and elevated them on poles in the same manner as all our American lines are now formed, and completed the whole distance between the two cities in May, 1844. It was a great success from the very first, and although the apparatus, then used was large and clumsy in comparison with the neat recording instruments now made, nevertheless, the principle of operation was the same. The principle of this telegraph is the employment of the attractive power of electro-magnetism to make marks or records—it is a long pen by which the operator in New York can write his letter in Washington.

The public we believe is not aware of the fact, that most of the telegraphing in our country is now performed neither with the Morse, House, Bain, nor any of the visual recording telegraphs, but simply by sound. Ten years ago each line had a most complete set of apparatus. The receiving register was made with the greatest care, so that the clock-work would move with the greatest perfection, and the various appliances had to be arranged in a particular form. The operator put the machinery in motion and he read from a paper the dispatch as it was slowly received. As he read aloud, a copyist near by wrote it down with a pencil, and when finished, it was handed to the copying-clerk, who wrote it out, put it in an envelop and dispatched it by a messenger. Expert telegraphists at length dispensed with the copyingclerks, and soon after the recording instruments were laid aside. The first operator who practically received messages by sound was Mr. Edward F. Barnes, of this city. This is now the daily practice of all the leading telegraph stations in America, only the local or interior stations have in use recording apparatus. Mr. Shaffner states in his work that, some years ago, as president of a telegraph line, he made a rule forbidding the receiving of messages by sound, but since then it has been reversed, and no operator can get employment in a first-class station unless he can receive by sound. At the Cincinnati stations there is not a single recording instrument; the mysterious agent speaks through the wires; the pen has given place to the tongue of the lightning, and an expert operator can receive 2,000 words per hour. Such is the perfection and such the present daily practice in American electric-telegraphing; and the 40 miles of wire between Washington and Baltimore in 1844, have grown into about 40,000 miles in 15 years—an almost miraculous achievement.

THE GREAT BALLOON.

We give elsewhere a description (from the *New York Daily Times*, and on its own authority) of a mammoth balloon that is being built in the neighborhood of this city for the express purpose of crossing the Atlantic ocean; in size it as much exceeds all former balloons as the *Great Eastern* steamship surpasses all other vessels. All the recent balloon ascensions seem to confirm the supposition that there is a current of air at the hight of about 10,000 feet, blowing from the west to the east; if this current should be found to be constant, and to extend across the ocean, it is very likely that the great feat may be accomplished. In regard to the Ericsson engine, unless it has sufficient power to raise itself by its fans, without being attached to any balloon, the most efficient way to raise the balloon by it would be to regard it as a part of the ballast and throw it overboard, rather than to use it in turning a propeller, while the fire to drive it would cause more danger than all the other perils of the enterprise combined. M. Rozier, one of the two men who made the first balloon ascension in 1783, lost his life two years afterwards by his balloon taking fire; and Madame Blanchard, widow of the famous aeronaut, was also killed by a similar accident. She carried up some fireworks, one of which set her balloon on fire, and she fell into one of the streets of Paris and was dashed to pieces. A lime stove was carried up by Messrs. Holland, Mason and Green, in their famous ascent from London, in 1836.

If the current of air should not be rapid enough to take the aeronauts across the Atlantic in a sufficiently short period of time, the air of the atmosphere would mingle with the carbureted hydrogen in the balloon, from the tendency which gases have to mix together, and thus the buoyancy of the balloon would be destroyed and the navigators dropped into the sea. If the speed should prove to be one or two miles a minute, there will probably be no difficulty from this cause; but it would be prudent to carry only three or four living persons, in order to have as large an amount as possible of dead ballast which may be thrown overboard.

THE ILLINOIS STATE FAIR.

[Special Correspondence of the Scientific American.]

MESSRS. EDITORS:—Being present at the last day of the Illinois State Fair, and knowing that you are interested in things of that nature, I propose to give you a brief account of the most prominent mechanical novelties there. The "Mechanics' Hall," on the north-west side of the grounds, was a large shed fitted with a line of shafting, which was driven by a handsomely-finished horizontal engine (made by P. W. Gates & Co., of Chicago), by which the stationary machines were operated.

It will be remembered that the Illinois Central Railroad Company (or the Illinois Central Railroad Land Company) offered a premium for the best ditching-machine; and, in consequence, there were many devices for such work on the ground. The most of these were intended to work by means of rotary scrapers and cutters; a number of others by means of plows and elevators; others were simply plows of peculiar shape, used by being passed several times through the same furrow. The most unique of these machines was Leonard Harrington's excavator, consisting of an upright shell of boiler-iron; the vertical section of the lower end being the cross section of the ditch cut. This shell contained, on the inside, an archimidean screw, and had spiral openings in its sides, provided with projecting cutters, which were rotated through peculiar mechanism, to throw the earth out of the ditch wherever desired. To commence work, it is only necessary to dig a hole large enough to let the shell and cutters in. This looks like a very good machine for heavy work. As usual, it was very difficult to ascertain the names of the machines and their inventors. There was a long row of reapers and mowers, each possessing some special advantage. The most noticeable novelties there were two "binders," one binding with wire, requiring one man to rake and one to attend the apparatus; the other binding with hemp cord and a cast-iron fastener. The wire-binder made a very loose bundle; the other was better, but the cord and fastening must be expensive. The latter machine was very ingenious and tolerably simple, the cut grain being carried off the platform by means of an endless apron, and delivered to a set of covered fingers, when it was compressed while being bound. The general opinion among the farmers seemed to be that binders were a great thing, but not yet brought to perfection.

Beside his machine, in an antique stove-pipe hat and a rusty coat, stood that veteran inventor, Pells Manny, who, with his son, John (now gone from earth), have introduced and invented more valuable improvements, probably, in reapers and mowers than any other two men in America.

Passing by the reapers, the ground allotted to the "steam plows" is in sight; and those, of course, claim a large share of attention. Only two were on the ground, the one announced from Seneca Falls not making its appearance. These two were "Van Doren & Glover's Rotary Plow, Reaper and Mower," and the widely-known "Fawkes' Plow." Van Doren & Glover's plow is an invention possessing some novelty, and the necessary features of cheapness and lightness seemed to be regarded. The engine was only four-horse power, horizontal, with link motion, and the piston-rod running through both ends of the cylinder. The outer end was fitted for attaching a cross-cut saw; the connecting-rod was of wood and double; the piston-rod was continued through a wooden guide-block, thus obviating the use of slides and cross-head. The boiler was an upright tubular, with a very small fire-box. The "plows," five in number, were simply cutters placed on each end of a strong iron bar, bent in such shape as to allow them to "lap" as they rotated, and this bar hung at its center on an iron shaft. This plow is not intended for "breaking;" it is for old land. A four-horse machine, the inventors state, will plow five acres in a day of 10 hours, reducing the ground to a fine tilth, and it can be built for $125 per horse-power, thus making a four-horse power cost $600 only. This machine weighs only 3,300 pounds. It was wretchedly built, the frame and much of the engine-work, levers, &c., being of wood; and it could not have run a week and held together. It further had the misfortune to have had its boiler burned the day before, causing it to leak so badly into the fire-box that only five pounds of steam could be maintained, which ruined the whole machine for all purposes of exhibition, and obliged its inventors (who were also its exhibitors) to take it off the grounds.

Fawkes' steam plow—the "Lancaster"—is a ponderous machine, weighing 10 tuns, when empty, exclusive of the gang of plows. It is built in the most substantial manner, and was the grand object of attraction on the grounds. The general construction of this machine is too well known to the readers of the SCIENTIFIC AMERICAN to require a detailed account here. It was built by Hausworth, Eakins & Co., of the "People's Works," Philadelphia, and is very plain in finish, but did admirable work on the ground by drawing a gang of eight plows (built at Moline, Ill.), and cutting 10 or 11 feet wide. It was said to be capable of plowing 25 acres per day. The two engine-cylinders are 9-inch bore and 15-inch stroke, geared down six to one on to the driving drum; it carries steam at 100 to 140 lbs., and has a direct-action "doctor" (about three-horse), built like the Philadelphia steam fire-engines, with a balance-wheel. The fireman stands in front of the boiler, in a very confined space, and it has only room for carrying about 350 lbs. of coal. The opinion on the grounds seemed to be that the "Lancaster" demonstrated the possibility of plowing by steam, but its paying practicability was more doubtful. The ladies wreathed Mr. Fawkes' machine with evergreens and flowers; planks were placed on top, making temporary seats, and taking a number of the aforesaid ladies on plank, Mr. Fawkes ran around the grounds on a pleasure excursion, to the huge delight of the crowd.

The machine drew up a short distance from the "Financial Office," in front of which was placed a two-horse wagon from which some speeches were made on steam-plowing; Mr. Fawkes being placed by one gentleman in the list with Watt, Fulton and Stephenson. Mr. Fawkes' financial backer was called for, and made his appearance on the stand. He is a short, round-faced gentleman, and wore a grey suit and Bonner hat; with benevolence in his looks, and good business tact in every motion. He was satisfied that Fawkes' principle was the best for a steam-plow, and he should stand by its inventor as long as he had a cent; whereat he made a bow, waved his hat, and sat down amid the most vehement applause. He spoke about a minute, and left the stand with a good word for him on every man's lips. Fawkes was the next called for, but a shower of rain beginning to fall, the crowd incontinently took unto themselves legs and ran away, to the regret of many who very much desired to hear Mr. Fawkes' speech. One of the "Committee on Steam Plows" took that opportunity to state that no award of either prize (first $3,000, second $2,000) had been made; that this committee were merely examining to report to the State Board, who would decide upon the propriety of handing Mr. Fawkes the prize before-mentioned. So ended the steam plow trial at the Illinois State Fair.

On the whole it is scarcely possible to avoid the conclusion that steam-plowing is, in point of economy, yet a doubtful question. It is much to be regretted that Messrs. Van Doren & Glover were so unfortunate with their little machine, which is only two months old from its first conception. It is on the principle of the French plow illustrated on page 401, Vol. VI., SCIENTIFIC AMERICAN, or rather a combination of that and "Usher's Plow," illustrated on page 288, Vol. VII. of the same journal. This principle seems a good one for old land, and a machine can be built in this style at a much less cost than a traction engine. That much has yet to be done, and that many men have yet to expend their talents and capital upon steam plows before they can come into common use, is the prevailing opinion at the West.

HORACE L. ARNOLD.

Elk Horn, Wis., Sept. 10, 1859.

THE STEAM PLOW PRIZE.

MESSRS. EDITORS:—The fair is over, and the Executive Committee of the "Prairie State" Agricultural Society has done its duty in the most ignoble manner. The great feature of this fair was the steam-plowing match; a prize of $3,000 having been offered by the society for the best steam-plow; it was fairly won by that of J. W. Fawkes, of Lancaster, Pa., illustrated on page 161, this volume of the SCIENTIFIC AMERICAN. The mechanical judges appointed to examine and report upon its construction and operation consisted of such men as Isaac Hedges and A. B. Latta, of Cincinnati, and P. W. Gates, of Chicago, who reported in favor of awarding Mr. Fawkes the $3,000 prize; but the Executive Committee in the face of this recommendation slid down from their position, and offered Mr. Fawkes the sum of $1,000. This he at first refused to take, but some friends advised him to accept of it, as his means were very limited and he had been at great expense in going to Illinois to contend for the prize. He felt indignant at the mean treatment he received, and it was hard to persuade him to take the $1,000, when he considered that the $3,000 were fairly won, and honestly his due. His plow was operated with satisfaction, in plowing, in traveling over the common roads, both rough and smooth ground, and as a stationary engine for driving machinery such as threshing machines, grist-mills, and other machines, required on a large farm. It is stated that the society had not sufficient funds to pay the prize; if so, they should not have offered it. They have backed out from it, under a mere show of an excuse, because the wooden pins which held the plows broke, owing to the stiffness of the soil and the depth at which they cut the furrow, and because the engine had to be stopped till new pins were furnished. The ground was so hard and dry that a six horse team could barely plow more than an acre and a quarter per day; yet the Mechanical Committee which reported on the subject say, "with the most liberal allowance for hauling water and coal, one mile for stoppages and turnings, the machine will plow 25 acres per day."

The cost for breaking prairie is $2.50 per acre; according to the estimate of the committee, the steam plow can do this for 64½ cts. per acre.

Mr. Fawkes has gone to Chicago, to operate the plow on his own account; from thence he will proceed to New York to be present at the Fair of the American Institute.

X. X.

Freeport, Ill., Sept. 10, 1859.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

RECLINING AND FOLDING CHAIR.

This invention consists in a novel way of jointing or connecting together the seat, back and arms of the chair, and attaching said parts to the tops or frame, whereby the occupant of the chair may, with the greatest facility, place himself in a more or less inclined position, and be retained at any desired point within the scope of the movement of the parts, and without being discommoded when in a recumbent position by the arms of the chair. The invention also consists in a novel way of arranging the legs or framing of the chair in connection with the back, seat and arms, connected together as above alluded to, whereby the chair may be folded within a small compass for transportation and also for the convenience of stowage when not required for use. This is a most convenient invention. We have had one of these chairs in use for some time, and can testify to its utility and comfort. It is the invention of J. H. Swan, of New York City.

IMPROVEMENT IN PIANOFORTES.

An invention by F. C. Lighte, of New York City, consists, first, in a plate of glass or other material capable of vibrating freely when struck by the vibrations of the air, arranged below or behind the sound-board of a pianoforte, for the purpose of receiving the vibrations of the air on the under side or back of the sound-board and reverberating them through suitable openings provided in the sound-board, and so causing the said vibrations to swell the tone of the instrument instead of being all absorbed in the bottom and blocking of the case as in most of the pianofortes in use. It consists, secondly, in insulating the iron frame or string plate from the wrest plank and wooden blocks upon which it is supported, by applying collars or washers of india-rubber, gutta-percha, leather, or other suitable moderately yielding material, round the screws by which the said frame or plate is bolted to the wrest plank and wooden blocking of the case, so that the said frame or plate shall rest upon the woodwork only at a few points and not over the whole surface thereof; and thereby, while a firm bed is provided for the said plate or frame, it is prevented interfering with the vibration of the woodwork, and producing the shortness of tone so common to pianofortes with the full iron frame.

IMPROVEMENT IN PISTOLS.

Joseph Rider, of Newark, Ohio, has patented a very ingenious mode of applying a movable breech to a pistol, which enables a common percussion cap to be used both for the priming and the charge, confining the cap in such a way that none of the force developed by the explosion of the detonating powder is lost, and enabling a small ball to be sent with great force. He also has an improvement in the lock, which enables the pistol to be made very compact. An effective pistol may thus be made small enough to be carried in the vest pocket. The patent for this "parlor pistol," as it is termed, is assigned to Messrs. Remington & Sons, rifle manufacturers, of Ilion, N. Y.

FILTER AND WATER-COOLER.

This invention consists in the employment of spun glass for filtering purposes; the glass being placed over a semi-cylinder in layers and held down in place by longitudinal strips or bars of either metal or wood. It also consists in arranging this filter in a box of a peculiar construction, so that the water will be supplied to the filter and from it to a receiver, where it is cooled and becomes ready for use. The inventor of this improvement is Eugene Duchamp, of St. Martinsville, La.

IMPROVEMENT IN FAUCETS.

The novelty of this invention consists in operating the stem enclosed in the tube of a faucet or stop-cock, by means of a handle so arranged that a lever power is obtained, and the stem is moved back and forth in a slot oblique to the axis of said stem when using the faucet for drawing liquor. Eugene Duchamp, the inventor of the filter mentioned in the preceding paragraph, is also the patentee of this improvement.

IMPROVEMENT IN TREES FOR SIDE-SADDLES.

The object of this invention is to obtain a tree that will be capable of adjusting itself to the back of the animal and correspond to its size and form, so that a perfect fitting saddle may invariably be obtained—one that will not injure the horse but fit snugly and comfortably on the back of the animal, and at the same time form a more agreeable seat for the rider than those of usual construction. The invention consists in connecting the two bars of the tree by a bridge at a point which corresponds with the hollow or lowest part of the back or dorsal vertebrae of the animal, and dispensing with the "head" which has hitherto connected the front ends of the bars directly over the withers of the animal. The inventor is Henry Adams, of New York City.

IMPROVED SEAL LOCK.

This invention is designed as a safeguard against dishonest *employés* on railroad freight trains, and the like. The object of the invention is to attach or combine with a lock a certain means which will disclose the opening of the lock, even if done in a legitimate way. The invention consists in combining with a padlock, or any lock provided with a shackle, a supplemental shackle so arranged as to be locked or fastened with a lead or other soft metal tube, which must be severed in order to detach the tube, the severed tube indicating that the lock has been opened. It is the invention of J. H. Lyon, New York City.

IMPROVED LOCOMOTIVE LAMP.

This invention consists in so combining an ellipsoidal and a paraboloidal reflector that a large flame may be used, and the rays of light which issue therefrom be projected parallelly within the limited dimensions required in order to receive the full benefit thereof. In locomotive lamps, commonly termed "head lamps," which are placed on the front part of the locomotive in order to throw light on the track, a paraboloidal reflector is used in order that the reflected rays may be projected parallelly and, so far as possible, kept within a space equal in width to the track. In order, however, to carry out this plan, the flame of the lamp is necessarily placed at the focus of the paraboloid, and as the focus of a paraboloid of sufficient dimensions to keep the rays of light within a compass equal to the width of the track, is quite near the back end of the paraboloid, a flame of quite limited size can only be used. By this invention, as previously stated, a large flame may be used and made to throw a more brilliant and intense light on the track at a greater distance than usual. The invention is applicable to ships, and also may be used for signal lights, &c. The inventor is N. J. Knapp, of Chicago, Ill.

IMPROVED WEIGHING DEVICE.

The object of this invention is to obtain a weighing device by which articles may be weighed accurately and with facility, the adjustment of poise weights dispensed with, and at the same time one that will admit of being used on a counter as the ordinary counter scales. The invention consists in combining a spring balance with the beam lever and scoop platform, whereby the desired end is attained. The inventor is J. A. Turnbull, of West Meriden, Conn.

FOREIGN SUMMARY—METALS AND MARKETS.

The price of gas in most of the cities of Great Britain is less than one half that of New York. In London it is only four shilling sterling (not quite a dollar) per 1,000 cubic feet. Mr. Flintoff, in delivering a lecture on this subject recently in Glasgow, stated that, while five shillings per 1,000 cubic feet were charged in the Scotish city, or one shilling more than in London, the coal was one shilling less in price; thus proving that companies which had the monopoly only regarded their own interests and made all they could out of the people. He asserted that gas-making was not that mysterious operation some imagined, and that a new company could manufacture gas in Glasgow with a reasonable profit, at two shillings and eleven pence per 1,000 cubic feet, not one-third the price of New York gas.

Messrs. Burns, of Glasgow, the principal stockholders of the Cunard steamers, are perhaps the greatest steamship proprietors in the land. They have lately contracted, in conjunction with Mr. Mac Ivor, of Liverpool, another proprietor, for six new large iron screw steamers, four for the Mediterranean service, and two for the Glasgow and Liverpool trade. Besides these, they have also either four or five still larger steamships in the course of construction for the Atlantic trade between Liverpool and American ports.

A new screw steamer, called the *Thetis*, of 680 suns burden lately made the passage between Greenock and Liverpool, burning only 1,018 lbs. of coal per horse power, per hour. No less than four and five lbs. are generally consumed in steamers per horse power.

Returns of the mineral wealth of England for 1859 have just been published. It amounts to £31,250,000 sterling in value. Of coal there were 65,008,649 tuns raised, of iron, smelted from the ore, 3,456,064; copper, 14,456; lead, 68,303; tin, 6,920; silver, 569,345 oz. The yield of copper ore was 226,852 tuns.

A great trial of reaping-machines, recently took place in Belgium on the very field where the famous battle of Waterloo was fought. It was anounced beforehand that 26 machines would compete for the prize, but only four entered into the contest. These were Burgess & Key's (McCormick's), Bell's (Scottish), J. A. Teelan's (Hussey's), and Cranstoun's (Woods). These were all American reapers, with one exception. The prize was awarded to Bell's, and this gave great dissatisfaction to most persons present, because it was held to be inferior in many respects to two of the others. It cut the grain (oats) very well, but it could only be turned with great difficulty, and was not very manageable. It laid the cut grass beautifully in swaths, and this appears to have been the main merit which it possessed. Burgess & Key's machine was of superior construction, and in a subsequent trial (not for a prize) it cut a field of trefoil, which Bells' had failed to do, and the machine was instantly purchased by one of the jury who had awarded the prize to the Bell machine. These statements are taken from the Brussels *Messenger*.

In several of the seaports in England schools have been provided for training boys for the mercantile marine. The government has given the old frigate *Conway* to Liverpool for a school, and great efforts are being made to elevate the character and qualifications of the common sailor. Hitherto such efforts have been confined to government-dockyards, in training youths for the navy. The low character which sailors have acquired in American ships, by our ship-owners employing the scum of all nations, forcibly calls for some great effort to revolutionize our entire mercantile marine, and a school for training boys in New York should be tried to see what effect it will produce. We think it would work well, if conducted upon correct principles.

It has been announced that a great reduction was about to take place in the French tariff on foreign metals, and hence we find that, as a consequence, pig-iron has bebecome firm in expectation of a large demand from France. The prices in our table are unchanged since our last, but in consequence of reports that Louis Napoleon is in favor of free trade, great expectations have been excited among the metal-workers of Sheffield and Birmingham in regard to large demands soon to be made for their cheap manufactures.

American candles, with S. R. Weeden's wick, manufactured at Providence, R. I., are on the track of British tallow candles, with Weeden's patent wick, in South America, and beginning to supersede them in some instances. The wick in these candles is self-consuming, and requires no snuffing—a very important improvement in tallow candles.

PRICES OF FOREIGN METALS, SEPT. 5.

	£	s.	d.
Iron, English Bar and Bolt :—			
In London, per tun.	7	0	0
In Wales	6	0	0
In Liverpool	6	10	0
Staffordshire Bars..	8	0	0
Sheet, single	9	10	0
Double	11	0	0
Hoop	9	0	0
Rod, round	8	0	0
Nail Rod, square ..	9	0	0
Shipping Iron :—			
Staffordshire Bars..	8	0	0
Sheet, single	9	10	0
Double	11	0	0
Hoop	9	0	0
Rod, round	8	0	0
Nail Rod, square....	9	0	0
Iron, Rails, in Wales, cash	6	5	0
Do. 6 months	6	10	0
In Staffordshire...	7	0	0
Railway Chairs, in Wales	4	0	0
In Clyde	4	0	0
Pig No. 1, in Clyde...	2	13	6
3-5ths No. 1 and 2-5ths No. 3	2	13	0
Staffordshire Forge Pig, at the works, L. W., nom	3	15	0
Welsh Forge Pig...	—	—	—
Acadian Pig, Charcoal	8	15	0
Scotch Pig, No. 1, in London	3	10	0
Iron, Swedish, bars, per tun	13	0	0
Russian C C N D..	17	0	0
Steel, Swedish Keg, nom	20	10	0
Do. Rolled.	19	10	0
Faggot..	21	19	0
Spelter	21	0	0
Zinc, in sheets	28	10	0
Copper, Tile	107	10	0
Tough Cake	107	10	0
Sheathing & Bolts, per lb.	—	—	11½
Sheet	—	—	11½
Bottoms	—	—	12
Old	—	—	10
Yellow Metal	—	—	10
Lead, British Pig....	22	15	0
Spanish	22	10	0
Sheet	23	10	0
Tin, English Block, nom	138	0	0
Bar	139	0	0
Refined	145	0	0
Foreign Banca	146	0	0
Straits	143	0	0
Tin Plates, Charcoal, IC, per box	1	13	0
Do. IX	1	19	0
Coke, IC	1	7	6
Do. IX	1	13	6
Canada, Plates, p'r t'n	18	0	0
Quicksilver, per bottle	7	0	0

[The above are prices within three per cent discount, the pound being valued at $4.85.

New York Markets.

COAL.—Anthracite, from $3.50, $4.50, to $4.75.

COTTON.—Ordinary—Uplands, 9¼c. per lb.; Florida, 9¼c; Mobile, 9¼c.; New Orleans and Texas, 9¼c. Middling—Uplands and Florida, 11⅛c.; Mobile, 11¾c.; N. O. and Texas, 11⅞. Middling fair—Uplands and Florida, 12⅜c.; Mobile, N. O. and Texas, 13c. Fair—Uplands and Florida, 12¾c.; Mobile, 13⅛c.; N. O. and Texas, 14c.

COPPER.—Lake Superior ingots at 23c. per lb. for cash; new sheathing, 26c.

FLOUR.—State, good, $4.70 a $4.75; State, extra brands, $4.75 a $4.85.; Michigan and Indiana, extra, $4.75 a $6.20; Genesee, extra brands, $5.50 a $7.50; St. Louis, extra, $6 a $8.50; Canada, extra, $5 a $6; Richmond City, $6.50 a $7.25; Baltimore, $5 a $6.

GLASS.—American Window—First, second, third and fourth qualities, per 50 feet: 6 by 8 to 8 by 10, $3.50 a $3.75; 8 by 11 to 10 by 15, $4 a $3; 10 by 16 to 12 by 18, $4.50 a $3.25; 12 by 19 to 16 by 24, $5.25 a $3.50; 16 by 25 to 20 by 30, $6 a $4; 20 by 31 to 24 by 36, $8 a $4.50; 25 by 36 to 30 by 44, $9 a $5. These prices are subject to a large discount—sometimes 50 per cent.

HEMP.—American undressed, $140 a $150; dressed from $190 a $210. Jute, $95 a $90. Italian, $2.75. Russian clean, $210 a $215 Manilla 6¼c. per lb.

INDIA-RUBBER.—Para, fine, 56c. a 60c. per lb.; East India, 37c. a 40c.

INDIGO.—Bengal, $1 a $1.50 per lb.; Manilla, good to prime, 55c. a $1.10; Guatemala, $1 a $1.15.

IRON.—Anthracite pig, $23 a $24 per tun; Scotch, $23 to $23.50; Swedish bar, ordinary sizes, $85 a $87.50; English refined, $53 a $54.50; English common, $43 a $45. Russian sheet, first quality, 11c. a 11⅛c. per lb.; English, single, double and treble, 3⅛c. a 3⅞c.

LEAD.—Galena, $5.75 per 100 lbs.; German and English refined, $5.70; bar, sheet and pipe, from 6c. to 6¾c.

LEATHER.—Oak slaughter, light, 33c. a 35c. per lb.; Oak, heavy, 30c. a 33c.; Oak, crop, 38c. a 40c.; Hemlock, middle, 23c. a 24c.; Hemlock, light, 23c. a 24c.; Hemlock, heavy, 22c. a 23c. Patent enameled, 16c. a 17c. per foot, light. Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

NAILS.—Cut at 3c. a 3⅜c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14¼c.

OILS.—Linseed, city made, 58c. per gallon; whale, bleached spring, 53c. a 55c.; sperm, crude, $1.25 a $1.28; sperm, unbleached spring, $1.35; lard oil, No. 1 winter, 87c, a 92c.; extra refined rosin, 30c. a 40c.; machinery, 50c. a 100c.; camphene, 45c. a 46c.; coal, refined, from $1.12 a $1.50; palm oil, 10c.; linseed, 59c,

RESIN.—Common, $1.60 per 310 lbs. bbl.; No. 2, &c., $1.70 a $2; No. 1, per 280 lbs. bbl., $2.25 a $3; white, $3.25 a $4.50; pale, $5.50.

SPELTER plates, 5c. a 5⅛c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5¼c.; American blister, 4¼c. a 5¼c.

TALLOW.—American prime, 10⅝c. to 10¾c. per lb.

TIN.—Banca, 32¾c. a 33c.; Straits, 32½c.; plates, $7.50 a $9.75 per box.

TURPENTINE.—Crude, $3.62½ per 280 lbs.; spirits, turpentine, 46c. per gallon.

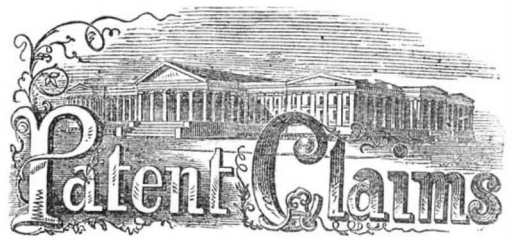
ZINC.—Sheets, 7¼c. a 8c. per lb.

The foregoing rates indicate the st te of the New York markets up to September 15th.

The demand for flour has been somewhat more lively during the past week.

There was a large supply of fat cattle during the week, 5,930 having been received mostly from the West, and they sold as low as 8½c. a 9c. per pound.

A circular issued from the office of the *Shipping and Mercantile List*, No. 58 Pine-street, contains a statement of our total cotton crop for the year ending August 31st. The crop of Sea Island was 49,039 bales against 40,566 in the previous year, and the increase of the entire crop of all kinds for the year was 757,813 bales.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING SEPTEMBER 13, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

25,375.—Henry Adams, of New York City, for an Improvement in Saddle-trees:

I claim a tree for side or ladies' saddles, constructed by connecting the bars, A A, by a bridge, B, at the point specified, and with an open space, a, between the front ends of the bars, at their junction with the horns, C D, for the purpose set forth.

25,376.—Geo. S. Avery, of Cross River, N. Y., for an Improvement in Rails for Railroads:

I claim an improvement in railroad iron bars or rails by an offset or bend, made in one end of the rails, and the lapping on of the other end of the rails, and inserting a key between them at the lap, and riveting or bolting them together, substantially as and for the purposes described.

[An engraving and description of this invention will appear in our columns in the course of a few weeks.]

25,377.—O. S. Bartlett, of Romulus, N. Y., for an Improvement in Ditching-plows:

I claim the combination of the arms, D D D, brace, H, rods, d d, and blocks, F F, substantially as and for the purpose set forth.

I also claim the mode of attaching and adjusting the shares, E E E, by means of the packing blocks, I I I, in combination with the bolts b b, and arms, D D, substantially in the manner specified.

25,378.—A. F. Blunk, of Indianapolis, Ind., for an Improvement in Straw-cutters:

I claim a straw cutter, constructed as shown and specified, that is to say, with angular knives, T, arms, K, wheel, E, feed rollers, B C, and D, slides, P S, springs, O, band, N, pulleys, J J, and endless belt, I, when these several parts are constructed and arranged to operate conjointly, as and for the purposes described.

25,379.—E. K. Breckenridge, of West Meriden, Conn., for an Improvement in Window-sash Fasteners:

I claim the employment or use of two cams, B B', placed on a common arbor, b, with a spring, E F, applied to them and a lever, C, the whole being fitted within a frame, A, and arranged to operate substantially as and for the purpose set forth.

[This invention consists in placing two cams on a common arbor, and connecting both by a single spring, the parts being placed in the sill of the window casing, and in such relation to the sash as to bear against its edge; one cam retaining the sash in an upward position, at any desired hight within the scope of its movement, and consequently opposing a downward movement, and the other cam opposing an upward movement, and thereby retaining the sash in a downward position, either cam being moved or adjusted when required, for the purpose of raising or lowering the sash by means of a lever.]

25,380.—Z. B. Brown and M. C. Godard, of Granby, Conn., for an Improvement in Seed-planters:

We claim the arrangement and combination of the carrier and stamping wheels F F, cams and marker device I I, upon the wheel F, the reciprocal levers, H H, seed slides or valves, D D, hoppers, B B, drill formers, J J, and covering shares, K K, substantially in the manner as and for the purpose described.

25,381.—J. S. Buell, of Buffalo, N. Y., for an Improvement in Sewing Machines:

I claim, first, In combination with the stationary corrugated surface, O O, the corrugated foot-piece, Q, constructed, arranged and operating therewith, as set forth.

Second, I also claim, in combination with the needle or its thread, the conical spool, X, and guide, U, for causing the slack in the thread to form the loop, and holding said loop from turning until seized by the looper, as set forth and explained.

25,382.—Stephen Burrows, of Lima, Wis., for an Improvement in Seed-drills:

I claim the employment of a grooved ring, B C, fitted on the axle or shaft of a seed drill, in combination with the peculiarly constructed tube, D E, leading from the hopper into the groove of the ring, substantially as and for the purposes set forth.

25,383.—Wm. Campbell, of Waterloo, Pa., for an Improved Churn:

I claim the perforated and hinged floats, F, as an Improvement in the construction of dasher-heads for churns.

25,384.—Rosanna Carpenter, of Medford, Mass., for an Improvement in Extracts of Fruits:

I claim, as a new article of manufacture, the above-described extract of fruit, prepared in the manner substantially as specified.

25,385.—R. P. Clark, of Johnstown, N. Y., for an Improvement in Handmills for Grinding Apples, &c.:

I claim the described improved handmill for household use, in reducing apples, potatoes, and other fruits and roots to pomace; the teeth, e I, of the combined cylinder, and adjustable yielding concave being formed and arranged in the particular manner set forth.

25,386.—Barnes Clayton, of Philadelphia, Pa., for Improved Fastenings for Shirt Studs:

I claim the hollow sliding case, A, and spring, B, in combination with the tie, or post, E, and the bar, D, the same being arranged to operate together, substantially in the manner and for the purhose set forth and described.

25,387.—P. S. Clinger, of Conestoga Center, Pa., for an Improvement in Wire Fences:

I claim the combination of the pin, S, with the ratchet, T, in connection with the mortised posts, and the hooked wires, H W, when these several parts are arranged substantially as described for the purpose set forth.

25,388.—T. T. and H. W. S. Collier, of Lavernia, Texas, for an Improvement in Cotton-seed Planters:

We claim the arrangement of the distributor, E, and the stirrer, H, constructed as described, to operate in combination with the packing wheel, I, substantially as and for the purpose set forth.

[The principal object of this invention is to obviate the difficulty of distributing cotton-seeds evenly from a hopper. For this purpose there is arranged in the hopper a stirrer made of rods of iron which pass through disks at the end, which stirrer revolves about its ax-

tributor and forces the seed into the seed cells. The seed cells are formed by cutting ratchet teeth into the face of the revolving cylinder called the distributor, and receive the seed from the hopper and carry it down into the discharging tube which passes down through the hollow share of the planter. A broad wheel follows the share and presses the earth around the seed.]

25,389.—Henry W. Colvin, of Pendleton county, Ky., for an Improvement in Sights for Fire-arms:

I claim the semi-circular form of the fore-sight with its range-piece or bead and shades, and triangular form of the hind-sight with its needle, or range and shades, substantially as described and for the purpose set forth.

25,390.—George Cook, of Paris, Ill., for an Improvement in Rotary Harrows:

I claim the arrangement of the teeth, d, placed eccentrically on triangular frames, E, which rotate on oblique pivots, c, substantially as and for the purpose specified.

[This invention consists in arranging the teeth of a rotary harrow on triangular frames which revolve on oblique pins, said teeth to be set on lines which do not pass through the centers of the frames, so that nhey clear themselves more readily and cause the frames to revolve without any extra weight.]

25,391.—Solomon Crowell, Jr., of Palmyra, N. Y., for an Improvement in Coffee-pots:

I claim the combination of the perforated diffusing-cham' er, C, having a tight conical bottom, f, with the concentric perforated digester, D, whereby the coffee is exposed in a thin layer of nearly uniform thickness, to the water percolating nearly uniformly through all parts, for the purposes specified.

25,392.—Henry Davis, of Baltimore, Md., for an Improvement in Brakes for Railroad-cars:

I claim increasing the frictional action of the car-brakes upon the peripheries of car-wheels, by the introduction of sand or its equivalent, between the frictional surfaces, at the time that the brakes are brought in contact with the car-wheels, substantially as set forth.

25,393,—David Decker, of New York City, for an Improvement in Pianoforte Actions:

I claim, first, Attaching the relieving-jacks, regulating screw, F3, directly to the key or to some part carried by the key, so that the repeating lever shall govern the action of the relieving-jack by or through the said regulating screw, whether constructed in this precise manner, or in an equivalent, for the purpose described.

Second, I claim the groove in combination with the tongue, pin, or equivalent, for the purpose of keeping the lifting-jack in its proper position in relation to the repeating lever, and for preventing any binding or sticking of said repeating lever and lifting-jack.

Third, I claim so arranging the adjustable piece, D, and repeating lever, E, both or either of them, so that their regulating screws, D2, and F3, both or either of them shall be at or near the end next toward the front of the key, in front of the hammer rail, for the purpose of being thus conveniently placed for regulating.

25,394.—Sylvanus A. Denio, of Boston, Mass., for an Improved Prison Lock:

I claim the lock or part, b, with its parts, c e i and k, arranged with each other as described, to move, hold and lock the bolt, k, in door, l, when combined, positioned and secured with lock, h, which in turn locks the shaft, c, all by turning a single knob; all the parts being constructed and operated in the peculiar manner described and for the purpose set forth.

25,395.—Simeon Dodge, Jr. and Benjamin Potter, Jr., of Marblehead, Mass., for an Improved Heel for Boots and Shoes:

We claim as a new article of manufacture, a heel having a concave seat, and a flat tread, with its rises united by cement, as set forth.

25,396.—Thomas Dougherty, of Macon, Ga., for an Improvement in Switch-stand for Railroads:

I claim the combination of eccentric, B, with the pin, C, through lever, D, to bar, E, for the purpose of locking and unlocking the main pin, A, to and from notches, M M M, substantially as and for the purposes set forth.

25,397.—Eugene Duchamp, of St. Martinsville, La., for an Improved Faucet:

I claim the arrangement and combination of the oblique slot, G, handle, F, stem, C, and tube, A, so that on turning the handle, F, the stem, C, will rise and fall with a spiral or screw movement, thus ensuring ease of operation, and tightness of packing, as shown and described.

25,398.—Eugene Duchamp, of St. Martinsville, La., for an Improved Filter:

I claim the employment of fine spun glass arranged in the manner and for the purposes set forth, in combination with the reservoir, G, floating valve, J, chamber, E, and pure water chamber, F, essentially in the manner represented and described.

25,399.—Eugene Duchamp, of St. Martinsville, La., for an Improvement in Apparatus for Heating Water:

I claim the combination and arrangement with the false bottom, G, and tank, A, of the perforated casing, D, fire-chamber, C, draft-pipe, F, smoke-pipe, H, as and for the purpose shown and described.

[This invention consists in placing within a cylinder or outer casing perforated at the top and bottom, a smaller cylinder, which latter serves as a fir-echamber; these are placed in the center of a tub having a false bottom, so that when the water, clothes and soap are put around the boiler in the tub, and a fire made in the inner chamber, a constant rotary current of the water in the tub will be obtained, and the dirt carried to the bottom of the tub.]

25,400.—John Fasig, of West Salem, Ohio, for an Improved Mop-head:

I claim the herein-named construction of a mop-head, consisting of the piece, B, with the slot, C, and hole, D, in combination with the rod, E, and notches, a, e, screw and nut, G, when the several parts are arranged and operated substantially as set forth.

25,401.—Jacob Fassnacht, of New Milltown, Pa., for an Improvement in Harness:

I claim the device of combining the hip-strap and breech-band in one continuous piece, A, for each half, united at B B, to form the breeching, as set forth,

25,402.—William R. Fee, of Cincinnati, Ohio, for an Improvement in Hydraulic Oil Presses:

I claim, first, The peculiar construction of the dies, D', and followers, D, having the grooves, G, and conduits, G', and also the oil passages, d, to facilitate the expression of oil, substantially as set forth.

Second, I claim the solid truss, K, when made a part of the press, and worked by means of the rack and pinion, substantially as set forth and for the purposes described.

Third, I claim the hinged hoop, F, for charging the press, substantially as set forth.

25,403.—J. H. Frampton, of Hopewell, Ohio, for an Improvement in Cultivators:

I claim the adjustable share standards, G G, attached to the parallel adjustable bars, D D, which are secured to the beam, A, by the bars, E E', the whole being combined and arranged substantially as and for the purpose set forth.

[This invention consists in a novel way of attaching the shares to the plow whereby they may be readily adjusted nearer together or further apart, or higher or lower, as the nature of the work may require.]

25,404.—Daniel K. France, of Congress, Ohio, for an Improved Churn Dash:

I claim the metallic strips, B, attached to the convex surface of the slats, by slots and screws, and operating in the manner and for the purpose substantially as set forth.

25,405.—C. L. Gilpatrick, of Saco, Maine, for an Improved Churn:

I claim the combination of the crank-shaft, D, and staffs, B B, with the top, A', when said top is provided with boxes, F, in which play slides through which the staffs pass, the same being arranged and operating substantially as and for the purpose specified.

25,406.—Elias J. Hale, of Foxcroft, Maine, for an Improvement in Lamp Chimneys:

I claim contracting the chimney above the flame, and admitting at or near the same point, a current of air, in the manner and for the purpose substantially as set forth.

25,407.—Robert Hale, of Roxbury, Mass., for an Improved Exhaust-pipe for Steam-engines:

I claim an exhaust pipe, constructed as described, and having an opening, B, and a steam pipe, C, in combination with a lip, i, operating in the manner set forth, for the purpose specified.

25,408.—William Hamilton, of St. Catharine, Mo., for an Improved Excavator:

First, In combination with an excavator frame constructed as described, having the side timbers braced in front only, I claim four wheels, when arranged in relation to the said frame, substantially as described, so that a common cart may either be backed between the hind wheels, or pushed over said wheels and frame, under the excavator, when the same is hoisted to be discharged, as specified.

Second, The combination of an excavator with a frame having the rear ends of each of the side timbers bifurcated for the reception of the wheel, the same being arranged to turn on a pin or journal, extending transversely through the two forks, as described.

Third, I claim the peculiar arrangement of hanging the excavator to the frame by means of arms, the same being so pivoted at the ends respectively to the excavator and side timbers, as that they shall be exposed to a tensile strain in the draft line, or thereabout, during the excavating operation of the machine, substantially as shown and described.

25,409.—Stephen P. Hart, of Boston, Mass., for an Improvement in Barrel Syringes:

I claim the spring, g, as applied to the syringe, operating in the manner substantially as set forth.

25,410.—Malachi B. Hassler, of Columbia City, Ind., for an Improved Churn:

I claim the arrangement of the hinged curved leaf, g, in combination with the wings, f f', constructed and arranged to operate substantially as described, for the purposes set forth.

25,411.—R. K. Hawley, of Baltimore, Md., for an Improved Construction of Segmental Circular Saws:

I claim a segmental veneer saw, the blades of which are formed, hung and clamped in the manner described.

25,412.—David Hinman, of Berea, Ohio, for an Improvement in Grinding the Teeth of Mowers and Reapers:

I claim the circular grooves, a a, on the faces, e e, of the grindstone, in connection with the standards, F F' G G', and holder, H, arranged and operating in the manner specified.

25,413.—W. W. Hollman, of Eddyville, Ky., for an Improved Mangle:

I claim the combination of the levers, K J K' J', with one of the rolls, and balancing lever, H H', substantially as and for the purpose set forth.

25,414.—W. H. Hortsmann, of Brooklyn, N. Y., for an Improved Mode of Manufacturing Telegraph Cables:

I claim constructing the cable by the apparatus, substantially as described, consisting of the reservoirs, wrapping apparatus, &c., or their equivalents, as specified.

I also claim the final reservoir, m, for coating a telegraphic cable after it has passed all the other apparatus, and before it has entered the water or ground, constructed and applied substantially as specified.

I also claim the manufacturing of the cable, substantially in the manner described, at the time it is laid, so as to perfect it and at once launch it into the place where it is to remain, whereby I avoid all the chances for injury and imperfections arising herefrom, growing out of stowing and handling the cable after it has been made, as heretofore has been done.

25,415.—A. H. Inskeep, of Middleburg, Ohio, for an Improvement in Harvesting Machines:

I claim, first, The arrangement of the revolving spiral cone-shaped cutter or gatherer with the base of the cone in front, to gather up and draw the grain back to either station ary or reciprocating cutters, substantially as described for the purpose specified.

Second, The combination of the spirally-formed gatherer or cutter, arranged as described, with the divider, D, guards, D' D', and stationary cutters, e, substantially as described, for the purposes specified.

25,416.—W. D. Johnson, of Raleigh, N. C., for an Improvement in Cultivators:

I claim the bars, A A, curved so as to form handles at one end, and having horizontal oblique positions to form the body of the frame, the draft bar, C, and guide or retaining bar, D, the front ends of the bars, A A, being connected or secured together by the collar or loop, B, in combination with the double scraper, F, substantially as described and for the purpose set forth.

[This invention consists in a peculiar manner of constructing the frame of the implement, whereby the same may be readily adapted for the cultivation of crops, and at the same time a very economical device obtained.]

25,417.—W. D. Johnson, of Raleigh, N. C., for an Improvement in Seeding-machines:

I claim the arrangement of two distributing slides, E F, with the projections, H H, on the wheels, C C, and two or more compartments in the hopper, B', inclined tube, G, inclined draught bar, B, and adjustable roller standard, I, substantially as and for the purpose set forth.

[The object of this invention is to obtain a seeding-machine capable of planting two different kinds of seed in alternate hills, and also drop therewith a fertilizing material in such a manner that a stratum of earth will intervene between the fertilizer and seed, so that the germinating principle of the latter will not be injured by direct contact with the former. The invention also has for its object the ready adjustment of a gage roller to vary the depth of the furrow according to the depth the seed may require to be planted.]

25,418.—Morris L. Keen, of Rogers' Ford, Pa., for an Improvement in Boilers for Making Paper Pulp from Wood:

I claim a boiler for boiling, under pressure, wood and ligneous materials for making paper pulp, constructed with an expansion chamber, stirrers and discharge valve or cock, arranged for the purposes and in the manner substantially as stated.

25,419.—Asa M. Keith, of Kosciusko, Miss., for an Improvement in Cultivators:

I claim the arrangement of the double scraper, the hoe drum and the hillers or coverers, in their relation to each other and to the parts of the frame to which they are attached, as and for the purposes set forth.

25,420.—John C. Kimball, of New Haven, Conn., for an Improvement in Movable Tops for Carriages:

I claim so constructing the standards or supports of a standing carriage-top, and attaching them by means of screws, that the top and standards or supports may be readily removed, when the whole is constructed and connected substantially as described and for the purposes set forth.

Second, I claim the combination of the standards with the body when the standards are secured by being screwed into the upper ends of the studs, and the whole is constructed, arranged and made to serve the purpose intended, substantially as described.

25,421.—Nelson J. Knapp, of Chicago, Ill., for an Improvement in Locomotive Lamps:

I claim the combination of the ellipsoidal and paraboloidal reflectors, E D, and burner, C, arranged substantially as and for the purpose set forth.

25,422.—Jesse Ladd, of Holderness, N. H., for an Improved Machine for Arranging Pegs:

I claim a machine or combination, consisting of the following devices, or their mechanical equivalents, viz.:

1. The grooved cylinder, D, furnished with a hopper or other proper means of supplying it with pegs.
2. The guiding receiver, H.
3. One or more advancers, L L, and the operative mechanism thereof.
4. A device or mechanism for discharging from the guiding receiver, H, the refuse pegs.
5. The springs, N N, or devices for preventing the discharge of the pegs from the guiding receiver, when they may be disposed therein with their butts in advance of their points.
6. The receiving spout, M.
7. The peg-carrier, O, and—
8. Mechanism for advancing the pegs through the said carrier.

I also claim, in combination with the said machine, or its hopper, and grooved cylinder, an agitator, E, or means of shaking or agitating the mass of pegs in the hopper, or its conductor.

I also claim, in combination with the said machine, or its receiving spout, M, the serrated bar, P, operated as described, or mechanism for insuring the descent of the pegs within the receiving spout, as specified.

I also claim, in combination with the said machine, or with the receiving spout and peg-carrier thereof, the device or part, U, made to operate in manner and by means substantially as specified.

I also claim, in combination with the said machine, or with the receiving spout, M, thereof, the door, R, and its operative mechanism, whereby the surplus pegs may be discharged from the spout after it may have become sufficiently supplied with pegs.

I also claim, in combination with the said machine, or its spout, M, the finger, O', or equivalent, to be operated in manner and by means, and for the purpose substantially as described.

25,423.—Augustus Lafever, of Battlecreek, Mich., for an Improved Board-measurer:

I claim, first, The employment or use of the cone gears, E J, and slinding pinions, F L, in connection with an endless toothed or serrated chain, T, fitted within a suitable case, arranged with gearing and indexes, and with or without the arm, C and lever, D, substantially as and for the purpose set forth.

Second, The arrangement of the yielding frames, H K, with the pinion, F, and cone gear, J, respectively attached to levers, b' c' g' h', and racks, a' f', substantially as and for the purpose specified.

[The object of this invention is to obtain a portable instrument or device by which the aggregate number of square feet, in a lot of lumber composed of pieces of varying lengths and thicknesses, may be ascertained by simply laying the instrument transversely over the pieces in the direction of their width, the instrument being capable of adjustment to suit the length and thicknesses of the pieces.]

25,424.—John S. Lash, of Carlisle, Pa., for an Improved Dumping Cart:

I claim the employment or use of the curved or segment rack, F, attached to the rod, E, and provided with the ledge, i, the pinion, g, and hooks, l l', arranged for joint operation as and for the purpose set forth.

I further claim the rod, H, provided with the spring, r, and connected to the sliding or pressure bar, I, provided with the arm, p, the above parts being applied to the cart, and arranged relatively with each other, to operate substantially as and for the purpose set forth.

[This invention consists in applying to an ordinary dumping-cart a segment rack and pinion, spring and pressure bar, in such a manner that the cart body may be readily tilted by the attendant and its load dumped, and the body made to right itself or assume its original position automatically by the forward movement of the cart.]

25,425.—Wm. Lees, of Germantown, Ohio, for an Improvement in Corn-planters:

I claim the cylinders, d d', in combination with the hoppers, c' b, with reference to the feed bar, D, arranged to operate substantially as described.

25,426.—Ferdinand C. Lighte, of New York City, for an Improvemcnt in Pianofortes:

I claim, first, The crystal reverberator, G, of glass, or other material, applied below or at the back of the sound-board, in combination with openings, a a, therein substantially as and for the purpose described.

Second, The insulators, f f, applied between the iron frame or plate, G, and the wrest plank and wooden blocking of the instrument, in such manner that the said frame or plate will bear upon the plank and blocking only at few points, substantially as and for the purpose described.

25,427.—Geo. Lindsey and Wm. Cameron, of Petersburgh, Va., for an Improvement in Tobacco Presses:

We claim a portable hydraulic jack, or other powerful press, so constructed as to be readily applied to an ordinary, or to a series of ordinary screw presses, for the purpose described, and adjustable as to hight on the truck on which it rests, in combination with the railroad track, E, at right angles with the track, B, when said press is used for increasing the pressure of the screw press and converting it into a retaining press, substantially as and for the purpose described.

25,428.—John H. Lyon, of New York City, for an Improved Lock and Detector:

I claim combining with a padlock, or any lock provided with a shackle, a supplemental shackle, arranged with a lead or soft metal tube, so as to be temporarily secured thereby to the lock case, and admitting of being released only by the severing of said tube, which thereby serves as a detector, substantially as described.

I further claim forming the lock case, A, of two parts, a b, with a division plate, p, between, whereby the construction of the lock is rendered extremely simple and the invention enabled to be carried out or produced at a moderate cost.

25,429.—Murdick Lytle, of Alleghany, Pa., for an Improved Steering Apparatus for Barges in Rivers:

I claim the application of a wheel, C, to the bow of a barge, so that said wheel shall revolve at right angles to the direction of the barge, in combination with an apparatus for operating said wheel by the power of the propelling boat, substantially as and for the purposes specified.

25,430.—Jacob Maize, of Wooster, Ohio, for an Improvement in Seeding-machines:

I claim the adjustable cultivators, K, provided with the arms, K', guides, M, and the adjustable jointed harrow, Q, when arranged in relation to each other, as described, and acting conjointly with the seeding apparatus, in the manner and for the purpose set forth.

25,431.—W. A. McDonald, of Mott Haven, N. Y., for an Improved Dovetailing Machine:

I claim, first, The employment or use of spiral saw-cutters, G G'

and G'' G''', attached to the rotating heads, F, connected by gearing, E, for the purpose specified.

Second, In combination with the cutters, G G' and G'' G''', the adjustable platform, L.

Third, The combination of the cutters, G G' G'' G''', platform, L, and gage, M, operated by the screw, c, for the purpose set forth.

[An engraving of this machine may be found on page 129 of the present volume of the SCIENTIFIC AMERICAN.]

25,432.—Edmund Miller and Benjamin Miller, of Rising Sun, Ind., for an Improvement in Cultivators:

We claim the combined arrangement of the guard, H, elevated wing, I, curved horizontally in two directions, adjusting shank, G, and bracket, E F, operating in connection with a shovel plow, in the manner and for the purpose set forth.

25,433.—Henry Miller, of Grafton, Va., for an Improved Shingle Machine:

I claim the manner of tilting the bed, as shown, to wit, by means of the adjustable wheel, I, on shaft, J, actuated by the ratchet, K, also on said shaft, the pawl, L, on the framing, A, spring, w, attached to the carriage, E, and spring, t', attached to the framing, A, and acting on the bed, F, the whole being arranged substantially as and for the purpose set forth.

I further claim the arrangement of the bed, F, and rods, G H, attached to the framing, as shown, to admit of the vertical adjustment of the bed, for the purpose of graduating the thickness of the shingles.

[This invention relates to an improvement in that class of shingle machines in which the bolt, in order to have the shingles cut in taper form, is adjusted obliquely to the cutting plane of the saw by means of a tilting bed. The object of the invention is to simplify the mechanism employed for such purpose, and to graduate with facility the length of the tilting movement or the degree of inclination of the bed, so as to give the shingles a greater or less degree of taper as may be desired.]

25,434.—Jonathan H. Mitchell, of Germantown, Tenn., for an Improvement in Cotton-scrapers:

I claim, first, The combination and arrangement of the beam, d, chair, c, mold-board, a, and share, b, when operating substantially as set forth.

Second, The adjustable and changeable share, b, when constructed arranged and operating substantially as and for the purpose set forth.

25,435.—William Morrison, of Carlisle, Pa., for an Improvement in Corn-planters:

I claim a corn-planter, constructed substantially as shown and specified, that is to say, with the mold-boards, m m', adjustable cutters or coverers, d d, hopper, B, slides, q q, and clearers, N and e, when these several parts are constructed and arranged for joint operation in the manner and for the purposes described.

25,436.—William O'Neill, of Pine Level, Ala., for an Improvement in Plows:

I claim the lapping land-sides of the plows and the bar, A, attached to the beam as specified, in combination with the bolts, nuts and braces described, whereby they may be formed at pleasure into a double or hill-side plow, as set forth.

25,437.—Wm. O'Neill, of Pine Level, Ala., for an Improvement in Plows:

I claim the arrangement of the adjustable mold-boards, M M', attached to the share by bolts, a, and constructed as described, with braces, z and T, stock, S, and share, S', and point, P, substantially as and for the purposes specified.

25,438.—Geo. T. Parkhurst, of Baltimore, Md., for an Improvement in Lamps:

I claim the flattened air-tubes, bent at right or other convenient angles, with a slit or opening at the outer angles, in combination with flat wick tubes, and the combination of the above parts with the cap or dome, made or operating substantially as described.

25,439.—Stephen B. Peet, of New York City, for an Improvement in Carriage Springs:

I claim a compound spring, composed of a combination of an elliptic leaf or leaves and a volute coil, substantially as set forth.

25,440.—John G. Perry, of Kingston, R. I., for an Improved Sausage-stuffer:

I claim combining the cylinders, c, having a spiral cavity or cavities, with the follower, D, substantially as described for the purposes set forth.

25,441.—Orris Pier, of Ludlow, Vt., for an Improvement in Horse-rakes:

I clain the arrangement and combination of the adjustable bar, I, lever, H, bar, E, rods, G, rake, F, strap, J, and seat, I', as and for the purpose set forth and described.

[The object of this invention is to obtain a rake that may be readily raised and lowered for the purpose of having its load discharged, and also readily adjusted, so that the ends of the teeth may be at the desired hight from the surface of the ground, and the rake be enabled to gather or rake all the hay without having its teeth catch into the ground, a contingency which frequently occurs in using the wire-tooth rake, greatly increasing their draught and the wear and tear of the implement.]

25,442.—Daniel R. Prindle, of Bethany, N. Y., for an Improvement in Boilers and Steamers:

I claim the so turning or forming the flange of the upper section so that it will contain water to prevent the fire from burning the packing beneath the flanges, substantially as described.

25,443.—S. G. Randall, of New Braintree, Mass., for an Improvement in Seeding-machines:

I claim the arrangement and combination of the series of plate wheels, D D, seed-boxes, A, and horizontal bar, B, substantially as shown and described, so that as the bar, B, is drawn along, the plate wheels shall assume an oblique position, as set forth.

[This invention consists in the employment or use of a novel harrowing device applied to and combined with a seed-box and seed-distributor, whereby a very simple and efficient implement is obtained for the desired purpose, and that may be used on rough ground without being obstructed in its work or liable to be broken or injured.]

25,444.—J. A. Safford, of Winchester, Mass., and John W. Chase, of North Weare, N. H., for an Improvement in Skiving Machines:

We claim, firstly, Hanging the gage roll, K, in vibrating frames, I, in combination with the spring, h, and retaining spring-catch, N, and adjustable stops, k l, the whole arranged and operating as specified for the purposes set forth.

Second, We claim the over-lapping knife, L, in combination with the adjustable spring apron, M, arranged and operating as specified for the purpose set forth.

25,445.—Francis C. Schaffer, of Brooklyn, N. Y., for an Improvement in Carriage-tops:

I claim the arrangement and combination, with the curtains, D, of the hooks, l, guides, d, and supporters, c, as shown and described, so that the curtains, D, may be kept stretched, and be readily lowered or raised and secured overhead, within the carriage at any desired point, as set forth.

[This invention consists in arranging the side curtains with hoops, which catch over guides attached to the top of the carriage, and extending from one side to the other, so that the curtains can be made to slide up and down, and that the same are retained in their position, when raised, by the friction of the hooks on the guides, and more particularly by the curve which they are forced to turn as soon as they begin to rise; and the curtains are hinged to the carriage-top in such a manner that they can be raised and supported in such a position that they protect the persons in the carriage against the direct influence of the rays of the sun, without excluding the air.]

25,446.—Thaddeus S. Scoville, of Rochester, N. Y., for an Improved Spirit Level:

I claim employing a single transparent cell or cistern of spirits, or other fluids, in combination with the scale, c, and rectangular stock, A, in such a manner that the surface line of the liquid shall indicate both the horizontal and perpendicular, with the intermediate degrees, substantially in the manner and for the purposes set forth.

25,447.—Harvey Sloan, of Franklin, Ind., for an Improvement in Seeding-machines:

I claim, first, The arrangement of shanks, I I', drag-bars, K K', levers, J J', bar, G, rest, H, and support, h, the same being combined and operating substantially as and and for the purpose specified.

Second, In connection with the subject of the first claim, the arrangement of rollers, B B, seed-boxes, C and D, slides, a and d d d, when the same are constructed substantially as and for the purpose specified.

25,448.—C. A. Smith, of Piermont, N. Y., for an Improvement in Railroad-car Seats:

I claim, first, The arrangement of the back and bottom of a car seat, as described, so that when the seat is adjusted to an inclined position both parts move together on the same pivot, a, on which the back moves, independent of the bottom, when the seat is reversed substantially as specified.

Second, I claim the spring catch, e, notched arc, f, bottom, A, and back, D, when the same are arranged and combined as described.

[This is an invention for inclining car seats at night, to adapt them for sleeping. The seat is so arranged that the bottom and back move together, on the same pivot, when it is desired to give the seat more or less inclination, and that the back moves independently of the bottom, but on the same pivot, when it is desired to reverse the seat. The seat is held at the desired inclination by the spring-catch and notched arc, the operation of which is so simple that it can be easily understood by any person, even though entirely unacquainted with mechanical apparatus.]

25,449.—P. M. Smith and T. T. Collier, of Lavernia, Texas, for an Improvement in Cotton-seed Planters:

We claim the arrangement and combination of the wheels, B, axle, C, crank, a, pulley, H, slide, D, agitator, F, fender-bar, S, plow-share, G, and scraper, h, substantially as and for the purpose described.

[This invention consists in arranging, over a reciprocating slide, an agitator, which serves to facilitate the discharge of the seed from the hopper through a hollow wrought-iron plow-share, said agitator being operated from a pulley on the same shaft which gives motion to the slide, so that both move simultaneously.]

25,450.—James C. R. Steirly, of Brooklyn, N. Y., for an Improved Thimble:

I claim the combination of the thimble and cutter in the manner and for the purpose set forth.

25,451.—David Stuart, of Philadelphia, Pa., for an Improvement in Cooking-stoves:

I claim combining with the hollow cross-piece, b, the distributor, a, constructed and arranged as set forth.

25,452.—J. H. Swan, of New York City, for an Improved Folding Chair:

I claim, first, The arrangement of the back, E, seat, F, and arms, G G, substantially as shown, so that the back and seat, when occupied, will be nearly counterpoised, and the arms, G, moved with the seat and back for the purpose specified.

Second, In combination with the back, E, seat, F, and arms, G G, the curved legs, A A B B', when the whole are arranged substantially as shown, so as to admit of being completely folded.

25,453.—James Taylor, of Rushville, Ill., for an Improved Churn:

I claim the peculiar construction and arrangement of perforated brakes and auxiliary reflectors, in combination with a dasher, having its blades flattened out gradually from near the shaft to their ends, substantially as and for the purposes set forth.

[This invention consists in arranging, on the side of the tub or barrel in which the dasher operates, a series of brakes, which are constructed of alternately wider and narrower ledges; and the wide brakes are cut out close to the side of the barrel, so that the cream or milk, as it is agitated by the dasher, is broke towards the sides of the barrel by the same, while the narrower brakes are so arranged that the current of milk or cream is broke from these sides, whereby the cream is not only reduced to butter in a very short time, but the churn can also be operated quite easily and with little exertion.]

25,454.—James S. Taylor, of Danbury, Conn., for an Improvement in Machinery in Forming Hat Bodies:

I claim the combination of the two perforated cones and exhaust, with one picker and feed arrangement, so arranged that the current of impelled fur is alternately shifted from the tip of one cone across on to the tip of the other in such a manner as to give the required proportions in forming a perfect hat body.

25,455.—George W. Tolhurst, of Liverpool, Ohio, for an Improved Washing-machine:

I claim the inside bottom box, B, constructed air-tight, so that when the pressure of the upper rubber is removed it will float, and expose the clothes to be handled.

25,456.—M. L. Tourtelett, of Neshonoc, Wis., for an Improvement in Seeding-machines:

I claim the combination and arrangement of the levers, G H, connected by the traverse rod, e, the cam, I, the slides, F F and L, for joint operation for the purpose set forth.

[This invention relates to an improvement in that class of seeding-machines which are designed for planting various kinds of seeds, and either in hills, drills or broadcast. The invention consists in a novel device or attachment, whereby the seed may be planted at a greater or less depth, and, at the same time, leave the earth pressed firmly on it, and the soil left with a smooth surface. The invention also consists in a peculiar arrangement of hoppers and mechanism for operating the seed-distributing devices, whereby either hopper may be used separately or all used simultaneously, as may be desired.]

25,457.—Louis S. Ullman, of Nashville, Tenn., for an Improved Hygrometer:

I claim the combination of the capsule and naturally spiral tail-like appendage of either of the plants specified, with an index and dial, or their equivalents, substantially as described, to constitute a hygrometer.

[This is a most novel invention, and we shall present our readers with an engraving and description of it in a few weeks.]

25,458.—John Van Horne, of Magnolia, Ill., for an Improvement in Machine for Weighing Grain, &c.:

I claim weighing, by means of a round ball or self-acting weigher, O, operating in a concave beam, or balance and blocks, and spiral springs, N N, working in the bottom of the beam by means of the grooves, P P, so as to weigh different weights or drafts, and board, H, combined for the purposes set forth as above described.

25,459.—Thomas J. Wallace, of Cameron, Ill., for an Improvement in Machines in Raking and Loading Hay:

I claim, first, A hay-raker and loader, all the parts of which are constructed, arranged and combined together for joint operation substantially as described.

Second, The combination of the inclined part, A, with its pivot, c, with the part, A, of the main frame and slot, d, substantially as and for the purposes set forth.

25,460.—Hamlin Whitmore and David M. Smith, of Springfield, Vt., for an Improved Carpenter's Rule:

We claim the spiral springs h h, applied to the pintle, e, of the joint, in combination with the elastic bearings, d', of the plates, c c, provided with notches, f, and projections, g, as and for the purpose set forth.

[This invention relates to an improvement in the joints of the rules whereby the same are prevented from casually opening and closing, a result due to the wear occasioned by a very little use. The invention consists in having spiral springs fitted on the pintles of the joints, and bearing against elastic plates at the central portion of the joints, said plates being notched and provided with projections, so as to form snaps or catches, to effect the desired object.]

24,461.—Charles Whitaker, of Davenport, Iowa, for an Improvement in Corn-planters:

I claim the arrangement of the seed-boxes or receptacles, F, slides, g, stationary plates, G', and movable plate, G, with the arms and weights, m, attached substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of corn-planters in which the corn is distributed from the peripheries of the wheels. The invention consists in a peculiar distributing-device, arranged in connection with a seed receptacle within each wheel whereby a very simple, economical and efficient machine is obtained for the purpose intended.]

25,462.—J. S. Williams, of St. Louis, Mo., for an Improvement in Grates:

I claim the combination of the stove-grate, A, having register plates, D D, and valves, H H, which admit unheated air from the room, at all times, through the bottom of said plates, but control the flow of heated air into the room, as described, with the ordinary fire-place, C, when the latter is separated from the flue above by a simple fire-board, b, in the manner and for the purposes described.

25,463.—W. B. Williams, of Warrenton, N. C., for an Improvement in Plows:

I claim, first, The combination of screw-bolts, S, nut, n, in beam, B, standard, A, cuff, c, and slotted brace, b, to regulate the depth of plowing substantially as described.

Second, And, in combination with the above, the curved arm, D, for collecting weeds, substantially as described.

25,464.—W. B. Williams, of Warrenton, N. C., for an Improvement in Plows:

I claim the combination of standards, S, plate, P, and oblique wings, W, substantially as and for the purpose set forth, with share, C.

25,465.—Albert Broughton, of Malone, N. Y. (assignor to himself and A. Lindsay, of same place), for an Improvement in Converting Rotary into Reciprocating Rectilinear Motion:

I claim the combination of the divided journal-box, F F', containing two bearings and closed by springs, G G, and the spring, I, or toothed plate, I', with the vibrating pinion-shaft, E, the whole operating substantially as and for the purpose specified.

[This invention consists in combining two opposite toothed racks with a single interposed rotary pinion, for the purpose of converting rotary into reciprocating rectilinear motion, by so applying the shaft of the pinion, in combination with a divided journal-box, having two bearings closed by springs, and so applying means of shifting the pinion-shaft from one bearing to another of the journal-box that the pinion is made to gear with the two racks alternately, and so caused, by its revolution, to give the carriage or device to which the said racks are attached a movement back and forth.]

25,466.—J. H. Gould, of Alliance, Ohio (assignor to himself and E. A. Hartshorn, of Mount Union, Ohio), for an Improved Cover for Stove-plates:

I claim the self-erecting handle, A, in combination with weights, C, arranged essentially as and for the purpotes set forth.

[This invention consists in the employment of a wire handle, in such relation to a common circular or other-shaped lid used for covering the boiler-holes in the top plates of stoves, that said handle will always keep an erect position, and, at the same time, is not liable to be bent or broken off, nor will it be in the way in using the top of the stove.]

25,467.—James A. Hamer, of Reading, Pa. (assignor to himself and Norris Maris, of Kimberton, Pa.), for an Improvement in Brick Machines:

I claim, first, The combination of the blades, I', and rods, L', with the valves, J', and spiral, K', constructed, arranged and operating, in relation to each other, substantially as and for the purposes set forth.

Second, The combination of the adjustable cover, D, with spiral, K', and trough, B, for the purpose of relieving or increasing the pressure upon the clay in the molds as set forth.

Third, The combination of the hinged smoothing-piece, Q, with the hinged vertically-reciprocating piece, P, as and for the purposes set forth.

Fourth, Providing the hinged smoothing-piece, P, with the slot, O, and tube, S, as and for the purposes set forth.

25,468.—S. P. La Due, of Rockford, Iowa (assignor to Thomas S. La Due, of same place), for an Improvement in Calendar Clocks:

I claim, first, The arrangement and combination of the wheels, C D E and G, and the ring, M and Q, the faces of which are marked with the proper figures and letters, so that they indicate the seconds, the minutes, the hours, and the days of the week and month, substantially in the manner specified.

Second, Arranging the wheel, G, in such a manner that it serves the double purpose of actuating the bell-hammer and to indicate the hours of the day substantially in the manner described.

Third, Placing the figures and dials on the faces of the driving-wheels to indicate the seconds and minutes by a continuous motion; also, to indicate the hours by a continuous or intermittent motion substantially in the manner described.

[This invention consists in arranging the wheels in the clock with figures and letters, in such a manner that the same, by their relative position towards an opening or openings in the lower part of the case, or towards a stationary point, indicate the seconds, the minutes, the hours, the days of the week, and those of the month, without the aid of movable hands or indexes, and these wheels therefore serve, at the same time, as driving parts of the clock, and as dials and hands, those wheels being dispensed with which usually serve to operate the dials or hands; and those wheels which indicate the hours, the days of the

week, and the days of the month, are so arranged that they have an intermittent motion, keeping the respective figures or letters in view during the whole hour or during the whole of the day, the changes taking place almost instantaneously with the wheels which indicate the days of the week and month, and at shorter or longer intervals, according to the hour which the clock has to strike, with that wheel which indicates the hours, which latter, however, may be made so as to have a continuous motion. And this invention also consists in arranging the wheel which indicates the hours in such a manner that it serves the double purpose of indicating the time and actuating the bell-hammer.]

25,469.—Joseph B. Okey, of Indianapolis, Ind. (assignor to himself and Wm. H. Hendrick, of same place), for an Improvement in Straw-cutters:

I claim, first, The combination of sliding-bar, B, when constructed asset forth, with yoke, C, and vibrating bottom, D; and—

Second, The combination of cams, F and G, with lever, A, when constructed and used as described, all operating substantially as and for the purposes mentioned.

25,470.—Joseph Rider, of Newark, Ohio (assignor to himself and E. Remington & Sons, of Ilion, N. Y.), for an Improvement in Breech-loading Fire-arms:

I claim the combination of the movable breech-pin, F, and the cap-tube, E, applied to a pistol substantially as described.

And, in combination with a hammer of the form described, I claim the arrangement of the main-spring and trigger, relatively to each other, to the hammer, and to the stock and barrel, substantially as described.

25,471.—Joseph C. Silvey, of New Orleans, La. (assignor to Thomas J. Dobyns, of St. Helena Parish, La.), for an Improvement in Sewing-machines:

I claim, first, Operating the needle-arm, by means of a grooved eccentric, G, and a pin, b, on the needle-arm, arranged relatively to each other to operate in the manner described and illustrated.

Second, The construction or arrangement of the portion of the feed-plate or table, B, through which the needle and the feeding-dog work, to form an inclined plane relatively to the direction of the movement of the feeding-dog, substantially as described and illustrated, for the purpose set forth.

Third, The combination of springs, R T and M, applied in the manner described, to effect the tightening of the stitch, and otherwise control the thread between the perforating-needle and its spool by the automatic operation explained.

[This invention consists, firstly, in a certain mode of applying an eccentric, in combination with the needle-arm, for the purpose of driving the needle, whereby the perforating needle is caused to have a slower motion in perforating the cloth, and a quicker motion on its return to take up the stitch, and to have its motion almost suspended for a considerable time while in the cloth. It consists, secondly, in the construction or arrangement of that portion of the surface of the feed-table which surrounds a feeding-dog working through the said table, and below or at the back of the cloth or material being sewed, in such manner as to form an inclined plane or occupy an inclined position relatively to the plane or direction of the movement of the roughened surface of the feeding-dog, whereby the said dog is made to operate effectually with only a simple reciprocating motion. It consists, thirdly, in a novel combination of springs attached to the needle-arm, for the purpose of controlling the thread between the eye of the perforating needle and the spool from which the thread is supplied to the said needle, and for regulating the tightness of the said thread in the stitch.]

25,472.—Seth D. Tripp, of Stoneham, Mass. (assignor to himself and Luther Hill, of same place), for an Improvement in Apparatus for Feeding Pegs:

I claim, first, Winding up the blank or strip of pegs with the ribbon, f, so that, as the ribbon is wound off by the movement of the machine, the blank will be fed up in the manner substantially as set forth.

Second, I claim hanging the spool, I, on a vibrating arm, F, so that the spool and trough, M, may follow the motions of the swinging-gate or part of the pegging-machine, to which the trough, M, is attached.

25,473.—Andrew Turnbull, of West Meriden, Conn. (assignor to himself and James D. Frary, of Meriden, Conn.), for an Improvement in Scales:

I claim, first, The combination of the beam-lever, F, with scoop platform, C, attached, with the spring, K, rack, J, adjustable or fixed pinion, e, with index or indexes, N, attached to its arbor, d, and traversing over a graduated plate or plates, M, substantially as and for the purpose set forth.

Second, I claim attaching or suspending loosely the rack, J, to the beam-lever, F, by means of a pivot, f, and having a spring, g, acting on said rack in order to keep the same in gear with the pinion, e, for the purpose set forth.

Third, I claim attaching the lower end of the spring, K, to the traverse bar, h, by means of the screw, L, and nut, i, in order to regulate the tension of the spring and preserve its uniformity, substantially as and for the purpose set forth.

Fourth, I claim, in combination with the beam-lever, F, spring, K, and indexes, N, connected with the beam-lever, the stop, j, on the arbor, B, for the purposes specified.

25,474.—O. H. Waters, of Baltimore, Md. (assignor to Alfred Hunter, of Washington, D. C.), for an Improved Clothes-dryer:

I claim the combination and arrangement of the adjustable grooved post, B, its radial arms, F, and box, H, with box, A, cylinder, D, and protector, K, the whole being constructed in the manner and for the purpose set forth.

25,475.—Lewis White, of Hartford, Conn., (assignor to himself and Daniel McLaughlin, of New York City) for an Improvement in Lamps:

I claim the application and arrangement of the operating gears, when placed in the manner and for the purpose herein described.

I also claim the movable flaps, B B, in the manner and for the purpose substantially as described.

RE-ISSUES.

William Fulton, of Cranberry, N. J., for an Improvement in Lamps. Patented August 3, 1858:

I claim, first, The perforated plate or air-distributor, C, or its equivalent, as shown in Fig. 2, for the purpose of regulating the elastic force of the air so that it may be presented evenly to the flame (when applied to flat wick lamps), it being placed horizontal.

Second, I claim the perforations, h, in the lower part of the cap, D, as shown in Fig. 1, in combination with the perforated or air-distributing plate, C, as shown in Fig. 2.

Third, I claim the register formed of the perforations, e, in the top, A, as shown in Fig. 3, in combination with the perforated plate or air-distributor, C, as shown in Fig. 2, and the holes, h, in the lower part of the cap, D, as shown in Fig. 1, the whole being arranged substantially as and for the purpose described.

P. A. Palmer, of Troy, N. Y., for an Improvement in Heating Elevated Ovens. Patented September 24, 1850:

I claim the arrangement and combination of revertible flues in elevated ovens of cook-stoves, with partition walls, in the manner as and for the purpose described and set forth.

I also claim the arrangement and combination of the oven plate, c, in and with the inner plate and ends of the oven, as and for the purpose described and set forth.

I claim the arrangement of the damper, e, immediately between the main part of the stove, and the bottom or lower part of the elevated oven, thereby combining it with the said oven, the stove and the double flue, c, for the purpose of controlling and regulating the heat in its passage into the flues of the said elevated oven, as described, disclaiming any damper found in any stove not having an elevated oven, as set forth.

Henry B. Goodyear, of New York City (administrator of Nelson Goodyear, deceased), for an Improvement in India-rubber Fabrics. Patented May 13, 1845. Extended for 7 years from May 13, 1859:

I claim making fabrics by thoroughly intermingling and incorporating the shearings or clippings of fibrous substances with the gum while rendered plastic by heat, substantially as and for the purpose specified.

EXTENSIONS.

C. J. Woolson, of Cleveland, Ohio, for an Improvement in Cooking-stoves. Patented Sept. 9, 1845.

I claim the forming of the bottom plate of the oven with a number of tubes or boxes, usually of sheet-iron or other substance thinner than the bottom plate, that descend from it, through the lower flue-space, the same being effected under an arrangement of their respective parts, substantially the same with that described and for the purpose set forth.

Frederick E. Sickels, of New York City, for an Improvement in the Mode of Tripping Cut-off Valves. Patented September 19, 1845.

I claim tripping the drop valve of the cut-off by a motion independent of the lifter, substantially in the manner and for the purpose described.

I also claim combining the wiper that drops the valve of the cut-off, whether working horizontally or vertically, with any of the moving parts of the engine, other than the lifters or their rocking shaft, by means of the sector and arm or arms, by means of which the extent of the cut-off can be regulated at pleasure during the action of the engine from the full to the least portion of the stroke, as described.

DESIGNS.

Henry Hubbard, of New York City, for a Design for the Handles of Spoons, Forks, &c.

NOTE.—A fortnight ago we took occasion to complain of the dilatory manner in which certain departments of the Patent Office were progressing. We are now happy to state that since that time the examiners have been busy at their labors, and most of the back-work has been brought up. The Commissioner has returned to his duties after an absence of about six weeks; and some members of the examining corps, who have had a shorter vacation, called upon us during the past week, on their way back to their posts, apparently invigorated by their sojourn among the hills of their New England homes.

Of the patents in the above list, THIRTY-EIGHT were secured through the Scientific American Patent Agency—a larger number, we are no doubt correct in asserting, than was ever before secured through a single agency in one week. For our superior facilities for obtaining patents, see advertisement on another page.

W. H. T., of Mass.—The facts stated by you in reference to your success in oiling journals are unprecedented so far as we know, but before we could publish them satisfactorily, we should like a sketch of the w y it is done. This would interest our readers more than the bare facts themselves.

E. P. M., of Tenn.—You cannot get a good work on mill-building. Such a work is needed, but the expense of getting it up would be great, and might not pay.

S. C. N., of N. Y.—We do not wish to publish anything more at present upon the subject of "Rain at Different Elevations," unless some very novel view is presented. We will make a note of the substance of your communication in our next issue.

J. J. B., of Iowa.—We have no knowledge of the practical value of the paint you mention. Address the patentee.

W. J. McC., of Tenn.—You can procure glazed clay pipes from Miller, Youle & Co., of this city.

M. S. C., of Md.—There are clocks that keep the day of the week, month and year. Paddle-wheels have been invented where a crank was employed to keep the paddles in position. No such contrivance has proved of any practical value. The improvement you suggest in reaping-machines is not new.

R. B., of C. W.—A good undershot wheel on your fall of 3½ feet (if you have plenty of water) will answer well for driving an upright or a circular saw. Address S. K. Baldwin, Laconia, N.H., regarding the turbine wheel.

S. T. N., of N. Y.—There are a number of patented machines for filing saws. See back numbers of the SCIENTIFIC AMERICAN. There are a number of patents in this country for file machines, some of which have done go d work. A file machine is now successfully operating in England, as we learn from our exchanges. We are not familiar with any practice of curing spavined horses. You should apply to a "horse-doctor."

J. W. D., of Texas.—The mineral which you have sent us contains a little sulphuret of copper, some shells, and carbonate of lime. It is not worth working for the quantity of metal in it. Your subscription expires Jan. 1, 1860.

G. B. B., of R. I.—We perceive nothing patentable in your "Plumb and Level Indicator." The same plan has been often submitted for our opinion before. In the first volume of the old series of the SCIENTIFIC AMERICAN you will find an illustration of a plan not very unlike yours.

W. H. B., of Ky.—We intend to notice all such communications as are sent to us having a bearing upon our business. Sometimes, however, the inquiries are of such a nature that we cannot answer them without subjecting ourselves to a great deal of inconvenience. Your letter was one of that kind, and desirous of serving you, we handed it over to Leavitt & Co. for attention. We hope you will be satisfied with the explanation, and not attribute any intentional neglect to us.

N. P. A., of N. Y.—The cheapest way to make carbonic oxyd is to burn charcoal or anthracite with an imperfect supply of air; it cannot be made cheaply from lactic acid salts.

S. W. W., of La.—You have probably learned by this time that the strange light which you saw on the 2d of September was the remarkable aurora borealis, which was observed in Cuba as well as in this latitude, where we are more familiar with the phenomenon. The "savans" would be very happy to explain it if they were able, but it is one of those secrets of nature which have yet eluded the comprehension of man.

J. C., of Ill.—Cement for the outside of brick walls, to imitate stone, is made of clean sand, 90 parts; litharge, 5 parts; plaster-of-Paris, 5 parts; moistened with boiled linseed oil. The bricks should receive two or three coats of oil before the cement is applied.

A. BROS., of N. Y.—Messrs. Fox & Polhemus, corner of Beaver and Broad-streets, sell an article of cotton hose. The Grenoble hose, made of linen and seamless, is sold by Charles Lenzmann, No. 54 Cedar-street. The New York Belting and Packing Company, Nos. 37 and 38 Park-row, keep a complete assortment of india-rubber hose.

G. H., of Miss.—Our dealers in telescopes do not credit the statements in the advertisement referred to. They say that telescopes combining so great power with so small a size have never been seen here, and that they should have imported some of those advertised if they had not satisfied themselves that the statements were erroneous. Bookbinder's paste is made in the same manner by different persons generally in the trade. It contains alum.

A. F. A., of Conn.—Clay tobacco pipes are made by Edwin Hollely, Nos. 39 Hudson-avenue and 241 John-street, Brooklyn.

R. H., of Ohio.—It would afford us pleasure to receive other contributions on coal-oils, especially in regard to the temperature and management of the retorts, the coals most suitable for the purpose and the methods of refining the products.

J. A. W., of Ga.—The best alloy for journal boxes is composed of copper, 24 lbs.; tin, 24; and antimony, 8. Melt the copper first, then add the tin, and lastly the antimony. It should be first run into ingots, then melted and cast in the form required for the boxes.

G. H., of Texas.—Ice has been made in this city, and in Washington, by mechanical power. The plan was to condense air by steam or water-power, and then allow it to expand in contact with water. The expansion absorbed large amounts of heat, making it latent, and drawing this heat from the water freezes it. The great capacity of water for heat (23 times as much as that of mercury) required so much power to freeze the water that the process was too expensive, and was abandoned. We do not believe that ice has ever been made in the summer for half a cent per pound.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Sept. 17, 1859:—

J. C., of Mass., $25; H. & F., of Pa., $30; M. & S.. of N. Y., $25; J. M. C., of Ky., $25; J. C. A., of Cal., $30; D. M. C., of N. H., $30; C. C. B., of Ohio, $25; D. & G., of N. Y., $20; K. & M. of Mass., $25; P. & R., of Conn., $25; G. C., of Maine, $25; N. G. S., of N. Y., $30; H. R. of Ga., $35; W. M., of Maine, $25; W. T. J., of Ill., $25; L. E., of Conn., $75; J. H. L., of Iowa, $30; A. R. R., of Mo., $25; W. J. H., of Ala., $67; N. H. C., of N. Y., $20; G. C. B., of Ill., $15; G. W., of Pa., $25; S. W. S., of Wis., $25; J. E. L. of Conn., $20; C. T. S., of Cal., $15; J. H. G., of Cal., $35; P. K., of Conn., $55; J. L., of R. I., $30: S. R. McD., of Del., $25; R. T., of Iowa, $20; R. C., of N. Y., $30; S. P., of Mass., $30; W. T. L., of Mich., $25; E. K., of Conn., $10; H. S., of Ohio, $25; J. C., of N. C., $80; C. M., of N. Y., $32; J. P. B., of Pa., $30; W. C., of Ill., $25; J. S. C., of Pa., $19; H. H., of Mass., $55; J. E. of Cal., $20; T. H. W., of Mass., $310; H. C. F., of Ohio, $30; T. R., of Conn., $30; G. F. P., of N. H., $32; W. S. K., of Conn., $25; J. J. K., of Miss., $30, L. H. F., of Pa., $25; A. D. H., of Mich., $30; W. E., of Maine, $30; A. A. D., of S. C., $30; W. B., of Ohio, $25; W. H. K., of N. Y., $25.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 17, 1859:—

W. C. of Ill.; C. M. of N. Y.; G. C. B., of Ill.; C. & L. of N. C.; S. R. McD. of Del.; P. K. of N. Y.; J. C. A. of Cal.; G. W. B. of La.. L. H. F., of Pa.; K. & S. of N. Y. M. & S., of N. Y.; W. G. of N. Y.; J. W. C., of N. Y.; H. H. of Mass.; W. S. K. of Conn.; C. C. B., of Ohio; J. E. of Cal.; W. H. K. of N. Y.; W. M. of Maine; P. & R. of Conn.; G. W. of Pa.; J. S. C. of Pa.; J. M. C., of Ky.; C. T. S. of Cal.; K. & M. of Vt.; H. O. A. of La. (3 cases); H. S. of Ohio; J. C. of Mass.; W. T. L. of Mich.

IMPORTANT TO INVENTORS.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, continue to procure Patents for Inventors in the United States and all foreign countries on the most liberal terms. Our experience is of thirteen years' standing, and our facilities are unequaled by any other Agency in the world. The long experience we have had in preparing Specifications and Drawings has rendered us perfectly conversant with the mode of doing business at the United States Patent Office, and with most of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

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Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. We also furnish a Circular of information about Foreign Patents.

The annexed letters from the last two Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & CO.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Communications and remittances should be addressed to

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MAINE CHARITABLE MECHANIC ASSOCIATION.—Fair and exhibition to be held in Portland, Maine, Sept. 27, 1859, at the new City Building. Competition open to all. Object—The promotion of art, mechanical ingenuity and industry; for the best specimens of which suitable premiums will be awarded. Goods received from the 10th to the 20th. Articles for exhibition carried and returned free by steamers from New York, and over all railroads centering in Portland; also by steamers from Boston. Articles and communications directed to J. R. Milliken, Secretary of Board of Managers (who will also send circulars), will receive prompt attention. [1*] S. C. CHASE, Chairman.

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CALIFORNIA AGENCY FOR PATENTS.—WETHERED & TIFFANY, San Francisco, will attend to the sale of patent rights for the Pacific coast. References:—Messrs. Tiffany & Co., New York; Wethered, Brothers, Baltimore; George W. Bond & Co., Boston. 4 13

APPEALS BEFORE THE JUDGES OF THE U. S. District Court, from the final decisions of the Patent Office, in Rejected Cases, Interferences, &c., are prosecuted by the undersigned on moderate terms.

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PATENT EXTENSIONS.—ALL PATENTS FOR Inventions, granted by the United States during the year 1845, will expire by their own limitations during the current year (1859) UNLESS EXTENDED ACCORDING TO LAW. The statute provides for the extension of Patents for an additional term of SEVEN YEARS, the grant being made to the inventor himself, or if deceased, to his heirs and administrators. The EXTENDED TERM inures solely to the benefit of the inventor or his heirs. Assignees or owners of rights under the first term of the Patent have no rights whatever in the extended term. The inventor or his heirs may, however, sell their interests in the Extension prior to the grant thereof, in which case the Extended Patent, when granted, becomes the exclusive property of such purchaser. Applications for Extensions must be made at the Patent Office at least 65 days prior to the extension of the Patent. The undersigned, having had great experience in Patent business, will promptly prepare the various documents and prosecute Extension cases on moderate terms. For further information address

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5 10 GEO. I. CROSSETT, Assignee.

CHRONOMETERS, FINE WATCHES, NAUTICAL AND ASTRONOMICAL INSTRUMENTS, &c.—D. EGGERT & SON, No. 239 Pearl-street, New York, offer on favorable terms first-class Marine, Sidereal and Pocket Chronometers; also, plain and finer quality of Watches, with new series train, so thoroughly adjusted as to be unaffected by any change of temperature, exercise or position in the pocket; Astronomical Clocks, Transit Instruments, Standard and Self-Registering Thermometers, Barometers, &c. 1 13eow*

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Zur Beachtung für Erfinder.

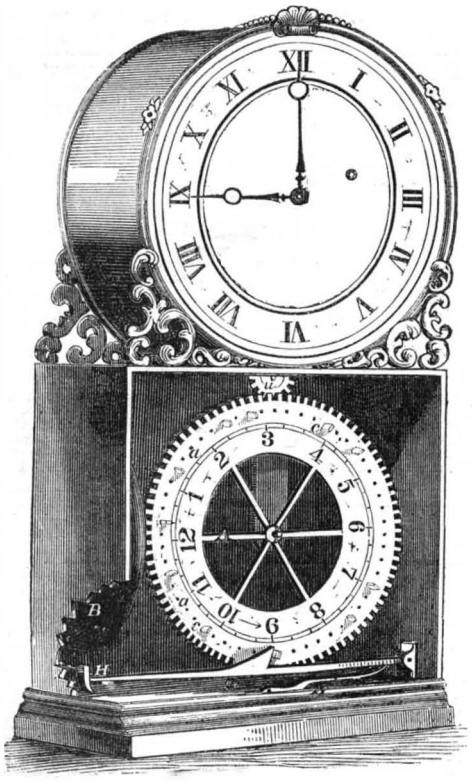
Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

QUIMBY'S MONITOR CLOCK.

This device is designed particularly for the use of schools. Its object is to enable the teacher so to arrange the clock as to indicate, by the stroke of a hammer upon a bell, the time for commencing and closing each recitation



The engraving represents a perspective view of this invention. The wheel, A, is so connected with the clock-work by the gear, *u*, that it (the wheel) revolves once in every 12 hours in the direction of the arrow marked upon it. In this wheel are drilled 144 holes, *a a*, which receive the pins, *c*, which are so arranged that they can be inserted or removed at pleasure. Some of these pins are represented in their place. Each pin, as it passes the cam, C, causes the hammer, H, to strike, by means of the spring, S, upon the bell, B. Thus, by inserting the pins at the proper intervals, as indicated by the figures on the wheel, A, the time of each recitation may be indicated, however irregular those intervals may be. When all the pins are in their place, the hammer will strike once in five minutes. If every other pin is removed, the hammer will strike once in 10 minutes, and so on; and it will easily be understood how the hammer may be caused to strike at different and still shorter intervals by increasing the speed of the wheel, A, or the number of the pins, *c*.

Those who appreciate the importance of promptitude and regularity in the school-room will readily see the utility of a monitor so vigilant and incorruptible. But this device may also be used for railroad-stations, and for other purposes where irregular portions of time are required to be audibly indicated. This invention was patented June 14, 1859, by E. T. Quimby, of New Ipswich, N. H., and further information of the same will be furnished by addressing Newton Brooks, of the same place.

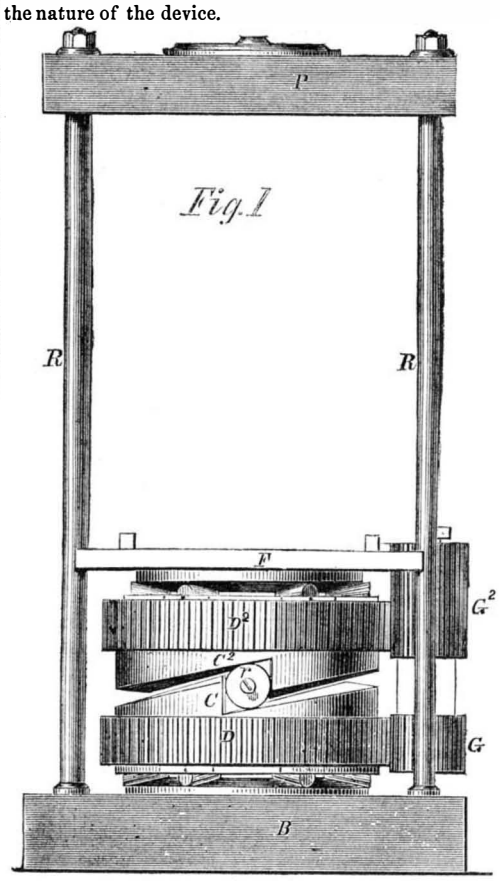
IMPROVED CAST STEEL.

In a communication to the London *Engineer*, Mr. Robert Mushet, in commenting upon the "Bessemer process" for manufacturing iron, describes improvements which he has made in producing steel from cast-iron. In an experiment with Welsh No. 1 pig-iron, which was purified in a Bessemer furnace, he added 10 pounds of a triple compound of malleable iron, carbon and manganese, to every 70 pounds of the cast-iron, and the ingots made from this were good welding cast-steel, on the other hand, ingots made from the same pig metal without the manganese and carbon being added, were so brittle that they cracked to pieces at both a high and low heat when worked under the hammer. He asserts that there never was, or can be, a bar of first-rate cast-steel made by the Bessemer process alone. In all pig-iron there is generally too much phosphorus, sulphur, or oxyd of iron, either of which prevents it from becoming steel. As metallic manganese is about the most oxydizable of metals, a small portion of it suddenly combined with liquid iron, holding oxyd in solution, takes up the oxyd from the iron, converts it into the oxyd of manganese, which passes into the slag, and in this manner the metal is purified. It is generally held that molten iron cannot contain oxyd of iron in solution, but Mr. Mushet is of a different opinion. He also asserts, that a very small quantity of metallic manganese introduced among molten cast-iron counteracts all the pernicious effects of phosphorus and sulphur in it. He says, "I have merely availed myself of a great metallurgical fact, namely, that the presence of metallic manganese in iron or steel, conferred upon both an amount of toughness, when cold and heated, which the pressure of a notable amount of sulphur or phosphorus cannot overcome." In another portion of his letter he says, "The great remedy for red-shortness in iron or steel is simply the addition of a little metallic manganese thereto. Why are the Prussian irons celebrated for their excessive red-toughness and cold-toughness? Simply because they contain a small alloy of metallic manganese."

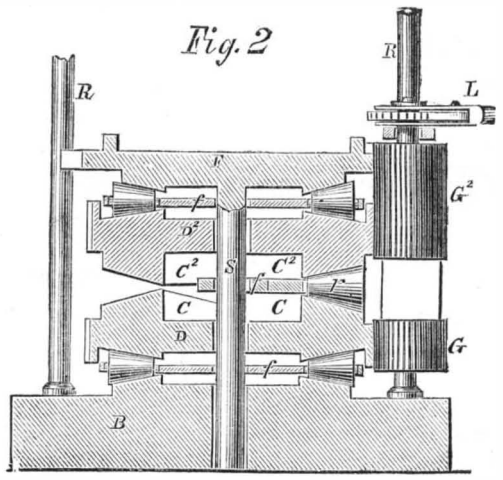
Here is information for our iron manufacturers who are endeavoring (or those who may wish to engage in the business) to make steel from pig-iron. Metallic manganese combined with cast-iron in a crucible converts it into good steel, according to Mr. Mushet's statement, and he has received a patent in England for the invention. It must not be forgotten that it is not the oxyd of the manganese which is usually employed in making steel, but the metal itself which is used. And it will not do to mix it with the pig-iron in the smelting furnace, because in that case, the manganese will all be oxydized by the air, instead of taking up the oxyd from the iron to purify it. This is a subject of no small importance, for if a little metallic manganese can convert iron scraps into good cast-steel when smelted in a crucible, every machine-shop in our country may easily manufacture its own steel.

IMPROVED CAM PRESS.

Here is a novel idea for a press, which, in the directness with which it multiplies the power, makes a not distant approach to the hydraulic press itself. A brief inspection of the engraving will enable one to understand the nature of the device.



The circular base, B B, is connected with the circular platen, P P, by means of the rods, R R R R. It will be seen that if the upper disk, D2, is made to revolve while the lower disk, D, is held stationary, the upper disk must rise, because it rolls the roller, *r*, up the inclined cam, C, and its own cam, C2, also presses upon the roller in a way to raise the disk. But in order to increase the power, instead of holding the lower cam stationary, it is caused to revolve only a very little more slowly than the upper cam. This is effected by having the geared periphery of the upper disk contain one more tooth than the periphery of the lower disk. The disks are made to revolve by turning the gears, G and G2, by means of the lever, L, which works with a click or pawl. Friction-rollers are interposed between the base, B, and the lower disk, and between the upper disk and the follower, F. These rollers, as well as the rollers, *r*, between the cams, are hung to frames, *f f f*, which run loosely about the shaft, S. All these rollers are provided with beveled tracks above and below.



When the press is used as a punch, the punch is attached to the lower end of the shaft, S, the follower is braced in its place, and the upper disk only caused to revolve by means of a crank attached to one of the friction rollers which interpose between it and the follower; the gears, G and G2, in this case being dispensed with.

The patent for this invention was granted to Thomas R. Hopkins, of Petersburg, Va., August 23, 1859.