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Improvement in Shingle Machines.

Many attempts to produce a shingle machine that will make shingles with a smooth surface like shaved shingles, and do the same rapidly and economically, have been made, and some partial successes have been achieved in this line. The machine herewith illustrated makes a compromise between sawed and shaved shingles by planing the side designed to be laid uppermost, and as the weather side of shingles is the only one which is required to be smooth, if the other is flat, this compromise will probably prove acceptable to the trade, provided the shingles are in other respects all that could be desired.

We have seen a sample of the shingles, and will say that we think them a very superior article, although we cannot vouch that all shingles made by the machine would correspond with the sample shown to us. We see no reason, however, to suppose that they would not, provided the timber from which they are made is of the proper quality.

The engraving shows the machine in perspective, and we shall content ourselves with such a general description as will exhibit the principle upon which the machine operates.

The cutting is done by a circular saw, A, and plane knives set in the planer head, B. The machine receives motion through the main driving pulley, E, and motion is transmitted to the planer shaft by a belt running on the pulleys, C and D.

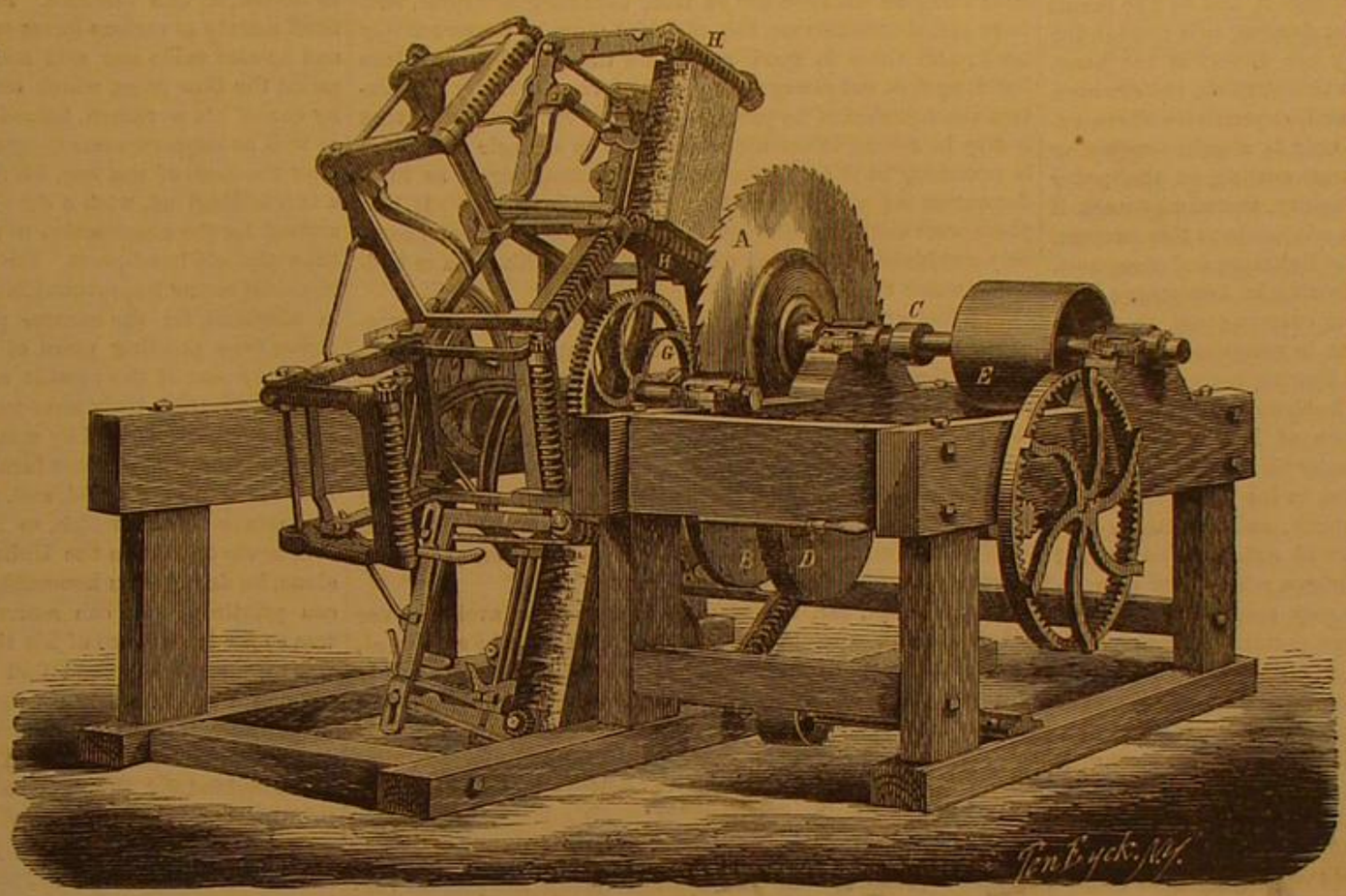
A pinion on the end of the planer shaft imparts motion to the gear, F, which, through a pinion fixed to the opposite end of its shaft, revolves the gear, G, fixed to the shaft of the bolt carrier, bringing the bolts successively over the planer and saw as required.

The bolts are held by spurred rollers, H, which are driven by a ratchet and pawl movement, actuated by a vibratory lever, which alternately feeds forward the top and bottom rollers, so that the proper wedge shape of the shingle is obtained.

The feed rollers are placed at the ends of clamping arms, I. The upper pair of each set of clamping arms is held by a lever cam which locks the apparatus, and holds the bolt firmly to the work.

By these devices the surface of the bolt is first planed, and then being brought to the saw a shingle is cut off. We are informed the machine operates with great rapidity and with but little more consumption of power than the saw would alone require.

Patented April 13, 1869, by Merrill Chase, Jr., and Horace J. Morton, of South Paris, Me., assignors to themselves and Freeman C. Merrill of the same place, where the machines may be seen in operation, and the working of which is said to be very satisfactory. For further particulars address Merrill & Morton, at the above-named place.



CHASE AND MORTON'S SHINGLE AND HEADING MACHINE.

The Dangers of Ballooning.

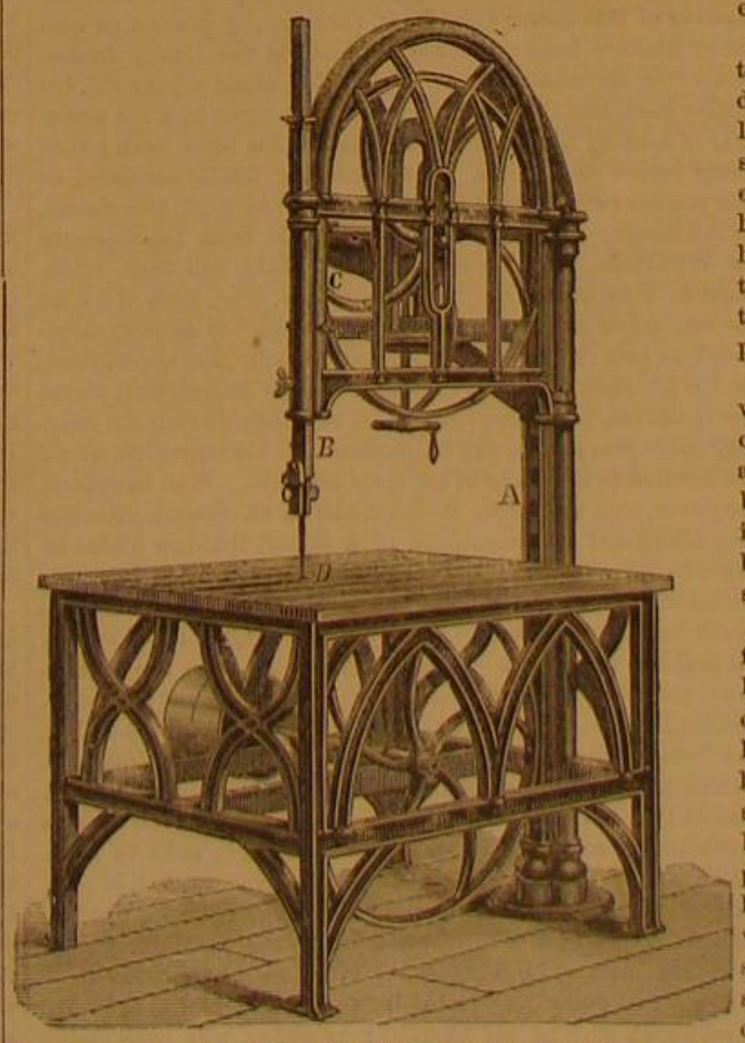
The London *Star* furnishes an interesting account of some of the dangers that must attend all attempts to navigate the air. A Mr. Youens recently undertook an ascent near Huddersfield, in the Aerial, which is capable of holding 20,000 cubic feet of gas. It rises to a hight of fifty feet, and expands to one hundred feet in circumference. Away floated the balloon in a westerly direction, oscillating for a considerable distance in a most extraordinary and unusual manner. M. Youens experienced a stronger breeze than he had anticipated, and, the current changing rapidly, his energy and knowledge as an aeronaut were very closely taxed in the management of the balloon. A fresh current drove the Aerial to the east for a time, but presently another gust, unexpectedly, in the direction of Halifax, thence towards Bradford, in a northerly course, and after the lapse of twenty minutes, the Aerial and its occupant pierced the clouds.

Mr. Youens then began to make observations for the purpose of selecting a suitable site on which to descend, and in a few minutes concentrated his attention upon a field in which a fête was being held. The breeze, however, carried the Aerial some three miles further, and a second time Mr. Youens attempted to lower himself in a field adjoining some farm houses at Denholme. Cautiously opening the escape valve, Mr. Youens continued the journey downwards and threw out the grapnels. Impetuous blasts of wind increased the difficulty of bringing the Aerial to anchor.

A strong wind prevailing, the balloon became unmanageable, and drifted over fields and stone walls with amazing velocity. The flukes of the grapnels penetrated the ground and uprooted the earth as they followed in the wake of the balloon, while the aerial chariot dashed onwards, making, in its career, wide gaps in several stone walls. Mr. Youens, preparing to encounter the worst fate, wrapped the end of the cord which opens the escape valve round one of his wrists, and burying himself in the car, permitted the balloon to proceed until the breeze subsided; when, after the car had been thrice capsized, and every article which it contained thrown out, Mr. Youens, who received no injuries, anchored, and completed a voyage of many miles, occupying half an hour in its accomplishment.

PLASS' PATENT SAFETY BAND-SAW.

It is usual, in band-saws, to place the saw outside the frame and column which support the driving parts, thus exposing



the saws to injury from handling lumber about them, also rendering them dangerous to the operator either from breakage of unsound saws, or by the saw sliding off the upper pulley while in motion and falling upon the operator, from which accidents have occurred. The main feature in this machine has been to produce a band-saw perfectly safe to the operator, and fully protected from injury to the saw—combining neatness and utility in all its parts.

By reference to the annexed engraving it will be noticed that the saw is placed to run upward inside the column, A, under the top arch, over the upper or tension pulley, and down inside the front frame and behind the guide bar, B, which can be adjusted up and down to the required hight for the work to be done. The saw also runs through a superior adjustable guide above and below the work, and a guide in the column near A, guiding equally well all widths of saws. The upper or tension pulley is entirely inclosed by the gate, C, which opens to change the saws, and perfectly protects the operator from the saw in case of breakage or sliding off. The upper pulley shaft is held in oscillating, yielding, and adjustable bearings, that can easily be set to accommodate the running of the saw.

Manufactured by the inventor, J. T. Plass, at his iron-works, Nos. 202 and 204 East 29th st., New York, where they can be seen in operation.

Malleable Cast Iron.

For the production of this material, says *Van Nostrand's Magazine*, most of the German founders use first fusion pig free from sulphur and phosphorus, or Scotch pig. Styria also furnishes a suitable iron, which can be used only in the north of Germany, however, on account of the expense of transportation and high duties. On account of the competition of wrought iron, great cheapness is very essential to its sale.

The makers keep secret the brand or grade of iron which they employ, but it is well understood that the brands are not the same in different establishments. The iron is melted in plumbago crucibles, holding about 30 kilogrammes. They are covered with porcelain lids to keep out impurities and cinders, which reduce the high heat requisite for the process. The fire in which the crucibles are placed, is from ·630 m. to ·940 m. square, and is surrounded with bricks of porcelain earth.

The use of blast is not advantageous, since the economy of time is offset by a greater consumption of coke. The natural draft of the chimney is sufficient when the furnace is properly constructed. As we have said, an essential condition of success is a high heat at the moment of pouring. Practice enables the founder to estimate the heat of the furnace, and he recognizes the precise moment by plunging a bar of red-hot iron into the crucible, from which, upon being withdrawn, the metal flies off in sparks. The crucibles are raised with tongs, with curved jaws, and the pouring is done with all possible promptitude—the surface being first cleaned.

By cementation the casting acquires the properties of wrought iron, having some analogy to steel. The operation consists in subjecting the castings to a prolonged red heat, in a bath of pulverized red hematite. They are arranged in boxes of cast iron called muffles. It would seem that the cylindrical form ought to be most advantageous for the boxes, but practically they are simply square, and with covers which should keep out entirely the least access of air.

In arranging the castings in the boxes they are placed in fayers alternately with layers of hematite. The cementing furnace is very simple. The grate is in front, and the draft of the chimney carries the hot air around the boxes. The heat should be conducted with care, starting rather vigorously, in order to reach quickly the desired temperature; then supplying the furnace at regular intervals. The cementation lasts three, four, and five days, according to the size of the pieces. A charge is about 350 to 450 kilogrammes of castings. In arranging the charges large pieces should not be mingled with small, and those muffles containing the larger pieces should be placed in the furnace first. On the other hand the smaller objects are placed on the sole of the furnace. Without these precautions many pieces may be burned, or badly decarburized—the latter becoming something intermediate between iron and steel. When the operation is deemed complete, the fire is allowed to fall, but the furnace is not un-

charged until it has gradually cooled. Practice plays an important part in the management of the firing, as the temperature can be judged of only after prolonged experience. Next to the fuel, the greatest expense is the cementing boxes, which are often serviceable only for a single operation.

AMERICAN INSTITUTE OF ARCHITECTS.--FIRE-PROOF CONSTRUCTION.

(Concluded from page 114.)

We conclude our review of Mr. Wight's paper on "Fire-proof Construction," published by the Committee on Library and Publications, a portion of which was given in our last issue.

"The objections to the brick arches are, that their great weight requires heavier beams than would otherwise be used, and that the form of their soffits is not beautiful, for they have the appearance of a long succession of little wagon vaults, requiring a resort to the doubtful expedient of furring the ceiling with iron lath. I think it might be objected to the French system of floors, that the expense would be too great, plaster being a dear article with us in comparison with its price in France, while our own cement has not the requisite properties to enable it to be substituted, besides being almost equally costly. The stone slabs of Mr. Eidlitz, are the only rigid material thus far used successfully with iron beams, and could be used to better advantage if laid *on* the beams rather than resting upon their lower flanges, as is done in the American Exchange Bank. They are doubtless the handsomest material that can be used for this purpose, but are open to the objection of being heavy and expensive—where expense is a question, and utility only is sought—requiring heavy beams and calling for elaborate cutting on the under side. It will be pertinent to our inquiry, therefore, to ask if there are any other rigid materials adaptable to this purpose, and possessing the desired quality of lightness and cheapness. Cast-iron plates may be used for flooring in two ways; first, when deafening and finished floor covering are required; second, when neither is required, as in manufacturing buildings, wherein a reasonably smooth flooring is required, and a few planks, laid where workmen habitually stand, will answer the purpose of non-conductors of heat. Experiment must determine the minimum quantity of iron (in proportion to the strength required), to be used in the floor plates. In obtaining the proper form for strength, and to insure true castings, the bottoms of the plates will naturally be covered with raised flanges, except at the edges, where they bear on the beams. These flanges or ribs may assume a decorative form, either a plain diaper or larger pattern to form a complete design for the ceiling when many of them are combined. By a judicious arrangement of the flanges the actual thickness of the iron may be reduced to three eighths or a quarter of an inch. When deafening is required, strengthening flanges may also be cast on top of the plates, and consequently the beams can be placed at wide intervals. The flanges on the top will then serve to keep the concrete, used for deafening, in its place, and avoid the cracks which might occur in a large surface of cement. The deafening may be of any thickness required, and will serve as a bed for the floor tiles. All that is then required for the under side is judicious decoration of the beams and floor plates. When deafening is not required, as in manufacturing buildings, the tops should be smooth. It has been objected that the floors of iron would be too cold for the feet of workmen. But it would be very easy to put down platforms of wood where the men habitually stand. Besides, when the lower story is heated, the stratum of hot air immediately under the ceiling would naturally keep the floor at a higher temperature than that of the air in the room, and the greater conductibility of the iron would rather tend to warm the feet of those who stand upon it. The plates, in all cases, being bolted to the flanges of the beams, would serve as bridging for the floors.

"Where decorative effect is desired, stone with marble panels is recommended. Our native quarries now afford stone light enough in color to set at rest all objections that may be made to its use on the score of light. But if those should hold good the material might be marble paneled with marble, the former white, and the latter colored. Obviously the cheapest material for wall covering in natural materials would be slabs of white marble. Let us then make some comparison of figures, and see what can be done with this material. Iron lath, of the form generally used, cost $1·25 per foot. Three-coat plastering costs nine cents per foot. A responsible dealer in marble informs me that he will put up inch slabs of Italian veined or Vermont marble for one dollar and a half per foot. Which, then, would you choose, polished marble at $1·50, or plaster, as good in appearance as that in any tenement house, at $1·34? This is a fair comparison for exterior walls or ceilings. Italian marble slabs can be procured in any quantity, from eight to nine feet long and three feet wide. In a room fifteen feet high, allowing four feet for wainscot and two feet for cornice, you may line your walls with one length of marble.

What treatment do we now give to doors? We build brick jambs with wooden or iron lintels, as if we would trim the doors with wood. We then put up cast-iron jams, rivet to their edges pilasters or architraves of the same material, and then surmount the whole, perhaps, with a cast-iron cornice and pediment. Some have gone so far as to inlay the panels of the iron work with bits of colored marble, thus heightening the effect of the already rough finish of the iron, a roughness which the best founderymen have been unable to prevent, and which it would cost untold money to reduce down to the smoothness of ordinary work in pine wood. In one of our most pretentious houses on Fifth Avenue, they are now putting up jams, architraves and cornices made of sawn slabs of marble or marble boards, in the same manner in which wood and iron have been used. And what does all this amount to? In the category of shams, there is no equal to this monstrous succession. You have imitated a Greek or Roman architrave and cornice by a wooden sham, your wooden sham has been imitated by an iron sham, your iron sham has been imitated by a marble sham. And what is the result? You have kept the form all along; you have come back to the original material by a succession of imitations, and have at last a shell without meat—marble carpentry instead of marble architecture. In all the stages of your attempt to revive the old forms, you have sham imitation of shams down to the final achievement of your carpenter in marble.

"In erecting modern fire-proof buildings, especially in so far as iron work is concerned, all the conditions imposed upon the architect are different from those which existed in past ages. The same may be said of the use of iron in any building. Subserviency to style, when the material used is not such as was the controlling element of that style, is destructive to all good art; for there can be no truly artistic effect except that which is produced by the best use of material, and its decoration in best accordance with its nature. If the use of iron is ever to lead to the erection of buildings worthy of being called works of art, such a result must be attained only by the recognition of this principle.

"The best thinkers have doubted whether there can be any such thing as architecture in iron, assuming of course, that to be called architecture, the material must be constructively used; and there is good reason for these doubts. An iron building does not always require the force of gravity to maintain the cohesion of its parts; it possesses such properties that it may be swung in the air or balanced on a single point, if it is necessary so to do. It is a machine admitting of as little decoration as a steam engine or a printing press. If iron alone were used for buildings, constructive necessity and economy combined, might lead us to build houses like steam boilers or water tanks."

In a foot note Mr. Wight states that an inspection of Harper & Brothers' building, since writing this paper, has convinced him that the principle of division into horizontal compartments has been carried out more thoroughly in it than in any other building of the kind. There are no openings through the floors. It contains neither interior stairs nor hoistways—both are on the exterior. The stairs are in an isolated tower approached by bridges, and the hoistway is without inclosure. This arrangement is, however, extremely inconvenient.

In conclusion, Mr. Wight urges architects to avoid the use of iron whenever possible so to do; but if it must be employed, to use it rationally and constructively, without attempt to imitate styles not in harmony with its constructive properties.

THE EARLY AMERICAN IMPROVEMENTS IN PRINTING PRESSES.

Few men have borne a more important relation to the wonderful progress made in this country, during the present century, in the improvement of printing presses, than Phineas Dow, of this city. Although now nearly ninety years of age, his mental and physical faculties are in a remarkably good state of preservation, and he affords a new illustration of the trite maxim that men are more apt to rust away, in idleness, than to wear out in good service. His career also illustrates not only mechanical genius of a high order, but extraordinary versatility and the happy faculty of turning a cunning hand to varied employments.

Phineas Dow was born in November, 1780, in Londonderry, a town in New Hampshire, named after the famous Irish locality which bears the same cognomen. His parents were both natives of this country, and he is, therefore, by descent, as well as by his own long-continued residence in the United States, truly "to the manor born." When but about a year old, his father died, and this misfortune imposed upon him the necessity of earning his bread by the sweat of his brow, from a very early period of his life. The surviving family consisted of his mother (who lived to reach a green old age), two sisters, and himself; and after various removals, from Londonderry to Wyndham, from Wyndham to Litchfield, and from Litchfield to New Boston (N. H.), young Dow, who, from the time he was six or seven years of age, was employed on such farm-work as best suited his strength and capacity, was apprenticed, in his fifteenth year, to a carpenter in New Boston, with whom he remained, working steadily and skillfully during the ensuing three years, under the impression that his future life would be devoted to the trade of his early adoption. It so happened, however, that the talent he displayed in wood-work attracted the notice and commendation of a friend, through whose influence he secured, at the age of eighteen, a more lucrative situation as a coach maker, at Salem, Mass., where he remained until he was about twenty-three years of age, employed mainly in making the bodies of the chaises, which were the fashionable vehicles of that period. About 1803 he went to Boston, where, after working some time as a journeyman coach-maker, he became the proprietor of a coach-making establishment, which he successfully conducted, until the war of 1812 prostrated that branch of industry, and compelled him to seek remunerative employment in a new field. His skill in wood-work well qualified him for the task he then assumed, of making the elaborate cabinet carving which was then required for the decoration of the furniture used by the wealthier classes, and this business he continued up to the time the war closed. During this period, he was the intimate acquaintance of Daniel Treadwell, who, as his next-door neighbor, was prosecuting his trade as a silversmith, under serious disadvantages, occasioned by the pressure and distress arising from the war. Dow and Treadwell, in conjunction, employed their leisure moments in efforts to construct a new machine for making iron screws, for which a great demand then existed, on account of the gradual consumption of the old supplies which had been received exclusively from England. Just as they were about perfecting their device, the sudden termination of the war overwhelmed their enterprise in the ruin which attended many similar efforts to supplant foreign products, for they were unable to compete with the British manufacturers, whose fabrics deluged the American market as soon as it was re-opened. Baffled in this direction, Mr. Dow, combining the knowledge he had acquired in their experiments with his previous acquaintance with various branches of mechanics, started a machine shop, where machinery of all kinds was repaired or manufactured, and it was as a machinist that he first established the connection with printing presses which has continued during the last fifty years of wondrous progress. Mr. Dow paid special attention, in his machine shop, to fire engines, and displayed such skill that he received all the patronage in the gift of the city of Boston, together with the compliment of the Mayor that his improvements were worth far more than the amount of his bills, and the appointment of official inspector of all the fire and steam engines in the city. While he was repairing, making, and improving fire engines, he was equally ready to execute orders for other descriptions of machinery, and, as it fell within his province to repair old printing presses, his establishment became the head-quarters, in Boston, of this business. For a time his efforts were confined mainly to various forms of the old-fashioned hand-press, and he also made and sold some ten or twelve hand-presses, called the Dow press, which embraced new devices, invented by one of his workmen, named Cooley (a half-breed Indian), as well as improvements suggested by himself. But not long after the close of the war, his friend Treadwell returned from a trip to England, with a firm conviction that the time had arrived for the construction of more rapid printing machinery than the old hand-press. His attention had probably been attracted to the improvements which were then still novelties in England, for the earnest practical efforts to construct a power type printing press, of any description, were made in the early part of the present century, and the London *Times*, of Nov. 28, 1814, truly announced that that journal was the first newspaper printed by steam-impelled machinery. From the plans and descriptions furnished by Mr. Treadwell, Phineas Dow made first a model, and, subsequently, a series of working power-presses, which, so far as is known, were the first ever made or used in the United States; and, for this service alone, he deserves an honorable niche in the history of American printing. We can scarcely realize that Mr. Treadwell was so far in advance of his time, that, after his power-press was completed, he could find no purchasers—no newspaper proprietor ready to venture upon the doubtful experiment of printing more than a few hundred copies per hour—no book printer anxious to secure such facilities!

Undaunted by this difficulty, Treadwell commenced the printing business himself, running his presses by horse power, but as soon as he was fairly at work issuing, with unprecedented rapidity, various popular books, his establishment was burned to the ground. The origin of the fire is not positively known, but the hand-pressmen of that day were intensely hostile to the new-fangled labor-saving invention, which threatened, in their judgment, the annihilation of their craft, and it was generally believed that this feeling had finally culminated in the destruction of the first power-press printing establishment of this country by an act of incendiarism. Thus the dawn of a great mechanical revolution was hailed by the indifference of employing printers and the deadly hostility of pressmen.

Mr. Treadwell, still undaunted, had other presses made, and for greater security, as well as to gain less expensive power, he established another printing office on the mill-dam, in or near Boston, where his presses were run by water-power.

Mr. Dow subsequently made for Mr. Isaac Ashmead, of this city, two of the Treadwell presses; and Mr. Ashmead was so well pleased with their operation that he had six other presses of the same pattern made by other machinists.

Mr. Treadwell's inventive genius was not confined to power presses or screw machines. He claims to have been the originator of the Armstrong gun, and Mr. Dow still remembers that, in 1814, Treadwell asked him what he thought of making a gun of "staves" of iron, and binding it together with iron hoops. Treadwell also invented, some years ago, a type-setting and type-distributing machine, as well as wrought nail and inking machines, which were made by Mr. Dow. Information in regard to the type-setting machine was surreptitiously given by one of Mr. Dow's blacksmiths to a man who went to England and had it patented there so promptly, that the real inventor, Treadwell, who had been tardy in his application, was denied a patent in this country.

While the Treadwell presses were being manufactured, Mr. Dow had in his employment, as journeymen, two men, who have since won imperishable renown, as well as a more substantial reward, for their useful improvements in printing presses—Seth and Isaac Adams—the inventors and patentees of the Adams press. They were originally cabinet carvers, and they were useful in the machine shop in making patterns, as well as in various other affairs requiring superior skill. Isaac Adams possessed great fertility of invention, while his brother Seth was a shrewd business manager; and this combination of talents secured their joint success in realizing large profits from the Adams press. Prior to their famous invention, and while they were still working for Mr. Dow, they invented a power press which was also called the Adams press and which attracted considerable attention. Mr. Dow made a number of these machines, and among other sales, he effected several in Philadelphia, including one to Samuel Coates Atkinson, of the *Post and Casket*; one to Joseph R. Chandler,

proprietor of the *United States Gazette;* and one to Jasper Harding, proprietor of the *Inquirer;* and while he was putting up these three presses, he effected sales to other Philadelphia printers and publishers.

Mr. Tufts, who subsequently invented and manufactured several presses of novel construction, was also one of the journeymen engaged in Mr. Dow's machine shop at the period when these important improvements were gradually being perfected.

While the journeymen of the establishment were busily engaged in preparing for the transition from hand to power labor, the inventive genius of the proprietor was not idle. In addition to his constant efforts to put into working order the models of other men, he labored steadily during his leisure moments, in conjunction with Mr. Sawyer, a cabinet maker, to perfect a power press that would make a simultaneous impression on both sides of the sheet; and after spending several thousand dollars and much time in completing a machine of this description, his efforts were apparently about to be rewarded with success, when a destructive fire consumed his whole establishment, and as it was totally uninsured, all the fruits of years of hard labor were suddenly swept away.

Immediate necessities compelled Mr. Dow to turn his energies in a new direction. For a time he was in doubt how to make his new start in life, and while he was gaining a temporary support at his former trade of cabinet carver, he made a piano which, after more than thirty years of hard service, is still in good condition, and it affords one of many existing proofs of the versatility of his mechanical genius.

After spending several years subsequent to the destruction of his machine shop in several places, Mr. Dow permanently established himself, in 1841 or 1842, partly at the solicitation of Mr. Isaac Ashmead, as a machinist, in Philadelphia, his shop being located in a part of the building now occupied exclusively by King & Baird's printing office. His superior knowledge of the machinery connected with power presses, which were then rapidly coming into general use, gave him, for a time, a monopoly of this branch of his business in Philadelphia, and made him "the doctor" of all the sick power presses of the city. After remaining in the King & Baird building for five or six years, he removed his establishment near Sixth and Arch streets, where, up to a very recent period, he continued his active business career, astonishing his numerous acquaintances by the unremitting intellectual and physical vigor displayed despite his near approach to the green old age of fourscore and ten.—*Printers' Circular.*

Dyeing and Printing.

At the present time, sumac is much used in dyeing and printing, in order to cause other dyes to take better on the fabrics or fibers of materials to be dyed or printed. According to an invention lately patented by Mr. J. L. Norton, of Bell Sauvage Yard, Ludgate Hill (whose name is well known in connection with the Abyssinian tube well), an extract of the bark of the hemlock tree is substituted for the sumac, the desired result being thus more effectually and economically attained. The following are the details of the methods by which Mr. Norton operates in order to obtain a number of different colors:

To dye 20 lbs. weight of cotton a magenta color, take 3 lbs. of Miller's extract of hemlock bark as imported from Canada, and boil it with 20 gallons of water, and then lay the cotton in the liquid for a night. In the morning, add 3 pints of red cotton spirits diluted with 20 gallons of warm water, and work afterward the cotton in this for 50 minutes. Then bring it out and wash twice with cold water, and afterward with warm water. Then take 20 gallons of fresh water heated to 160° and put two pints roseine solution into it, and work the cotton in this liquor till the color is full enough. Wash the cotton and dry it.

To dye a primula color, proceed as before, only using a solution of Hoffman's violet instead of roseine, and work at the same temperature (160°). A bluer tint may be obtained by increasing the heat, or a redder by lessening it.

To dye a lavender color, take of extract of hemlock bark 1½ lbs. to 20 lbs. of cotton, and work the cotton in the extract diluted with 20 gallons of water for half an hour. Rinse and wash in cold water, and then in warm. Take of red cotton spirits 1 pint, diluted with 20 gallons of warm water, and work the cotton in it for 15 minutes, then wash in two warm waters. Afterward work the material in a bath consisting of 1 pint of Nicholson's No. 2 blue solution, with 1 gill of nitric acid at about 100°. Wash the cotton and dry it.

To dye a green color, prepare with 4 lbs. of extract of hemlock bark mixed with 20 gallons of water. Lay the cotton in this for 1½ hour at a boiling heat; then prepare a bath with 20 gallons of cold water and 2½ pints of double muriate of tin, and work in this half an hour. Wring the cotton out and wash off well to kill the strong acid. Afterward take 20 gallons of water at a temperature of 170° or 180°, and put into it 1 pint, or nearly so, of iodine green paste diluted with 1 gill of methylated spirits; if a yellow shade is required add a little picric acid. Work the materials in this for about 20 minutes, then wash and dry it.

To dye a gold color, prepare with ½ lb. of extract and 1 lb. turmeric dissolved in 2 gallons of water. Work at a heat of about 90°, then cool down and add ½ gill nitric acid. If the color is not red enough, add a little annatto; if not deep enough, repeat until the shade required is obtained.

To dye black, take 4½ lbs. of extract of hemlock bark and boil it with 20 gallons of water, and then lay the cotton in this liquid for a night. In the morning take it out and put it into a cold lime water bath of 4°, and work in this for 10 minutes. Wring out and sodden with 15 gallons of old sumac liquor, 1½ lb. of copperas, and 2 gallons of urine. Work it in this for 15 minutes, wring out, and again put it into the lime liquor and work in it for 10 minutes, and then wring out. Afterward scald 6 lbs. of chipped logwood with 15 gallons of boiling water, and work in this for 20 minutes, and then give the cotton 3 turns in 15 gallons of cold water, in which 1 lb. of copperas has been dissolved. Soap it with 1 lb. of soap in 20 gallons of warm water, and wash off in cold water and dry.

To dye brown, proceed as above, only with 4 lbs. of the extract, and in the morning take the cotton out and work it for 30 minutes in 20 gallons of cold water, to which add 2½ pints of red cotton spirits. Then wash off in two cold and one warm waters. Then scald 7 lbs. chipped logwood with 15 gallons of boiling water, and let it cool a little, and then work the cotton in it for 30 minutes. Take the cotton out and add 1 lb of alum to the bath and work the cotton again for the shade required. Wash off in cold water, and dry.

By red cotton spirits is meant a compound of about 2 parts of aquafortis to 1 pint of spirit of salts, to which block tin is added for the purpose of killing it before using. The quantities directed to be used of the several aniline dyes are applicable to the usual commercial strengths.—*European News.*

A SIPHON FOR DRAINING A TUNNEL.

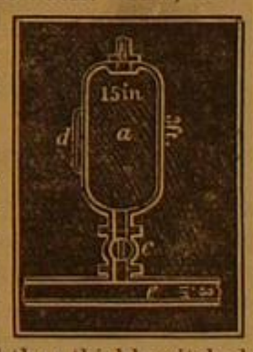
The tunnel through the Blue Ridge, in Virginia, is 4,273 feet long, and 700 feet below the top of the mountain; on this account it was thought expedient to construct without shafts. This tunnel slopes from west to east, at the rate of 70 feet to the mile, so that, on the west side, the water, which proved very abundant and troublesome, had to be removed by artificial means. For some distance at the entrance I determined to introduce a siphon of unusual length, which proved a difficult, and, at the same time, interesting experiment.

The whole length of the siphon is 1,792 feet, viz., 563 feet inside of the tunnel, and 1,229 feet outside. The level of the water inside is upward of 9 feet below the summit, and the fall outside 29¼ feet, so that the head is a fraction over 20 feet.

Iron faucet pipes of three inches interior diameter were adopted. It was feared that larger ones would carry along too much air; and that the siphon would have to be fed too often at the summit, an apprehension which the results observed seem to justify.

A common faucet cock is placed at each end, to close the siphon when it becomes necessary to fill it again with water; and at the summit a large air vessel is provided to collect the air disengaged from the water, with a suitable opening at top, to let the air out and replace it with water; this opening being closed by a cap tightly screwed down. At the bottom of the air vessel there is, besides, a large cock, which is closed while the siphon is being fed through the top opening, so as not to interrupt the running of the siphon during the operation.

The annexed diagram represents the air vessel, *a*; *b* is the cap; *c* the cut-off cock; *e* the main pipe or siphon; *d* is a glass tube for observing the level of the water. This, however, being often broken was dispensed with at last; the level of the water being easily ascertained by knocking against the air vessel.



Things being now disposed as described, it might be supposed that the discharge would have gone on uninterruptedly, requiring only a careful attention to replenish occasionally with water the air vessel; but such was not the case; at first the joints had been made tight by packing with oakum and then thickly pitched over. The siphon was filled with water through the air vessel, which, being then closed and the ends open, the water began to flow; but this did not continue for more than five or ten minutes, when the air vessel was found empty of water, and had to be replenished at these short intervals; moreover, notwithstanding this tedious repetition of feeding the siphon, it would ultimately run dry in about two hours.

This was a truly discouraging circumstance; we ascribed it to the fact that, there being upwards of 200 joints, air was introduced in small bubbles through the oakum packing by the external pressure at every joint, and that it accumulated rapidly all along, especially in the longer arm of the siphon, which soon became too light. Accordingly, we decided not to abandon the enterprise, but to caulk the joints with lead in the usual way, which was not done before for motives of economy, and because, it being only a temporary fixture, it would have been more easily taken apart.

This operation was not entirely successful, though the caulking was made so hard that many of the bells broke in packing, without making the joints perfectly impermeable. Then a cement was made of equal parts of white lead and red lead mixed to the consistency of soft putty, with equal quantities of Japan varnish and boiled linseed oil. This cement carefully coated over the joints, made them at last perfectly tight. The siphon thus improved runs now regularly. Still the air vessel must be replenished with water every two hours, which is done by a pipe leading from a spring; and moreover, every six hours the ends must be closed, and the whole siphon filled in anew with water; otherwise it would run dry. It is probable that, owing to its being so long, and consequently so level, bubbles of air travel along very slowly and increase in size gradually; possibly some air may find its way under external pressure through the iron itself.

A curious circumstance took place in the beginning; the tunnel having progressed much beyond the well of the siphon, and the water considerably increased, a horse-power with chain pumps was constructed at the further end to pump up the water into troughs, by which it is led to the siphon well. Here, the siphon being insufficient for this accession of water, another horse-power was introduced to pump up water out of the same well. As soon, however, as the chain pumps began to revolve in the well, the siphon suddenly stopped and we were obliged to dig a separate well for it; since which time both have worked well.

The siphon, by actual measurement, when just replenished, discharges 43¼ gallons per minute, whereas all known formulæ give between 54 and 60 gallons, and furthermore, in Weale's "Engineers' and Contractors' Companion" occurs this conflicting remark taken from R. A. Peacocke's work:

"By Dr. Young's formula (considered by him the best), a 5-inch pipe would be used where a 3½ would suffice; a 7-inch where a 5 would suffice; a 10 inch where a 7 would suffice, and a 14-inch where a 10 would suffice."

And then he goes on to show the useless expenditure resulting from pipes too large being used in obedience to these formulæ. But here, in this extraordinary long siphon, his opinion is not sustained, and we find, on the contrary, the discharge is less than the formulæ given, and that neither they nor Mr. Peacocke's rules are applicable to this case.

The siphon I have described is, I believe, the longest ever attempted to be used, and on this account the results and anomalies it presents are somewhat interesting. It certainly has rendered considerable service in the Blue Ridge Tunnel; with no other current expense than the employment of a man to attend to the air vessel.—*By Col. Claudius Crozet, C. E., in the Journal of the Franklin Institute.*

A Chinaman on the Chinese Question.

Whatever may be the average intellect of the Chinese, there can be no doubt as to the intellect of the man who made the following speech. The remarks were delivered by Choy Chew, a Chinese merchant, at a recent banquet in Chicago:

"Eleven years ago I came from my home in China to seek my fortune in your great Republic. I landed on the golden shore of California, utterly ignorant of your language, unknown to any of your people, a stranger to your customs and laws, and in the minds of some an intruder—one of that race whose presence is deemed a positive injury to the public prosperity. But, gentlemen, I found both kindness and justice. I found that above the prejudice which had been formed against us, there flowed a deep, broad stream of popular equality; that the hand of friendship was extended to the people of every nation, and that even Chinamen must live, be happy, successful, and respected in 'free America.' I gathered knowledge in your public schools; I learned to speak as you do; to read and write as you do; to act and think as you do; and, gentlemen, I rejoice that it is so; that I have been able to cross this vast continent without the aid of an interpreter; that here in the heart of the United States I can speak to you in your own familiar speech, and tell you how much, how very much, I appreciate your hospitality; how grateful I feel for the privileges and advantages I have enjoyed in your glorious country; and how earnestly I hope that your example of enterprise, energy, vitality, and national generosity may be seen and understood, as I see and understand it, by our Government. Mr. Burlingame has done much to promote good feeling in China toward the American nation. He made himself well acquainted with the authorities at Pekin. He won their confidence to a remarkable degree. He is an excellent man, and, I believe, if his advice is received and acted upon, China will soon be the cordial friend of all the commercial powers of the earth. Already we are doing something in the way of progress in modern improvements. Steamboat lines have been established on our rivers, and the telegraph will soon connect us with the wonderful sovereignty of the Western hemisphere, where the people rule, where everything proclaims peace and good will to all. China must brush away the dust of her antiquity, and, looking across the Pacific, behold and profit by the new lessons of the New World.

"We trust our visit, gentlemen, may be productive of good results to all of us; that the two great countries, East and West, China and America, may be found forever together in friendship, and that a Chinaman in America, or an American in China, may find like protection and like consideration in their search for happiness and wealth."

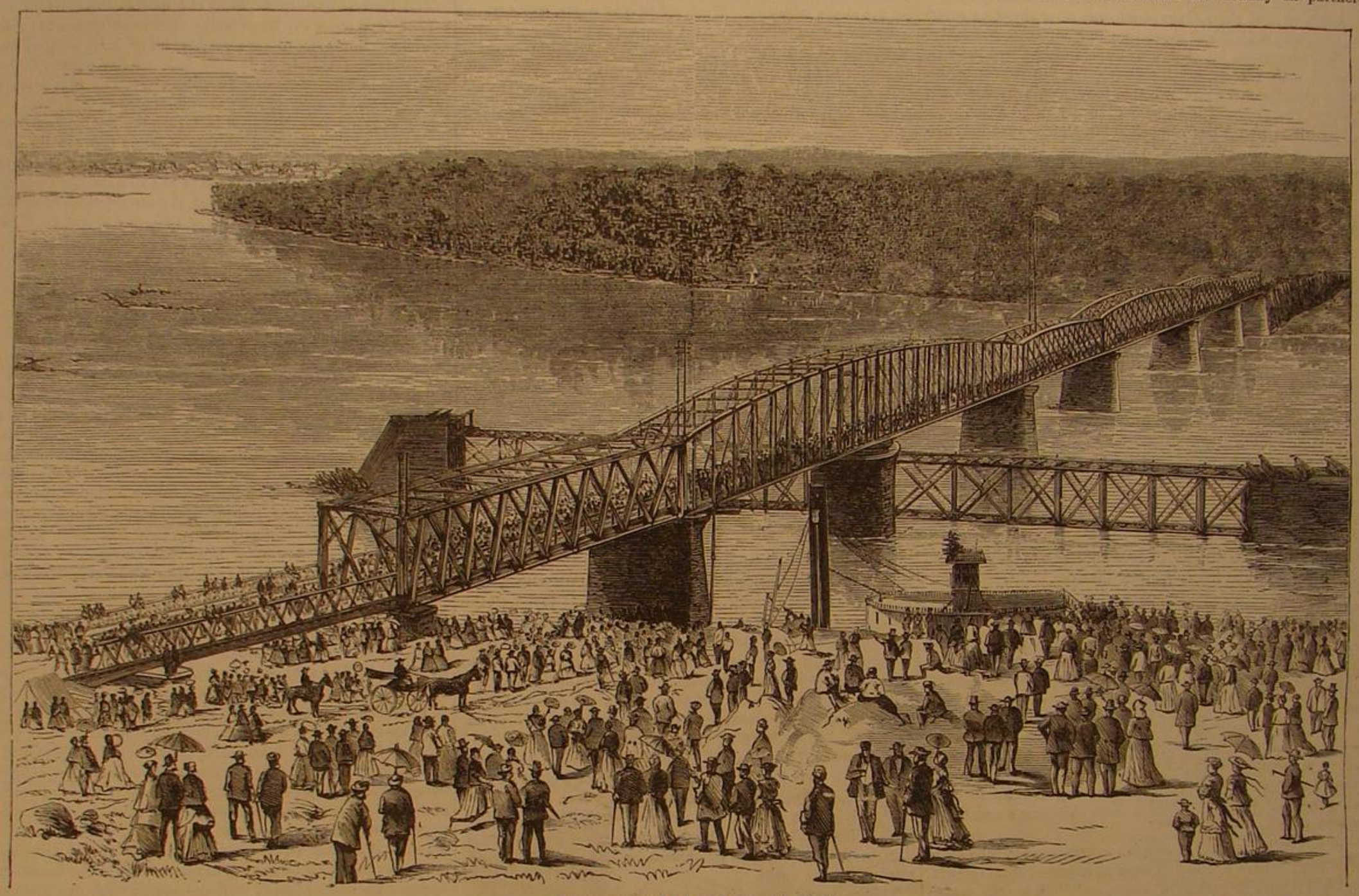
The Anthracite Coal Region.

Concerning the anthracite coal region, which has been so much talked of in connection with the miners' strike, we find an interesting sketch in the Baltimore *Sun*. Its area is four hundred square miles, and one hundred and seven miles of it lie within the limits of Luzerne county, Pennsylvania. The total quantity raised in the whole State of Pennsylvania down to 1860, amounted to a little over eighty-three millions of tuns, of which Luzerne furnished twenty-nine millions. The first company for mining coal was formed in 1792, and it was five years before they shipped to Philadelphia, and this venture consisted of thirty tuns. The city authorities consented to take it, and tried to burn it under the boilers of the engines at the water-works, but it put the fire out. The balance was broken up and used in place of gravel over the sidewalks, and only the blacksmiths near the mines used the coal for home use. The discovery was made by a tavernkeeper, Jesse Fell, of Wilkesbarre, who concluded that a good draft was alone necessary to make it burn, and he built a grate of green hickory saplings, placed it in a large fireplace in his barroom, filled it with broken coal and dry wood under the grate and set it on fire; the flames spreading through the coal, it was soon ignited, and before the wooden grate bars were consumed the success was proved, and hundreds of people flocked to the old tavern to witness the discovery.

SUSPENSION BRIDGE OVER THE MISSOURI RIVER.

Kansas City, Missouri, although not so well known in the East as Leavenworth, Omaha, St. Joseph, and possibly some other Missouri river towns—enjoys remarkable advantages of natural location and commercial facilities. It is already the terminus of seven different railroads.

To Kansas City belongs the honor of building the pioneer bridge over the Missouri. On the south or west side of the river the Pacific Railroad (of Missouri) extends from St. Louis to the State line at Kansas City; the Kansas Pacific Railway, late Union Pacific Eastern Division, is now in operation four hundred and five miles west from the same point of the boundary. The Missouri River Railroad, now operated in connection with the Missouri Pacific, continues that line up the river to Leavenworth; and the Missouri River, Fort Scott, and Gulf Railroad, running at present to Paola, forty miles south, is being pushed rapidly to the Indian Territory, and will become the great route from the North to the Southwest. On the opposite river bank the North Missouri Railroad forms a second line to St. Louis; the Missouri Valley Railroad runs northward to St. Joseph; and the Kansas City and Cameron Railroad, forming part of the Hannibal and St. Joseph Railroad line, opens a direct route to Chicago. The bridge, now completed, was built by the last-named road and will enable the seven roads to unite at common points within the city.



THE KANSAS CITY BRIDGE.

The location of the bridge, as shown in the accompanying topographical sketch, is opposite the town, and immediately below a bend in the river. It was begun in January, 1867. In February Mr. Chanute, the chief engineer, took charge of the works. In the spring the enterprise was interrupted by a high flood, and it was not until August that work could be resumed. The south abutment of the bridge was placed eighty feet back from the face of the bluff, and from it a sixty-six foot span extends over a street and the track of the Missouri Pacific Railroad to a pair of pillars standing near the edge of the rock face; a span of one hundred and thirty-three feet reaches from them to pier No. 1, the first river pier. A pivot-draw of two spans, each one hundred and sixty feet in the clear, and three hundred and sixty-three feet long over all, from center to center of piers Nos. 1 and 3, turns upon pier No. 2, which is placed as nearly as possible in the center of the channel. Pier No. 4 was located two hundred and fifty feet beyond No. 3; No. 5, two hundred feet further north, on the edge of the sand-bar; and two spans, two hundred, and one hundred and seventy-seven feet respectively, cover the distance remaining to pier No. 7, which stands on the edge of the wooded shore, taking the place of a north abutment. The railroad is then carried over the bottom land on two thousand three hundred and sixty feet of trestle-work, descending one foot in a hundred to an embankment. The carriage-way is carried down on a heavier grade by a side trestle.

The difficulties attending the building of this bridge were wholly in the foundations. The length of the structure is one mile.

The masonry of all the piers is of limestone, quarried in the neighborhood, the facing being of ashlar and the backing of heavy rubble. The ashlar of the upper courses, above the ice-breaker, is of a good blue-stone, of uniform color, and the stones used below are of a grayish tint. The piers finish eleven feet higher than the great flood of 1844, and forty-eight feet above the lowest water observed. The total hight of pier No. 4, from rock to coping, is eighty-nine feet. The pivot pier is circular in form and twenty-nine feet in diameter, finishing thirty-two feet on top.

The entire structure was completed by July 3, 1869, and the event was celebrated by the citizens of Kansas City with the greatest enthusiasm.

Bleaching Straw Hats.

Straw hats which have turned yellow may be bleached by the use of a soap prepared by taking any good soda soap and precipitating it from its solution by means of common salt, and adding to it one fourth the weight of sulphate of soda, previously rubbed into a mass with water, then drying the product. About equal parts, by weight, of water are to be poured upon this, and for every two pounds of soap, half an ounce of spirits of sal-ammoniac is to be added; and after the whole has assumed a gelatinous consistency, one part of the mass is to be dissolved in eight parts of warm water; smaller proportions of the foregoing will of course answer for a few articles. The objects to be bleached are to be washed by means of a brush in this solution, and transferred, while still moist, into water acidulated with hydrochloric acid (twenty-five parts water to one and a half of acid), and allowed to remain a few hours in this liquid. They are then to be washed with fresh cold water and dried. Experiment has proved the results of this method of bleaching to be exceedingly satisfactory.

Chinamen in California.

Hittell's "Resources of California," a notice of which will be found under the head of "New Publications," in another column, contains the following statements in regard to the Chinese in California, and their present condition:

"The Chinamen in California are nearly all very ignorant and very poor. Their number is about fifty thousand, of whom more than half have been six or seven years in the State. Most of them are engaged in mining; and the remainder are merchants, fishermen, washermen, and a few are employed as cooks in hotels, and as farm laborers on farms owned by white men. Most of them come from Southern China, and nearly all of them are members of five great companies, called the Yung-Wo, the Sze-yap, the Sam-yap, the Yan-wo, and Ning-yeung companies. These companies have each a large building in San Francisco, where they lodge and feed all the members of their company when they arrive from China, or when they come on a visit from the interior. The companies are benevolent associations, and take care of their indigent and sick. There are no Chinese beggars in the streets, and no Chinese patients in the public hospitals. The common laborers are brought to the State under contract to work for several years at a low rate of wages (from four to eight dollars) per month; and they usually keep these contracts faithfully. The employers in these cases are either the companies or associations of Chinese capitalists. The Chinamen generally are very industrious; indeed they are the most industrious class of our population, and also the most humble, quiet, and peaceful. The merchants are considered to be very faithful to their promises, and in San Francisco they can get credit among their acquaintances quite as readily as other men in similar branches of business. In the mines, the Chinamen work in the poorest class of diggings. They own no ditches, large flumes, hydraulic claims, or tunnel claims. The white miners have a violent antipathy to them, will not permit them to work in many districts, and will often drive them from their best claims in the districts where they are permitted to work. Sometimes the celestials venture to dam a stream, but not often. They use the rocker more than any other class of miners.

In San Francisco, the merchants are usually in partnerships, with not less than three nor more than ten partners; all of whom live in the store, and deal chiefly in Chinese silks, teas, rice, and dried fish. The two latter articles form a large portion of the food of the Chinamen in the State. They have not learned to use bread instead of rice. Those who can afford it, eat pork, chickens, and ducks. Beef, and most of our garden vegetables, do not find much favor with them, even among the wealthiest. The washermen are usually in companies of two or three, and they have numerous little shops in the streets of San Francisco, and in the smaller towns. They sprinkle their clothes previous to ironing, by filling the mouth with water and then blowing it over them. For ironing, instead of a flatiron, they use an iron pan with a smooth bottom, and kept full of burning charcoal. There are not more than one thousand Chinese women in the State, and nine tenths of these are prostitutes of the lowest class. The Chinese children are few.

The Chinese men, women, and children learn English very slowly; most of those who have been five or six years in the State cannot understand the most common English words. All the Chinamen in California adhere to their national costume, with some slight variations. They wear their hair long, use no white muslin or linen next the skin, and never put on a dress coat or stove-pipe hat. In the cities they ordinarily use wooden-soled shoes, with thin cotton uppers. Instead of a coat, they have a short blouse, generally of dark blue cotton, fitting close up to the neck. The wealthy have this blouse made of silk or fur. In cold weather, if of silk or cotton, it is wadded. The legs and lower part of the body are inclosed in breeches of cotton or silk, tight from the thigh down, and loose above. Some of the poorer men find trousers of the European pattern more convenient, and wear them. The miners generally wear coarse boots or shoes.

A Madras paper states that the wounded caudal appendage of a young lion was recently amputated at the stern while the beast was under the influence of chloroform. After the operation the surgeon commenced briskly rubbing, so as to inflate the lungs, a plentiful supply of water being also poured over the body, which soon restored the animal to life. This, we believe, is the first time that a lion has had his tail bobbed while under the influence of chloroform.

RESTORATION OF PERSONS APPARENTLY DEAD FROM DROWNING.

The following rules for the restoration of persons apparently dead from drowning, are those given by Professor Benjamin Howard, of this city, and sanctioned by the Metropolitan Board of Health of the city of New York. The accompanying engravings will also aid in their application.

Fig. 1 represents the mode of forcing and draining off water and other accumulations from the stomach, throat, and mouth, according to Rule 2, preparatory to performing artificial breathing.

Fig. 2 represents the posture of patient, A, according to Rule 3—arms extended backward, and ribs thrown prominently forward by a roll of clothing, *a*, beneath the back.

RULE 1.—Unless in danger of freezing, never move the patient from the spot where first rescued, nor allow bystanders to screen off the fresh air, but instantly wipe clean the mouth and nostrils, rip and remove all clothing to a little below the waist, rapidly rub and dry the exposed part, and give two quick, smarting slaps on the stomach with your open hand.

If this does not succeed immediately, proceed according to the following rules to perform artificial breathing:

RULE 2.—Turn the patient on his face, a large bundle of tightly-rolled clothing, *a*, Fig. 1, being placed beneath his stomach, and press heavily over it upon the spine for half a minute.

RULE 3.—Turn the patient quickly again on his back, Fig. 2; the roll of clothing being so placed beneath it as to make the short ribs bulge prominently forward, and raise them a little higher than the level of the mouth. Let some bystander hold the tip of the tongue out of one corner of the mouth with a dry handkerchief, and hold both hands of the patient together, the arms being stretched forcibly back above the head.

RULE 4.—Kneel astride the patient's hips, C, Fig. 2, and with your hands resting on his stomach, spread out your fingers so that you can grasp the waist about the short ribs. Now, throw all your weight steadily forward upon your hands, while you at the same time squeeze the ribs deeply, as if you wished to force everything in the chest upwards out of the mouth. Continue this while you can slowly count—one—two—three; then suddenly let go, with a final push, which springs you back to your first kneeling position. Remain erect upon your knees while you can count—one—two; then throw your weight forward again as before, repeating the entire motions—at first about four or five times a minute, increasing the rate gradually to about fifteen times a minute, and continuing with the same regularity of time and motion as is observed in the natural breathing which you are imitating.

RULE 5.—Continue this treatment, though apparently unsuccessful, for two hours, until the patient begins to breathe; and for a while after this help him by well-timed pressure to deepen his first gasps into full, deep breaths; while the friction of the limbs, which should, if possible, have been kept up during the entire process, is now further increased.

RULE 6.—AFTER TREATMENT—EXTERNALLY.—As soon as the breathing has become perfectly natural, strip the patient rapidly and completely. Enwrap him in blankets only. Put him in bed in a room comfortably warm, but with a free circulation of fresh air, and except for the administration of internal treatment, let him have perfect rest.

INTERNALLY.—Give a little hot brandy and water, or other stimulant at hand, every ten or fifteen minutes for the first hour, and as often thereafter as may seem expedient.

The philosophy of this treatment will be given in our next issue.

Electro-Heating Apparatus.

This invention, patented March 12, 1869, is based upon the well-known fact that electricity, in passing through a conductor of insufficient capacity (such, for instance, as a wire of very small diameter), evolves or develops heat. It is also well known that a wire of any great length, and of sufficiently small size to evolve considerable heat, will not conduct a strong current of electricity without difficulty and loss, and that as the wire becomes heated, its non-conductivity is increased, and that, in consequence, the heat becomes so great that the wire will be fused.

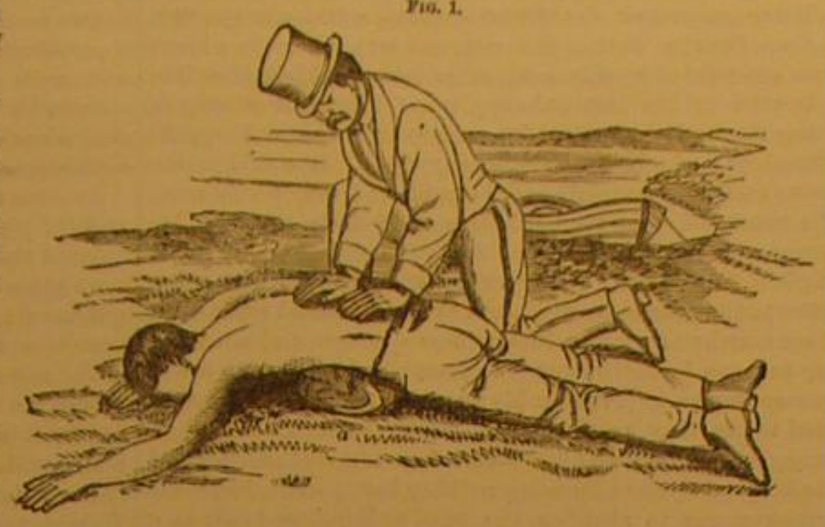
The object of the invention is to obviate this difficulty by enabling a strong current of electricity to pass through a heat-evolving apparatus of any length; and to this end it consists in providing an electrical conducting coil, or chain, with intervals of small conducting power, in traversing which the electricity will be caused to evolve heat; and further, in interposing between said obstructing intervals, free conductors of much larger size, which constitute reservoirs of electricity, and radiators of heat, and will effectually obviate the difficulty experienced in a continuous length of conductor of insufficient capacity.

In the engraving, Fig. 1 is a plan of a device, or apparatus, by which the invention may be applied for warming railway carriages, by means of heated metallic plates placed under the feet of passengers, portions of the plate being omitted, in order to expose the interior.

Fig. 2 is a plan, on a larger scale, of a portion of the conducting and heat-evolving coil or chain. Fig. 3 represents a vertical transverse section of the apparatus.

In this application of the invention, A, Fig. 1, may represent a bed or case of suitable non-conducting material. It is

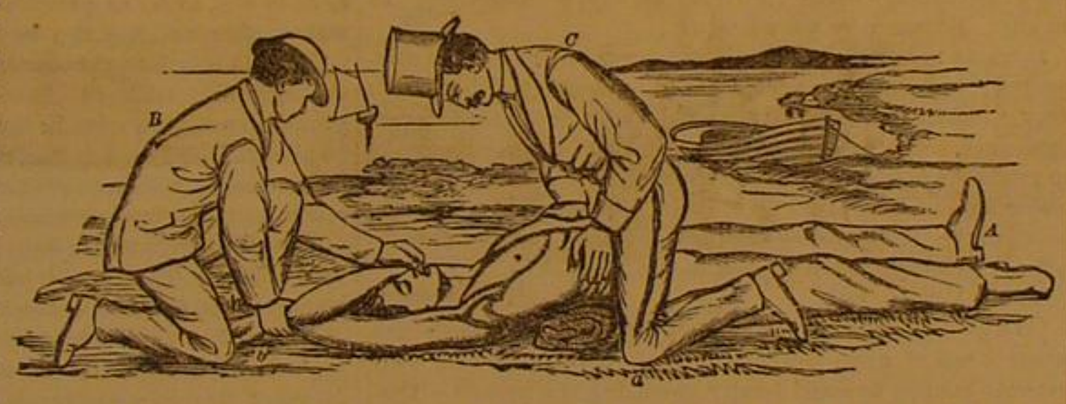
FIG. 1.



divided into parallel longitudinal grooves, of a sufficient size and depth to contain the coil or chain, and close enough together to allow of a compact arrangement of it. B represents the spaces, or divisions between the coil, and C, the coil, resting in the bed or groove. F G represent wires, to be connected with the poles of an electrical machine, battery, or generator, furnishing or producing a current of electricity best suited for the purpose of evolving heat; and H is a metallic plate, covering the coil, C, without contact therewith.

If the wires, F G, be placed in connection with any suitable electrical apparatus, the current of electricity, in passing the small intervals, D, Fig. 2, will evolve heat, but by reason of the shortness of these, and the reservoirs provided by the interposed metal, C, the coil or chain may be extended to any length, in order that a large and compact arrangement may be obtained to afford the required accumulation of heat. As

FIG. 2.



soon as the obstructions, D, become heated, the heat is rapidly communicated to the reservoirs and radiators, C, and from these to the metallic plate, H. It is intended to use the invention for producing heat in all cases where it can be applied to advantage, and to use the kind of electricity and electrical apparatus that may be found best adapted for the purpose.

In this application of the invention, namely, for railway carriages or cars, it is proposed to employ magneto-electric machines, constructed especially for this purpose, for producing the requisite current, placed, if necessary, under the car, and to obtain the power to operate them from the axle of the car—thus taking advantage of a motive power which already exists, but of which, heretofore, no use has been made.

Fig. 1

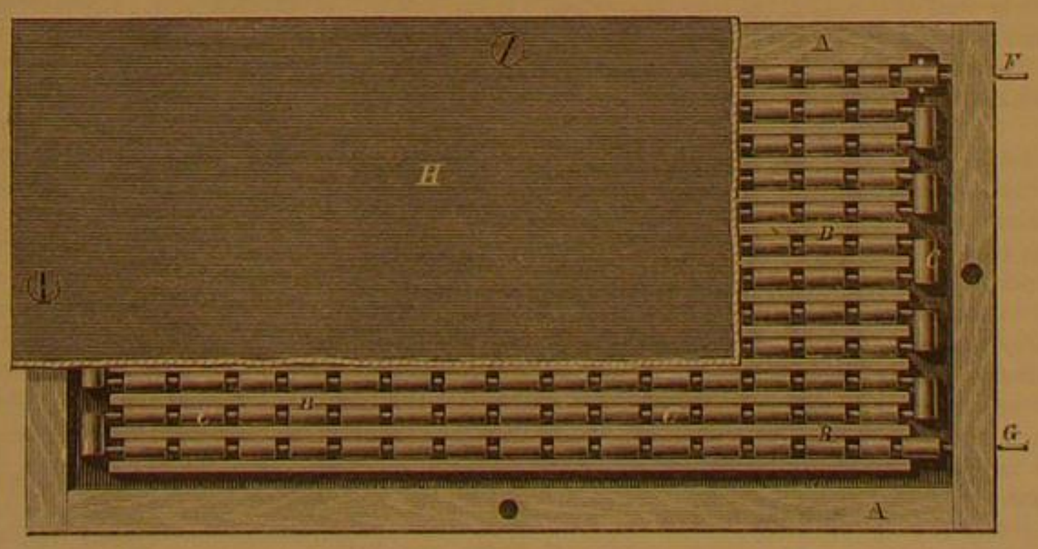
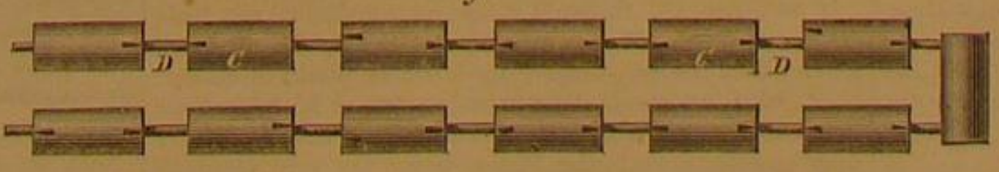


Fig. 2



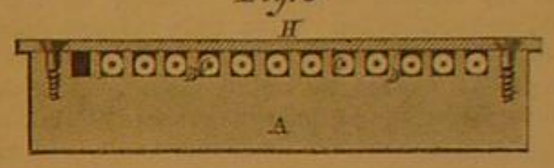
BURTON'S ELECTRO-HEATING APPARATUS.

A machine capable of heating to incandescence one foot of platinum wire one tenth of an inch diameter, will heat one hundred feet one hundredth of an inch; two hundred feet, two hundredths of an inch, etc.; the law being that the lengths of the wires vary inversely in proportion to the squares of their diameters. Now to reduce this to practice, it will be seen that a machine or battery of the power above referred to will heat a length of coil or chain, in which the aggregate length of the small wire of one-hundredth of an inch diameter, forming the obstructions, is one hundred feet; and two hundred feet, if their diameters are reduced one half, etc. In other words, having a machine of a certain power and a certain degree of heat is required, the diameters of the obstructing media may be reduced or increased in order to accommodate them to the power of the machine.

In order to warm an American car upon this plan, allowing for a tray placed in the floor of the car, in front of each seat, it is estimated it would require an entire length of the chain or coil of about three hundred and sixty feet, and in which the obstructing media form an aggregate length of about seventy feet; so that to accomplish this it would require a machine to heat this latter number of feet of small wire.

Although this may be a new application of electricity, and no machines can now be obtained already organized, and of sufficient power to be applied for this purpose, English electricians have made estimates of machines which come within all the requirements, as to power, space occupied, weight, power to operate them, etc., to make the invention practical and economical. Even with machines constructed for light-house purposes, eighteen feet of number twenty iron wire can be melted instantly; and the fact is well known to electricians, if the same machine were organized for producing a current of *quantity*, the heating power would be greatly increased.

Fig. 3



The inventor is not aware of any chemical battery by means of which this invention may be economically applied. In this case, the law of equivalents is in the way; and there must be a destruction of the battery corresponding to the amount of heat produced. In the course of time, however, chemical batteries may be constructed so as to be applied advantageously, as for instance those having large metallic surfaces exposed to a weak chemical action; or earth currents may be accumulated and utilized for this purpose; but for the present he relies entirely upon the magneto-electric machine. Advantage may be taken of a train of cars going down grade, when usually the steam is cut off and the brakes put down, without taxing the locomotive at all; whereas, in case of combustion of coal, the loss is the same whether going up or down grade. Among some of the advantages claimed for this method of heating railroad cars are the following:

First, its economy; second, its safety; and, third, its comfort. Concerning its economy, the trays may be constructed of hard wood, and covered by any metal, but copper would be best on account of its absorbing heat more rapidly and retaining it longer. As regards the cost of magnet machines, this would be materially reduced if they were made by machinery and in large numbers, instead of by hand. There would be but little wear and tear of them except at certain points; and in case the magnets should in time become weakened, they could be easily taken apart and re-charged. There being no strain or wear and tear upon the coil, being protected from injury by the plate covering it, and, besides, there being no possibility of its becoming oxidized by the degree of heat it would be subjected to—say 120 or 140 degrees, it is supposed it would last for an indefinite period. It is to be borne in mind, also, that by dispensing with stoves, eight seats in each car are gained, and, consequently, a train of seven cars would accommodate the same number of passengers, which, with stoves, would require eight cars. In short, the percentage upon the original outlay, would not compare to the annual expense of warming cars upon the plans now in use.

Regarding its safety, in case of a train being thrown from the track, instead of passengers being roasted alive by red-hot stoves, or scalded by the severance of steam pipes, the stoppage of the car stops the electric current; but even if it did not, there could be no possibility of a casualty from the effects of heat. What is claimed here as an advantage might be seized upon as a very glaring fault, and the question might be put: "But how do you propose to warm the car *before starting*, or in case a train should run into a snow bank?" The answer is, that by means of a wheel or pulley, connected by a band or cord with the machine under the car, the necessary current may be obtained by hand power to warm the car. "This might answer," the questioner is supposed to continue, doubtingly, "but how would you manage, say, with your invention applied to the cars of the Union Pacific Railroad?

You must know that, in ascending the Rocky Mountains, not only is the locomotive taxed to a much greater extent than upon the level ground of the prairies; but the

higher the train ascends the more rarefied, and, consequently, colder becomes the atmosphere." This is answered by stating that, in order to ascend the grades of the Rocky Mountains, locomotives of much greater power, and sometimes several, are employed; and the necessary revolutions of the machine may be kept up by an arrangement of pulleys similar to that employed in all machine shops, by which the speed of a lathe may be controlled by slipping the band upon a pulley of large or small diameter.

There can be no question as to the comfort of warming cars by electricity. There would be no exhalation of noxious gases nor deterioration of the atmosphere, as is the case with stoves. The heat radiated from, say, thirty metallic plates in the floor of the car would be not only sufficient to keep the feet of passengers comfortably warm; but by heating the lowest strata of air, would produce a genial warmth in the body of the car.

Much more might be said of this invention for utilizing the heat of the electric current. Much more might be said of its application in cases where a cheap power may be obtained; but it is presumed enough has already been said in order that the public may form an intelligent idea of the principles upon which it is based and of what is claimed as some of its advantages. Address for further particulars Dr. W. Leigh Burton, Franklin and Seventh streets, Richmond, Va.

Correspondence.

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

Crumbling of Pistons and Packing Rings.

Messrs. Editors:—Can you give me any scientific reason or explanation why the packing-rings or piston head should, while in operation, crumble and fall to pieces like plumbago? In two instances it has happened in my experience; first on a 12 by 30-inch engine, with 120 lbs. steam, making 60 revolutions per minute, apparently working well, perfectly smooth, and without jar. When main belt and steam were off, I could turn the engine by its 10-ft. fly pulley with ease, proving that it was not too tightly packed. After the accident the cylinder was perfectly smooth, and not in the least cut. The piston head was completely annihilated with the exception of the hub, which remained keyed to the rod. There was not a piece which weighed more than a pound, and those were few. The others were about the size of buckshot, or smaller, resembling plumbago. The oil used was machine oil, made in a candle factory.

Accident No. 2. Engine, 12 by 36 inch; steam, 50 lbs., 50 revolutions per minute; engine running beautifully, and had been for three months without removing cylinder head, when, hearing some disagreeable noise inside, I immediately shut down and removed the back head. To my surprise I discovered that the engine had turned into a shot factory, about two thirds of the outside rings had crumbled entirely to pieces about the size of buck shot, the remaining third being smooth on the under side of the piston. The oil used in the cylinder was crude olive oil of the country. In this case the follower and the remainder of the head remained intact. Both engines were horizontal.

The first accident occurred in San Francisco, Cal., in 1853. The second near this place (Saltillo) in 1866. Of the legion of inquiries I have made not one person have I found who could give me any satisfaction concerning the cause, or who ever heard or witnessed a similar accident; still I cannot believe that I am the first to whom this phenomenon has presented itself, as I firmly believe that there is no effect without a cause, and that certain causes produce similar effects. There must certainly be a reason which can be given, either chemically or mechanically, or both combined; but I must confess that my limited knowledge is not sufficient to solve the problem.

Steam has been used to propel pistons in cylinders for a sufficient length of time to have shown all its different results as regards temperature connected with the different lubricators, but in the above cases the lubricators as well as temperatures differ widely, and still produce similar results, which seems to clearly prove that neither the one nor the other is the immediate cause. George S. Pierce.

Saltillo, Mexico.

[Our correspondent is mistaken in supposing neither temperatures or lubricators have anything to do with the phenomenon described. Such accidents do not frequently occur, but have been observed and accounted for. The change in the piston head and packing rings is a chemical one; the iron combining with carbon liberated from the lubricators. It is perhaps not generally known that oils or tallow may be decomposed in steam cylinders at high temperatures, their carbon uniting with the iron to form a substance resembling plumbago or the substance formed from cast iron when long exposed to sea water. This is more apt to occur in jacketed cylinders where an excess of oil is employed.—Eds.

Purifying Drinking Water.

Messrs. Editors:—Perchloride of iron, no doubt, will answer very well for the purification of muddy water of streams like the Maas in the Netherlands, or the Mississippi and Rio Colorado on this continent, and where there is time for the muddy deposit to settle. The action is similar to alum for the precipitation of clay in water.

But for wells, cisterns, reservoirs, private or public, for water on shipboard, from springs or tanks—in all of which more or less organic substance is taken from the soil or deposited by the atmosphere, to breed diseases among those who have to use it—the simple method of forcing air through it purifies it perfectly, even when very foul before. The nitrogenous parts are oxidized and precipitated. A perforated pipe in the receptacle, not so near the bottom as to stir up the muddy deposit, and connected with an air pump above, by which air is impelled through the water a few times during the day, will make and keep the water perfectly sweet and wholesome.

As stated in your issue of August 7th, under the head of "Bread Baking," the patentee gives it free for family use, or for private cisterns, wells, or tanks.

R. d'Heureuse.

Lockjaw Cured by Tobacco.

Messrs. Editors:—Reading in the late papers the account of the recent melancholy death of the Engineer Roebling from tetanus, or lockjaw, reminded me of an incident in the military campaigns of a friend of mine, a Major in the 10th Indiana Cavalry during the war, and which he only a short time ago related to me among other events of his soldier life.

In view of the late unhappy event, I deem it worthy of being generally known, as his remedy is very simple, quick, efficacious, and obtained almost anywhere. It would in the above case have certainly saved the life of a very useful man. His command was then—Christmas 1864—in middle Tennessee near the Alabama line. One of his men was wounded slightly in the foot, hardly serious enough to go back a few miles to the nearest hospital, and as the command was, after a short march or so, going into winter quarters, and not wishing to leave it, he concluded to press on with it. The consequence was he took cold in his wounded foot, and tetanus ensued before they reached their winter quarters. All their surgeons and assistants had been left at various hospitals, and the hospital steward knowing nothing better to do, had made arrangements to abandon the man, as hopeless, to die at a plantation. The major casually learned his condition, and as it was a case of life or death anyhow (or rather certain death), he resolved to try an experiment and save him if possible. The man had the lockjaw more than forty hours, they had no medicines along (useless if they had) and the major's only resource was a plug of navy tobacco. He cut off a square of it (about three inches square), put it in a mess pan with boiling water until it was hot through, and saturated with the water; taking it out he allowed it to cool so as not to blister, then flattening it out, he placed it on the pit of the man's stomach. In about five minutes the patient turned white around the lips, which also began to twitch—the man was getting very sick—and in nine or ten minutes the rigid muscles relaxed and his jaws fell open. Indeed, it seemed as if the patient would fall all apart and go to pieces, so utterly was his entire muscular system relaxed. The tobacco was immediately removed and some whisky gruel given to stimulate him. Next day the man was taken along in ambulance, and in a few days mounted his horse all right, as bold a "soger boy" as as any. So much for a dead man.

It seems necessary in this disease to produce nausea, or sickness of the stomach, to cause the rigid muscles to relax. It is very difficult or almost impossible to administer internal medicines, and some external application becomes necessary to produce nausea, and this is furnished by the tobacco. The major found afterwards that damp tobacco applied to any part of the body would produce sickness, but much more quickly of course when applied to the stomach.

Mount Vernon, Ind. Aaron Baker.

[We give the above for what it is worth. The remedy proposed is one of great power, and would need to be used with extreme caution to avoid fatally nicotizing the patient.—Eds.

Argentine Republic Exposition.

Messrs. Editors:—The Exposition National, in Cordova (Argentine Republic), is to take place in the early part of next year.

It may be interesting to American manufacturers to learn that agricultural implements will be admitted free of duty, and that articles intended for this exposition will be conveyed to Cordova from Buenos Ayres at the expense of the State.

Information will be furnished to those interested on application to Edw. F. Dawson, Consul Genl.

128 Pearl street, New York city.

Car Improvements.

Messrs. Editors:—For a freight car or way passenger car, I would have an iron box fastened up under the car over the truck, having drip pipes. The box will contain water and the drip to be supplied by a set faucet. It will act the same as in a rolling mill.

For the through passenger cars, from New York to San Francisco, I would have four extra sets of trucks—one set at Chicago, another at Echo, another near Cisco, and the fourth at the end of the line. The cars to be raised by machinery, and the fresh trucks placed under. No delay need arise from the change. It will give satisfaction to the public and enable the train men to perfect their time.

H. N. Armstrong.

Stillwater, Minn.

A Machine Swindler.

If swindlers still thrive, it is also certain that all the fools are not yet dead. We are convinced of this by the receipt of a letter from the proprietor of the Machine Works at Exeter, N. H., who informs us that there is a firm at St. John, New Brunswick, that carries on the business of ordering machinery from manufacturers in the States, under the very plausible pretext that it is simply for the purpose of opening up a larger trade. The proprietor of the Exeter Machine Company was not exactly satisfied to ship his machinery to a strange firm without knowing something more about it, therefore he dispatched an agent to St. John, who there learned that the senior of the firm was a noted rascal, and that he was in constant receipt of machinery which he sold as quickly as possible, and pocketed the money and cheated the shipper. It does not seem to us possible that any of our manufacturers could be induced to ship machinery to a firm about which they know nothing—but so it appears.

Extinction of Fires in Manufactories.

The *Bulletin of the National Association of Wool Manufacturers* for July, contains the following account of the use of sprinklers for the extinction of fires in cotton and woolen mills:

Sprinklers, within a few years, have been extensively introduced into the Lowell mills, and in connection with the system of reservoir and mains, are considered the most effective means known for extinguishing fire. In some of the departments of a cotton mill, fire spreads over a whole room with such rapidity that hydrants, or other ordinary means, seem to be wholly inadequate to extinguish it. In such a case, a suitable sprinkler appears to afford the greatest protection practicable.

As constructed at Lowell, a sprinkler consists of a network of pipes perforated with small holes, so arranged and directed that when a valve connecting the sprinkler with the main pipes is opened, the water will flow into all parts of the system of pipes, and escape at the perforations with sufficient force to wet thoroughly and in a very short time every part of the room it is designed to protect. The idea is not new or peculiar to Lowell, but perhaps it has been more extensively and systematically adopted there than elsewhere. It was first introduced at Lowell, in the year 1845, into the picking room of the Suffolk Manufacturing Company, by Mr. John Wright, the agent of that company.

As is well known, this department of a cotton mill is peculiarly liable to fire from the action of the machinery on the cotton, and particularly on the foreign substances which are often found mixed with it.

After the construction of the reservoir, the advantages of the sprinklers, when used in connection with it, were so obvious, that they were soon introduced into the picking departments of all the cotton mills in Lowell. In 1852 and 1853, sprinklers were put into the roofs of the mills. In one of the old mills, which have slated roofs, the plan adopted was to carry a six-inch pipe from the main in the mill yard up near the middle of the mill to the level of the perforated pipe, which was placed a few feet below the ridge-pole, and extended the whole length of the mill in a single line, gradually diminishing in size from five inches in diameter near the middle, to three inches at the ends. This pipe was perforated with two holes three-sixteenths of an inch in diameter, in each foot in length. These holes point in different directions, so as to wet, as far as practicable, all parts of the roof. The water, after striking the roof, falls; and a large portion of it finds its way into the stories below. The valve connecting the sprinkler with the main pipe is placed in or near the ground, usually in a pit in the ground, near the mill so as to be always readily accessible, and, the water being constantly maintained in the main pipe at a high pressure, the sprinkler can be put in operation with very little delay.

The roof sprinkler is deemed a very great security against heavy losses by fire, as it affords the means of applying a large volume of water at the top of the mill, where, from the elevation, it would otherwise be difficult to apply it. This apparatus is expected to discharge about four hundred gallons of water per minute, and is intended to be used only for a few minutes at a time, unless the fire is confined to the roof. Its efficient action requires that most of the hydrants should be shut off.

Between the years 1853 and 1859, sprinklers had been introduced into many of the carding and spinning rooms of the cotton mills, which rooms are particularly liable to the rapid spread of fire. In the year 1859, sprinklers were required to be put into all such rooms, as well as into all picking rooms, and all other buildings and rooms liable to the rapid spread of fire or of difficult access.

It has been found by experiment that about four hundred and fifty gallons per minute is the largest quantity of water which can be drawn from the main pipes in some of the mill yards, from the reservoir alone, and maintain an effective working pressure. If a large fire should occur at a time when the canals are drawn off, as they often are during the night and on holidays to enable repairs to be made, the force-pumps could not be operated, and the supply of water would be limited to that which could be drawn from the reservoir. By operating one section at a time, the sprinklers can be effectively used in such an event; but in a large fire, the supply of water would be much too small for the efficient action of all the apparatus provided. The remedy is a larger main pipe, an improvement we are looking forward to, in order to perfect the system.

There is said to be a grape vine near Santa Barbara, California, the trunk of which measures thirteen inches in diameter, the branches covering an area of sixty-five feet in diameter. It is trained upon a trellis-work supported by sixty-four posts. It is stated that the vine last season yielded six tuns of grapes, which brought $260. The vine is twenty-four years old. Another vine, trellised in the same way, eleven years old, bids fair to outstrip the old one. It now covers an area of thirty-six feet in diameter.

An exchange states that a new description of lava is being thrown from the crater of Vesuvius since the last eruption, consisting of a beautiful mass of crystallized salt. This beautiful phenomenon has hitherto been unknown in volcanic natural history. The scientific bodies are occupied in investigating the cause and composition of the crystals. None of the *savans* feel inclined to go down and see into it as yet.

PREMATURE BURIAL---ITS PROBABILITIES.

A writer in *All the Year Round* gives a collection of instances where premature burial had *very nearly* taken place, and also instances of resuscitation where death had been previously supposed to have taken place, and argues therefrom the great probability that such interments are more frequent than is generally supposed.

Most of the facts are extracted from a debate upon a petition presented to the French legislature in 1866, and in which Cardinal Donnet, Archbishop of Bordeaux, took a leading part. The Cardinal stated no less than three instances which had occurred in his experience, where people were at the last moment rescued from being buried before death, although the appearances seemed to warrant the conclusion that they were dead. The petition alluded to set forth the danger of hasty interments, and suggested the measures thought requisite to avoid terrible consequences. Amongst other things, it was asked that the space of twenty-four hours between the decease and the interment, now prescribed by the law should be extended to eight-and-forty hours.

The article from which we have quoted gives some remarkable cases of suspension of life in cases of drowning, which ought to be generally known, as showing that efforts to restore vital action ought not to be too hastily given over.

"On the 13th of July, 1829, about two o'clock in the afternoon, near the Pont des Arts, Paris, a body, which appeared lifeless, was taken out of the river. It was that of a young man, twenty years of age, dark complexioned, and strongly built. The corpse was discolored and cold; the face and lips were swollen and tinged with blue; a thick and yellowish froth exuded from the mouth; the eyes were open, fixed, and motionless; the limbs limp and drooping. *No pulsation of the heart or trace of respiration was perceptible.* The body had remained under water for a considerable time; the search after it, made in Dr. Bourgeois' presence, lasted fully twenty minutes. That gentleman did not hesitate to incur the derision of the lookers-on, by proceeding to attempt the resurrection of what in their eyes was a mere lump of clay. Nevertheless, several hours afterwards, the supposed corpse was restored to life, thanks to the obstinate perseverance of the doctor, who, although strong and enjoying robust health, was several times on the point of losing courage, and abandoning the patient in despair."

It is also shown that in suffocation by foul air and mephitic gas, suspended animation may be mistaken for real death, and a case is stated where a person thus suffocated with charcoal fumes and apparently dead, was restored to life only after *eleven hours'* unremitting exertions.

A singular fact is mentioned in regard to persons who have died of cholera:

"While M. Trachez (who had been sent to Poland to study the cholera) was opening a subject in the dead-house of the Bagatelle Hospital in Warsaw, he saw another body (that of a woman of fifty, who had died in two days, having her eyes still bright, her joints supple, but the whole surface extremely cold), which visibly moved its left foot ten or twelve times in the course of an hour. Afterwards the right foot participated in the same movement, but very feebly. M. Trachez sent for Mr. Searle, an English surgeon, to direct his attention to the phenomenon. Mr. Searle *had often remarked it.* The woman, nevertheless, was left in the dissecting-room, and thence taken to the cemetery. Several other medical men stated that they had made similar observations. From which M. Trachez draws the inference: 'It is allowable to think that many cholera patients have been buried alive."

Exposure to cold is stated to be another cause of the suspension of vitality liable to be mistaken for actual death.

"M. de Parville now professes to place in any one's hands a self-acting apparatus, which would declare, not only whether the death be real, but *would leave in the hands of the experimenter a written proof of the reality of the death.* The scheme is this: It is well known that atrophine—the active principle of belladonna—possesses the property of considerably dilating the pupil of the eye. Oculists constantly make use of it, when they want to perform an operation, or to examine the interior of the eye. Now, M. le Docteur Bouchut has shown that atrophine has no action on the pupil when death is real. In a state of lethargy, the pupil, under the influence of a few drops of atrophine, dilates in the course of a few minutes; the dilation also takes place a few instants after death; but it ceases absolutely in a quarter of an hour, or half an hour at the very longest: consequently, the enlargement of the pupil is a certain sign that death is only apparent.

"This premised, imagine a little camera-obscura, scarcely so big as an opera-glass, containing a slip of photograpic paper, which is kept unrolling for five-and-twenty or thirty minutes by means of clock-work. This apparatus, placed a short distance in front of a dead person's eye, will depict on the paper the pupil of the eye, which will have been previously moistened with a few drops of atrophine. It is evident that, as the paper slides before the eye of the corpse, if the pupil dilate, its photograpic image will be dilated; if on the contrary, it remains unchanged, the image will retain its original size. An inspection of the paper then enables the experimenter to read upon it whether the death is real or apparent only. This sort of declaration can be handed to the civil officer, who will give a permit to bury, in return."

It may be that in France, where people are required to bury their dead so early after decease, the danger of premature burial is not exaggerated; but in this country where, under ordinary circumstances, the bodies of the dead are kept until decomposition sets in, we do not believe the danger of burying alive is one in twenty millions. A good deal of excitement has been created in the public mind by recent sensation articles in the daily papers, exaggerating the risk of premature burial, and painting in high colors the value of an apparatus whereby a person so interred and returning to consciousness might by his own efforts extricate himself. We would be willing, however, to wager that however efficacious such an apparatus might be, it would not, in this country, be practically tested once in half a century.

Electricity Applied to Manufacturing Textile Fabrics.

ELECTRIC ENGRAVING MACHINE.

A machine for engraving the cylinders of copper or brass employed in printing woven fabrics and paper hangings, is an invention of French origin. The voltaic current is used to determine, by means of electro-magnets, the slight simultaneous advance or withdrawal of any number of engraving diamond points from the varnished surface of the copper rollers to be engraved, according to the position of a corresponding metal contact point on the non-conducting surface of a prepared pattern. The pattern and cylinder to be engraved are moved mechanically in concert, and the proportion of their relative movements can be varied by mechanical adjustment. The engraving points have a slight vibrating motion given to them, which scratches off the varnish whenever brought into contact with it, and produces a series of fine zigzag lines, which facilitate the retention of the pasty coloring matter used. The prepared pattern determines the moments at which this contact occurs; and the concert between the movements of the pattern and the roller produces a similar agreement between the pattern and the figures engraved, which may clearly be made larger or smaller than the pattern in any desired proportion and in any required number. The copper when exposed is afterwards etched by an acid bath.

ELECTRIC LOOM.

This extremely ingenious contrivance, in which the usual Jacquard cards are replaced by an electrical arrangement, worked by a pattern prepared in tinfoil with insulating varnish, is the invention of Cav. G. Bonelli, Turin.

A simple metal plate, perforated with holes, each of which is provided with a kind of piston, successively plays the part of each successive paper card in the usual arrangement. The pistons fill up every hole that is not required, but are withdrawn by electro-motors from those holes which require at each beat of the loom to be kept open. This is effected as follows:

A sort of metal comb, each tooth of which is the terminal of a separate insulated conducting wire, rests on the prepared pattern. Whenever a tooth touches the tinfoil, a circuit is completed through its conducting wire; but where a tooth rests on the varnish, the circuit is broken. Each conducting wire includes in its circuit an electro-magnet. The pistons already spoken of are each composed of a small soft-iron shank, and brass button-shaped head, and are all held horizontally in a frame, one opposite each electro-magnet. In one position of this frame, the heads of these pistons project through the openings of the metal card or perforated plate; the diameter of each pole is a little larger than the head of the corresponding piston, each piston being exactly in the center of its corresponding pole. In this same position all the soft-iron shanks touch the poles of the corresponding magnets, and the metal comb rests on the prepared pattern.

A certain number of the electro-magnets corresponding to the uncovered portions of the tinfoil, are therefore active or attract the shanks, but the others exert no attraction. The frame with the pistons is now pulled forward away from the magnets; those pistons which are opposite the active magnets are held back, sliding in their frame, so that their button-heads pass behind the perforated plate; but the other pistons come forward with the frame leaving the magnets. The perforated plate then drops a little way, and by this simple contrivance all those piston-heads that were in front of the plate are retained there, whatever pressure comes against them, for they are now eccentric from the poles. The plate in this condition presents a perfect analogy with the common prepared card. A certain number of holes corresponding to the metallic part of the pattern are vacant, the rest of the holes are blocked up, and present an unbroken surface by which the proper hooks of the Jacquard loom are acted on during one stroke. The perforated plate is then brought back to the position first described, the prepared pattern is moved on a little step, and the same process repeated.

When shuttles with several different colors are to be used, the pattern is subdivided into insulated portions corresponding to the separate colors by removing a very thin outline of foil round each; all the parts correspouding to one color are afterwards connected.

As each shuttle is thrown, the battery is brought in contact with the appropriate series of insulated patches of tinfoil, producing a succession of different cards, and the pattern is not shifted forward until all the colors are exhausted. After the completion of each fresh combination on the perforated plate, the battery circuit is broken by a proper contact-breaker, and the injurious spark is thus avoided, which would otherwise occur when the comb is lifted from the pattern prior to a shift.—*The Student's Text-Book of Electricity.*

Durability of Portland Cement.

It is somewhat difficult to ascertain the durability of modern substances, as manufacturers occupy themselves principally in producing cheaply, and pay little attention to experiments on durability. We know very well that a modern coat does not last so long as if it were made of cloth as manufactured forty years ago, yet we prefer it by reason of its fineness of texture and the lowness of its price. We can ascertain the quality of a pane of glass in regard to its clearness, transparency, polish, etc., but we cannot tell how long it will last before getting dull or assuming iridescent colors.

It is not improbable that a good Portland cement may last for tens or even hundreds of years; but we cannot prove this, as our experience and observations only embrace a period of fifty years.

We do not know what other agents besides air and water may effect cement in the course of time, nor can we tell whether all cements are equally durable.

This last idea forcibly occurred to me ten years ago, when a cement produced by a German house was used successfully in laying pipes at a distillery. Another cement procured in the following year from the same manufactory and used in the same purpose fell to pieces in a few weeks.

This induced me to make experiments, which I do not consider conclusive, but which may serve to prevent similar occurrences, and may also give the manufacturer a hint how to conduct experiments in this respect.

These experiments served principally to determine the influence of warm and salt water, and of the air at different temperatures. In this manner I tried to concentrate the influence of time.

My experiments were comparative ones, as they served for practical purposes, in order to determine which kind of cement should be used for a certain purpose.

1. I immersed set pieces of cement in water containing 15 per cent of common salt, in which I kept them for weeks at a temperature of 30° Centigrade.

2. The same pieces were then dried in the sun and again immersed in the solution.

3. I also made experiments with cement in the winter of 1856-57, by exposing it in a wet state to the frost, and then immersing it in hot water, and *vice versa.*

Some German cements stood these superficial trials very well, others rather badly, and the English cement worst of all.—*Reid's Translation of Lipowitz' Treatise.*

Our Importations from France.

We gather from the report of Mr. Nicolay, dated April 29, 1869, that the importations of French goods during the period extending from July 1, 1863, to December 31, 1868, were as follows:

1863 (six months)	$ 54,283,403
1864	82,345,531
1865	139,141,569
1866	180,617,837
1867	149,994,256
1868	131,457,225
Total	737,839,821

These importations were chiefly articles of luxury. The New York *Times* in commenting upon this subject, remarks: "The articles of actual utility are fractional in value compared with those which enter exclusively into ladies' use. Thus, taking the year 1866 as a basis of illustration, the reported value of merinoes, bombazines and crape was not less than $39,222,500; silks absorbed $6,799,193; shawls, $3,832,505; kid gloves, $7,046,800; flowers and artificial feathers, $3,549,035; fancy goods, $8,605,037; buttons and trimmings, $8,701,273; laces, $2,478,620; jewelry and precious stones, $7,321,023; miscellaneous dry goods, $16,548,276. Here are ten articles which in one year represent, in the cost prices at Paris, an aggregate of $104,104,262; and this sum was at least doubled when the consumers paid their accounts. And in this recapitulation we take no notice of the Paris boots and shoes, the hair, and the minor *et cetera* of which the ladies are the sole buyers. Nor does any statement founded upon certified invoices indicate the full extent to which the Paris trade is indebted to American buyers. To render this view complete, we must add the sums expended by American visitors, who are supposed to make their purchases without the slightest reference to cost."

Refining Vegetable Oils.

Mr. C. Michaud, of Honfleur, has discovered a new method of refining oil which will probably eclipse all those in general use at the present day. This method has just been communicated by M. Chevallier to the Société d'Encouragement. While sulphuric acid is introduced into the oil in minute numerous streamlets, air is blown into the oil so as to produce a great commotion in the liquid and to fill it with air bubbles. The mucilage contained in the crude oil, being acted on by the acid, soon forms with the air a voluminous layer of scum at the surface, which is skimmed off as it forms. This insufflation of air is repeated several times in succession, and the scums cleared off every time until the oil is clarified. At this point of the operation it still retains free sulphuric acid. It is now run into a copper vessel, and steam is forced through it until the oil has reached a temperature of 100° C. The steam is then allowed to bubble through for half an hour or an hour longer. After the oil has cooled down some 20° or 30° C., which may be done artificially, it is run through an ordinary filter. Two large refineries have lately been put up on the "Michaud" plan, and the oil produced by them is so pure, that the wick of a lamp burning it will not carbonize after many days' usage.

A LARGE company of homeless boys and girls left the office of the Children's Aid Society, a few days since, in charge of one of the Western agents, to be provided with homes and employment in the States of Illinois and Wisconsin. The number of destitute and friendless children applying to this Society for aid during the past few weeks has been exceedingly large. The demand for clothing was considerably in excess of the supplies in their wardrobe. This Society is one of the best of all the charitable institutions of this city, and deserves a liberal support. Children exposed to all the vices of a great city are tenderly taken away to virtuous homes in the country. What can be more Christ-like than this?

Improvement in Front Gear for Wagons.

We not long ago expressed the belief entertained for some time by us, that there was yet room for considerable improvement in draft vehicles, and as if to corroborate our belief we now have before us a marked improvement in the front gear of wagons, comprising changes in the construction of the tongue, a new method of connecting the reach or coupling bar to the bolster, and important changes in the structure of the framework to which the tongue is connected.

By reference to the engravings the structure of the tongue will be easily understood. It is composed of two pieces of timber, say, for a two-horse wagon, one inch by two and three eighths, tapering toward the point in the usual proportion. The two parts are joined together at the front end, but separate back toward the bolster, and are laterally braced by metallic plates having studs at the ends which pass through the timber bars and are firmly riveted. The ends of the bars where they meet the hounds are plated with metal, but are not attached in the usual manner. Before we state the method of attaching the tongue we must, however, describe the modification made in the general framework attached to the axle and sand bar.

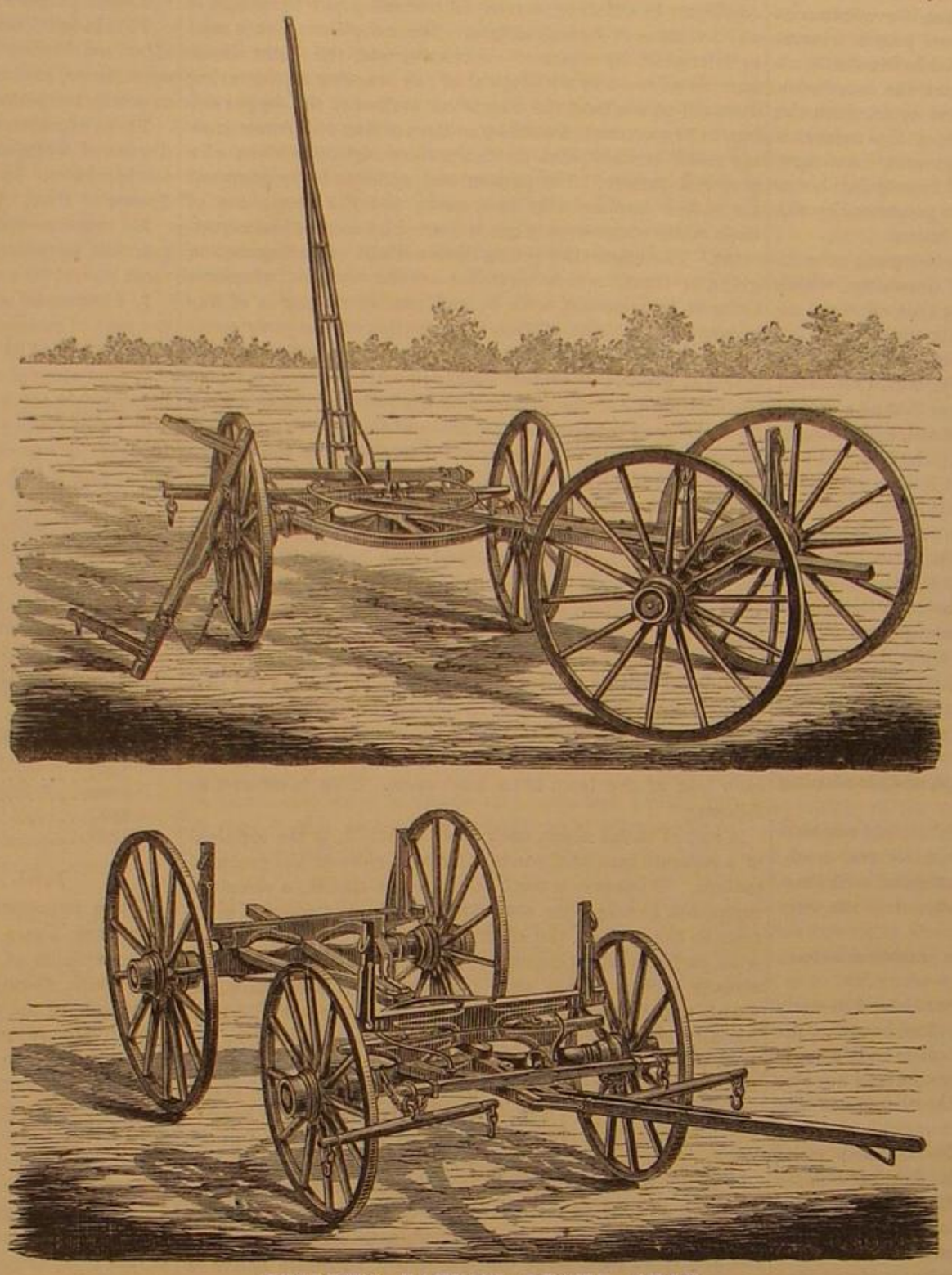
A straight bar of wood is placed between the hounds, running back through a recess in the top of the axle and bolted not only to it but to the center of the curved oscillating bar in the rear of the axle To the straight bar thus inserted, the reach or coupling bar is attached in the rear of the front axle, thus allowing more cramping of the forward wheels without jamming them into the wagon box. By this means, also, the draft is transferred to the reach without the intervention of the axle and the old-style king bolt, and all rocking motion of the axle is avoided. Instead of the king bolt running down through bolster, axletree, and reach, as commonly used, a fixed bolt rises from the axle upon which the bolster turns, tapering toward the top to allow some play.

The two parts of the tongue are connected to the hounds by a suitable bolt, both the hounds and the straight draft bar above described being recessed to admit the ends of the tongue bars.

The advantages secured by these changes are greater strength, grace, and lightness of parts, greater freedom in cramping, less wear in use, and consequent greater durability.

The inventor, a practical wagon builder, informs us that wagons built with this form of front gear, have so completely superseded the old style, in the section where he resides, that he is now building none but the new style.

Patented, July 27, 1869, through the Scientific American Patent Agency, by A. Finley, Bainbridge, Ind., who desires to dispose of his entire right.



FINLEY'S PATENT FRONT GEAR.

Nutmegs and Cloves

The nutmeg-tree throughout the Indian Archipelago becomes fruitful at the age of seven years, and increases its produce till the fifteenth year, when it reaches the hight of productiveness. It is said to continue prolific for a quarter of a century in the Moluccas. Seven months in general elapse from the appearance of the blossom and the ripening of the fruit. The average produce of a tree from its fifteenth year may be calculated at five pounds of nutmegs, and a pound and a quarter of mace. The great harvest is in the months of September, October, November, and December, and there is a small one in May and June. The fruit having ripened, the outer integument bursts spontaneously, and is gathered by means of a hook attached to a long stick, and the mace, having been cautiously stripped off and flattened by the hands in single layers, is placed on mats for three or four days in the sun to dry. In damp and rainy weather the mace is dried by the heat of a charcoal fire, so as not to smoke it or blacken its surface. The mace liberated from the macy envelope is transported to the drying-house, and deposited on an elevated stage, the heat of a smouldering fire beneath passing upwards with the smoke between the rafters. Dried up kernels, which figure as damaged at public sales, have undergone too high a degree of heat in this process. The fire lighted in the evening is extinguished in the morning, the process of smoking is repeated for two or three months, when the nuts will be found to rattle freely. They are now regarbled, and finally packed for transportation in tight casks, the insides of which have been smoked, cleaned, and covered with a fresh coating of water and lime. Cloves, which are planted in rich, red mold, yield generally at the end of six years, and reach the highest state of bearing at twelve years, when their average product is six to seven pounds of marketable fruit.' The fruit is terminal, and, when of a reddish hue, is plucked by the hand, so that the process of gathering it is tedious. It is then dried for several days on mats in the sun until it breaks easily between the fingers and assumes a dark brown color. It loses about 60 per cent in drying. When past its prime the clove tree has a ragged and uncombed appearance, and its existence is limited to twenty years, unless in very superior soil.—*Grocer.*

How an Elevator Operates.

When the boat containing the grain to be taken into store is moored alongside the pier, the "transferer" is swung out from the side of the elevator into the hold of the boat, and sinks into the loose cargo. This "transferer" is simply a series of metal scoops or buckets, fastened to a band inclosed in a siphon-shaped box, and when in operation these scoops run quickly through the grain, and carry it to an upper floor in the elevator, each one emptying itself as it runs over the crescent at the top of the siphon, and, going down the other leg of it, is ready for another plunge through the grain in the hold of the vessel. Arrived at the upper floor, the grain is first weighed, a large stationary hopper seated on a standing scale being provided, into which the buckets empty their contents; and when the "beam" of this scale goes up it indicates that the number of bushels at which the scale has been set is in the hopper, when, by pulling one slide and closing another, the contents of the hopper are let out and the entrance of any further grain prohibited until it all escapes. In measuring or weighing a cargo by this means, the rule is to allow to the bushel sixty pounds of wheat, fifty-six of corn, fifty-six of rye, thirty-two of oats, forty-eight of barley, and sixty of peas. When weighed the grain falls on a sifter underneath the hopper, which is continually jogging backward and forward, where, in passing through the perforations in the iron bottom, it is cleansed of dirt, husks, pieces of cob, or such foreign matter, larger than the kernel itself, as may have got into the grain. It is thence conveyed again to a story above that on which the hopper is situated, to a screen containing still smaller perforations than those in the sifter, where it undergoes a second cleansing process, and from this point to a "blower," through which a blast of air is continually passing, and by this means it is still further cleansed of the fine dust that has collected in it. After this it may be either run directly into the ship which is to take it to a foreign port, or put in store. If stored, it is transferred to its appointed bin, on any floor of the warehouse, by means of an auger-like apparatus inclosed in a square box-like arrangement running longitudinally over the roof of the warehouse. This is known as the "conveyer;" and from it, at oblique angles, there run square tubes, which, when opened, let down the grain to any floor where it is desirable to store it. These tubes extending vertically through the entire depth of the building, and over the bin on each floor thereof have slides, which, on being drawn, allow the grain to make its exit into that particular compartment. Sometimes, in consequence of the fact that the grain has become heated or sweaty, and is in danger of being totally spoiled, it is necessary to put it through the drying process. In such event it is run into a large cylinder, through which hot air is continually passed by means of tubular pipes, and conveyed thence gradually into a bin in the coolest part of the warehouse. When it arrives here it is invariably dry and hard, having occupied about twenty or twenty-five minutes in passing through the cylinder. Another operation is the "smutting" of the grain, or the taking from it the black fungus, which renders it diseased, and which, if allowed to remain in a cargo mixed with the sound grain, will in a short time spoil the whole of it.—*New York Times.*

Water and Health.

Let it be everywhere taught that water forms the largest component of the several textures and organs of both animals and vegetables; it being in the proportion of more than three fourths of the entire body, and four fifths of the nutrient fluid, blood, consisting of it. Of the predominance of the aqueous over the solid parts of the entire body, a striking proof is furnished in the case mentioned by Blumenbach, of the dry mummy of an adult Guanche, which, with all the viscera entire, did not weigh more than seven pounds and a half. How large and constant must be the supply of water, in the first place, to meet all the wants of assimilation and nutrition, from the incipient stage of digestion to the final deposit from the blood in the cells, for the growth and support of the several organs; and, in the second place, to compensate for the continued loss of this aqueous fluid from the kidneys, and in the secretions from the skin and the gastro-intestinal and pulmonary mucous surfaces. In order to make up for the consumption and discharge of water in these different processes of assimilation and of disassimilation or waste, the organism is supplied, first, by the fluid taken as drink; secondly, by that which is absorbed by the skin and lungs from the surrounding air; and, thirdly, by the water largely contained in the substances used for food. Even of the solid food which we eat, not less than four fifths of it consist of water; and we might go so far as to say that nine tenths of the whole of our food are little else than pure water. If lost in any great quantity from the body, there ensues an arrest of vital action, as may be easily seen in the lower animals. Liebig shows how water contributes to the greater part of the transformations that take place in the living organism.

Prout is decided in his appreciation of the dietetic value of water, and he ranks the aqueous, together with the saccharine, the oily, and albuminous, as the four great elementary, proximate, or primary staminal principles. We have well-authenticated cases of persons who have lived for a length of time while abstaining from all customary food, and whose only drink was water. Of this nature is the case of Reuben Kelsey, related by Dr. McNaughton, in the "Transactions of the Albany Institute," 1830. This man, aged 26 years, lived on water alone for fifty-three days. "For the first six weeks he walked out every day, and sometimes spent a greater part of the day in the woods. His walk was steady and firm, and his friends even remarked that his step has an unusual elasticity. He showed himself a week before his death, and was able to sit up in bed to the last day."

Kelsey starved himself to death, under a delusion that when it was the will of the Almighty that he should eat, he would be furnished with an appetite.

Among the greatest names in medicine are found the warmest eulogists of water, as the most salutary and sustaining drink in health, and among the foremost remedies in disease. It is to be deeply deplored that the profession at large is not thoroughly imbued with this truth, and does not feel it to be a paramount duty to urge on all persons its importance, and an adoption of the practice flowing from it, as conducive alike to man's physical and moral well-being and pleasure. There is abundant testimony, derived from the personal experience and extensive observations of eminent medical men, to show that the inconveniences and dangers from living in hot climates are infinitely less for water-drinkers than for those who use intoxicating liquors of any description. A similar kindly and preservative power is displayed in favor of those who are exposed to the extreme and continued cold of Arctic travel and navigation, and who, under circumstances, either from choice or necessity, have made water their sole drink, except when the occasional addition of tea or coffee was procured. This is the experience, also, of soldiers in the field, and expososed to hardships of all kinds, and of men who have to carry on laborious occupations in a high temperature, as in iron founderies, glass-houses, etc.—*By John Bell, M. D., in Druggists' Circular.*

A CORRESPONDENT proposes the introduction to the Southern States of the date palm, the sugar palm, and the cocoanut palm—those palms furnishing fruit, sugar, oil, fiber, etc. He argues in favor of trying at least the experiment of introducing these Indian palms; and he holds that, if properly planted and cared for, they will flourish and become profitable to the South.

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Contents:

(Illustrated articles are marked with an asterisk.)

THE RELATION OF THE DIAMETERS OF GEARING TO FRICTION.

Given a mean effective pressure in a steam engine making its stroke in a given time, or a given weight of water constantly falling through a given number of feet in a given time, the mechanical power of each may be at once deduced; but this power is never wholly utilized in useful work. The resistances which absorb the power of motors may be placed in three categories; namely, the resistance of the medium in which the several parts of the prime motor and the machinery driven by it move, friction of bearing surfaces, and, finally, the resistances overcome in the materials, the change of form in which is the useful work performed.

The proper proportions of wheels cannot be attained without due consideration of the resistances in the two first categories, as well as those in the latter. It is doubtful, however, whether in the construction of ordinary machinery, all these elements are taken properly into account. In many instances we know they are not. The number of revolutions of a pinion driven by a spur wheel being established by the proper number of teeth in each, or the speed of pulleys being determined by their circumferences, all other considerations are too frequently lost sight of. In some cases the form of the teeth best calculated to secure least consumption of power from friction is properly taken into account; but even this is in most cases no more than approximated.

If we bear in mind the fact that increase of the perimeters in gearing is always accompanied by a reduction of pressure upon the teeth, and *vice versa*, the work performed remaining constant, it becomes evident at once that the diameters of wheels used to perform a given amount of work is an important element in determining their proper proportions.

As friction is independent of velocity and directly dependent upon pressure, it follows that reduction of pressure is also reduction of friction, and that the converse is also true. From this it will be seen that the larger the gearing employed to do a given amount of work the less will be the friction between teeth, all other things being equal.

Reduction of friction takes place in a system of pulleys and belts by increasing their size on account of the reduced tension of the belts necessary to do a given amount of work.

But increase of size implies generally increase of weight or pressure upon journals, and thus while there is diminution of friction between teeth, or of tension in belting, there will be more or less increase of friction upon the journals from this cause, so that on this account there must be a limit to economical enlargement. Again, increased size implies increased resistance from the medium in which the machinery moves, commonly the air, and this also fixes a limit to economical enlargement.

The ratio of the friction of a wrought-iron journal playing in a cast iron bearing, well oiled, is, according to Morin's experiments from ·07 to ·08 of the pressure. If the teeth of wheels are perfectly formed their friction ought to be nearly reduced to rolling friction, and the ratio of this to pressure is so slight that it need not perhaps be considered here. But such perfection is only theoretical, and there can be rarely found gears so perfectly cut that there is not more or less sliding friction between their teeth. The friction in journals, is, however, increased, all things else being equal, by diminished diameter.

A somewhat complicated mathematical formula would be required to express this relative increase, and we will not at this time enter upon its discussion. For practical purposes it is enough to say that when other considerations will admit, it will be found more economical of power, and more conducive to durability to allow a liberal size for toothed gearing and for pulleys than to scrimp the pattern.

THE LAW OF HYDROSTATIC PRESSURE.

The *Mining Journal*, of London, gravely publishes the following specification of a new motor, which, if it is a motor at all, is the long-sought for perpetual motion. The inventor says:

In carrying out my invention I avail myself of the property of bodies or objects of a certain specific gravity when immersed in a fluid of a greater specific gravity to rise or ascend to the surface of such fluid; this buoyancy represents a greater or a lesser force or power, according to the greater or lesser difference between the specific gravity of the object and that of the fluid, and the size or the displacement caused in the fluid by such object. In order to make the said objects, which I will call floats, as light as possible, and yet strong enough to resist the pressure of water, I construct them of thin sheet metal, and in preference in the form of tubes or hollow cylinders with conical or flat ends; a number or series of these cylinders are hinged or linked together in a similar manner as the buckets of a chain-pump; this chain or float is passed over two sets of pulleys, disks, or arms fixed to two horizontal shafts, the one placed vertically above the other, the said pulleys being formed to suit the shape of the floats; one half of this chain of floats passes through the center of the tank holding the water or other fluid, and the other half passes outside the tank through the air. The floats when in motion enter through the bottom of the tank in the manner hereafter described, and rise up by their buoyancy through the water; they then pass round the top pulley, descend outside the tank and passing over the bottom pulley, again enter into the tank, and so on. Now, the principal part of my invention consists in passing the float through the bottom of the tank. On the bottom of the tank I fix a barrel or cylinder; this cylinder may be square or any suitable shape to fit one or more of the floats, and conical at one or both ends to admit of the free ingress and egress of the floats, and on every float I fix an ordinary cup leather, either made of leather, india-rubber, wood, metal, or any other suitable material. Supposing the floats to be in motion, the one float passing into the cylinder before the other has passed out would prevent very little if any escape of water, which escape could be pumped by a small pump into the tank again. The motion communicated by the rising floats to the float pulleys, disks, or arms and shaft is further transmitted by means of belts or gearing in the manner usual with other motive engines. The details of arrangement and construction of my new motive-power engine may be altered or varied, but the main feature of my invention consists in passing the floats through the bottom of the tank. I do not confine myself to fixing the cup leathers, made either of leather, india-rubber, wood, metal, or any other suitable material, on the floats themselves, as I may in some cases fix the leathers, india-rubber, wood, metal, or any other suitable material in the barrel or cylinder at the bottom of tank, so as to form a water-tight joint round the floats passing through the cylinder or barrel.

We should not have called our readers' attention to this had it not been that the same supposed principle in various modifications has been lately several times submitted to us, in the supposition that it would really give motive power. In one case the liquid employed was mercury, and in another it was oil, etc., but the idea in each was that continuous motion could be obtained by the action of buoyancy alone.

Now what is buoyancy? The ordinary definition of it fails to give a proper idea of the true reason why a body immersed in a fluid of greater specific gravity, rises to, and floats upon the surface. In short, the term is one of those inefficient ones still retained in scientific language.

Let us suppose a U-shaped tube filled with water, the bend being at the bottom, and the tube stationary. The water will come to a common level in both legs of the tube. Now if we place a cork upon the surface of the liquid in one leg of the tube, the cork will, at first, sink a little, while the water in the other leg will rise a little and then remain at rest as before. Thus every vessel launched into the ocean raises the general level, while it sinks more or less into the water.

If by means of a wire the cork be forced down below the surface of the water the latter will rise in the opposite leg of the tube until its weight, in that leg, just equals the weight of the water and cork in the other leg, plus the weight of the wire or other force used to depress the cork.

From this simple experiment it can be at once seen that floating of the cork is the result of the upward pressure of the liquid in which the cork is immersed; which upward pressure is the result of an equal downward pressure in other portions of the liquid.

Mechanics are too apt to read the enunciation of the law by which pressure is transmitted through liquids without appreciating its full force. *Liquids transmit pressure equally in all directions.*

If buoyancy is the result of pressure it follows that no body or series of buoyant bodies can exert by virtue of their specific lightness an upward pressure greater, or as great as the weight of a mass of water equal to their aggregate bulk. To suppose they could exert an upward force equal to this bulk of water would be to suppose them destitute of weight.

In the invention, the specification of which we have copied above, the pressure of the supernatant column of water upon the area of the aperture in the bottom of the tank through which it is proposed to pass the floats, will always be greater than the buoyancy of the floats, and instead of the floats being drawn successively in, through it, they would be effectually prevented from entering. In short, neither mere pressure, nor buoyancy can, under any circumstances, produce motion, and the common mistake of the searchers after a perpetual motion is the non-appreciation of this fundamental fact.

Pressure may indeed be converted into motion, but when this is done it is no longer pressure.

A GOOD PIECE OF ENGINEERING.

Those who wish can see a good job in steam engineering at No. 9 Baxter street, in this city. They can, moreover, get some good hints as to how a boiler should be set, and how mixed fuel composed of shavings, sawdust, pea, and dust from anthracite, can be thoroughly and economically consumed.

The engine set up under the superintendence of F. W. Bacon, M.E., of this city, is from the manufactory of Woodruff & Beach, of Hartford, Conn. It is a horizontal non-condensing engine, with cylinder 24" by 48" making fifty revolutions per minute. The fly wheel is 16 feet in diameter, with rim 32 inches in width, turned smooth on the surface, and carries a 30-inch single belt running slack. The belt is 95 feet long and drives a pulley keyed into the main line of shafting, 5½ feet in diameter by 32 inches in width.

There are two boilers, each five feet in diameter, with 44 4-inch tubes 15 feet long. The shells of the boilers are made of the best three eighths-inch charcoal iron. These boilers are set according to Mr. F. W. Bacon's plan, illustrated in No 9, Vol. XVII of the SCIENTIFIC AMERICAN, and ordinarily carry from forty to fifty pounds of steam. The grate surface is 25 square feet for each boiler. The chimney is 110 feet high and 40 inches square on the inside. The smoke burning pipe is 8 inches in diameter, perforated with one fourth-inch holes' giving an aggregate area of 2 square inches to each foot of grate surface. Each furnace door has a 3·75-in. aperture which supplies air to a box the full size of the door, from which the air enters the furnace through one fourth-inch holes in the side next the fire, thus distributing the air over the top of the fuel.

The latter is, as we have stated, as incongruous a mixture as one could well attempt to burn in such a furnace, the sawdust and shavings being swept down from the floors of the wood-working shops in the building; but notwithstanding the smoke is with easy firing practically consumed, so little escaping that no annoyance is caused to those whose buildings are in the immediate vicinity.

One of the boilers has been found to give ample steam for 75 indicated horse-powers.

The whole is a model of good work, and is well worth the inspection of those about to place new horizontal boilers. It demonstrates indisputably the utility of the method of setting boilers above referred to.

THE SOLAR ECLIPSE.

The returns from the different scientific expeditions, have been only such as have been made in the daily papers and the details are extremely meager.

From Springfield, Ill., Louisville, Ky., Des Moines, Iowa, Wilmington, N. C., Vincennes, Ind., Raleigh, N. C., Ottumwa, Iowa, and other prominent points comes the welcome news that the day was beautifully fair and the observations were made under the best possible circumstances.

The principal points to be determined in the observation of this eclipse, were first and foremost, the nature so far as could be ascertained of the rose-colored prominences, second, the true nature of the *corona*, and, third, the existence or non-existence of planets between the orbit of Mercury and the sun.

The belief that the corona is concentric with the sun will be open to question, if the reports that reach us are correct in regard to the appearance presented by it in this eclipse. The form is stated to have been rhombidal rather than circular, as hitherto observed.

The rose-colored protuberances appeared to the number of five or six. The result of the observations made upon them are not, however, yet sufficiently collated to justify any positive conclusion. So far as we can gather, no planets within the orbit of Mercury were discovered.

It is reported that one of the observing party at Shelbyville, Ky., observed eleven bright lines in the solar spectrum, thus adding six to the five already determined. Meteors were also observed passing between the earth and the moon. General success seems to have been secured in taking photographs and in all the other methods of observing.

THE REMOVAL OF THE TARIFF ON COAL.

We wish to be distinctly understood as not advocating the removal of the tariff on coal because we believe its removal will affect the prices of coal in the United States. The Nova Scotia coal cannot successfully compete in quality with the anthracite brought into this market. The reasons for our position are two: First, we maintain that combinations which ignore the public interest are not entitled to even a show of protection. Second, we would like to see the public convinced by an experiment that the great outcry that has been made against this tariff has been founded upon a false and exaggerated estimate of the power supposed to be put in the hands of coal monopolists by the tariff.

There is in circulation a report that the Pennsylvania coal dealers have arranged to buy up the Nova Scotia mines so as to have the absolute control of the whole Eastern market. We do not credit this rumor, which is probably a sensational production of the correspondent of the *Halifax Reporter*, in whose columns the report first appeared. It is undoubtedly intended to highten public feeling in regard to the present status of affairs, and may accomplish that end, but before we believe it we must have better evidence than we have yet seen.

THE ALBANY AND SUSQUEHANNA RAILROAD.

The public mind is excited, and the reputation of the Empire State scandalized, by the recent shameful transactions on the Albany and Susquehanna Railroad. Whatever may be

the merits of the case, one thing is certain, the power of granting injunctions, now vested in the judiciary, affords opportunities for bold and unscrupulous operators to embarrass the transactions of rival interests, which, in our opinion, ought to be curtailed.

It only seems necessary to trump up a series of charges with or without basis, to obtain an injunction, and the appointment of a receiver, who forthwith takes possession and ousts the holders of the coveted property.

In this case the citizens of Albany have been told by one of the high contracting parties, that the former superintendent of the road is a poor railroad manager, who has been running the road against the interests of the stockholders—a veritable King Log, for whom they are kindly offered in exchange a King Stork. Not having lost confidence in Mr. Ramsey, or having much reason to repose confidence in Mr. Fisk, they reject the offer. Whereupon all the forces at the command of both parties, legal and otherwise, are marshalled in battle array, and a series of disgraceful encounters have taken place.

We have neither time nor space to review the history of these transactions, but their effect upon the morals of the community cannot but be disastrous, while the confidence of the public in railroad management must be more or less shaken. What the final result will be, time will show. Meanwhile the action of Governor Hoffman, in taking possession of the road and appointing Gen. McQuade Superintendent, will meet hearty approval. It is about time that some check was put upon the conspiracies now going on in connection with railroad transactions.

THE LIGHT HYDROCARBONS.

There is a considerable number of hydrocarbon oils (popularly spoken of as the light hydrocarbons on account of their low specific gravity) of mineral origin. That is, whatever their original source, upon which point there has been much speculation, they are now found collected in the earth, either free or mixed with other mineral substances.

The increasing use of these oils and the great number of their derivatives applicable to industrial purposes, renders them second in importance to very few known mineral products.

The oldest known oil of this kind was, we believe, discovered in Persia, and it received and has retained for ages the name of naphtha. This oil is a volatile, light-yellow, transparent liquid, with a strong odor, characteristic of most oils of its class.

The art of distilling similar oils from coal tar, was developed later, and the same term was applied to the light products of such distillation, the heavy products being called dead oil and asphaltum.

Still later it was found that coal would, when distilled, yield similar oils, and the term naphtha was applied to the light oils obtained from coal.

The next step was the distillation of petroleum, and still the term naphtha was made to do duty for the light distillates. This term is then popularly applied indiscriminately to a large number of hydrocarbons, which yet have marked points of difference, the most general and prominent distinction being that based upon specific gravity.

It is true that there are some distinctive terms applied to classes of these oils, but these are in some cases erroneous, and in others too indefinite. Benzine or benzole is one of these terms popularly applied to all hydrocarbon oils ranging in specific gravity from 45 to 80 degrees Baumé.

The term gasoline is strictly applied to oils ranging from 80 degrees Baumé upwards to sometimes as high as 90 degrees. But we have often heard it improperly applied to those of a less specific gravity than 80 degrees.

These oils as found in market are all complex mixtures of different oils. It has been asserted on good authority that each of them contain, in various proportions, at least twelve different hydrocarbons whose boiling points range from 32° Fah. to 318°, eight of them boiling at lower temperatures than water.

The naphthas are all highly inflammable, but they are not in themselves explosive. The lighter ones are, however, very volatile, and their vapors when mixed with air in the proper proportions to afford complete combustion, are highly explosive. They are also very difficult to keep in anything but hermetically sealed vessels of a material impervious both to the oils and their vapors. Nothing so porous as wood in its natural state will hold them, and for the most part they are put up in tight-sealed tin cans. Cans which have contained these oils and which have had left in them a small residue, are the most likely to contain an explosive mixture of air and hydrocarbon vapor.

The light hydrocarbons may, however, be safely used for lighting purposes in apparatus specially designed to convert them into vapor, which vapor is passed through pipes and burners like ordinary illuminating gas. The latter is very explosive when mixed with common air in the proper proportions, but it is undoubtedly the safest illuminating agent devised up to the present time. The safety consists in the use of the proper appliances for its consumption.

Whenever these light hydrocarbon oils are used for consumption in lamps, there must, from the nature of the case, be great danger. There is the partially filled lamp, its open space filled with vapor, and communicating with the external air, and the flame in close proximity to the explosive mixture that must inevitably be sometimes formed. Although there may be many exemptions from disaster, there is always in such cases an immediate risk, and although the papers constantly give us accounts of serious casualties resulting from such causes, their frequency does not surprise us so much, as that they are not far more frequent, taking into account the character of the oils so largely sold to a gullible public.

THE PROPOSED TUNNEL UNDER THE BRITISH CHANNEL.

This long talked of and much-mooted proposition seems at length to have reached a stage of definite action. From an article in *All the Year Round* we are enabled to gather something as to the possibility of its achievement. Demonstrated possibility, joined with desirability, seems, at the present age to be all that is necessary to initiate any engineering enterprise.

The conditions on which the success of this enterprise depend are comparatively few and simple. The first condition relates to the geological formation in which the work would have to be done.

It has frequently been pointed out, and there appears to be no difference of opinion on the subject, that there are to be found, on opposite sides of the Channel, tracts of coast presenting geological features almost identical. The English coast between Deal and Folkestone, for instance, corresponds in every particular with three miles of the French coast, a little to the westward of Calais. That the same formations continue under the bed of the sea is a probability that has been noticed in a report to the Geological Society on "The Chalk Ridges which extend parallel to the Cliffs on each side of the Channel tending towards the North Sea," by Captain J. B. Martin, in 1839. Careful geological investigation has been made with a view to discover whether the chalk formations obtaining on each coast continue unbroken for the whole distance dividing them; and there appears no reasonable cause of doubt that this is the case.

Impressed by these facts, Mr. William Low, an engineer who for many years had been confident of the feasibility of connecting the English and French railway systems, by means of a sub-channel tunnel, set himself earnestly to examine for himself the geological formations of the two shores. After most careful examination, Mr. Low became satisfied that the deductions of the geologists were correct. His examination of the borings for several artesian wells on both sides of the Channel, strengthened his opinion as to the regularity of the strata. It became his firm conviction that along a certain line, about half a mile west of the South Foreland, and four miles west of Calais, the tunnel could be made entirely through the lower, or gray chalk, which, owing to its comparative freedom from water, and other qualities, would be a most desirable stratum in which to work. With the result of these investigations, and with plans of the tunnels he projected, Mr. Low, in 1867, betook himself to the Emperor ofthe French, who, giving the English projector a cordial reception, desired him further to organize his plans, and to come again when he might be prepared to submit definite proposals.

In 1856, M. Thomé de Gamond, a French engineer of repute, who had for many years been advocating the construction of a tunnel between England and France, obtained, by order of the Emperor, an investigation of his plans at the hands of a scientific commission. This body, satisfied with the substantial accuracy of M. de Gamond's geological conclusions recommended that his investigations should be practically tested by sinking pits on the two coasts, and driving a few short headings under the sea at the expense of the two governments. Owing possibly to the backwardness of the Great British Circumlocution Office, this recommendation does not appear to have had any practical result. In 1857, M. de Gamond published the upshot of his researches, and the report of the commission: and at the Paris Exposition of 1867, he publicly exhibited his plans. It was very natural that Mr. Low, after his interview with the Emperor, should put himself in communication with M. Thomé de Gamond. This gentleman unreservedly placed his experience at Mr. Low's disposal, and, after a time, the results of their joint labors were laid before Mr. James Brunlees. He, after careful examination, consented to co-operate with the two engineers in the prosecution of the work. A committee of French and English gentlemen of influence and position, was, by desire of the Emperor, formed to further the project; and it is by the executive committee of this body, under the chairmanship of Lord Richard Grosvenor, that the matter is now practically brought before the public.

But the opinions of Messrs. Low and Brunlees, and of M. Thomé de Gamond, received further confirmation.

Mr. John Hawkshaw, whose name is well known to the public at large and to the engineering world, was induced to test the question, and to ascertain by elaborate independent investigation, the possibility of a sub-channel tunnel. With characteristic care and caution he took nothing for granted, but went himself over the whole ground already traversed by Mr. Low and by M. de Gamond. His geological researches led him to the same conclusions, and his expression of opinion in favor of the gray chalk was very decided. Not even satisfied with the theoretical results of these investigations, carefully though they were made, Mr. Hawkshaw held it necessary to make borings on each coast, at the precise points at which the ends of the tunnel would be situated. Thus Mr. Hawkshaw and the French commission came to the same decision. Now, the well at Calais, from which a considerable part of the geological inferences had been drawn, was at some distance from the spot where it was proposed to begin the tunnel on the French side, and possibly the strata might, in the precise place indicated not run as anticipated.

This did not, however, turn out to be the case. The actual borings conclusively proved the correctness of the views entertained.

The boring on the English coast was commenced at St. Margaret's Bay, near the South Foreland, in the beginning of 1866, and was satisfactorily completed in 1867. It was carried completely through the chalk and into the green sand, which was reached at a depth of five hundred and forty feet below high water. The boring on the French coast, three miles westward of Calais, was carried to a depth of five hundred and twenty feet below high water. It was intended to pass through the chalk as on the English side, but accident frustrated this design.

Simultaneously with these borings the bottom of the Channel was carefully examined by means of a steamer provided with all suitable apparatus. The main useful results established by these experiments appear to be, that on the English coast the depth of chalk is four hundred and seventy feet below high water, of which two hundred and ninety-five feet are of the gray formation, in which it is proposed to work; that on the French coast, the depth of chalk is seven hundred and fifty feet, four hundred and eighty being gray: and that there appears to be no room to doubt the regularity of the strata between the two shores along the line proposed.

So, it would seem, firstly, that the chief condition is satisfactorily insured, and the geological formation of the sea's bed is such as to admit of the excavation of a tunnel through the lower gray chalk; and secondly, that it is not necessary to go to a depth unsuitable for railway traffic. It is calculated that the approaches to the tunnel can be constructed at gradients not exceeding one foot in eighty.

The next point of paramount importance to the traveling public is the question of the safety of the tunnel when made. The dangers most carefully to be guarded against are two: any possible irruption of water from the sea, or from unexpected land-springs; and any deficiency in ventilation.

Engineers are of the opinion that these dangers can all be provided against. Recent borings on either side of the Channel have proved that there need be no fear of land water, and the impermeability of chalk and the depth below the bottom of the sea, at which the tunnel will be placed, being in no case less than one hundred feet, it is maintained that there would be no danger from incursions of the sea water. The submarine excavations in the Cornish mines are an existing demonstration of the safety of the proposed tunnel.

Ventilation will be secured by means of powerful steam engines, and attempts to raise the necessary funds are wisely to be postponed until two small headings, or galleries, are driven from each country, connected by transverse driftways. Ventilation would thus be secured in the manner customary in coal mines and works of a similar nature, and the feasibility or otherwise of connecting England and France by a tunnel can be demonstrated.

The New Postoffice for New York.

The long-talked of and prayed for new Postoffice was commenced on the 9th inst. The grounds situated at the lower end of the City Hall Park, opposite the SCIENTIFIC AMERICAN office, are now inclosed by a high board fence, within which a large number of laborers are engaged in the preliminary work.

The new building is to have frontages on Park Row, on Broadway, on the Plaza to be laid out between it and the City Hall (or in a straight line across the Park), and on the curve at the southwesterly terminus of the Park. The style of architecture will be *renaissant*. The material of the edifice is to be a light-colored granite, and, in shape, the building will be conformable to the area of the plot of ground to be built upon. It is to have three stories and an attic over the street level, and a deep basement. The roof will be of the Mansard style. The basement and first story of the building are to be devoted to postoffice purposes exclusively; the second story will contain court rooms for the United States Courts, offices for the United States Marshal, etc., the money order and registry departments of the Postoffice and the private offices of the Postmaster; the third story will comprise principally the offices of the judges and other officers of the Federal courts, and the attic rooms will be fitted up as places of deposit for Federal records, etc.

The plans for the new building will be ready for the contractors in about one month hence. The excavation for the edifice is to be thirty feet in depth, and will require the removal of more than 50,000 cubic yards of earth, as there are to be a cellar and sub-cellar. The plans are all to be drawn under the direction of Mr. A. B. Mullett, the supervising architect of the Treasury Department, who has taken rooms at the Astor House in order to be near the scene of operations while the construction of the building is going on.

An important suggestion has been made (but it is only a suggestion as yet) to connect the basement of the new Postoffice with the press and mailing rooms of the prominent newspaper offices, by an underground pneumatic railway, so that there may be no delay in sending off the editions of the papers which go to the various parts of the country by mail. If the proposition be acted upon, much time will be saved to the newspaper establishments, the extra handling of the papers being avoided, and the prompt delivery of the morning journals all along the different mail routes will be assured.

Mr. Mullett hopes to have the whole building ready for occupancy by September, 1871. He is assisted in his labors by Mr. Hulburd, who superintends the erection of the building; Mr. Judson York, assistant supervising architect, and, in the absence of Mr. Hulburd, acting as superintendent; and Mr. John F. Ames. With such capable and thorough assistants, it may be regarded as certain that Mr. Mullet, whose energy is well known and highly appreciated by the Government, will push forward the work to a speedy completion, and that, when pronounced ready for occupancy, the edifice will be an ornament to the city.

There are also to be important changes in the laying out of the City Hall grounds, and Broadway, from the lower corner of the Plaza to Chambers street, will be widened forty-two feet.

Storms in the Sun.

We now know that our own sun (resembling in this probably most other solar bodies of the same kind) is in so highly fluid and excitable a condition as to be constantly sending out from its surface forked tongues (thousands of miles in extent) of inflamed hydrogen gas, like the flickering streams of light from the stars of a street illumination; and, moreover, as to be subject to great periodical disturbances, now called "magnetic storms, which are in all probability caused by certain combinations in the movements of those little solid bodies, on one of which we live, round the sun. Even now one such epoch of magnetic storm seems to be thought pretty near at hand. The sun has been lately exhibiting the most surprising forms of disturbance, and presenting to scientific eyes less "fixity" of essence than ever. Spots so vast that we must estimate their dimensions by millions of square miles, have broken out from time to time, and have presented rapid changes of figure, indicating the action of forces of inconceivable intensity. Clusters of smaller spots, extending over yet vaster areas, have exhibited every form of disturbance known to the solar physicist, and every degree of light, from the apparent blackness (in reality only relative) of the nuclei, to the intense brillancy of the faculous ridges. And we now know that these appearances are not merely matters for the curious, with which, as they happen at a distance of above ninety millions of miles, practical men need not concern themselves. This much, at least, is certain, that the vast changes now going on in the physical constitution of the sun are changes which do most powerfully affect the electric condition of our earth, which have in former years caused the most violent disturbances in the various artificial as well as natural electric apparatus of the world we live in, and which, to speak of the least of all its possible effects, might, just as well as not, happen some day to throw the electric condition of every telegraphic cable on our planet, under the sea or above it, in the most dire confusion, and send down telegraphic companies' shares to zero in a lump, even if they did not contrive to telegraph to us, after some strange inarticulate fashion that shares in all public companies, even in that very limited public company, the human race, are, in a physical point of view, of very doubtful value indeed. Let us explain briefly to what we allude.

On September 1, 1859, shortly before noon, two astronomers —Messrs. Hodgson and Carrington—one at Oxford, the other in London, were at the same instant scrutinizing a large group of sun spots. On a sudden two intensely bright patches of light appeared in front of the cluster. So brilliant were they that the observers thought the darkening screens attached to their telescopes must have become fractured. But this was found not to be the case. The bright spots indicated some process going on upon the sun's surface—a process of such activity that within five minutes the spots traveled over a space of nearly 34,000 miles.

Now, at the Kew Observatory there are self-registering magnetic instruments which indicate the processes of change by which the subtile influences of terrestrial magnetism wax and wane. At one time the line traced by the pointer will be marked by scarcely perceptible undulations, indicating the almost quiescent state of the great terrestrial magnet. At another, well-marked waves along the line exhibit the pulsations of the magnetic system, influenced in a manner as yet intelligible to the physicist. And then there is a third form of disturbance, the sharp, sudden jerks of the pointer exhibiting the occurrence of those mysterious phenomena termed "magnetic storms."

When the records of the Kew Observatory came to be looked over, it was found that at the very instant in which the brilliant spots of light had appeared to Messrs. Hodgson and Carrington, the self-registering instruments had been subjected to the third and most significant form of disturbance—a magnetic storm began, in fact, as the light broke out on the sun's surface. But this was not the only evidence of the sympathy with which the earth responded to the solar action. It was subsequently found that soon after the spots of light had appeared the whole frame of the earth had thrilled under a mysterious magnetic influence.

At the West Indies, in South America, in Australia, wherever magnetic observations are systematically made, the observers had the same story to tell. In the telegraph stations at Washington and Philadelphia the signalmen received strong electric shocks. In Norway telegraphic machinery was set on fire. The pen of Bain's telegraph was followed by a flame. And wherever telegraphic wires were in action, well-marked indications of disturbance presented themselves. Even this, however, was not all. The great magnetic storm was not a mere instantaneous electric throe. Hours passed before the disturbed earth resumed its ordinary state. And thus it happened that in nearly all parts of the earth night fell while the storm was yet in progress. During the night magnificent auroras spread their waving streamers over the sky, both in the northern and the southern hemisphere. As the disturbed needle vibrated, the colored streamers waved responsive, and it was only when the magnetic storm was subsiding that the auroral lights faded from the heavens. Now, it is evident that these phenomena show the most intimate relation between these peculiar disturbances in the sun and the magnetic currents of our own earth. Directly one of these changes takes place upward of ninety millions of miles away, the electric condition of our planet is changed in some mysterious way, of which our instruments, and even the condition of our sky, bear record.

The pens of all our telegraphic wires may some day trace in flame a handwriting more ominous of human destiny than was the handwriting which during Belshazzar's feast traced a warning on the wall of the fall of the Babylonian dynasty. Moreover, note this, that these changes in the condition of the sun take place at intervals of about eleven years. The variable star which swings round it, as well as supplying us with light and heat and (apparently) magnetism, clouds over every eleven years these spots, so that it seems most likely that every eleven years certain magnetic conditions recur which have not occurred in the interval. If so, perhaps, the magnetic excitement of 1859 will recur, and it may be in much greater force next year—in 1870. And if it does, how are we to say what may or may not recur with it?

Type Setting by Machinery.

The following is a description from the *Scientific Opinion* of an invention recently patented: The type pockets are stationary, and are arranged in a circle or a portion of a circle around or over a revolving wheel or frame, the wheel carrying a number of pickpockets, each of which is capable of withdrawing type from one of the pockets, the precise pocket upon which each pickpocket shall operate, being in one arrangement determined by the position of the perforations in a strip of paper acting in concert with a system of levers and triggers or fingers in manner as, or nearly as follows: The systems of perforations which the inventor found suitable was similar to that used in a former apparatus, in which each letter or sign is represented by two or more perforations, the distinctions between the several letters or signs being effected by changing the positions of the perforations from one to another of a series of straight lines or imaginary lines, as, for example, fourteen, which number will, in ordinary cases, be found to be sufficient. The strip of paper thus perforated is passed by an intermittent movement over a perforated drum or plate and into contact with a series of fourteen pins attached to, or formed on, a corresponding number of levers or triggers, each movement of the paper bringing two perforations opposite to two of the pins, which said two pins enter the said perforations, and the corresponding levers move into position to set one of the pickpockets.

Bleaching Ivory.

The following recipe for bleaching ivory is said to be very satisfactory: The ivory, when cut into plates of the proper thickness for keys, is placed in a flat vessel, and a solution of carbonate of soda, in the proportion of ten ounces of soda to two pounds of soft river water to each pound of ivory is poured over it. This is allowed to remain for 36 or 48 hours, after which the solution is to be poured off and the ivory washed several times in cold, soft water. After this it is to be again immersed in a solution consisting of three quarters of a pound of sulphate of soda, and two pounds of soft water, to a pound of the ivory, and allowed to remain five or six hours. Two ounces of hydrochloric acid, previously diluted with four times its weight of water, are then to be stirred in, and the vessel covered with a tight-fitting cap, and allowed to remain 36 hours. The liquid is then poured off, and the ivory plates well washed and dried in the air. Should the desired degree of whiteness not be obtained by one operation, it can be repeated until successful. As the gases generated during the process are injurious to the lungs, it will be readily understood that the operation should be conducted in the open air or in a chimney, where the fumes can be carried off.

Patent Bottle Stopper.

A new safety stopper for bottles has been patented in England. It is composed of a short vulcanized india-rubber or cork tube, in the upper part of which is inserted a metallic ring, on which this tube is kept fast by any suitable means, either by binding, spurs, expansion, etc. A screw-tapped peg with a conical head is inserted upwards in the india-rubber tube, through which it runs, and is provided with a round screw nut at its upper part. This tube so fitted, is inserted in the neck of the bottle to be stopped, and the screw nut being turned to the right with the fingers causes this screw-tapped peg to move upwards; the conical head of the latter entering gradually in the india-rubber tube presses it against the internal side of the neck at the very place where this neck is conical, and the bottle is hermetically closed, because the conical head of the peg presses against the india-rubber or cork tube in its whole periphery against the conical neck of the bottle. To open the bottle, the screw nut must be turned to the left; then, by pushing down the peg, its conical head comes out of the rubber tube, and the stopper is easily removed.

Profits of Small Inventions.

Hiram Tucker lately applied for an extension of his patent for a Spring Bed Bottom. The invention consisted in supporting the ends of wooden slats on stirrup springs. It appeared from the patentee's sworn statement that he had cleared in profits from his patent over one hundred and twenty thousand dollars.

Judge Fisher, the Commissioner of Patents, decided that the invention was not one of great importance to the public, that the patentee had not expended an extraordinary amount of time, ingenuity, or expense upon the invention, and that the profits already made were an adequate compensation. The application for extension was therefore rejected.

FOR the sake of the future cleanliness of the city, we are glad to chronicle the fact that a new Postoffice is about to be erected upon the lower point of the City Hall Park. Already the filthy apple, peanut, and ice-cream stalls are cleared away, and in their stead we can look out upon a clean board fence. The municipal authorities of this city are constitutionally wedded to all sorts of nuisances, and it is vain to expect, or even hope for anything like good order, either in the streets or other public places under city control.

PAPER FROM SHAVINGS AND SAWDUST.—Dr. Matthiessen, a well-known *savant*, now appears in the character of an inventor and patentee in England of an important improvement. He submits wood when in a state of division, such as shavings, sawdust, or disintegrated wood, to what is known as a rotting process—that is to say, the wood in a state of division is steeped either in running or stagnant water, and is allowed to undergo a rotting or fermenting process, by which process certain constituents of the wood will be decomposed and removed, and the subsequent treatment of the residual ligneous fiber for the production of pulp or paper will be thereby rendered more economical, and the process of boiling and bleaching is more easily effected.

BROADWAY has been re-paved from Bowling Green to Union Square at a cost of very nearly $463,000. The work was commenced in the month of June, 1867, and has been going on wearily ever since, very much to the inconvenience and annoyance of those who crowd that busy thoroughfare.

IN estimating the practical value of any science, something more than the mere material results of its application must be taken into account. It must be credited with whatever aid it affords to its sister sciences.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The prospectus of the West Indian and Panama Telegraph Company has been issued. The design of the company is to connect South America with Europe and the United States by means of a cable from Cuba to Central America.

It is stated that the thick tough sap found in large quantities in the leaves of New Zealand flax, may be converted into a gum for sealing envelopes, which, when dry, unites the surfaces of paper so thoroughly that no process of steaming or soaking will permit them to be separated again. For this reason, it is now being used in large quantities in England, in the preparation of what are called "safety envelopes."

An important reduction in the charges for messages by the old Atlantic cable has been made. Since August 10, dispatches could be sent at the following rates: Thirty shillings sterling, or $7·50, gold, for ten words; and three shillings sterling, or seventy-five cents, gold, for each extra word. Press messages are sent at one half the above rates.

Mr. Welborn, in the *Deutsche Ind. Zeitung*, says that proto-sulphate of iron can be absolutely preserved from oxidation by placing with it a piece of camphor wrapped in a piece of clean and dry paper.

Wooden toothpicks are made by patent machinery, and the manufacture of these articles is principally, if not wholly, carried on at an establishment near Boston, which has been in operation for four years. The aggregate number sold is quite large, sometimes amounting to five millions a day.

A light-house is being erected at the south-west pass, in the Mississippi river. It will be of cast iron, and the work will be completed as speedily as possible.

The recent exhibition of textile fabrics in Cincinnati shows that the South is largely extending its cotton manufactories. According to the latest reports, Georgia has forty-seven cotton mills; South Carolina, forty; Missouri, twenty-seven; Alabama, eleven; Tennessee, forty; and there are also many mills in North Carolina and South Carolina. The product generally is fine shirtings and sheetings, and the specimens exhibited at Cincinnati compared favorably with the goods from the New England manufactories.

In nineteen years there has been an increase of 1,817 factories and 261,882 hands in connection with the textile industries of Great Britain. The number of spinning spindles during the same period increased from 25,638,716 to 41,516,484; and the number of power looms from 301,443 to 549,365. The motive horse power increased from 1850 to 1868 as follows:—Steam, from 103,113 to 332,851; water, from 26,104 to 29,830.

An international exhibition is to be held in Turin, in 1872, to commemorate the completion of the Mont Cenis tunnel.

The tunnel of the Marietta (Ohio) Railroad is cut under a well of excellent water. The well is as good as ever, and not a drop leaks through, although trains pass directly under it.

Iowa will soon have four railroads connecting the Mississippi and the Missouri rivers. The great central line extending from Davenport to Council Bluffs, is just completed and in successful operation. Two others, one beginning at Dubuque, and already built to Fort Dodge, and the other at Burlington, will be completed in a few months.

The Common Council of Newark have adopted a resolution to commence an action against the Newark and New York Railroad Company for a violation of the provisions of their charter of the City ordinance, by crossing Hamilton street at such an angle as to practically destroy its value for public travel.

The manual labor system at Cornell University appears to work well. One student supports himself by cabinet making, another by printing, another by photography, while others work on the farm. One young man who sweeps the rooms and makes fires has taken the first prize in science and German.

The seventh Industrial Exhibition of the Mechanics' Institute of San Francisco, will commence in that city on the 14th of September, 1869. The building cost $45,000, and covers an area of 70,000 feet.

St. Louis, anticipating shipments of silver ore from Colorado as soon as the Kansas Pacific Railroad is finished to Denver, is about to erect smelting furnaces to meet the requirements of the expected new branch of industry.

On a farm at Ida, Monroe County, Michigan, there is an immense block of granite which is an object of curiosity. The stone is about 40 feet high, 50 feet long and 20 feet wide, and upon the surface, which is as smooth as a planed floor, there can plainly be seen the foot-prints of an immense bear.

The Portland and Kennebec Railroad Company is putting a monster trip hammer into its machine shop at Augusta. It was purchased in Philadelphia, and cost $3,000. It weighs twenty-three tuns, and will strike a blow of 2,000 pounds, and may be graduated to strike with a force anywhere from 2,000 pounds to one pound.

The Royal assent has been given to the bill for the purchase of the British telegraph lines by the Government.

The Liverpool Chamber of Commerce has resolved to send a circular letter to the chambers of commerce in this country, advocating the discontinuance of the weighty and unnecessary covering, and heavy iron bands on cotton bales, and suggesting the adoption at American ports of the same system for the allowance of tare which prevails in England.

A dispatch from Lisbon states that a French company offers to form a telegraph line from Lisbon and Gibraltar to England and America, on a twenty years' concession and without subsidy.

The New York State Agricultural Society will hold its twenty-ninth annual exhibition and fair at Elmira on the 14th, 15th, 16th, and 17th days of September next. Exhibitors or persons intending to present animals or articles for exhibition are required, by a rule of the Society, to make their entries on or before Saturday, the 24th inst.

Cars fitted with chairs are now run with the 12 o'clock night train over the New Jersey Railroad. These cars are intended to answer the purpose of sleeping cars.

A strike is in progress among the miners of the White Pine gold regions. A large number of miners are at work, however, at $4 per day, and it is thought that the dissatisfied workmen will finally be compelled to return to their labors at the same rate. The miners already at work have formed a protective society, and promise to resist any infringement of their rights by the Miners' Union.

The Viceroy of Egypt has ordered a large quantity of sugar-making machinery from a Paris firm. The total amount of the order is about $3,000,000.

An addition of glycerin to the glue and molasses of which printers' ink rollers are usually made is said to act very beneficially, and removes all endency of the rollers to become hard, or to dry and crack.

The Indiana State Geologist, Professor E. F. Cox, has returned home after quite an extended investigation in the counties of Owen, Clay, Vigo and Parke. He found large deposits of coal and considerable iron ore in all these counties, and traced the belt of block coal from the south-western portion of Owen County up into the extreme northern corner of Parke, while it is his belief—and some little surface investigation has supported the idea—that the block coal extends as far north as Fountain.

A petition is circulating for a light-house and fog signal at Ash Point Island, in the Muscle Ridge Channel, Maine. One important fact stated in connection with the necessity for a light and fog signal at this point is, that during the year ending June 30th, last, 31,401 vessels passed Owl's Head in the daytime, and the number of vessels navigating these waters is said to be increasing at the rate of 3,000 a year.

The great needle manufactory of Carl Schleicher, in Schonthal, near Duren, on the Rhine, exported in the year 1868 no less than 340,000,000 of sewing needles, which were disposed of in various parts of the continent of Europe, in North and South America, and in Africa.

Answers to Correspondents.

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

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

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

C. B. F., of Mo., says: "1st, I am about to build a house and wish you to inform me if it is good to build the basement wall of concrete? Is it practicable, durable, and cheap, and how made? 2nd. I think of building my cistern above ground, a wood tank four feet from the ground, and run the water to any part of the house through pipes, for drinking purposes, the pipe to be large enough to hold say two palls of water, laid four feet deep under ground to basement. Will it be as cool as the water in an under-ground cistern?" ANS.—1st. It is common in this part of the country to build foundations of concrete, composed of lime, sand, water, gravel, and round or broken stones. A trench of boards is first made of the width of the desired foundation. Fill the trench with the concrete to the depth of a foot and let it stand for a day or two, or until sufficiently hard; then put on another foot of concrete, and so go on, adding concrete and raising your trench boards as the wall rises. 2d. If the water had to pass through a considerable extent of pipes underground it would be measurably cooled. But in your case you will get little or no benefit in the way of cooling.

A. R., of N. Y.—We are informed by parties who are authorities on the subject, that the life of oak ties will scarcely exceed in the average, eight years for white oak and five years for red oak, although the best white oak will sometimes last twelve years in exceptional cases. They could scarcely be bought for less than from forty-five to fifty cents each for 7½ feet, 6 inches face and 6 inches in depth. The objections you name to stone ties are sufficient to condemn them but they have been obvisted by the interposition of an elastic substance between the rail and the stone block, and this has been accomplished at an expense that perhaps does not render the scheme impracticable, taking into account the greater durability of a permanent way made of such material. But the great, and as yet unsurmounted obstacle to the use of stone, is the proper confining of rails to the stone blocks. Nothing yet devised has met this requirement.

C. D. M., of N. J.—A plumb line does not always hang in a perpendicular to the earth's surface. It has been observed to deviate from this line in the vicinity of large mountains, being attracted by their masses, and the Director of the Imperial Observatory, at Moscow, in Russia, has found in the immediate neighborhood of that city a deviation of nineteen seconds, decreasing in different places to eight seconds, from the spheroidal perpendicular. These deviations are not caused by proximity to mountains, but are attributed to subterraneous cavities in the earth under the city, either filled with air or water. Very slight deflections in the plummet have also been traced to the attractions of the sun and moon.

C. H. P., of Ill.—A good liquid blueing, free from acids, is the soluble, or basic Prussian blue, otherwise the ferrocyanide of potassium and iron. This substance is perfectly soluble in pure water, and may be made by adding to a solution of pure protosulphate of iron, a solution of ferrocyanide of potassium. A white precipitate will be formed which may be separated by filtration and washed. It becomes blue by exposure to the air, and may be dissolved in pure water as required.

S. C. L., of Mich.—Capillary attraction does not exist between all liquids and solids. It is one of the manifestations of the attraction of adhesion, and as this attraction does not exist between certain liquids and solids, there can, in such cases, be no such thing as capillary attraction. You can raise alcohol through a glass wick composed of tubes having a very fine bore. The heat of the flame will, however, be apt to fuse and close the upper ends of the tubes.

E. W., of Ohio.—Any kind of glass properly annealed can be easily drilled, but it cannot be made so tough by any process now known that it can be riveted. Perhaps, however, you mean to ask whether glass can be joined by metal rivets; if so, yes.

E. S.—A method of casting by compression is one of the new things of the age. Potters' clay is used for the molds, and the metal is forced in at the bottom by a cylinder and piston. The fineness of this kind of casting excels every other method known. By it the finest engravings can be accurately copied.

N. B., of Del.—If any one sends us a letter that contains sixteen distinct inquiries, we promise in advance that we will not answer them. There is a reasonable limit to which our time and patience can be taxed, but beyond that we are as likely to get cross as other good men.

S. T. M.—If you have an instrument, as you say, that will quickly and accurately divide a circle into any given number of equal parts, without the trouble of spacing with dividers, and is at the same time cheap and portable, it is something that is wanted and will sell readily.

D. E. F., of Ala.—There is no solvent that will reduce carbon to a liquid state without combining with it chemically. The bisulphide of carbon is a chemical compound, not a solution.

T. D., of Ohio.—You are right in your opinion. The quacks you allude to will never help your eyes. The only thing you can do is to use the best spectacles you can procure.

R. J., of Ky.—You will not succeed well in your attempt to grind brass cocks tight with emery. A much better material is molders' sand or pounded glass.

R. C. Y., of Miss.—Salt exists in the form of minute dust in the atmosphere, near bodies of salt water, being carried up in the form of salt spray by the winds.

D. P., of Vt.—A ball rolling down an inclined plane does not press against the surface of the plane with a force equal to its weight. A reference to some good text book on physics will set you right on this point.

Business and Personal.

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

Recent American and Foreign Patents.

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

TRUCK PLOW.—M. Mickelson, Ashland Mills, Oregon.—The object of this invention is to provide improvements in plow trucks, calculated to facilitate the management of the plows connected to them, in guiding and adjusting them so as to take more or less land, the tongue being rigidly connected to the beam when properly adjusted. Also, in adjusting the plows relatively to the depth of cutting and for raising them out of the ground. Also, for adjusting the wheels of the truck so as to support the axle and the body of the truck in a horizontal plane, either when both the wheels run on the surface in making the first furrow or after the first furrows has been made and one wheel runs in the furrow.

HAY FORK.—Newell Hinman, Sparta, Mich.—This invention consists in the arrangement of a pair of branched curved tines, forming a bifurcated shank, to which the rope and locking device are attached, and another short tine, bent in the opposite direction, is jointed.

SEED AND MANURE DROPPER.—John G. Ham, Newnan, Ga.—This invention consists of hopper supported in front on a wheel, and in rear provided with two or more plows, or cultivators, and operating handles, the said hopper being provided with an adjustable passage through the bottom for delivering the seed or other matter, in which passage one or more saws are arranged and operated to facilitate the feeding.

SEWING MACHINE.—L. H. Cobbs, Montgomery, Ala.—The object of this invention is to provide improvements in the construction of the Grover & Baker sewing machine, whereby the "lost motion" due to the wear of the crank connection with the needle arm, also the lost motion of the operating device for the vertical shaft of the curved needle may be avoided.

BENDING MACHINE.—D. G. Morris, Catasauqua, Pa.—This invention consists of a strong stand, having upon one side a pair of vertical grooves, a fixed former, and a bending lever and anti-friction wheel.

GUN LOCK.—William Dashner, Point Pleasant, West Va.—This invention consists in arranging a recessed projection on the interior of the rear end of the lock plate, for inclosing the tumbler dog and dog spring, and in the arrangement of a single or straight hammer spring on the outside of the plate, attached to the said plate in a peculiar manner, and to the hammer, a flat projection being formed on one side at the end to be secured, which passes through a corresponding slot, or mortise, in the front end of the lock plate, and is secured at the inside by a pin. A thin flat plate is arranged on the recessed inner projection, inclosing the tumbler and tumbler spring, to protect them from dust. The whole arrangement is exceedingly simple, and the entire lock is composed of very few and cheaply-constructed parts. It is also adapted for great efficiency in operation. For the terms on which the entire patent will be sold, or license to manufacture under said patent, address the patentee as above.

GRAIN BINDER.—Wm. Lottridge, Charles City, Iowa.—This invention relates to improvements in grain-binding machines, the object of which is to provide a machine capable of binding the sheaves with bands of straw, to be made and placed in position by the attendant. The arrangement of the machine is such that the grain is delivered upon a raking device attached to the side thereof, which conveys the grain in gavels in a lateral direction up an incline and delivers it into a trough, across which a band has previously been placed by the operator, with the ends to be tied around the sheaf in the notched or grooved ends of a pair of curved compressing jaws which move up from each side and condense the sheaf between them, and present the said ends of the band to a twister which twists the ends together, and from which the twisted end of the band is taken and tucked between the band and the sheaf by a tucker, in a manner similar to that practiced when bound by hand. After the tucking is accomplished, a discharger, actuated by a spring, strikes the sheaf at the end and drives it out of the trough.

BOBBINS FOR SEWING-MACHINE SHUTTLES.—R. S. Mershon, Zanesville, Ohio.—This invention consists in constructing a tubular bobbin, having one fixed and one movable pivot, or journal, or both journals or pivots may be movable; said pivots being operated or forced outward to maintain the bobbin in its place in the shuttle, by a spiral spring inclosed within the tube of the bobbin, and arranged to bear against the inner ends.

BREECH-LOADING FIREARM.—John D. Blaker, Newtown, Pa.—This invention relates to improvements in breech-loading firearms, having for its object to provide an improved arrangement of catch spring and detaching lever for holding and disconnecting the barrel, which is hinge-jointed, and swings downward for resisting the charge.

LEATHER-ROLLING MACHINE.—C. W. Monson, Upton, Iowa.—This invention consists in an arrangement of a part of smooth metallic rollers in a frame so that one may be caused to pass against the other or the leather between them, by the action of a foot-treddle while the other is turned by a hand-crank.

VISE.—Ira Coggswell, Jr., La Salle, Ill.—This invention relates to improvements in bench vises, designed to provide for conveniently adjusting the holding jaws to any required position for holding the work to advantage.

SEWING MACHINE TABLE AND COVER.—Thomas E. Hunt, Lafayette, Ind.—This invention relates to a new sewing machine table and cover, so constructed that the cover when swung open will be out of the way of the table, and that the latter will be enlarged when not covered.

WATER-TIGHT HOSE.—C. H. Proessdorf and E. Bauch, Boston Highland, Mass.—This invention relates to a new compound for making woven hose or piping water-tight, so that it may be used to the same advantage as rubber and leather hose.

VELOCIPEDE.—C. B. Guy, Postville, Iowa.—This invention relates to a new three-wheeled velocipede, adapted to two or more persons, and operated by the hands of the driver.

EMBROIDERING ATTACHMENT TO SEWING MACHINES.—Israel M. Rose, West Hampton, N. Y.—This invention relates to a new device which may be attached to any kind of sewing machine, and which will produce an embroidery stitch of very fine and ornamental appearance.

HORSESHOE.—P. C. Johnson, Central City, Colorado Territory.—This invention relates to a new manner of constructing the calks of horseshoes, so that they can be readily fastened and removed. The object of the invention is to provide a horseshoe which can always remain on the hoof, and which may easily receive new calks when the old ones are worn, or when in winter sharper toes have to be attached.

COMBINATION FISH BAR AND RAILROAD CHAIR.—Thos. J. Adams, Portsmouth, Ohio.—This invention relates to a new mode of securing the joints of railroad rails in a strong, durable, and economical manner, and increasing the bearing surface or base of the same on the sleeper to any desired extent.

MILK COOLER.—Jacob Dingee, Downington, Pa.—This invention relates to a new milk cooler, which is so arranged that the steam produced during the cooling process will be allowed to escape, and that the process itself will be rapid and thorough.

PIANOFORTE.—Charles A. Peterson, New York city.—This invention relates to a new manner of adjusting the chords in pianofortes by a novel arrangement of agraffes and a new substitute for the ordinary bridge.

HOISTING JACK.—W. A. Bowyer, Helen Furnace, Pa.—This invention relates to a new hoisting jack, which can be used to aid in loading timber upon wagons and for elevating other articles, and also for a wagon jack.

WASHING MACHINE.—Jonas Tramblie, Sanwich, Ill.—The object of this invention is to provide for public use an improved washing machine which shall be simple in construction, cheap, durable, easily cleansed and dried, and convenient of operation.

COMBINATION FURNACE.—J. Dwight Kellogg, Jr., Northampton, Mass.—This invention is intended to serve as a substitute for the ordinary cooking stove, in warm weather, being adapted for use either indoors or out of doors, and costing little, either to manufacture or operate, as the heat is economized to a degree that renders an unusually small amount of fuel necessary.

MEASURING DEVICE FOR SEEDING MACHINES.—H. B. Quick, Horicon, Wis.—The object of this invention is to produce for public use a new and improved device for effecting the escape of the seed from the seed box in a uniform and certain manner, such device being so adjustable that the quantity of seed sown shall be entirely under the control of the attendant, who can vary it at pleasure.

FORCE PUMP.—Luke L. Kellogg, Leon Center, N.Y.—This invention relates to a double-acting pump, provided with two buckets, moving simultaneously in opposite directions, and it consists in moving each bucket in one direction through a passage for the purpose of allowing water to pass through it, and then moving it in exactly the contrary direction through the same passage, for the purpose of forcing the water out of it.

COMBINATION PLOW.—B. F. McCarty, J. W. and R. J. Orr, Florence, Ga.—The object of this invention is to construct a simple, cheap, convenient, and durable plow, which can readily be adjusted to operate, either as a single plow, a double cultivating plow, or a covering plow; and the shares of which, when operating as a plow or cultivator, can be adjusted to cut the furrows anywhere from four to twelve or more inches apart.

CHURN.—W. L. Gordon, Dalton, Ga.—This invention consists in placing within a churn a vertical shaft, having on its lower end the dasher, and at its upper extremity a horizontal balance wheel, and there being, between the cover of the churn and the balance wheel, a cross head sliding on said shaft, which cross head is joined, by means of connecting rods, with the free end of a treadle, and is also, joined, by means of cords proceeding from its extremities, with the head of the shaft, all in such manner that, when the cords have once been wound around the shaft by hand rotation, and the free end of the treadle raised, then by exerting the treadle, a continuous rotation of the vertical shaft may be produced.

COMBINED CORN PLANTER AND CULTIVATOR.—Aaron G. Aiken, Somerton, Ohio.—The object of this invention is to provide for public use, in connection with corn planters, an improved device for raising and lowering the plows, rollers, etc., together with an improved feed regulator, and an improvement in the construction of the covering device; the whole being so constructed and arranged as to adapt it for convenient use, either as a cultivator or corn planter.

ATTACHING BELLS TO STRAPS.—Dwight M. Welch, Middle Haddam, Conn.—The method of attaching bells, heretofore employed, has been to pass their shank or stem through the strap end, fasten it there by a piece of wire, or species of forelock, passing through a hole in the end of the shank, on the back side of the strap. This left that side of the strap rough, so that it had to be covered to prevent its lacerating the horse's flesh, and to keep the bells from becoming detached, and make the whole device neat in appearance.

CORSET SPRINGS.—Mrs. Frances Lee Barnes, New York city.—This invention relates to a certain improvement in corset springs, whereby the same are made stronger and more durable in places where they now most easily break.

POLICE NIPPERS.—W. Gray Phillips, Brooklyn, N. Y.—This invention has for its object to furnish a neat, simple, and convenient instrument for use by the police in securing prisoners when they are taking them to the station house, and which shall be so constructed that it can be readily and quickly applied to the wrist of the prisoner, and when applied will enable him to be securely held.

WIND MILL.—C. S. Jenkins, Landsdale, Pa.—This invention has for its object to improve the construction of wind mills, so as to make them more convenient in use, more effective in operation, and more under the control of the operator than when constructed in the ordinary manner.

GRAIN BINDER.—N. F. Gilman, Rochester, Minn.—This invention has for its object to furnish an improvement in the method of binding grain as it is cut by a reaper, by means of an apparatus which shall be simpler than those usually applied, requiring a machinery less complex, and consequently less liable to get out of order from the roughness of the grain field.

KEY RING AND CHECK.—Charles A. Wentworth, Boston, Mass.—This invention has for its object to furnish an improved key ring, which shall be so constructed and arranged as to be securely locked and yet allow the keys to be conveniently put on and taken off, and which will allow the owner's name and address to be conveniently engraved or stamped upon it.

CUTTER BAR FOR MOWERS AND REAPERS.—B. Johnson, Carrollton, Ohio, and W. Johnson, Hanover, Ohio.—This invention has for its object to to improve the construction of the cutter bars of reaping and mowing machines, so as to make them cut more freely, run easier, and be less liable to become choked or clogged than when constructed in the ordinary manner, and which will allow the cutters to be conveniently dressed or sharpened when desired.

BEEHIVE.—Samuel B. Cranford, Upper Marlborough, Md.—This invention has for its object to improve the construction of beehives, so as to make them more convenient in use.

HAND PLOW.—William Gowen, Bartlett, Tenn.—This invention has for its object to furnish a simple and convenient hand plow or cultivator, designed especially for garden use, in putting in the seeds and cultivating the plants.

LINK ATTACHMENT FOR BRAKE BLOCKS.—Robert Humphrey, Albany, N. Y.—This invention has for its object to furnish an improved means for connecting the brake block to the frame of the car truck, which shall be strong, simple, and durable, and not liable to become accidentally detached.

COMBINED GANG PLOW AND DITCHING MACHINE.—Wilson Crawford, Streator, Ill.—This invention has for its object to furnish a simple and convenient machine, which shall be so constructed and arranged that it may be readily adjusted for use as a ditching machine or as a gang plow, as may be desired, doing its work well and thoroughly in either capacity.

WATER FENCE.—W. C. Barber, Van Wert, Ga.—This invention has for its object to furnish an improved fence for streams, and other places exposed to high water and freshets, which shall be so constructed and arranged as to open and allow the water and drift wood to pass through, and which shall at the same time be strong, simple in construction, and durable.

CULTIVATOR.—Nathan Butler, Otterville, Mo.—This invention has for its object to furnish an improved cultivator, which shall be simple in construction and convenient in operation, being so constructed and arranged that the plows may be readily adjusted to run at a greater or less depth in the ground, and that the plows may be easily raised away from the ground when desired by a simple movement of the driver's seat.

TELESCOPIC PIANO HINGE.—Amos S. Blake, Waterbury, Conn.—This invention has for its object to furnish an improved hinge for pianos, melodeons, organs, and other purposes, which shall be simple in construction, effective in operation, and at the same time so constructed and arranged as to leave the surface of the wood work to which it is attached entirely smooth, for convenience in finishing and polishing said wood work and in using the instrument.

PLOW CLEVIS.—W. W. Atteberry, Chesterfield, Ill.—This invention has for its object to furnish an improved adjustable clevis for attaching two or more horses to a plow, and which shall be so constructed and arranged that it may be readily adjusted to cause the plow to cut a wide or narrow furrow as may be desired.

GAS OIL.—John Butler, New York city.—This invention has for its object to furnish an improved heavy gravity compound oil with crude resin, and which shall be particularly adapted to the manufacture of rich gas for lighting small towns, public buildings, dwellings, etc.

EXPANDING DOUBLE SHOVEL PLOW.—Edward Wiard, Louisville, Ky.—This invention has for its object to furnish an improved double shovel plow, which shall be so constructed and arranged that the shovels may be adjusted to work at any desired distance apart, or at any desired pitch, as the circumstances of the case may render desirable.

WHEEL.—Thomas Ryan, Scott Bar, Cal.—This invention relates to a new and useful improvement in making wheels of carriages, and all descriptions of vehicles, and all descriptions of spoked wheels, whereby they are made more durable than wheels constructed in the ordinary manner.

CAN OPENER.—John A. Wells, Holly Springs, Miss.—This invention relates to a new and improved machine for opening tin cans, such cans as are used for containing and preserving (air tight) oysters, and various kinds of fruits, vegetables, meats, and extracts of various kinds.

LOOM.—Wm. Townsend, Seneca Falls, N. Y.—This invention relates to an improvement in looms, for weaving fancy cassimeres, and other goods, having particular reference to the method of operating the harnesses or heddles of the looms.

LOOM.—George H. Holmes, New Brunswick, N. J.—This invention relates to a new and useful improvement in looms for weaving cloth, having particular reference to the "take up" of the cloth.

WEATHER STRIP.—John Shaw, Clayton, Del.—This invention relates to a new and improved arrangement for preventing the entrance of wind and water under outside doors.

OPERATING NOZZLE EXHAUST VALVES.—A. Onslow, Jersey City, N. J.—This invention relates to a new and useful improvement in operating a valve on the exhaust nozzle in the smoke stack of a steam boiler.

CAB AND CRADLE.—George H. Henkel, Hartford City, Ind.—This invention relates to a new and improved arrangement, whereby a child's cab is converted into a cradle, and *vice versa*.

CHIMNEY COWL.—D. C. Battey and Carl L. Svensson, Topeka, Kas.—This invention relates to a new and useful improvement in cowls, whereby the draft is greatly increased.

STAIR ROD.—George W. Rogers, New York city.—The object of this invention is to produce cheap and durable stair rods, which will securely hold stair carpets in place and which will not require as frequent cleaning as the metallic rods now in use; also to provide a cheap and reliable fastening.

CORSET FASTENING.—Mrs. Marie T. Smith, New York city.—This invention relates to a new corset fastening or clasp, which is so arranged that the buttons or knobs formed thereon will not have to be passed through apertures of the fabric.

Official List of Patents.

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FOR THE WEEK ENDING AUG. 10, 1869.

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93,393.—RAILWAY RAIL SPLICE AND CHAIR.—T. J. Adams, Portsmouth, Ohio.
93,394.—MACHINE FOR MENDING STOCKINGS.—Benj. Arnold, East Greenwich, R. I.
93,395.—BEEHIVE.—Thomas Atkinson, Memphis, Tenn.
93,396.—CLEVIS.—W. W. Atteberry, Chesterfield, Ill.
93,397.—FENCE.—D. B. Ayres, Brooklyn, Mich.
93,398.—FLOOD FENCE.—W. C. Barber, Van Wert, Ga.
93,399.—CORSET STEELS.—F. L. Barnes, for herself, and as executrix of the estate of S. H. Barnes, deceased, New York city.
93,400.—CHIMNEY COWL.—D. C. Battey and C. L. Svensson, Topeka, Kas.
93,401.—DITCHING MACHINE.—Spencer Bentley, Green Oak, Mich.
93,402.—TELESCOPIC QUADRANT HINGE.—A. S. Blake, Waterbury, Conn.
93,403.—BREECH-LOADING FIREARM.—J. D. Blaker, Newtown, Pa.
93,404.—COUPLING FOR CARRIAGES.—Albert Booth (assignor to A. Booth, Son & Co.), Springfield, Ill.
93,405.—LIFTING JACK.—W. A. Bowyer, Helen Furnace, Pa.
93,406.—MANUFACTURE OF IRON.—E. Brady, Philadelphia, Pa.
93,407.—RAILWAY CAR COUPLING.—H. F. Breneman, Rapho township, assignor to himself and M. L. Greider, Lancaster county, Pa.
93,408.—SHUTTER WORKER.—F. E. Brown, Springville, Iowa.
93,409.—RULING MACHINE.—J. H. Bruce, Nashville, Tenn.
93,410.—INSULATOR FOR LIGHTNING RODS.—John Burnham, Batavia, Ill.
93,411.—COMPOUND OIL FOR PRODUCING GAS.—John Butler, New York city.
93,412.—CULTIVATOR.—Nathan Butler (assignor to himself and D. S. Butler), Otterville, Mo.
93,413.—MODE OF MAKING CORUNDUM WHEELS.—A. W. Calder, San Francisco, Cal.
93,414.—STEAM ENGINE.—W. C. Champlin, Allegeny City, Pa. Antedated Aug. 3, 1869.
93,415.—SEWING MACHINE.—L. H. Cobbs, Montgomery, Ala.
93,416.—VISE.—Ira Coggswell, Jr., La Salle, Ill.
93,417.—SAW MILL.—H. W. Conkling, Tecumseh, Mich.
93,418.—BEEHIVE.—S. B. Cranford, Upper Marlborough, Md.
93,419.—DITCHING MACHINE.—Wilson Crawford, Streater, Ill.
93,420.—GUN LOCK.—William Dashner, Point Pleasant, West Va.
93,421.—SADIRON POLISHER AND GLOSSER.—J. D. Davies, East New York, N. Y.
93,422.—PRINTERS' GALLEY.—Alexander De Puy, New York city.
93,423.—HAY ELEVATOR.—Wm. Derr, Tiffin, Ohio.
93,424.—MILK COOLER.—Jacob Dingee, Downington, Pa.
93,425.—SASH LOCK.—Samuel Easter, Charlestown, Mass.
93,426.—COMPOSING STICK.—John M. Eaton, Charlestown, Mass.
93,427.—COOKING STOVE.—John Fleming, Erie, Pa.
93,428.—SPURS FOR EXCELSIOR MACHINES.—J. A. Folsom, South Bend, Ind.
93,429.—FLASK FOR VULCANIZING RUBBER PLATES FOR SETTING TEETH.—C. G. French, Springfield, Ill.
93,430.—PLOW.—J. W. Gilliam, Elkton, Ky.
93,431.—HAND PLOW.—Wm. Gowen, Bartlett, Tenn.
93,432.—POCKET BOX FOR PERCUSSION CAPS, ETC.—Georges Gros, Bordeaux, France.
93,433.—VELOCIPEDE.—C. B. Guy, Postville, Iowa.
93,434.—SEED AND MANURE DROPPER.—J. G. Ham, Newnan, Ga.
93,435.—PORTABLE GASOMETER.—J. H. Hayward, New York city.
93,436.—FINGER GUARD FOR HOLDING HOT CORN.—Henry Hebbard, New York city.
93,437.—CAB AND CRADLE.—Geo. H. Henkel, Hartford City, Ind.
93,438.—HORSE POWER.—John Heuermann, Davenport, Iowa.
93,439.—HORSE HAY FORK.—Newell Hinman, Sparta, Mich.
93,440.—BUCKLE.—J. P. Hisley, Syracuse, N. Y.
93,441.—TAKE-UP FOR LOOMS.—G. H. Holmes, New Brunswick, N. J.
93,442.—LAMP BURNER.—Julius Hubbard, Montgomery, Ohio.
93,443.—RAILWAY BRAKE BLOCK.—Robert Humphrey (assignor to himself and R. C. Blackall), Albany, N. Y.
93,444.—SEWING MACHINE TABLE.—T. E. Hunt, La Fayette, Ind.
93,445.—RECLINING CHAIR.—Anthony Iske, Lancaster, Pa.
93,446.—WINDMILL.—C. S. Jenkins, Landsdale, Pa.
93,447.—HORSESHOE.—P. C. Johnson, Central City, Colorado Territory.
93,448.—CUTTER BAR FOR HARVESTERS.—Benjamin Johnson, Carrollton, and Wm. Johnson, Hanover, Ohio.
93,449.—MACHINE FOR GRADUATING CARPENTERS' SQUARES.—H. K. Jones, Hartford, assignor to the Hart Manufacturing Company, Kensington, Conn.
93,450.—GRAIN SEPARATOR AND CLOVER-CLEANING MACHINE.—E. L. Kelly, Reading, Mich.
93,451.—APPARATUS FOR DRILLING METAL.—J. A. Kirkpatrick and G. W. Hornby, Evansville, Ind.
93,452.—APPARATUS FOR UTILIZING WELLS AS REFRIGERATORS.—J. J. Kiser, Sulphur Springs, Ind.
93,453.—CANE AND STUBBLE SHAVER.—P. G. Kleinpeter, Plaquemine, La.
93,454.—VISE.—James Larkin, Detroit, Mich.
93,455.—CORN SHELLER.—W. D. Leavitt, New Orleans, La.
93,456.—CLOTHES PIN.—J. E. Lines (assignor to himself and J. W. Smith), Bryan, Ohio.
93,457.—BUNG.—Wm. Long, West Troy, and J. Garand, Troy, N. Y.
93,458.—GRAIN BINDER.—William Lottridge, Charles City, Iowa.
93,459.—TENSION DEVICE FOR SEWING MACHINE.—T. A Macaulay, Northampton, Mass.
93,460.—NEEDLE-HOLDING BLOCK FOR SEWING MACHINES.—T. A. Macaulay, Northampton, Mass.
93,461.—BELL-ROPE SUPPORTER.—W. C. Marshall, Hartford, Conn.
93,462.—CHURN.—James McElroy, Allegeny City, Pa.
93,463.—BOBBIN FOR SEWING MACHINE SHUTTLES.—R. S. Mershon, Zanesville, Ohio.
93,464.—TRUCK PLOW.—M. Michelson, Ashland Mills, Oregon.
93,465.—LEATHER-ROLLING MACHINE.—C. W. Monson, Upton, Iowa.
93,466.—CARRIAGE POLE AND SHAFTS COMBINED.—Augustus Moore and John Aylwerd, San José Mission, Cal.
93,467.—MACHINE FOR BENDING CAR HOOKS.—D. G. Morris Catasauqua, Pa.
93,468.—COMBINED FURNACE AND STEAM GENERATOR.—Franz Mörth, Vienna, Austria.
93,469.—BRAKE FOR MACHINERY.—R. D. Napier, Birkenhead, England.
93,470.—EXHAUST-NOZZLE-VALVE DEVICE.—A. Onslow, Jersey city, N. J.
93,471.—CHURN DASHER.—D. K. Overhiser, Williamsport, Pa.
93,472.—WINDMILL.—P. C. Perkins, Mishawaka, Ind.
93,473.—PIANO-FORTE.—C. A. Peterson, New York City.
93,474.—POLICE NIPPER.—W. G. Phillips, Brooklyn, N. Y.
93,475.—NEWSPAPER FILE.—L. C. Prindle, Chicago, Ill.
93,476.—WOVEN HOSE FOR WATER, ETC.—C. H. Procssdorf and E. Hauch, Boston Highland, Mass.
93,477.—PROCESS OF PREPARING ICELAND AND IRISH MOSS for use in food.—W. J. Rand, Brooklyn, E. D., N. Y.
93,478.—MANUFACTURE FROM ICELAND MOSS AND CARRAgeen.—W. J. Rand, Brooklyn, E. D., N. Y.
93,479.—STAIR ROD.—G. W. Rogers, New York City.
93,480.—EMBROIDERING ATTACHMENT FOR SEWING MAchine.—I. M. Rose, West Hampton, N. Y.
93,481.—METALLIC BUNG WITH AUTOMATIC VENT.—Augustus Ruoff, Detroit, Mich.
93,482.—ROOFING COMPOSITION.—S. I. Russell and J. H. Cole, Chicago, Ill.
93,483.—PROCESS FOR FORMING THE HUB AND SPOKES OF wrought-iron wheels.—Thomas Ryan, Scott Bar, Cal.
93,484.—CARRIAGE JACK.—J. F. Seaman, Cortlandville, N. Y.
93,485.—MECHANICAL MOVEMENT.—H. F. Shaw, West Roxbury, Mass.
93,486.—CLUTCH.—H. F. Shaw, West Roxbury, Mass. Antedated August 5, 1869.
93,487.—WEATHER STRIP.—John Shaw, Clayton, Del.
93,488.—CLOTHES WRINGER.—Gilbert Smith, Highland Falls, N. Y.
93,489.—CORSET FASTENING.—M. T. Smith, New York City.
93,490.—HOISTING MACHINE.—W. M. Smith, Augusta, Ga.
93,491.—MANGLE.—Nicolous Soderstrom, Chicago, Ill.
93,492.—TURNING LATHE.—I. H. Spencer, North Providence, R. I., assignor to A. N. Bullock, A. C. Bullock, and E. R. Clark.
93,493.—STALK CUTTER.—Lucas Stadler, Bowen, and W. H. Staats, and A. C. Schwanke, La Prairie, Ill.
93,494.—STEAM CULTIVATOR.—A. J. Stevens, San Francisco, Cal.
93,495.—SLED BRAKE.—J. B. Storey and I. N. Ross, Butler, Pa
93,496.—SHINGLE MACHINE.—D. B. Strong and William Buskirk, Winchester, Mo.
93,497.—PEGGING JACK.—W. H. Sweetland, Marblehead, Mass.
93,498.—TANNING COMPOSITION.—N. A. Thornton, Conikee, Ala., assignor to himself and M. L. Thornton, Lumpkin, Ga.
93,499.—TOILET PIN CASE.—T. R. Timby, Saratoga, N. Y.
93,500.—LOOM.—William Townsend, Seneca Falls, N. Y.
93,501.—PERMUTATION PADLOCK.—J. E. Treat, Oxford, Mich.
93,502.—EXTENSION LADDER.—C. G. Udell, Chicago, Ill.
93,503.—BIRD BATH.—T. W. Van Tassel, (assignor to himself and William Beaman), Washington, D. C.
93,504.—COMBINED KNOB LATCH AND LOCK.—J. H. Vickers, (assignor to Norwich Lock Company), Norwich, Conn.
93,505.—CAN OPENER.—J. A. Wells, Holly Springs, Miss.
93,506.—KEY RING AND CHECK.—C. A. Wentworth (assignor to A. C. Norcross), Boston, Mass.
93,507.—EXPANDING DOUBLE SHOVEL PLOW.—Edward Wiard (assignor to B. F. Avery), Louisville, Ky.
93,508.—CASKET HANDLE.—H. C. Wilcox (assignor to the Meriden Britannia Company), West Meriden, Conn.
93,509.—DEVICE FOR OPERATING COCKS OF STEAM CYLINders.—W. H. Woods, San Francisco, Cal.
93,510.—COMBINED CORN PLANTER AND CULTIVATOR.—A. G. Aikin, Somerton, Ohio.
93,511.—SEWING MACHINE.—J. F. Andrews, Lancaster, Pa.
93,512.—LIFTING JACK.—J. B. Ausbourne (assignor to himself and Hiram Mallory), Milwaukee, Wis. Antedated August 5, 1869.
93,513.—SPEED INDICATOR FOR SHIPS.—Armand Banare, Paris, France.
93,514.—IMPLEMENT FOR SLITTING AND JOINING RAGS FOR CARPETS.—John Beal, Port Gibson, N. Y.
93,515.—BASE-BURNING STOVE.—W. S. Bronson, Hartford, Conn.
93,516.—BASE-BURNING COOK-STOVE.—W. S. Bronson, Hartford, Conn.
93,517.—STOVE ATTACHMENT.—M. E. Capen, Aurora, Ill. Antedated August 3, 1869.
93,518.—STUFFING BOX.—W. H. T. Clark, San Francisco Cal.
93,519.—RABBETING MACHINE.—J. J. Clark and Thomas Clark, Elgin, Ill.
93,520.—HORSE HAY FORK.—Francis Cramer, Chess Springs Pa.
93,521.—MONKEY-WRENCH.—Loring Coes, Worcester Mass.
93,522.—NAIL EXTRACTOR.—I. F. Davis, Rockford, Ill.
93,523.—DISTILLING ALCOHOLIC SPIRITS AND LIQUORS.—Jonathan Dennis, Jr., Washington, D. C. Antedated Feb., 1863.
93,524.—WAGON BRAKE.—Charles Dold. Mason, Ohio.
93,525.—MATCH MACHINE.—W. B. Eltonhead, Philadelphia, Pa.
93,526.—TREATING CLAY AND DRYING BRICKS.—Jeremiah Fisher, Reading, Pa.
93,527.—ADDRESSING MACHINE.—George Gibbons, Meriden, Conn.
93,528.—CORSET.—T. S. Gilbert (assignor to himself and G. F. Bushnell, Birmingham, Conn.
93,529.—SEEDING MACHINE.—M. L. Gorham, Rockford, Ill.
93,530.—CULTIVATOR.—E. S. Gregory, Lockport, N. Y.
93,531.—PASSENGER AND STATION REGISTER.—J. C. Hackett, Sacramento, Cal.
93,532.—DEVICE FOR ATTACHING TRACES TO VEHICLES.—I. C. Ham, Charlestown, Mass.
93,533.—ANIMAL TRAP.—George Haneline, Akron, Ohio.
93,534.—MORTISING CHISEL.—Carl Hinz, San Francisco, Cal.
93,535.—LANTERN.—John Hughes, Buchanan, Pa.
93,536.—COPYING PRESS.—J. M. Keep, New York city.
93,537.—PUMP.—Luke Kellogg, Leon Centre, N. Y.
93,538.—PORTABLE COOKING FURNACE.—J. D. Kellogg, Jr., Northampton, Mass.
93,539.—METHOD OF WEAVING GALLOON.—Jacob Kemper, Philadelphia, Pa.
93,540.—BASTER-GUIDE FOR SEWING MACHINES.—J. T. Jones, (assignor to the Singer Manufacturing Company), New York city.
93,541.—CAN OPENER.—G. C. Joyce, Baltimore, Md.
93,542.—SLATE FRAME.—Alicia Lynch and M. L. Moffat, Brooklyn, N. Y.
93,543.—COMBINATION PLOW.—B. F. McCarty, J. W. Orr, and R. J. Orr, Florence, Ga.
93,544.—SUBMARINE CLOTHING.—Clark S. Merriman, Afton, Iowa.
93,545.—METALLIC CARTRIDGE.—Isaac M. Millbank, Greenfield Hill, Conn.

93,546.—Metallic Cartridge.—Isaac M. Millbank, Greenfield Hill, Conn.
93,547.—Valve for Water Closet Pipes.—Geo. R. Moore, Philadelphia, Pa.
93,548.—Stump Extractor and Press Combined.—Nicholas V. Morelle and Lewis J. Morelle, Newark, Wis.
93,549.—Plow.—H. W. Neal (assignor to Jason McVay), Sidney, Ohio.
93,550.—Churn.—James L. Nelson, Lewisburg, W. Va.
93,551.—Clothes Dryer.—Theodore Oakley, Booneville, N. Y.
93,552.—Screw Plate.—A. W. Owen and James Barnes, East Canton, Pa.
93,553.—Sewing Machine.—Hiram Plummer, Brooklyn, N. Y., assignor to himself and William E. Doubleday and Company, New York city.
93,554.—Device for Regulating the Feed in Seeding Machines.—H. B. Quick (assignor to himself and Hiram Barber), Horicon, Wis.
93,555.—Packing Device.—William Riddle, 10 Larkhall Lane, England.
93,556.—Cabinet Bedstead.—Daniel T. Robinson, Boston, Mass., assignor to William B. Wickes, Sharon, Mass.
93,557.—Extension Dining Table.—Daniel T. Robinson, Boston, Mass., assignor to William B. Wickes, Sharon, Mass.
93,558.—Plow.—John Runyon, Marshall township, and Geo. Ingersoll, Marshall Mich.
93,559.—Grain Separator.—James F. Russell, Franklin, Ohio. Antedated August 5, 1869.
93,560.—Cutlery.—Wm. Sanderson, New York city.
93,561.—Double Faucets.—Edward Sauter, Hartford, Conn.
93,562.—Device for Holding Lids to Cups, etc.—Ph. I. Schopp, Louisville, Ky.
93,563.—Electrical Machine.—H. Julius Smith, Boston, Mass.
93,564.—Automatic Boiler Feeder.—Henry E. Stager, Milwaukee, Wis. Antedated July 31, 1869.
93,565.—Lamp Extinguisher.—Wm. H. Terpening and Clinton W. Terpening, Geneseo, Ill.
93,566.—Washing Machine.—Jonas Tramblie, Sandwich, Ill.
93,567.—Copying Press.—W. W. Underhill, Boston, Mass.
93,568.—Sleigh Bell.—Hiram Veazey, East Hampton, Conn.
93,569.—Sleigh-bell Fastening.—Hiram Veazey, East Hampton, Conn.
93,570.—Knee-clasp for Horses, etc.—Job A. Warden, Minnesota Junction, Wis.
93,571.—Apparatus for Holding Hat Blocks.—James White, Cleveland, Ohio.
93,572.—Revolving Firearm.—Rollin White, Lowell, Mass.
93,573.—Hoop Skirt.—John Whitehead and John McKeever, New York city.
93,574.—Apple Parer and Slicer.—David H. Whittemore, Worcester, Mass.
93,575.—Revolving Ice Pitcher and Coffee-pot.—John P. Adams, New York city, assignor to himself, Henry S. Chandler, and Marcus Ormsbee, Brooklyn, N. Y.
93,576.—Machine for Driving Posts.—Wm. Altick, Dayton, Ohio.
93,577.—Lantern.—Joshua E. Ambrose, Lombard, Ill.
93,578.—Piston Packing.—Joseph Anthony and Thomas B. Purves, Greenbush, N. Y.
93,579.—Hay Elevator.—T. H. Arnold, Troy, Pa.
93,580.—Tool Holder.—Joseph R. Bailey (assignor to himself and Selden A. Bailey), Woonsocket, R. I.
93,581.—Hay Loader.—Joseph R. Bailey, Woonsocket, R. I., assignor to himself, Selden F. Bailey, and Orin Freeman.
93,582.—Milk Separator.—Anna E. Baldwin, Newark, N. J.
93,583.—Milk Cooler.—Anna E. Baldwin, Newark, N. J.
93,584.—Railway Draw Bar.—David S. Beals, Adrian, Mich.
93,585.—Ax.—Jacob H. Beidler, Adrian, Mich.
93,586.—Grain Separator.—Charles A. Bikle (assignor to himself and John W. Garner), Hagarstown, Md.
93,587.—Coffee-pot.—E. Blunt, Jr., New York city.
93,588.—Sewing Machine.—Joseph Bond, Jr., Newark, N. J.
93,589.—Miter Box.—Seth D. Bowker, Kansas City, Mo.
93,590.—Grapple.—J. H. Brinton, Thornbury, Pa. Antedated August 6, 1869.
93,591.—Glass Mold.—Homer Brooke, New York city.
93,592.—Buckle or Slide for Hoop Skirt Bands.—Heman P. Brooks, Waterbury, Conn.
93,593.—Three-horse Equalizer.—Willard P. Brooks, Bloomington, Ill.
93,594.—Optical Instrument.—O. B. Brown, Malden, Mass.
93,595.—Machine for Disintegrating, Dispersing, and Mixing Fertilizers and other Materials.—Thomas Carr, Bristol, Great Britain. Patented in England, October 22, 1868.
93,596.—Device for Applying Steam to Wool, etc.—Wm. Carter, Columbus, Ind.
93,597.—Injector for Insect Powders.—Charles Chinnock, Brooklyn, N. Y.
93,598.—Mechanical Movement.—Thomas J. Clark and Geo. M. Clark, Higganum, Conn.
93,599.—Fuel-reservoir of Base-burning Stove.—Thos. J. Coulston, Springville, assignor to E. S. Shantz and Joseph Johnson, Royer's Ford, Pa. Antedated May 25, 1869.
93,600.—Hinge for Stove Lid.—Thomas J. Coulston, Springville, assignor to E. S. Shantz and Joseph Johnson, Royer's Ford, Pa. Antedated May 25, 1869.
93,601.—Refrigerator.—E. J. Creasy, Philadelphia, Pa.
93,602.—Railroad Lamp.—James M. A. Dew (assignor to himself and Oswell A. Bogen), Chicago, Ill. Antedated April 6, 1869.
93,603.—Printers' Quoin.—Daniel Dorrity, Pont-Audemer, France, assignor to Farrell Dorrity, New York city.
93,604.—Friction Clutch.—George D. Emerson, Calumet, Mich.
93,605.—Corn Cultivator.—Wm. Emmons and David A. Wells, Sandwich, Ill.
93,606.—Enameling Wood and other Solid Materials with Hard Rubber.—Perry Finley, Memphis, Tenn.
93,607.—Deodorizing Compound.—Randall Fish, Washington D. C.
93,608.—Shuttle for Loom.—Charles H. Fiske, Lowell, Mass.
93,609.—Lightning Rod.—David A. Foot and Avery Chadwick, Winona, Minn.
93,610.—Submarine Rock-drilling Machine.—John G. Foster and George W. Townsend, Boston, Mass.
93,611.—Cultivator.—Daniel D. Franklin (assignor to himself and J. S. Underwood). Flora, Ill.
93,612.—Bending Machine.—Henry S. Golightly and Chas S. Twitchell (assignor to the New Haven Folding Chair Company), New Haven, Conn.
93,613.—Machine for Making Bullets.—J. E. Granniss, New York city.
93,614.—Cleaver.—Chas. Hammond, Philadelphia, Pa.
93,615.—Sewing Machine.—Anna Hancock, New York city.
93,616.—Hat.—Henry Hayward, New York city.
93,617.—Material for Lubricating Wool and other Animal Fibers.—George Felix Henry, Ivar Axel Ferdinand Bang, Francois Roch Charles Monestier, and Jean Pierre Albin Figuier, Paris, France.
93,618.—Gang Plow.—Philipp Herbert, St. Louis, Mo.
93,619.—Measuring and Folding Cloth.—L. Hillman, Newton, N. J.
93,620.—Clothes Rack and Dryer.—Amos Hornor, Ross, Ind.
93,621.—Wagon.—C. C. Johnson, Springfield, Vt.
93,622.—Compound for Destroying Vermin in Cattle.—Frederick Kalteyer, San Antonio, Texas.
93,623.—Vulcanizing Rubber for Dental Plates, and for other Purposes.—Cyrus M. Kelsey, Mount Vernon, Ohio.
93,624.—Neckties.—Geo. Kennedy (assignor to himself and F. R. Harbaugh), Philadelphia, Pa.
93,625.—Electro-Magnetic Machine.—Jerome Kidder, New York city.
93,626.—Clothes Rack and Stand.—W. B. Kimball, Peterborough, N. H.
93,627.—Harvester.—I. Lancaster, Baltimore, Md.
93,628.—Cutter Head.—Michael Lehman, Cincinnati, Ohio.
93,629.—Process of Preparing Coke from Colorado and other Coals.—W. J. Lynd, Golden City, Colorado Territory.
93,630.—Platform Scale.—Wm. Maguire (assignor to himself and F. B. Loney), Baltimore, Md.
93,631.—Planing Teeth for Saws.—Gottleib Maulick (assignor to himself and Thomas P. Marshall), Trenton, N. J. Antedated Aug. 6, 1869.
93,632.—Bed Bottom.—Alexander McBride and W. P. McBride, Lowell, Mich.
93,633.—Spindle and Bobbin Tubes for Spinning Machine.—Alexander McFarland and C. W. Pack, Paterson, N. J.
93,634.—Side Saddle.—J. C. Miller, Danville, Ky.
93,635.—Washing Machine.—L. F. Muhlinghaus, Brooklyn, E. D., N. Y.
93,636.—Rolling Cutter for Plows.—Robert Newton, Jerseyville, Ill.
93,637.—Mechanism for Operating Shuttle Boxes of Looms.—Archibald Nimmo (assignor to himself and Thomas Moran), Philadelphia, Pa.
93,638.—Bridge.—C. H. Parker, Boston, Mass.
93,639.—Elastic Trace Connection.—Hugh Quinn, Charlestown, Mass.
93,640.—Mode of Desulphurizing Auriferous Pyrites and other Sulphuret Ores.—Julio H. Rae and Thomas T. Davis, Syracuse, N. Y.
93,641.—Harvester.—C. A. Reed, Madison, and J. M. Campbell, Beaver Dam, Wis.
93,642.—Extension Ladder.—Artemas Rogers, Pancsville, Ill.
93,643.—Kiln for Roasting Ores.—J. M. Rohrer and J. H. Bassler, Pine Grove, Pa.
93,644.—Till Lock.—J. P. Schmucker, Lattasburg, Ohio. Antedated Aug. 4, 1869.
93,645.—Process and Apparatus for Extracting Oil from Vegetable and other Matters.—Thomas Sim, Baltimore, Md.
93,646.—Floor for Buildings.—H. M. Smith and W. C. Smith, New York city.
93,647.—Pianoforte Action.—Theodore Steinway, New York city.
93,648.—Saw Set.—N. B. Tyler, Warren, Ohio.
93,649.—Friction Brake for Cotton-lapping Machine.—Edward Van Winkle, Paterson, N. J.
93,650.—Elastic Pitman for Stone-channeling Machine.—G. J. Wardwell, Rutland, Vt., assignor to the Steam Stone Cutter Co., New York city.
93,651.—Cultivator.—H. J. Wattles, Rockford, Ill.
93,652.—Attaching Bells to Straps.—D. M. Welch, Middle Haddam, Conn.
93,653.—Revolving Fire-arm.—Rollin White, Lowell, Mass.
93,654.—Removable Calk for Horseshoes.—Edward Whitehead, Cincinnati, Ohio.
93,655.—Suspenders.—A. B. Wilcox, Lowell, Mass.
93,656.—Device for Adjusting and Buttoning Neckties.—Omar Wilson, Sandusky City, Ohio.
93,657.—Stop-cock Box for Water and Gas Mains.—O. F. Woodford (assignor to J. E. Miller), Chicago, Ill.
93,658.—Hydrant.—Michael Zwiebel, Pottsville, Pa.
93,659.—Composition Cement for Pavements.—Abraham McKeon, Rutherford Park, N. J.
93,660.—Railway Car Seat.—T. C. Theaker, Bridgeport, Ohio.

REISSUES.

64,102.—Auxiliary Air Chamber for Stoves, Heaters, and Furnaces.—Dated April 23, 1867; reissue 3,585, (dated Aug. 3, and omitted in the list of claims of that date).—Elizabeth Hawks, Troy, N. Y.
38,175.—Postoffice Post-marking and Canceling Hand-Stamp.—Dated April 14, 1863; reissue 1,748, dated Aug. 23, 1864; reissue 3,586 (dated Aug. 3, and omitted in the list of claims of that date).—M. P. Norton, Troy, N. Y.
77,269.—Fertilizer Attachment.—Dated April 28, 1868; reissue 3,587 (dated Aug. 3, and omitted in the list of claims of that date). C. C. Foster, Odessa, Del.
44,037.—Machine for Making Twist Drills.—Dated Aug. 30, 1864; reissue 3,588.—American Standard Tool Co., Newark, N. J., assignees, by mesne assignments, of A. R. Arnold.
56,525.—Cooking Stove.—Dated July 24, 1866; reissue 3,589.—Esek Bussey, Troy, N. Y.
63,223.—Carriage.—Dated March 26, 1867; reissue 3,590.—John Curtis, Cincinnati, Ohio.
67,749.—Packing for Deep Wells.—Dated Aug. 13, 1867; reissue 3,591.—E. F. Griffin, Chicago, Ill., administrator of the estate of A. D. Griffin, deceased.
88,721.—Wagon Brake.—Dated April 6, 1869; reissue 3,592.—August Kessberger, Springfield, Ill.
48,955.—Tobacco Press.—Dated July 25, 1865; reissue 3,593.—J. D. King, Toronto, Canada West.
38,003.—Mode of Purifying Cast Iron.—Dated March 24, 1863; reissue 3,594.—S. W. Kirk, Coatesville, Pa., and C. E. Stotsenburg, Wilmington, Del., assignees of S. W. Kirk.
34,984.—Coal-oil Lamp.—Dated April 15, 1862; reissue 2, 55, dated Feb. 4, 1868; reissue 3,595.—Holmes, Booth, & Haydens, Waterbury, Conn., assignees, by mesne assignments, of Joseph Ridge.

DESIGNS.

3,604.—Ornamenting Harness Trimmings.—Wm. Blum, Newark, N. J.
3,605.—Picture Frame.—Edward B. Bradley, New Haven, Conn.
3,606 to 3,608.—Door Escutcheon.—Wm. Gorman (assignor to the Russell & Erwin Manufacturing Co.), New Britain, Conn. Three Patents.
3,609.—Bridle Bit.—A. Hegeman, Jr., New York city.
3,610.—Frame of a School Desk.—Alfred Hutchinson, Philadelphia, Pa.
3,611.—Upright Drill.—F. A. Pratt (assignor to Pratt, Whitney & Co.), Hartford, Conn.

EXTENSION.

Straw Cutter.—D. C. Cummings, Smithville, N. J.—Letters Patent No. 13,385, dated Aug. 7, 1855.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,005.—Apparatus for Preparing Flax, Hemp, and other Fibers, and in Converting the same into Silver.—Henry Lawrence & Sons, New York city, and John Good, Brooklyn, N. Y. July 2, 1869.

2,053.—Apparatus for Removing Artificial Coatings from Metallic Surfaces.—B. H. Harmon, Clifton Springs, and P. H. Rose, Canandaigua, N. Y. July 7, 1869.

2,089.—Sofa Bedstead.—H. F. Hover, Philadelphia, Pa. July 10, 1869.

2,138.—Coiled Springs and Machinery for Making the Same.—Wm. Metcalf, Pittsburgh, Pa. July 15, 1869.

2,147.—Propelling Machinery for Canal Boats and other Vessels.—F. R. Pike, New York city. July 16, 1869.

2,160.—Electro-Magnetic Engine.—Louis Bastet, New York city. July 17, 1869.

2,175.—Transfer Engraving.—Robert Neale, Brooklyn, N. Y. July 19, 1869.

2,204.—Marlin Spike.—Calvin Torrey, Boston, Mass. July 21, 1869.

2,208.—Railroad Spring.—John W. Cochran, New York city. July 21, 1869.

2,212.—Extract from Hops.—Hugh Burgess, Royers Ford, Pa. July 21, 1869.

2,218.—Breech-Loading Firearm.—Geo. T. Abbey, Chicago, Ill. July 21, 1869.

2,242.—Harness Motion for Power Looms.—E. B. Bigelow, Boston, Mass. July 23, 1869.

2,276.—Water Measurer.—Girard Sickles and O. A. Farwell, Boston, Mass. July 27, 1869.

NEW PUBLICATIONS.

We are in receipt of the publishers advance sheets of a new work entitled "Our Home Physician," being a new and popular guide to the art of preserving health and treating disease, with plain advice for all the medical and surgical emergencies of the family. It treats of the structure and functions of the human body; the influence of occupation on health and longevity; the laws of inheritence; with new and original chapters on diet, stimulants and narcotics, air, sunlight, exercise, climate, electricity, and nervous diseases of modern times; and full directions for the care of the sick, and the management of infants and children; with a general description of recent medical discoveries and improvements; plain suggestions for the treatment of diseases adapted to the wants of the household, and for those who, like miners, sailors, planters, and dwellers in remote districts, are beyond the ready call of a physician. The discussion of these topics is based upon the most recent and the highest authorities in the several departments, and brought down to the latest dates. The author is George M. Beard, A.M., M.D., lecturer on nervous diseases in the University of New York; Member of the New York County Medical Society; one of the authors of "The Medical Use of Electricity," etc.

There are numerous illustrations, a specimen of which we this week copy in an article on the Restoration of Persons Apparently Dead from Drowning. We recommend the work to all who desire to obtain new and valuable information in regard to the preservation of health and the proper treatment of disease. It will shortly be published by E. B. Treat & Company, 654 Broadway, New York city.

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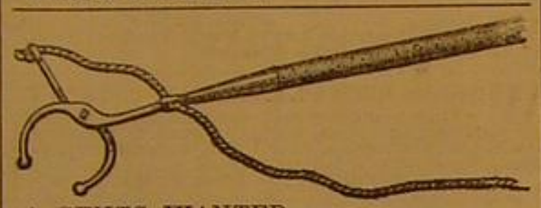

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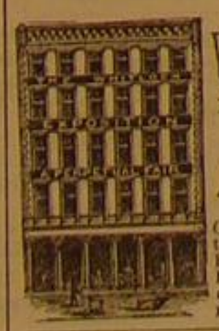

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