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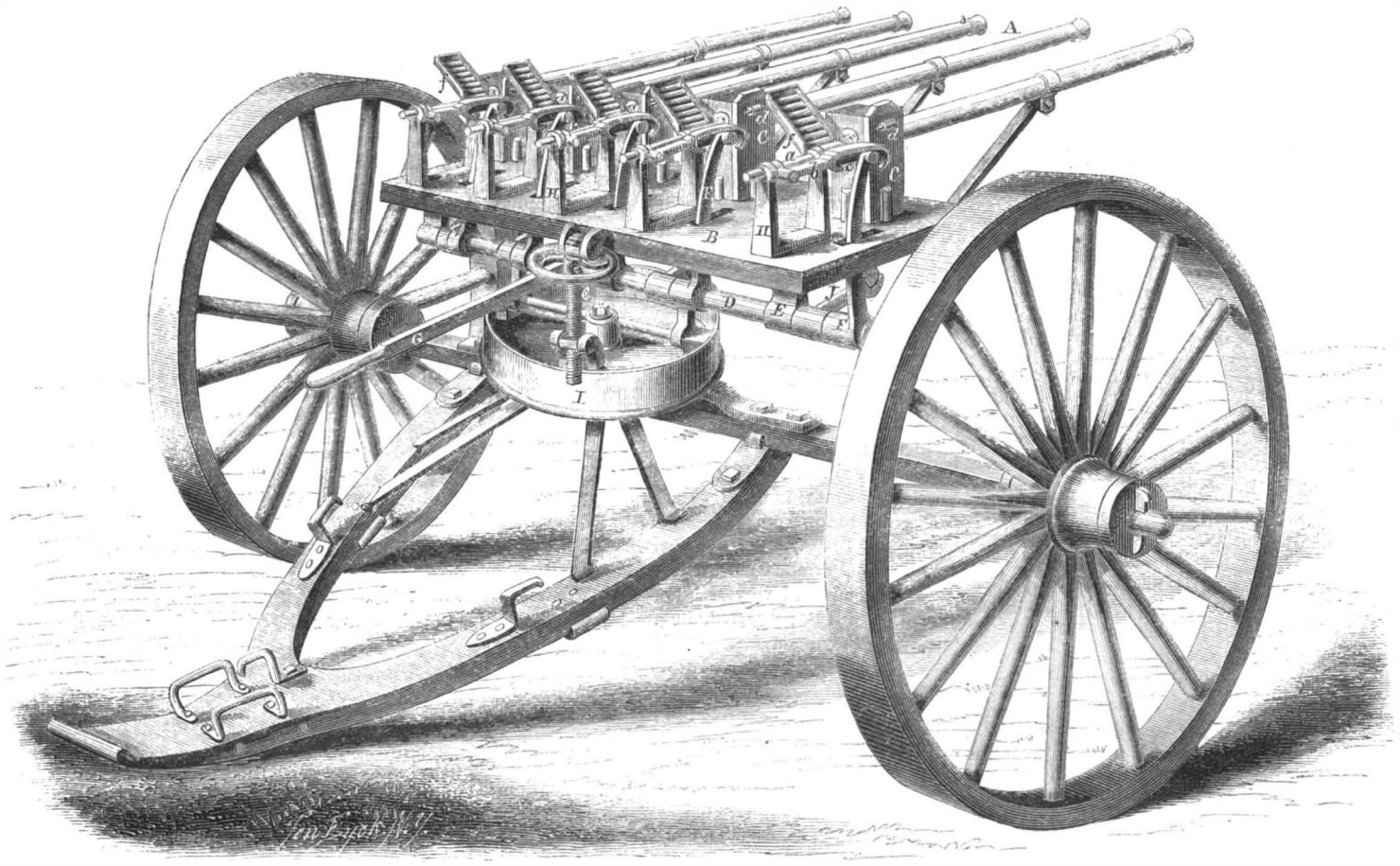


CROZIER'S PATENT AUTOMATIC BATTERY.

The war for liberty and the preservation of the Union, which the North is now engaged in, has brought forth many inventions which otherwise would never have been produced. Guns of all kinds, shot, shell and projectiles without number have been invented and have played a most important part in the fearful struggle at this moment going forward. The weapons most destructive to life have been declared the most merciful, in that they, through this very quality, tend very greatly to a speedy termination of the disputed points between nations. If this assertion be correct, then certainly we must admit that the battery which we herewith illustrate possesses features which will render its adoption by the Government most desirable. If there are any cogent arguments concealed in volleys of bullets, then this new battery will prove a most formidable adversary. The weapon in question is novel in its design and construction; a full description of its details and operation is here appended:—The five rifles, A, Fig. 1, are mounted on the bedplate, B, and secured at the breech to the wrought-iron boxes, C, and in the center by the braces to the bedplate. The shaft, D, is provided with the bearings, E, and carries the arms, F, upon it. This shaft is further provided with the the lever, G, one end of it terminating in a handle that is grasped by the gunner. The stands, H, have holes bored in the upper ends, through which the ramrod, *a*, works. The stands are bolted fast to the bedplate; the ramrod has a small collar secured to t by a set screw, there is a pin attached to this collar, over which the eye of the arm, *b*, is slipped. This arm carries, on the side opposite the reader, the lock.

Fig. 2.

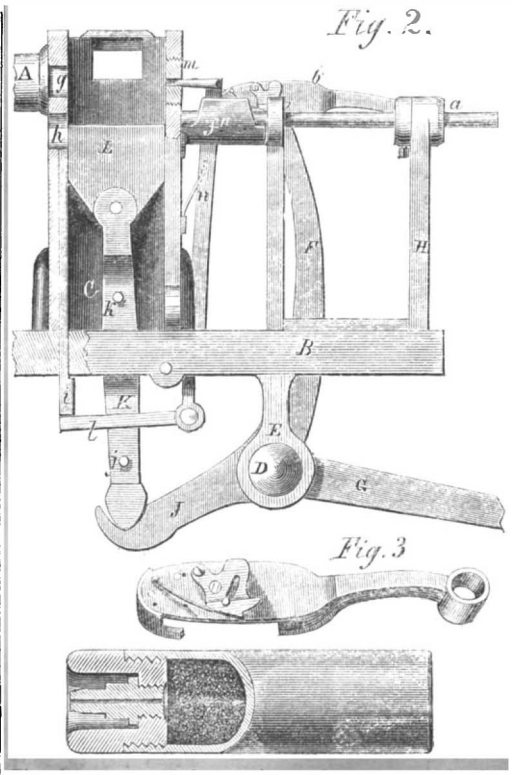


Fig. 3

The long arm, F, has a pin on its upper end, that traverses, by moving the lever, in the recess, *c*. The side of the breech box nearest the reader can be removed by knocking out the key, seen at *d*, and access is then obtained to the internal arrangement of the parts connected with it. Attached to the axle of the battery is the casting, I, having a hub or boss in its center. By taking hold of the lever the whole apparatus may be moved on its center, and the lateral range of the missiles thereby secured. The vertical range is attained by raising or lowering the front edge of the bedplate with the screw, *e*; as it is very close to the center of motion and the muzzles of the rifles are remote from it, the change from elevation to depression can be made very quickly. The hoppers, *f*, containing the cartridges, are slipped over a small sheet fitted to the hoppers; this sheet is bolted to the front of the breech box, and can be seen very plainly in the section Fig. 2, to which we shall now refer.

In this view of the battery the side of the breech box or loading chamber is removed and the details of it exposed to view. The arm, J, connects through the medium of the link, K, with the block, L, to which it is jointed; it slides easily in the loading chamber and is moved up and down, as will be seen, by the long lever, G. The breech of the rifle enters the chamber at *g*; immediately below it will be seen another aperture, *h*, this will be alluded to hereafter. The small slide, *i*, works in a groove cut for it in the end of the loading chamber, and is operated by the pins, *j* and *k*, on the link, K, and the arm, *l*, on a small counter shaft, invisible in the perspective view. The plug, *m*, is screwed into the front of the loading chamber, and is drilled out for the reception of the hammer, *n*, which is in its turn worked by the

lock, *o*, or exploding apparatus on the arm, *b*; the small spring bolted on the front of the loading chamber insures the return of the hammer to its proper position when disengaged by the previous operations. An enlarged view of the lock and the arm to which it is fastened is seen in Fig. 3, as also a cartridge with the nipple end shown in section.

The operation of this novel instrument of defense is as follows:—The gunner takes hold of the lever, having first aimed the rifles by means of the screw in front, works it up and down, and thus discharges the contents of the cartridge case into the ranks of the enemy. As the handle of the lever descends the opposite end is elevated, carrying with it the sliding block. This sliding block has just had a cartridge presented for its consideration, and is conveying the same to the upper end of the loading chamber; so soon as it arrives there the lock is disengaged, the hammer flies in through the aperture, explodes the cap and discharges the barrel. The recess shown on one side of the lock arm is made of the requisite length to secure accuracy in the time needful to the various operations. The small slide rises with the link and presents a portion of its end through the circumference of the lower aperture, so that the cartridge is pushed in just far enough by the ramrod to allow the block to work freely as it rises opposite to the rifle breech. As fast as the cartridges are thrust in, the others above roll down the hopper to the proper position opposite the hole in the loading chamber; on the return of the lever they are pushed in by the ramrod, and this operation also brings down the empty case, the contents of which have just been discharged. The empty case falls out on the other side of the chamber and rolls into the circular box beneath the bedplate; the cases are then re-loaded and are ready for use. The cartridge case is made of stout brass, and is large enough to carry a round ball of an ounce weight, or an elongated projectile of greater weight. All that is necessary, then, in this battery, is to work the handle up and down, and the battery vomits forth a discharge of bullets which is truly terrible to contemplate in its destructive power. It is not at all complicated, and as the motions of the machine are all positive, there is no danger of any derangement. The most ignorant contraband could, with this battery in good working order, slay more rebels than ever Samson slew Philistines with the jaw-bone of the ass.

Further information in regard to this invention may be had by addressing the inventor, A. H. Crozier (who has obtained 13 patents, from which he has realized $285,000), care of Smith, Cooley & Co., No. 236 Washington street, New York City.

Ship-building in Maine.

The State of Maine is distinguished for ship-building, and at the present moment this business appears to be quite active. The Bath (Maine) *Times* reports quite a large number of vessels on the stocks, several of which are nearly completed. It says:—"At Hospital Point, by Lemont & Robinson, a ship of about 900 tuns is being timbered out. At Arnold's yard, Wm. M. Reed & Son have a fine ship of about 1,000 tuns very nearly completed. In the yard formerly occupied by Hall, Snow & Co., preparations are being made by Mr. Orrin Blaisdell to build a barque of 400 tuns, under contract with parties in Bath. J. P. Morse has a keel stretched in his yard, and some frames up for a steamboat, to take the place of the steamer *Seguin*, recently sold. She will be adapted to sea service if needed. Mr. Morse, also, has in his yard a frame for a ship of about 900 tuns, which he is intending to put up as soon as the steamer is completed. Messrs. Houghton & Brothers have a ship of 1,000 tuns timbered out in their yard. Wm. Rogers, Esq., has stretched the keel for a ship of 700 tuns. Messrs. W. V. Moses & Son have a ship of 1,000 tuns on the stocks completed, rigged and ready for launching, called the *Sarah Freeman*. Messrs. E. & A. Sewall have a ship of 1,000 tuns nearly timbered out. In the shiphouse, Messrs. Rideout & Hathorne have a ship of 900 tuns timbered out. The yard of Messrs. Larrabee & Allen presents a scene of unusual activity, there being about 150 men employed. The gunboat *Isco* is fast approaching completion. A brig of 480 tuns is now timbered out in the same yard. Messrs. W. & J. Drummond have in their yard a barque, of 600 tuns, underway. Messrs. John Patten & Son have commenced a ship of about 1,000 tuns in their yard. Thus it appears that ship building in Bath has not been carried on during the winter season to a greater extent for some years past than at present."

Caution to Refiners of Petroleum.

We would direct the attention of all those engaged in the refining of petroleum to the following from the London *Chemical News*:—

It is well known that one of the most objectionable impurities in coal gas is bisulphide of carbon, which, upon combustion, yields sulphurous acid—a gas particularly detrimental to pictures, bindings of books, art decorations and even to delicate constitutions. Numberless have been the expedients resorted to, with a view to get rid of this noxious impurity, and latterly with some degree of success. Nevertheless, the formation of sulphurous acid by the combustion of sulphur compounds in coal gas has precluded its use in many public libraries, picture galleries and in private dwellings.

It is much to be regretted that the rock oil furnished by some refining companies contains a notable quantity of sulphur, either in the form of sulphureted hydro-carbons or sulphuric acid. These impurities generally arise from a neglect on the part of the refiner to remove the whole of the sulphuric acid he employs in his refining process. It is of the highest importance that the sulphuric acid should be abstracted as far as possible; and, although we do not say that during the process of refining some sulphureted hydro-carbons may be produced which, in the present state of our knowledge, it would be impossible wholly to remove, yet from actual experiment we have detected the presence of sulphuric acid in some samples of rock oil, showing that this acid was not wholly withdrawn by the after use of alkalies, washing or other expedients. It is essentially important, in order to produce a good sample of refined rock oil, that the whole of the sulphuric acid should be abstracted; otherwise, during combustion, sulphurous acid will be generated, and a noxious compound very insidious and prejudicial in its effects will be generated, in greater or less quantities, by the use of rock oil. Refiners should satisfy themselves by chemical tests that every trace of sulphuric acid is removed from their samples of oil before permitting them to go to market. Neglect in this important particular may soon engender a distaste for a beautiful and most economical mode of illumination, rendered prejudicial by inattention to simple precautions in refining, which a desire to produce a safe and saleable article ought to ensure. A piece of white blotting-paper, moistened with a solution of iodic acid and starch, held over the flame of a rock-oil lamp, will become bluish-purple, if sulphurous acid is generated during the process of combustion. This test, however, is not sufficient, as there may be other deoxidizing agents in the gases resulting from combustion, which would set iodine free. The samples of rock oil may be tested with a solution of chloride of barium. If the sulphuric acid has not been wholly removed, a heavy white precipitate will indicate its presence. We would recommend refiners always to test their oil after the washing process is completed, to see if the last traces of sulphuric acid have been withdrawn. In some instances which have come under our notice a very marked reaction took place when tested with chloride of barium, as well as decided indications of sulphurous acid in the products of combustion, when a slip of paper, moistened with a solution of iodic acid and starch, was held over the chimney of the lamp.

New Survey of the Atlantic Ocean.

A new survey of the sea-bottom between Ireland and Newfoundland has been made by the British ship *Porcupine*. The primary object of the survey was to ascertain the most gradual slope of the bed of the ocean and the route most suitable for a line of telegraph cable. Two routes have been selected for examination. The first or Galway route presents the greater facilities. For a distance of 160 miles due west from Cashla Bay there was found to be a gently undulating sea-bottom or terrace, having the decline of an ordinary beach. From 100 to 185 fathoms of water rolled above it; the intermediate soundings being 20, 65, 68, 74, 76, 82, 105, 135, and 165. At the western extremity of this terrace rises a bank which is but little more than 80 feet below the surface of the ocean. Beyond this is a descent of 700 fathoms in 10 miles, when the telegraphic plateau is gained—a vast submarine plain, stretching thence to the banks of Newfoundland with a tolerably even depth of two miles of water. The second route starts from Valentia. A valley 525 fathoms deep is first met with. A ridge 25 miles in width rises from the opposite edge of this valley, which ridge is between 195 and 230 fathoms below the surface. At the western extremity of this the bed again declines till the bottom of a second and much deeper valley is found. In this sea-valley the waters are three miles in depth. Beyond this a gradual rise takes place till the telegraphic plateau is reached.

The various objects brought up from the ocean-bed by the sounding machine and dredge have been placed in the care of Professor King of Queen's College, Galway, for examination by the Lords Commissioners of the Admiralty. The surface of the deep-sea bed is one vast sheet of *foraminifera* and other minute structures, whose functions are to clear the waters of the ocean from all mineral and organic impurities. There are perforating mollusks living at great depths; but Professor King does not entertain apprehension that they would bore into a telegraphic cable. He inclines to the belief that the organic accumulations to be expected on foraminiferous bottoms would, in the course of a few years, completely encrust it. The wide bank discovered 160 miles off Galway, called Porcupine Bank, consists of siliceous sand and coarse gravel, with the addition of considerable quantities of the *débris* of shells and other organisms. Pieces of rock, some three or four inches in diameter, are found with fresh specimens of *truncatulina* and various genera of bryozoa adhering to the upper surfaces of them, showing that the water at the comparatively inconsiderable depth where they live is not much affected by storms. Several fishes were brought up by the dredge from the bank surface and about 50 shells, besides sponges, star-fishes, sea urchins and hermit crabs.

A Sensible Project.

The French Government has determined to accomplish a reform in the dwellings of the operative classes in Paris, and is about to commence by the construction of a *cite modèle* on the Boulevard Mazas, for unmarried workmen. The situation is well chosen, being in the center of the manufacturing quarter of Paris. The proposed building is to be five stories high, and each floor is to be divided into small rooms completely separated, and to be approached by a spacious staircase. The ground floor is to be appropriated to a reception-room or common hall, open to all the lodgers, a restaurant or dining-room, an office for the director, and an apartment for the house-porter.

If some persons in this part of the world would adopt this idea, they would, if they managed properly, reap a fitting reward for their outlay of time and money. There is always a large floating population, in this and other cities, of mechanics who desire suitable homes; these are too often unattainable, and we think an institution comprising the features of the French model would be very popular.

Icelandic "Skier."

Their daily food is taken cold, and consists chiefly of raw, dried stockfish and "skier." The latter dish is simply milk allowed to become acid and coagulate, and then hung up in a bag till the whey runs off. In this form it is both nutritive and wholesome, being more easily digested than sweet milk; while, to those who take to it, it is light, palatable, and delightfully cooling. Milk is prepared in this way by the Shetlanders, who, in the first stage, call it "run milk," and when made into skier, "hung milk." The same preparation is made use of by the Arabs, and it is also the chief diet of the Kaffirs and Bechuanas at the Cape. Our idea, that milk is useless or hurtful when sour, is merely an ignorant prejudice. Those who depend for their subsistence chiefly on milk diet, and have the largest experience, prefer to use it sour, and medical authority endorses their choice.

THE New England Pin Company, of Winsted, Conn., is making pins of iron instead of brass. They are also made at Seymour in the same State.

THE GREAT LILLIPUTIAN WEDDING.

For some weeks past the public mind of the great metropolis has been considerably stirred by the announcement that a wedding was on the tapis between Charles S. Stratton, better known as "General Tom Thumb" and Miss Lavina Bump, known however, by the more euphonious name of "Lavinia Warren." Lemuel Gulliver in all his peregrinations never saw a more curious pair, and the whole world has never witnessed a marriage ceremony more novel or extraordinary. This little pair came together under the managerial strategy of the renowned showman, P. T. Barnum; and gossip will have it that the moment their tiny eyes first gazed into each other, a warm and loving affection at once sprung up, and the General, perceiving that his hour had come, when, if ever he could realize—

"That only bliss of Paradise which has survived the fall," entered at once upon the pleasing duty of offering his heart and hand, which were both eagerly accepted; and from that hour he regarded himself as no longer a fair little bachelor destined to pine away and die in cold neglect, but would henceforth assume the dignity of a family man, with "buds of promise" opening before him. Like full grown lovers each of them "sighed like a furnace," and worked as industriously as two beavers to bring their affections into the legal crucible to be molded into unity for life, just as speedily as money and labor could bring this happy event to pass. Elaborate and costly toilets were prepared, expensive jewels were purchased, and an extensive retinue of clerical gentlemen were set to work to arrange for the nuptial ceremonies. On the 10th inst. the General, with his tiny bride and a host of attendants, walked up the aisle of Grace Church, under the inspiring strains of the organ, as it peeled forth the "Grand March of Tannhauser," and in the presence of a brilliant assemblage of invited guests, were solemnly made "man and wife" by the Episcopal form. After the close of the grand ceremonies, the gay couple returned to their headquarters at one of the most fashionable hotels, and then received the congratulations of that branch of city society which is sometimes designated as the "cream," but better known as the "codfish aristocracy." Ministers, Generals, Editors, Doctors, Lawyers, Bankers, and their wives were on hand, vieing with each other in doing homage to the happy pair, to a degree that might flatter the vanity and excite the pride of an Emperor. The immediate attendants of the bride and groom at the hymenial altar were the renowned Commodore Nutt the miniature man, and Miss Minnie Warren, the bride's sister, who is a perfect little fairy of sixteen years. It is thought even possible that ere this she has struck a chord in the Commodore's generous heart; he is altogether the nicest little chap of his age. Upon the table in the reception room we noticed a case of gorgeous bridal presents; while on the outside of the hotel was the "great unwashed"—intensely peering into every door, window and stone of the hotel, with an intensified curiosity that would seem almost to penetrate to the most sacred apartment.

Stratton, the bridegroom, is a native of Bridgeport, Conn., and is now 25 years old. According to a biography now before us, he is but 32 inches high and weighs 33 pounds. He has traveled extensively, and feels at home wherever night overtakes him. He is said to own a mammoth residence in Bridgeport, which his wife declares not to be suited to her taste at all, and that she must have a nice snug cottage, and furthermore that she will be mistress of her own house. He has also accumulated a handsome fortune, owns a yacht, is fond of sports, and is withal very careful of his money. Mrs. Stratton, his wife, is a native of Massachusetts, of respectable parentage, and is now 21 years old; she is 32 inches in height, weighs 30 pounds, is well developed, and on the whole a very nice little woman—not lacking in solid good sense. The parties have known each other for a few weeks only, and we believe it is a fact that the General popped the question on the first time that he found himself left alone in company with the lady.

It is generally admitted, we believe, that these little people have as good a right to marry as the larger folks—as to the policy of such a match it is too late to offer advice. Suffice it to say that, though they are unquestionably the smallest married pair of human beings on earth, they have created an immense sensation in bringing themselves together.

The Gunboat "Tuscumbia."

This iron-clad vessel is rapidly approaching completion, and with all her armament aboard, will soon be ready to sail to any point indicated by Commodore Porter.

The *Tuscumbia* is one among the largest vessels in the Western fleet. In strength of timbers, imperviousness of her coat of iron mail, staunchness of build and completeness of outfit, she will rank among the very best of the iron-clads yet built. Her length is 182 feet, breadth of beam 70 feet, depth of hold 8 feet. She will draw 5½ feet of water with all her armament, stores, coal, &c., aboard.

Her machinery is of superior finish and extraordinary strength, and is all below the iron-clad deck, and is constructed upon an entirely new plan, lately approved and adopted by the navy. She has two cylinders, 30 inches in diameter, 6 feet stroke, working two powerful side-wheels 25 feet in diameter 12 feet bucket. She is also supplied with two other cylinders, 20 inches stroke, working two screw propellers 6 feet 6 inches in diameter. She is furnished with two small engines for working the capstan, one forward and the other aft. She has six 28-feet boilers 40 inches in diameter, with five flues each, with an auxiliary pumping engine for filling the boilers. By her pumps the vessel could be flooded in a short time.

The *Tuscumbia* has, in addition to her armament, an apparatus for throwing hot water, capable of ejecting a scalding stream to a distance of 200 feet. The armament consists of three 11-inch Dahlgren guns, in battery, forward, and two 100-pounder rifled guns, in battery, aft. The iron plating on the batteries or gun-rooms is six inches in thickness forward and four inches thick aft. The sides of the vessel are plated with 3 inch wrought iron; the deck with 1-inch wrought iron.

The cost of the *Tuscumbia* will be about $250,000. Her magazines are provided with an apparatus by which they can be completely flooded in the short space of one minute. A bulwark of iron, loop-holed for musketry is placed around her guards. Her speed will be about twelve miles an hour against the current. She will be manned by 150 marines. Her custom-house measurement is 980 tuns.

The *Tuscumbia's* engines and machinery were made by the well-known firm of McCord & Co., St. Louis, Mo.

Umbrella Thieves foiled at Last.

The wise man when out of doors invariably carries his umbrella; he trusts not to the promise of fair skies, nor heeds the whisperings of laziness which suggest that he is encumbering himself unnecessarily; but in foul weather or in fair, he may be seen armed and equipped against atmospheric phenomena of all kinds. To be wise in this respect, however, is a costly virtue, now-a-days; for wheresoever man goeth, there are thieves, and there seems to be a class of these gentry who prey especially upon the umbrellas of society, and who, regardless of expense (to other people) pursue their calling industriously. They waylay mankind in hotels and in boarding-houses, in ballrooms, in barber's shops—in every locality where, haply, they may find an umbrella, they penetrate and despoil. Their days are over, their occupation is gone; lost are all the silken and cotton opportunities for plunder; vanished are the chances for acquiring portable property that once abounded so greatly. The umbrella is no longer a despised and neglected part of man's appurtenances, but has its proper place and position assigned to it. Foote's Patent Umbrella Stand is the agent which secures to us the inalienable right of doing as we please with our own property; and we can intrust our umbrella to its care, conscious that when we return it will be found unmolested. The apparatus in question is made of iron cast in various styles, and is highly ornamental in appearance. By an exceedingly simple and ingenious device, which cannot be described clearly without engravings, the umbrellas are locked up so that there is no possibility of their being stolen, unless, indeed, the gentleman who has a passion for umbrellas, chooses to carry off a hundred pounds or so of iron in his disgraceful flight. As we have previously remarked, there are different sizes and styles of these convenient stands, from those sold for a dollar, adapted to but one, up to those with twenty-eight apertures, capable of accommodating a like number of umbrellas; and we think that henceforth he who is without one of these necessary additions to his house or counting-room will display a recklessness, in regard to his umbrella, which would be properly punished by having it stolen. This stand is an article of universal utility, and is for sale by the Wheeler & Wilson Manufacturing Company, whose office and salesroom are at No. 505 Broadway, New York City.

THE NEW LAW OF "ABANDONMENT."

We desire to remind our inventive friends who may happen to have incompleted applications of long standing still pending at the Patent Office, that the new law, which brings such cases into the class of "abandoned inventions," will begin to take practical effect on the 2d of March, 1863. The law was passed March 2d, 1861, and section 12 reads as follows:—

"*And be it further enacted*, That all applications for patents shall be completed and prepared for examination within two years after the filing of the petition, and in default thereof they shall be regarded as abandoned by the parties thereto, unless it be shown to the satisfaction of the Commissioner of Patents that such delay was unavoidable, and all applications now pending shall be treated as if filed after the passage of this act."

In matters which relate to obtaining patents, delays are often dangerous. Let all who have pending applications complete them at once, and thus relieve themselves of all liability to loss.

Professional Courtesy.

We are publishing from time to time a series of illustrated articles, on the principal industrial interests of the loyal States. These articles are written by us at an expense of much time and money, and present faithful pictures of all the operations peculiar to the subject discussed. We are very glad to have these articles copied, but we suggest that those who do so should not omit to credit the source from which the information is obtained. We are brought to these reflections by seeing a verbatim reprint of our article on the "Wheeler & Wilson Sewing Machine" (published on pages 1, 2, and 3, present volume of the Scientific American) in a Canadian journal, the editor of which has overlooked the customary courtesy.

Redemption of the Soiled Stamps.—The postage stamps formerly in use by the community, as currency, are being redeemed by the Government, through the Post-office Department, as rapidly as possible, and many ludicrous scenes naturally occur during the hours allotted for the reception of them. One day last week two individuals were seen on their way to the post-office in this city, with a huge bag containing $8,400 worth of the sticky tender. The bag held about a bushel of the stamps, and was altogether quite a formidable purse; it was the property of the Eighth Avenue Railroad Company. The history of each of these little bits of paper would be curious reading.

Paper made from the swamp flag, called "cat tails," is now manufactured upon a somewhat extensive scale in this State, and the demand for it is greater than can be supplied. We have examined a sample of this product, and it appears to be well adapted for card-board and paper-hangings, for which purposes it is now used.

American Manufacturers, Attention!—Exportations of British machinery are increasing. India and Australia are the best customers of the English iron manufacturers. The value of the steam-engines shipped in the first ten months of 1862 was £1,288,000, being an increase of more than £200,000 on the previous year. During the same period the foreign expenditure on English telegraphic wire and apparatus rose from £171,000 to £246,000.

Telegraph Line to the Holy City.—It is reported that the Syrian telegraph is already in operation as far as Ourfa, at the top of the Desert, beyond the Euphrates, and a branch line will soon be extended to Aleppo, Damascus and Beyrout, from which latter station a line will run north to Joppa and Jerusalem. Travelers in the East may therefore soon order apartments in Jerusalem by telegraph.

THE NEW PROPELLER "NIPHON."

This is a beautiful vessel of 475 tuns, designed for the China trade; she might, however, be adapted for a gunboat, being capable of carrying a moderate armament, and of sailing fast. She is 157 feet 6 inches long over all, about 154 feet between perpendiculars, has 25 feet 6 inches extreme breadth of beam and 9 feet 6 inches depth of hold, and has a deck above this 6 feet 6 inches high, making her whole depth 16 feet, which brings her under the rule of measurement as a double-decked vessel. Her ends are long and sharp, with slightly concave lines; the stem is nearly upright and handsomely curved in the wake of the forefoot, and her stern is semi-elliptical, and well proportioned. Viewed broadside on, she presents a lively sheer graduated her whole length, and as great care has been bestowed in the regularity of her planking, she looks finely. She has 10 inches dead rise at half floor, and to strengthen her bilges and aid her in holding on by the wind, and prevent her from rolling when going free, she has bilge-strakes 60 feet long, which project outside of the planking 6½ inches, in all 10 inches thick, and are tapered toward the ends to blend with the hull. Her model and style of workmanship reflect great credit on all who have been employed upon her. The following details of her materials and the style of her construction will be interesting to all who are engaged in shipbuilding:—Her partner-beams are 15 feet by 10, boiler-hatch beams 10 feet by 7, and all others in the lower deck frame are 7 feet by 7—they are about 3 feet apart—of hackmetack. The deck is white pine, 3 inches thick. The upper deck frame is also hackmetack, the hatchbeams, mastbeams and forecastle beams are 8 inches by 4½—the rest 5 inches by 4½ and 2 feet apart. The deck is of white pine, 2½ inches thick. The lower deck water-way is 12 inches by 10, ceiling in between-decks 1¾ inches, spirketing 6 inches high, and plankshear 4½ inches, pine; the top of plankshear 17 or 18 inches above deck. The top timbers are of hackmetack, except in wake of 3 ports on each side, only one on each side being pierced for cargo ports. Top timbers 8 inches by 5, tapering to 8 inches by 4½, and 8 inches apart. The outer plankings or bulwarks, from the plankshear to the upper deck, are two-inch pine, excepting on the round of the stern and on the bow, where they are oak. The stem, sided 12 inches, and stern posts, 13 inches, are of oak, also the knightheads—the keel of rock maple one length, and two of white oak, 12½ inches and 12, with lock scarphs 10 feet and 3 inches shoe. The frame or ribs are of Pembroke angle iron 3½ inches by 2½, and ½ inch thick, extending all in one piece from the keel to gunwale. They are only 16 inches from center to center. The cross floors consist of reversed angle iron, and $\frac{5}{16}$ths-inch plate in wake of boiler and engine, on every frame, and elsewhere plate with angle iron on every alternate frame. There is a water-tight iron bulkhead, ¼ inch thick, stiffened by 9 vertical angle irons at the mainmast, to which the boiler and coal bunkers of iron extend. Another similar bulkhead about 16 feet from the stem, and one abaft the engines, 10 or 12 feet forward of stern post, dividing the vessel into four water-tight compartments. The main keelson, riveted to every floor, consists of two angle irons, 3 feet by 3 feet 6 inches, and running through the main bulkhead to the engine floors, which are four feet high above the keel. Instead of ceiling there is a system of bracings of 3 inches by ⅝ bar iron, crossing each other diagonally, and about three feet apart. This strapping, or diagonal bracing, is securely fastened to a heavy stringer plate, 6 inches wide by ¾ thick, running fore-and-aft at the lower part of the plate-iron knees which are attached to the beams by screw bolts and nuts; the lower ends of the strapping are firmly riveted to a bar keelson 4½ by ⅝, attached to the cross-floor heads by double rivets. The planking of the vessel is of the best white oak, the garboard strake 5 inches thick, bolted edgewise to the keel at the distance of four feet. The second strake is 4 inches, and all the rest to plank-shear 3½ inches. This planking is fastened to the angle-iron ribs, by galvanized iron bolts with round heads, having a square shoulder ¾ of an inch from the head toward the screw ends; these bolts are driven from the outside through the ribs, and finally set up by galvanized nuts on the inside of the angle-iron ribs. Between the oak plank and the frames there are strips of tarred felt, and elsewhere wherever oak and iron come in contact.

The upper deck is flush fore and aft, and on it is a companion-way to cabin, towing bits, engine and fire-room hatches, main deck and fore hatches. The wheel-house is forward of the foremast, there is also a patent Manton windlass; the chains come in through water-tight pipes from the hawse holes, so as to exclude the water from the between-decks, Abaft the mainmast is a house, 14 feet by 12, for officers' lodging and mess room, and around the quarter deck are seats attached to a light open rail, supported by turned stanchions; these seats have tin water-tight cylinders attached to them, removable with the seats to serve for life-preservers. There are also ample accommodations for the captain and engineers, and a long dining saloon upon the deck. In addition the ship is fitted with a galley, donkey boiler, pump, and a distilling and steam apparatus for cooking for a large number of passengers or the crew. All the mattresses are filled with cork and other material, so as to adapt them for life-preservers, and all the doors and the chairs have water-tight tin cases attached to them for the same humane end. We believe Capt. R. B. Forbes, the designer of the vessel, calls these the *Monitor* life-preservers.

In case of her being required for a gunboat or an armed-despatch vessel, it will only be necessary to cut and fit the ports, where guns, from heavy 32-pounders to 42-pounders, can be safely mounted, and on the upper deck several light Parrot rifles can be easily made useful.

The rig is peculiar, and may be called a "barkentine," but it differs from the usual rig so-called, inasmuch as the square sails are on the mainmast, the fore and mizen being fore-and-aft rig with boom sails and gaff topsails; the fore stay-sail or main jib sets on a stay setting up to the knight-heads, the bowsprit is really nothing more than a jibboom, on which sets a sail the stay of which goes to the mast-head, close up to the fore cap, and to the topmast there sets a jib topsail. The dimensions of the spars are as follows:—Foremast above deck, 60 feet; head, 10; diameter, 19; rake, 1 inch to the foot; distance from outer part of the stem, 34 feet; topmast, 42; pole, 8; foreboom, 41; gaff, 29. Mainmast, 45 feet from the foremast; 51 feet 6 inches above deck; rake, 1 inch to the foot; head, 12 feet 6 inches; diameter, 20; topmast, 25 feet 6 inches; topgallant, 15; royal, 11; and pole, 5. Total, 56 feet 6 inches—all in one stick. Main yard, 52 feet; topsail yard, 39; topgallant, 29; royal, 20 feet 6 inches. On this mast there is no square mainsail, only a small storm spencer, fitted to brail to the mast. The mizen is 45 feet 6 inches from the mainmast, and is 60 feet above deck, with 8 feet head, and a topmast on which sets a flying gaff-topsail and a stay-sail. The topmast is 32 feet; mizen boom, 41 feet; gaff, 23 feet. As the smoke pipe comes up in the center of the space between the main and mizenmasts, this is the only way by which sufficient canvas can be safely carried on the mainmast. The rig is certainly novel and unique, and will doubtless propel as well and work as well as the regular barkentine.

The draft of the *Niphon*, when in her best light cargo trim, will be 10 feet aft and 7 forward; and when deeply laden, 11 feet or 11 feet 6 inches aft and 8 feet 6 inches forward.

The motive power, got up by the Atlantic Works, consists of two vertical cylinders, 26 inches diameter by 26 stroke, directly acting on the shaft, which is 32 feet long by 8 inches diameter, moving a four-bladed screw 9 feet in diameter. The engines are condensing, with all the usual appliances of pumps, blower, &c. The boiler is 25 feet long by 10 feet shell, with 64 feet grate and 1,600 feet fire surface, and of the kind generally known as the double-return flue boiler. It is expected that she will make, under steam alone, under favorable circumstances, 11 statute miles an hour, and consume 12 or 14 tuns of coal per day of 24 hours, carrying 30 lbs. of steam, and making 75 revolutions, and under steam and sails, with a side wind, she ought to compete with any vessel of her size. As the fastenings of the bottom plank are of galvanized iron, countersunk, three-fourths of an inch, and well plugged, when the bottom is well covered by felt laid on "half-stuff," the composition metal will wear as well as on any purely wooden ship and insure a clean bottom.

The *Niphon* is intended for the China or Japan trade, and has first-rate accommodations for about twenty cabin and two hundred other passengers. She was built entirely after the plans and designs of Capt. R. B. Forbes, under his superintendence, by his executive foreman, Mr. Sylvanus Smith, at East Boston, and will very soon be ready for sea. Her rigging is fitted by Francis Low & Co., her sails made by John Lothrop, her joiner-work by Manson, Peterson & Co.; finally, her model and molds were made by J. J. Lawler, under Capt. Forbes's orders, and are intended for good speed and fair carrying capacity—say 300 tuns of dead weight, or 150 tuns of 40 cubic feet in light goods, and 200 tuns of dead weight.

The advantages of the mode of building as adopted in the *Niphon*, are a good combination of lightness and strength, greater durability, especially in hot climates than if the vessel was built wholly of wood, greater carrying capacity, better ventilation, and consequently more healthy than a wooden ship; ability to get at a leak, large or small, from the inside, when not full of cargo; no stowage for vermin; easily repaired. She has two important advantages over iron vessels; first, the absence of condensed vapor, which always takes place in iron vessels, making them cold in cold weather, and hot in warm weather; and secondly, the bottom being coppered will keep clean better. In short, there can be no doubt of the superiority of this mode of building over wood, and of its being, taking all things into consideration, as good as all iron. For light draught war-vessels it is very superior to all wood, as the amount of weight saved will enable them to be plated in wake of machinery sufficiently thick to keep out many of the lesser projectiles.

In regard to the mode of constructing vessels by a combination of wood and iron, as now adopted by Capt. Forbes, though not identical, it is on the same general principle as that used and patented by R. F. Loper, of Philadelphia, about fourteen years ago, the patent right for which has been lately renewed.

Accurate Machinery.

Newton's London Journal of Arts contains a paper read before the Institution of Mechanical Engineers, London, by Mr. John Anderson, the chief Government machinist at Woolwich, on the copying principle applied to the rifling of fire-arms. The principal object of the author is to set forth the benefits that result from the use of correctly operating machinery. He states that extreme accuracy may be more expensive at the outset, but it ultimately is the cheapest and most satisfactory. Many articles, after being turned and planed, have to undergo much hard filing before they are brought to a perfect fit; whereas, if this labor was spent in making a true fit in the lathe or planing machine, the greater expense of subsequent fitting would be avoided. In the Woolwich gun factory, certain metallic rings, one foot in diameter, had to be fitted to corresponding cylinders, and they were required to move easily yet without shake, as any looseness in the fit rendered them useless. Several good new lathes were tried in vain to make them fit, and they had, therefore, to be scraped and ground by skilled hand labor. Mr. Anderson was confident that the lathes could be perfectly arranged so as to obtain perfect roundness of the rings in them. Measures were therefore adopted to secure perfect roundness and steadiness of the lathe spindle, and with such success that at but a trifle more cost than the previous fitting of one of the rings by hand, the labor was reduced from three days' time to only one hour in fitting a ring. The lathe spindle became a true copy and the sliding rest a correct medium of transfer, and the combination of the two in operation resulted in perfect roundness in the rings. The lathe is a copying machine; and just as its bearing surfaces are, so is the work which is produced by it. In making the successive cylinders for building up an Armstrong gun, it is essential that perfect concentricity of the several parts should be obtained, in order to obtain a bearing of the whole surface.

THE deep-sea telegraph cable between France and Algiers has failed. It has been unavailable for three months, and all attempts made to repair it have proved abortive.

VALUABLE RECEIPTS.

FENCE POSTS.—Taking the vast extent of our country into consideration, an incalculable expense is incurred every spring in the putting-up of new fences and the repairing of old ones. It has been found that one cause of this great trouble and expense is the rapid decay of those parts of timber fence posts that are inserted in the ground. Fences would last three times longer than they usually do, could those parts that are covered in the earth be so treated as to render them as durable as those parts that are exposed above ground. A great saving would therefore be effected by any simple method of treatment to prevent rot in fence posts. This may be effected in two ways. One by boiling the feet of fence posts in coal tar; the other by charring them. As few farmers can obtain coal-tar, the latter mode is the most convenient for them to practice. About eighteen inches in length of the foot of each post should be charred to the depth of one-third of an inch. It is well known that charcoal is a very fixed substance. It will scarcely change its condition by exposure to the natural elements, and it therefore forms an almost indestructible coating to the interior timber of posts.

GLUE CEMENT.—A correspondent sends the following described mode of making a cement of glue and shellac. Dissolve half a pound of good common glue in water, in the usual way and saturate clean white paper in it until the glue solution is absorbed. The saturated paper is then dried and cut into strips, and these are put into a clean glue-pot containing about half a pound of alcohol, then boiled gently over a fire for about an hour. A light cover is kept upon the glue-pot during ebullition. The paper is now removed from the glue-pot, and is found freed from the glue, which has been taken up by the alcohol. The object of thus soaking the paper in glue is simply to obtain an extensive surface for the alcohol to act upon the glue. At this stage of the operation half a pound of pulverized gum shellac is gradually added, and the boiling of the alcohol continued with occasional stirring until the gum is dissolved. This forms a very adhesive cement for leather belts and several other purposes.

WELDING CAST STEEL.—To make the composition used in welding cast steel, take of borax ten parts, sal-ammoniac one part; grind or pound roughly together; then fuse in a metal pot over a clear fire, continuing the heat until all spume has disappeared from the surface. When the liquid appears clear, the composition is ready to be poured out to cool and concrete. To prepare it for use it is ground to a fine powder. The steel to be welded is raised to a bright yellow heat, and then dipped into this welding powder; it is then placed in the fire again; and when it attains the same heat as before, it is ready to be placed under the hammer.

TO MAKE AUSTRIAN GUN COTTON.—Take cotton yarn and twist it into strands of suitable size to answer the same purpose as grains in gunpowder. [The size of these strands can only be ascertained by experiments.] It is then steeped for a few minutes in nitric acid contained in a stone-ware vessel, squeezed, and thoroughly washed by water which is permitted to fall upon it from a pipe set at a hight of several feet. After this it is squeezed, and dried in a room heated to 130° Fah., when it is ready to be treated with a mixture of monohydrated nitric acid of 1.52 specific gravity, and monohydrated sulphuric acid of 1.14 specific gravity. These acids in equal quantities are mixed together in a glass or stone ware vessel, and allowed to stand for twenty-four hours, then the prepared yarn is immersed in it for forty-eight hours, with occasional stirring; the vessels being covered; then it is squeezed, washed for several hours in running water, and dried again. After this it is soaked for a short period in dilute silicate of potash, squeezed, washed again, dried and is fit for use. This gun cotton is manufactured by M. Reny of Vienna. It emits but little smoke and is not subject, like common gun cotton, to explode by percussion.

A GENTLEMAN, recently arrived from Canada, states that a fee of $1,500 was paid to him the other day in Quebec, wholly in American silver. He didn't want the stuff, but was compelled to take it. Poor fellow!

COFFEE AND ITS SUBSTITUTES.

The use of coffee as a beverage seems to have originated among the Turks in Arabia, from whence it was carried to Europe in 1669. It has gradually become a national beverage to Europeans and Americans, as well as the Moslems, and it has been called "one of the chief necessaries of life among the people." The coffee bean is the seed of the *Coffea Arabica*, a shrub which grows to about the hight of 30 feet, but it is usually cut down to about six feet, to increase the yield of the bean. Its cultivation was confined until within the past century to Egypt and Arabia, but it is now cultivated in the West India and East India Islands; also in Brazil upon a most extensive scale. A single tree sometimes yields about 20 pounds of beans, and about 1,100 pounds are obtained as the crop of an acre of land. There are a number of varieties of coffee, but Mocha or Arabian is still the most famous. Its beans are small and of a dark yellow color; Java is a larger bean, and the color is a paler yellow; West India and Brazilian coffee is of a blueish grey color. Physiologists have endeavored to account for the extended use of coffee, by ascribing to it a peculiar quality for preventing the waste of animal tissue in the living being. This principle is called caffeine, and is composed of carbon 8, nitrogen 2, hydrogen 10, and oxygen 3 parts. Roasted coffee contains about 12.50 parts of caffeine. In roasting coffee, great care should be exercised not to overheat it, because the caffeine in it is so liable to volatilize. The best temperature to roast coffee is 392° Fah., and the operation should be peformed in a close revolving vessel. When the beans have assumed a bright brown color, they should be cooled, if possible, in the vessel in which they have been roasted, so as to retain all the aroma that has been developed by the roasting operation. Burnt coffee beans are just as suitable for making an infusion as charred wood. Upon no account therefore should coffee beans be so heated in roasting as to char them. Coffee should never be boiled, because the boiling action volatilizes the aromatic resin in it, and this constitutes nearly three per cent of the beans. It should be ground as finely as possible, and scalded with water heated to the boiling point. It can be clarified with the white of eggs, or isinglass. This information relates to pure coffee.

In Germany and England the poorer classes, who cannot afford to buy coffee, use mixtures of it, and in many cases, other substances as entire substitutes. In Germany dried yellow turnips and chicory root mixed together are employed as a substitute; chicory is also very generally mixed with common coffee in England. Lately several mixtures and substitutes for coffee have become more common among our own laboring people on account of the great rise in the price of coffee. In some of our country villages German families roast acorns and use these as substitutes for coffee. Roasted rye is an old and well known substitute, and so is "Cobbett's coffee," which consists of roasted corn. Many persons roast white beans and peas, and mix them with coffee, others roast carrots and beets, and make a mixture of them with coffee. In some parts of France a mixture of equal parts of roasted chestnuts and coffee is used. It makes a very superior beverage to chicory, turnips, and all the other articles mentioned. The substitutes for coffee are innumerable, and so far as taste is concerned, this is a mere matter of cultivation. If any of these substitutes for coffee contained caffeine or a similar principle, they would answer the same purpose, and their use should be inculcated; but in all the analysis that we have examined of chicory, turnips, carrots, beets, peas, beans, corn and rye, no such substance as caffeine is mentioned, therefore they are not true substitutes for it in a chemical and physiological sense. We have been unable to obtain a satisfactory analysis of chestnuts and acorns, but it is well known that these contain tannic acid, and it is certain that caffeic acid is very nearly allied to it; hence they may have a close resemblance to coffee in taste, and perhaps in effect lso.

THE Commissioners of the International Exhibition in London have decided that there will be no public ceremony connected with the delivery of the prizes.

Desulphuration of Iron in the Puddling Process.

The following very useful information to our iron manufacturers is from *Silliman's Journal*, translated from a German work:—

"The inferior quality of bar-iron obtained from the puddling of pig-iron reduced from iron ores rich in sulphur, or even from good ores when reduced with coal containing much pyrites, is well known to iron-masters, and many methods have been devised for the desulphuration of this iron in the puddling process. Among the best of these is the addition of binoxyd of manganese; still this is liable to objection as it is infusible, and thus prevents its becoming thoroughly incorporated with the iron; moreover, commercial oxide of manganese often contains impurities which possibly may be taken up by the iron in the puddling-process, and influence unfavorably the quantity of bar-iron produced. This subject has recently been studied by Prof. Richter of Leoben (Austria). Richter calls to mind the powerfully oxidizing effect of litharge (oxide of lead), and its use to promote oxidation in many metallurgical processes. On experiment he finds that litharge will not only remove sulphur in the puddling procees, but, what is equally important, it also oxidizes the phosphorus contained in the iron, thus affording a most simple means of correcting two sources of great annoyance to the iron-master.

"The experiments were made at the forges of Count Donnersmark at Frantschach near Wolfsberg in Carinthia, with pig-iron which contained so much sulphur that it was impossible to make it into puddled-bar. The process of puddling was undertaken in two double puddling-furnaces arranged for burning wood. Each furnace was charged with 7 cwt. of this iron. To one of the furnaces there was added 3 lbs. of sulphid of iron and ½ lb. of phosphid of iron, in order to still further deteriorate the quality of the product. After complete fusion, 3 lbs. of litharge was added to the furnace in which the sulphid and phosphid of iron had been placed, and on thoroughly mixing this with the charge, the iron commenced to boil finely—the litharge being deoxidized by the carbon. The reduced lead was immediately re-oxidized by the atmosphere, and by subsequent reduction and re-oxidation it again and again exercised its oxidizing influence on the harmful impurities contained in the iron. There was soon formed an easily fusible slag containing oxide of lead, which also exercised an oxidizing influence upon the impurities contained in the iron, while at the same time the oxides thus formed united with the slag. After an hour and a half from the time of charging, the iron was made into balls, these were shingled, and without difficulty rolled into puddled-bar. In the other furnace, in which the iron was puddled in the usual manner, it was two and a half hours before the puddled balls could be taken out of the furnace, and, notwithstanding the greatest care was exercised, these crumbled to pieces when struck with the hammer, and rolling into bar was not to be thought of. Besides this, the loss in weight when the litharge was employed was but 11 per cent, while in puddling this iron by the ordinary process the loss was 18 per cent. The puddled-bar obtained from puddling with litharge proved neither hot nor cold short, and was of sufficiently good quality to be forged into iron for scythes. A repetition of the experiments gave a confirmation of these results. Richter adds, that, in some instances, the use of metallic lead may perhaps be preferable to litharge."

STALE.—An exchange relates a "good anecdote" of a chap who is on board of a man-of-war. When the iron-clad was just going into action, the soldier was on his knees. An officer sneeringly asked him if he was afraid. "No, I was praying," was the response. "Well, what were you praying for?" continued the officer. "Praying that the enemy's bullets may be distributed the same way as the prize money—principally among the officers," was the quick and ready retort. This "good anecdote" is as old as the hills, and was uttered by a British sailor in Nelson's fleet, and therefore was clearly a plagiarism on the part of our "iron-clad" friend.

GRANDEAU, the French chemist, has discovered the metal rubidium in the ashes of the beet, tobacco, coffee, tea and raw tartar.

Information about Milling.

We have received a very great number of letters upon this subject, many of which have been published, and a still larger number have not—some because of their obscurity, others because of their similarity in ideas to those which have been published. The following is one which evinces considerable practical and general knowledge of the subject :—

Messrs. Editors :—The information drawn out in the Scientific American by the inquiries of "A Young Miller" has been read by me with more than usual attention. The town in which my apprenticeship to the milling business was commenced has four mills, in which are thirteen runs of stone in all, each mill having one run with bolt connected, for the same purpose that "A Young Miller" intimates his is used ; and one of them has a run with cooler, bolts, conveyors, &c., for merchant work. The other eight runs—two in each mill—are used for other grinding. I have been employed, more or less, in all of these mills, and for several years in one of the best grist mills in the county, and for a few weeks in one of the best flouring mills in the State, and have also made stone-dressing in Maine, New Hampshire and Vermont my special business for three years. If "A Young Miller" has by this time a good dress on his millstone, he must be a happy man. He has had a variety of dresses recommended, one at least of which I would work off a millstone as soon as possible, for reasons urged by some of your correspondents in their objections to circle dresses. In some sections of country that I have passed through, the circle dress is preferred, even after trial of the straight dress ; and one of the best flouring mills within my knowledge (having five runs of burrs) uses a circle dress. Oliver Evans, the father of American millers, in his work entitled "The Young Millwright's and Miller's Guide," discusses the comparative merits of circular and straight dresses, and his diagrams and explanations favor the circle dress. In "The American Miller and Millwright's Assistant" (referred to by one of your correspondents) Mr. Hughes devotes a few pages to the subject, and shows even less disparity between straight and circle dresses than I believe really exists among the great variety of straight-furrowed, commonly called quarter dresses. "Old Miller" objects to circle dresses, and asserts "the greater the circle the warmer the meal." It seems to me this favors the circle, and the smaller the better, as one might be so large that a few feet of its circumference would vary but little from a straight line. My experience in putting in circle dresses has modified former prejudice against them very much, and my experience with straight dresses has led me to reject what some of your correspondents recommend. Making the draught circle with a radius equal to one-sixth of the radius of the stone, I find no fault with, except the incorrect way of stating the question, viz.: "one inch to the foot." Some of your correspondents remark particularly about cutting down the furrows square on the back, but they give no reasons for doing so. Is it not a fact that when they are cut so, and made large at the skirt, they are generally more or less filled with meal and sometimes with dough? There is no use, then, in cutting away the stone to be replaced with meal.

"A Young Miller" gave us the size, quality and velocity of his millstone, but said nothing about the amount of power at his command. Is it unnecessary that the power should be taken into consideration in dressing a millstone? Only one of your correspondents mentions anything about power, and that only in reference to the amount ground, whilst others suggested that the stone should run faster, increasing its speed by 66 per cent. beyond its present velocity, thus augmenting its grinding capacity to twenty bushels an hour. The following are important considerations for millers and millwrights :—Would a change of gearing produce the result, or must a new wheel or other power be furnished? One suggested that "A Young Miller's" bolt reel should be increased in diameter by 33 per cent. more than its present size, but no one has said a word about its movement. Does it make any difference whether a thirty-inch reel makes forty revolutions in a minute or a forty-inch reel makes thirty revolutions per minute? If the centrifugal force increases with the square of the distance, is not a large reel more liable than a small one to carry the meal around without sifting it, even if the cloth moves with a given velocity? Does not the condition of the millstones, and consequent condition of the meal, have much to do in determining the amount and quality of work performed by a bolt of any description? May not this account in part for the great difference in the opinions of your correspondents in relation to the working capacity of "A Young Miller's" bolt? Is it not equally as important to agricultural communities that grist mills should be kept in the best possible condition, as it is to proprietors of flouring mills that they should be kept so? Is there not great need of, as well as great chance for improvement in that class of mills, all about the country, where small quantities of grain are ground for individuals? O. A. J.

Causes of the Whirlpool.

Messrs. Editors :—Having inquired through your columns, some weeks since, as to the cause of whirlpools, and noticed the statements of two of your readers, I will venture an explanation. The immediate cause is the meeting of opposing currents. If at the point of contact the currents pass each other, friction between them will cause a whirl. To illustrate :—Two boys run toward each other, if they pass and catch hold of hands they will be set into a whirl. If the force which impelled them increased, the whirl would increase until the centrifugal force would part their hands. In the experiment of a vessel with a hole in the bottom, the whirl is caused by the lateral currents running along the surface to the discharging tube ; the slightest irregularity in the surface, or any other cause which can vary the direction of the currents, may determine the direction of the whirl. If a given vessel be filled and discharged a number of times, the whirl will not always be in the same direction. Sometimes the water will discharge without a whirl, showing that the lateral currents meet at the opening, without passing each other. Whirlpools may be seen in rivers wherever there are passing currents, or where there are obstructions at the bottom. They revolve in either direction with equal facility. Mr. Morley, in No. 3, Vol. VIII, of the Scientific American, says "The whirlpool is caused by the diurnal rotation of the earth.....The direction of the whirlpool in the northern hemisphere will be against the hands of a watch, and the opposite in the southern." He refers to an east and west current to prove his hypothesis. Now, east and west currents do not always exist in whirlpools. Where a river runs south and a shore current runs north, whirlpools will be formed at the point of contact between the two currents. That they are caused by the rotation of the earth is certainly incorrect ; or that the motion of the earth determines the direction of the whirl is equally so, for water is in all conditions upon the surface of the earth subject to more powerful influences that slightly vary the direction of its currents, than can be supposed to result from the cause alleged. R. F. Stevens.

105 East Forty-ninth street, New York City.

A Grateful Inventor.

Messrs. Munn & Co. :—The patent for an improvement on my "Hoosier Grain Drill and Seed Sower," has been duly received. I thank you for the prompt and efficient manner in which you have so ingeniously set forth my claims and engineered my case through the Patent Office. The perspective view given by you in the drawing is very much better than I expected it could be executed ; I feel constrained to express to you my thanks as well as admiration for the perfection of the work, and to advise all persons having business to transact with the Patent Office, or desiring to have drawings of machinery executed, by all means to go to Munn & Co. I am satisfied that I have the best Grain Drill in the world! You may perhaps think this boasting, but my experience in Drills—after a full and careful examination of the defects of nearly all now in use—justifies the assumption. Joseph Ingels.

Milton, Ind., Jan. 22, 1863.

Completion of the Duomo at Florence.

The Italian Government, desiring to mark its sympathy with modern progress in the arts, and in the hope of completing one of the most famous architectural monuments in the country, has invited architects to send in by the beginning of the year (1863) designs for the completion of the west front of the Duomo at Florence. This invitation has not been confined to Italians living at home or in foreign countries, but the competition, which embraces three grades of premiums, has been thrown open to the world, and several distinguished French architects are understood to be about to compete. Amongst the Englishmen are, we believe, Mr. Papworth and Mr. Burges, the last the successful competitor for the Memorial Church at Constantinople, and, with Mr. Clutton, for the Cathedral at Lille. Mr. Burges is also known as the successful restorer of Waltham Abbey. The restoration of the Duomo at Florence, or rather the finishing of its west end, has been an architectural problem for several centuries. Arnolfo de Lapo began it in 1294, and before his death in 1300, probably carried it as far as the springing of the vaults. The nave and smaller domes of the choir may have been built in the next twenty years. Arnolfo, after the fashion of the Mediæval architects, left no drawings to show how the work was to be completed. Brunelleschi took the work in hand and covered its magnificent "crossing" with the present enormous dome, an octagon. Mr. Fergusson suggests that Arnolfo intended to use an octagonal dome-tower, diminishing in stages and surmounted by a spire, the whole to be about 500 feet high, after the general fashion of Chiaravalle, near Milan, a contemporary work. The proper method of completing the west front is open to much discussion, and will doubtless engage the attention of many architects.—*Athenæum*.

The Glut of Silver in Canada.

It is some gratification in these days of paper currency to know that there is coin still somewhere on the continent. If we have no specie the Canadians are surfeited with it, and are consequently in just about as bad a fix as we are. The following paragraph tells the whole story :—

"It would do a hard-money man good to go to Canada. The currency consists almost exclusively of American silver. Silver abounds everywhere. Everybody is loaded with it, and everybody tries to get rid of it, as people do of doubtful funds. The taxes are paid in silver, and the collectors take it by the bushel. The City Treasurer of Toronto has half a tun of it. The merchants have bags of it in their safes. The banks won't receive it. The Great Western Railway has issued printed notices that only five per cent of silver will be received for fare or freight. Only think of a country where you cannot pay your fare on the cars in silver coin! At Toronto, London and elsewhere, business men and firms have united in a general resolution to receive silver only at a discount of five per cent for Canada bank paper. This of course applies to American silver, as the Canadian and English coinage is a legal tender. Think again of a region, within one mile of Detroit, in which the 'dirty rags' issued by the bank are worth five cents on the dollar more than the shining coin!"—*Detroit Advertiser*.

Steam Superheaters.

It is well-known that considerable benefit is obtained from superheating steam passing from the boiler to the cylinder of a steam engine, but the iron tubes of a superheater are very liable to corrode. This evil has caused many parties who had adopted iron tube superheaters to abandon their use for copper tubes. A correspondent (F. H. Wenham) of the London *Engineer* states that he has used a superheater provided with iron tubes for eighteen months, and the plates and tubes, which are very thin, are as perfect as when they were put in. He states that this result has been effected by allowing some grease to pass through the superheater. It has formed a varnish coating on the surface of the metal which protects it from oxidation. He states that if a pipe is fitted to the superheater to admit some oil, grease or tar occasionally at the point where the steam enters, the metal will be protected and the iron superheater be rendered as durable as one having copper tubes.

Chocolate Corn.

In Illinois a species of millet is grown under this name, which serves as a substitute for coffee, and tastes precisely like weak chocolate, and even resembles it in color. The preparation of a beverage from it is thus described:—"If we want for our table four pints of chocolate, we take one and a half head of grain, nearly filling the funnel of our coffee-mill, which is about 4¼ inches wide, and 1¾ inches high, and grind the kernels a little fine. Having proceeded thus far, we mix the ground substance with two pints of water, and boil it until the starch contained in it forms into a lump; the liquid is then passed, to separate it from the grains, through a fine wire sieve or tin colander; two pints of sweet milk, from which the cream has been skimmed, and a good table-spoonful of common powdered sugar, and a little cinnamon, are then added to the decoction. It is now boiled once more, and a most delicious beverage, which is scarcely distinguishable from light chocolate, is ready for use. If you wish to improve it still further, you may add an egg and a little nutmeg."—*Exchange.*

We have long been stigmatized as a nation of dyspeptics, and we think the reason why we are so is given very fully above. When people put such slops and messes as "chocolate corn" into their stomachs, they ought not to be surprised if "their general health is not very good." Pork and "pie" have a great deal to answer for in this country, and we wish most heartily that the old Jewish law regarding the usage of the former could be observed by our people. Few persons have digestive organs of sufficient strength to master this meat, and whether we eat it boiled, roasted or fried, or more indigestible still, in the shape of sausage meat, it is almost certain to rebel against us. It is but seldom that we ever use this food in our family, but we had the curiosity the other day to ascertain how much fat or grease was contained in two big doggy-looking sausages, weighing, perhaps, half a pound. The result was that over two table-spoonfuls of clear lard was extracted from those two sausages alone. We have frequently seen men, and women too, eating this sort of diet, and have heard them complain that "it did not set very well;" we should think not. A table-spoonful of lard between the sensitive coats of the stomach is not apt to induce the most delightful sensations, and those persons who persist in using pork in any shape, would find themselves much better off without it. Down with the sausage! Let us have no more of it; it has created enough distress already, and we hope that it will disappear from our tables entirely. We are borne out in our dislike of pork by medical testimony of a high character. Repeatedly have physicians declared that it was unwholesome and so on; but still the people cannot relinquish the forbidden food. We are "down" on pie, too; not, however, in so great a degree as we condemn pork. Pies, made in the proper manner, are not necessarily unwholesome, but in the hands of ordinary cooks they are tremendous weapons of offense. The unwholesomeness of pies arises mainly from the quantity of butter (shortening) employed in the pastry. Fruit baked between two crusts is not unhealthy, but the crust itself is, and lies heavily on the stomach. The butter turns sour, gives flatulence, and creates distress generally in persons of ordinary digestive force. In the country everybody eats pie; at morning, noon and night there is a deluge of pie which old and young eagerly attack. The little children cry for it, the old ones demand it; and we heard with horror, on one occasion, a woman relate that she had just baked 17 pies for the week. "How many are there in your family?" we asked. "Two," she said. Comment is superfluous. Here are two people who eat 17 pies in a week, quite as a matter of course. They were always sighing and complaining; the husband was downcast and unhappy, and always taking "tonics," and they were at a loss to imagine why life seemed so commonplace and dull. We ventured to suggest that the 17 pies weekly had some responsibility in the matter, but were met with scorn and derision. This is not a solitary case; we might cite many others, and if the reader lives in the country his observation will bear us out in our statement. Pie is a good thing in its way, but it is not a household god, and to live on it mainly is to be dyspeptic and full of all manner of minor troubles. The man who introduced pie and pork as articles of diet has a great deal to answer for; and consumers of such edibles have usually a heavy doctor's bill to settle annually.

How Turpentine and Tar are Made.

The immense forests in North Carolina, which cover the sandy ridges between the swamps and water-courses, consist almost wholly of the long-leafed pine, the *Pinus palustris* of the Southern States. From them is gathered one of the great staples of North Carolina—the turpentine. These trees at maturity are seventy or eighty feet high, and their trunks eighteen or twenty feet in diameter near the base. They grow close together, very straight, and without branches to two-thirds of their height. Overhead, their interlocking crowns form a continuous shady canopy; while beneath, the ground is covered with a thick, yellow matting of pine straw—clean, dry, level, and unbroken by undergrowth. The privilege of tapping the trees is generally farmed out by the land-owner, at a stated price per thousand, about from twenty to thirty dollars. Under this privilege the laborer commences his operations. During the winter he chops deep notches into the base of the tree, a few inches from the ground, and slanting inward. Above, to the hight of two or three feet, the surface is scarified by chipping off the bark and outer wood. From this surface the resinous sap begins to flow about the middle of March, at first very slowly, but more rapidly during the heat of the summer, and slowly again as winter approaches. The liquid turpentine runs into the notches or boxes, as they are technically called, each holding from a quart to half a gallon. This, as it gathers, is dipped out with a wooden spoon, barreled, and carried to market, where it commands the highest price. That which oozes out and hardens upon the scarified surface of the tree is scraped down with an iron instrument into a hod, and is sold at an inferior price. Every year the process of scarifying is carried two or three feet higher up the trunk, until it reaches as high as a man can conveniently reach with his long-handled cutter. When this ceases to yield, the same process is commenced on the opposite side of the trunk. An average annual yield is about twenty-five barrels of turpentine from a thousand trees, and it is estimated that one man will dip ten thousand boxes.

The trees at length die under these repeated operations. They are then felled, split and burned for tar. The dead trees are preferred for this purpose, because when life ceases, the resinous matter concentrates in the interior layers of the wood. In building a tar kiln a small circular mound of earth is first raised, declining from the circumference to the center, where a cavity is formed, communicating by a conduit with a shallow ditch surrounding the mound. Upon this foundation the split sticks are stacked to the hight of ten or twelve feet. The stack is then covered with earth as in making charcoal, and the fire applied through an opening in the top. As this continues to burn with a smoldering heat, the wood is charred, and the tar flows into the cavity in the center, and thence by the conduit into vessels sunk to receive it.

About Cotton.

It is calculated that the average weekly consumption of cotton in Great Britain last year was 22,900 bales, as compared with 45,900 bales in 1861, and 48,100 bales in 1860. The average weekly consumpton of France last year was 5,200, as compared with 11,000 bales in 1861, and 12,000 bales in 1860. The average weekly consumption of the rest of the continent was reduced last year to 8,300 bales, as compared with 18,100 in 1861 and 18,600 in 1860. An average total is thus arrived at of 36,400 bales per week last year, in Europe, as compared with 75,000 bales per week in 1861 and 78,700 bales per week in 1860. The total receipts of cotton in New York during the month of January last was 21,493 bales. Letters from British Consuls, Bunce and Molyneux, in South Carolina and Georgia, make the Southern crop of cotton last year to be about 700.000 bales of 500 lbs. each. They state that there are now 4,500,000 bales in the secession States. The last arrivals from California bring the intelligence that the cultivation of cotton of a superior quality has been entirely successful in several counties in that State, and in Southern Utah 95,000 lbs. have been baled and prepared for market. In the Tulare Valley, great preparations are making by the farmers there to cultivate the Peruvian kind. The Legislature of California seems to think highly of the prospect, and has authorized the expenditure of $12,000 to promote the cultivation.

A Curious Mirror.

Among the curiosities exhibited at the last Paris Exposition, was a huge concave mirror, the instrument of a startling species of optical magic. On standing close to the mirror, and looking into it, it presents nothing but a magnificently monstrous dissection of your own physiognomy. On retiring a little, say a couple of feet, it gives your own face and figure in true proportion, but reversed, the head downwards. Most of the spectators, ignorant of anything else, observe these two effects, and pass on. But retire still farther. Standing at the distance of five or six feet from the mirror, and behold, you see yourself, not a reflection—it does not strike you as a reflection—but your veritable self, standing in the middle part between you and the mirror. The effect is appalling, from the idea it suggests of something supernatural; so startling in fact that men of the strongest nerves will shrink involuntarily at the first view. If you raise your cane to thrust at your other self, you will see it pass clean through the body and appear on the other side, the figure thrusting at you the same instant. The artist who first succeeded in fashioning a mirror of this description brought it to one of the French kings—if we recollect aright it was Louis XV.—placed his Majesty on the right spot, and bade him draw his sword and thrust at the figure he saw. The king did so; but seeing the point of a sword directed at his own breast, threw down his weapon and ran away. The practical joke cost the inventor the king's patronage and favor; his Majesty being afterwards so ashamed of his own cowardice that he could never again look at the mirror or its owner.—*London Engineer.*

Manufacturing Items.

There were 115,766 bales of manilla hemp imported in 1862. It has advanced from 7½ to 9 cents per pound, with an upward tendency during the year.

The Naumkeag Steam Cotton Mill, Salem, Mass., last year, manufactured 2,564,000 yards of cloth. Its profits for the first six months of the year were $42,411, and it declared a dividend of 5 per cent.; and its profits in the second six months were $185,253, which, added to surplus on hand, gave a dividend of 66 per cent.; so that the total division of profits for the year was 71 per cent. Its average dividends in twelve years of operation have been 11½ per cent.

The Farmers' Woolen Mill, of Beaver Dam, Wis., owned by G. H. Stewart & Co., manufactured during the past year (1862) 37,000 pounds of wool in cloths, doeskins, cassimeres, flannels and stocking yarn; and sold 15,000 pounds in roves for home spinning, mostly in this country. Over $20.000 worth of its own manufactures have been sold at the mill in small lots for home consumption. This mill makes only pure woolen goods.

WALL PAPERS IN RELIEF.—The *London Builder* gives the following description of the manufacture of wall paper with the figures in relief. It says:—"The mode in which relief is attained is by the repeated printing of flock upon flock either upon a gold or a plain ground; in the latter case the paper is hung with butt (not overlapping) edges; and, after being well sized, is reduced to one tint by an even coat of oil paint. In both cases the effect is very good. A simple lozenge pattern, about three inches in height, being in uncolored flock on a gold ground, in relief, to the height of about a quarter of an inch, is exceedingly pleasing."

THE NORMANDIE.—The French Admiral has sent home the *Normandie* (iron-plated frigate) in disgrace, as of no use to him.

[We cut the above from an exchange—how true it is we cannot say.—EDS.

MECHANICS and chemistry are handmaid arts; the one furnishes the instruments, the other supplies the materials.

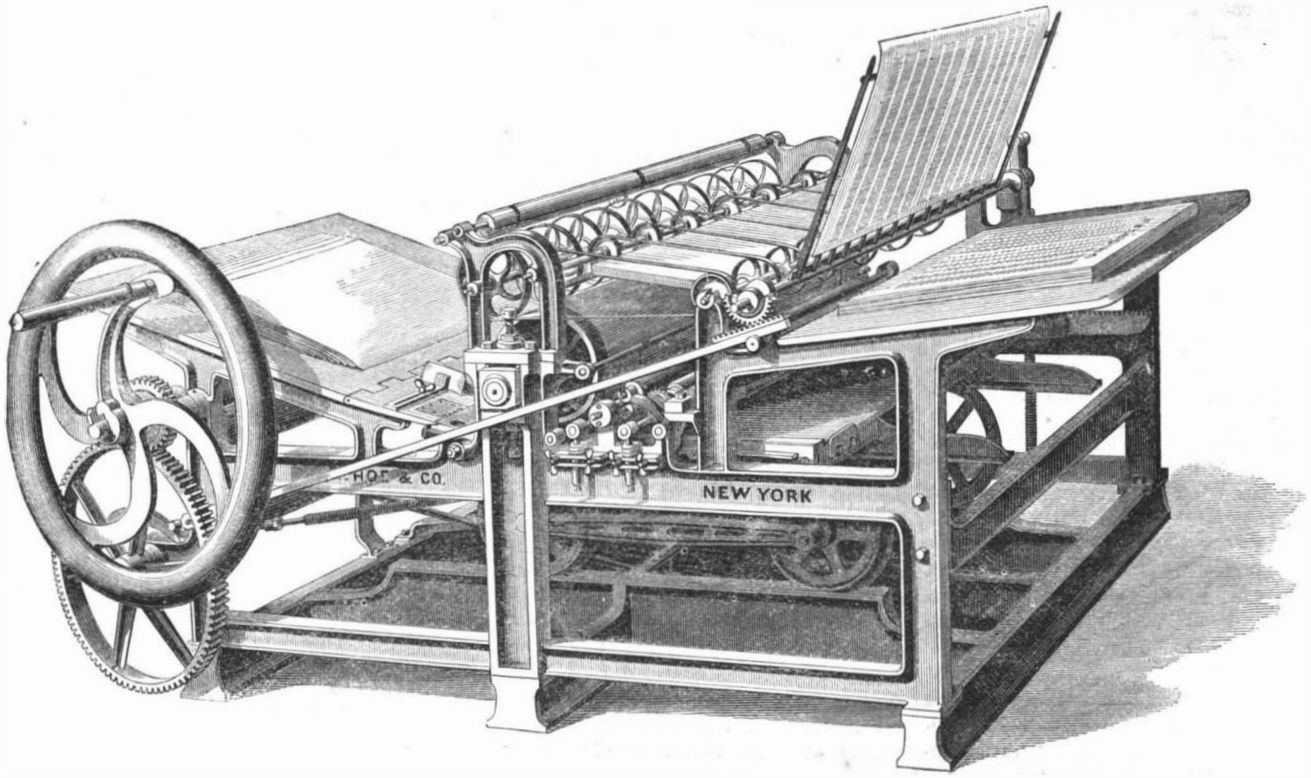
THE Boston *Journal* has lately been printed on paper made from wood at Roger's Ford, Pa.

Improved Printing Press.

The press which we herewith illustrate, and which we have thought important enough to merit a brief notice upon another page, will be found well adapted to the wants of that large class of publishers interested in country newspapers, as well also to all others who require a press combining facilities for job and newspaper printing. The mechanical details and operation of the press are here appended.

The bed is carried by a truck having large friction rollers, running on a railway (hence the name of the press), and is driven backwards and forwards by a crank motion, which stops and starts it so gently that the bed springs, usually employed, are not needed. The paper is fed through adjustable guides, to the under side of the impression cylinder, instead of the upper, and the feed-board lifts the sheet up over the guides and against the cylinder as the fingers on the latter clasp it. After an impression is made, the impression cylinder remains stationary while the bed returns; a fresh sheet is then laid on the feed board, and the fingers close on this sheet before the cylinder starts again. As the cylinder wheel gears directly into a rack on the side of the bed, an excellent register is obtained without a pointing apparatus. The bed is provided with iron bearers to equalize the impression on the form. The impression cylinder is never shifted to suit forms of different sizes, but the forward edge of the type is always placed to the same line on the bed, and the fingers and fly-tapes are as easily adjusted as on the ordinary job press made by Hoe & Co. The ink fountain has the adjustable knife, so necessary to job work; a form 27x42 inches, is inked by one roller and a form 22½ x42 inches by two rollers. The press has Hoe's self-acting sheet-flyer, and can be run easily and safely at from 700 to 800 impressions per hour. We saw one of the presses in operation, and were told that it was frequently run at from 1,000 to 1,200 impressions per hour without difficulty. The press occupies a space 5½ feet by 10 feet and can be worked in a room 7 feet high; those persons who have used them say that they run so easily that no vibration of the building is perceptible. In the last number of the Scientific American we illustrated an improved caloric engine, and it occurs to us that the combination of this press and the engine would make a very safe and efficient establishment for a country printer.

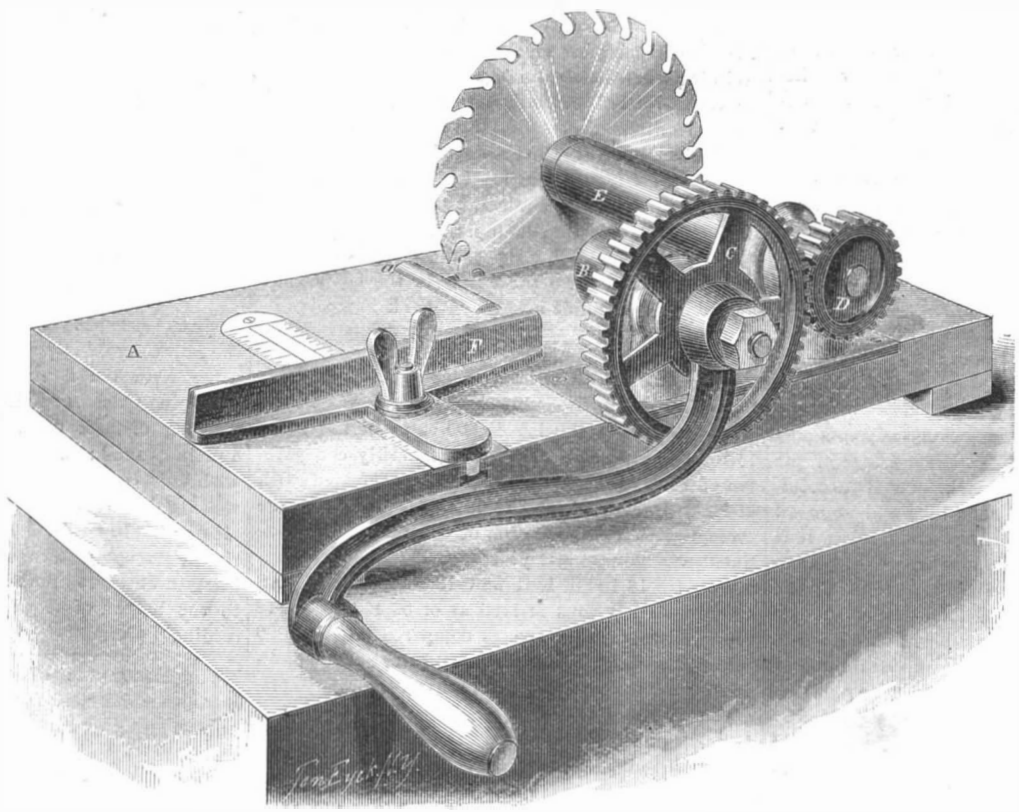
Persons wishing to purchase a press of this kind, or those desiring further information in regard to it, should address the manufacturers, R. Hoe & Co., 29 Gold street, New York.



HOE'S NEW "RAILWAY" PRINTING PRESS.

Improved Hand Saw-mill.

The demand for light, portable and efficient tools is always great, and we think that there is a large field open to our inventors in this direction which seems to have been but partially explored. We illustrate this week another portable sawing apparatus which is exceedingly simple in its working parts. The bench or block, A, has a bracket or pillow-block, B, secured to it which carries, on a stud fitted to it, the gear-wheel, C. This wheel meshes into the pinion, D, keyed on to the saw arbor running in the box, E. The power is applied at the crank or handle, and by means of the gearing, as will be apparent to all, the saw is revolved. The saw, it will be noticed, has teeth of a peculiar shape and this peculiarity enables it to cut with much greater ease than would be supposed from the arrangement of the machine. The teeth are chisels as the reader will see by looking at the angle of inclination at which they strike the timber. They make a very clean cut, and we are assured that a "stick" as large as will pass under the saw-bearing can be cut with ease; this on the working size would be about four inches. The guide, F, and index at the side, gages the cut with reference to the saw, and the small roller, *a*, let into the frame, facilitates the entrance of the stuff to be cut. No feeding apparatus is needed on this tool, as from the formation of the teeth the timber is drawn in as fast as it can be cut. This saw mill is the invention of Thomas J. Wells, and was patented Dec. 16, 1862. Further information can be had by addressing him at 40 Dey street, New York.



WELLS'S PATENT PORTABLE SAWMILL.

The "Montauk" under Fire.—The *Montauk*, one of the *Monitor* iron-clads, has been in action, lately, near Savannah, and used her 15-inch guns for some time. The rebel work, however, was so massive that not even these tremendous projectiles were able to damage it. The range was long—600 yards—but we think in close action against any other iron-clad, the *Montauk* would soon make some demonstration that could not be misunderstood. The *Montauk* was struck repeatedly by heavy shot from the rebel guns, but was not injured or caused to desist in her attack by them.

There are 83,635,000 tuns of coal raised in Great Britain annually.

The Scientific American.

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VOL. VIII, NO. 8....[NEW SERIES.]....*Nineteenth Year.*

NEW YORK, SATURDAY, FEBRUARY 21, 1863.

WHAT CAN BE DONE FOR INVENTORS---ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past SEVENTEEN years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are procured through the agency of this office. We also publish a larger pamphlet containing the PATENT LAWS of the United States with a digest of facts relative to the rights of inventors and assignees. This pamphlet is important to every person who owns a patent or is about to apply for one. Sent by mail on receipt of six cents.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,
No. 37 Park Row, New York.

STRIKES.

Strikes are constantly occurring among our workmen, with what real benefit to them we know not. We hope, however, that they may succeed in getting through these troublous times unincumbered by debt or severe hardship. Upon none do the trials incident upon a disturbed political condition fall with more severity than upon the laboring classes, and it is a very empty sort of consolation to tell them that their sufferings can all be traced to the working of natural laws; that because there is little or no demand for labor their wages will be small, or that the reverse is true, when business becomes brisk again. They should have the sympathies of the community, and those who are concerned in the distribution of public or private charities should see to it, that none of their charges are overlooked. The price of all kinds of food and the necessaries of life are raising rapidly, and those whose incomes are restricted must feel the additional tax very keenly. We hope that the strikers will come to some amicable arrangement with their employers, whereby their troubles may be satisfactorily settled. The laborer is certainly worthy of his hire.

DRILL YOUR CENTERS.

If machinists, and others in the habit of using engine lathes, only knew how much time and trouble are saved by the simple practice of drilling a center, they would never omit it when about to turn a shaft. In the first place, to make a center with a center punch is to be guilty of a very unmechanical proceeding; the center in work to be turned should be round and true; it ought also to conform to the shape of the dead or live center of the tool, which it is to be turned in. This feature cannot be obtained with a center punch. The latter are always ground up to a sharp point on a stone, and are more apt to be triangular, than cylindrical in shape. Notwithstanding all these bad features, the punch is employed with the utmost confidence by a great many mechanics—by far too many—as a substitute for the drill. "It takes too long to drill the center," says Shiftless, and then whack goes the hammer, and a three-sided conical kind of a cavity is indented into the shaft, and the clumsy workman proceeds to turn it down. In all probability he does not get two inches in length on it, before the work comes leaping out of the lathe and lies in the bed a faithful witness of his want of skill and forethought; the result is that the center has to be renewed and the shaft runs out of truth. Now how much better it would have been to have drilled the shaft at once, and so made a perfect job—one that would last. Very often work goes out of the machine-shop and comes back again to be done over, because the person for whom it was made did not know what he wanted; or for other reasons, then the utility of a drilled center is fully apparent, as the shaft may be put in the lathe and it will run true, whereas in a center made with a punch there is no reliance of any kind to be placed. Again we say, then drill your centers!

IRON FERRY-HOUSES.

All the ferry-houses and other buildings on the wharves of New York are constructed of frail and perishable wooden materials. Several years ago we recommended the erection of fire-proof iron store-houses on our wharves, and also urged the substitution of stone piers for the timber structures provided for our shipping. A sensible reform has been commenced by the Union Ferry Company in the erection of a handsome and spacious iron building in place of the old wooden ferry-house at the Fulton Ferry. This new iron building was commenced in the month of August last and is not yet completed, but it is in a very advanced state. It is comparatively lofty, being 60 feet in hight to the peak. The sides and roof are formed of corrugated iron plates supported on iron columns sustained and braced with suitable tension rods. The roadway from the street to the boats will be covered the whole length, and passengers will pass from the ferry-house to the boats without exposure during storms. A dome is to be erected in which a large clock will be placed fronting Fulton street. It will have a glass front and be illuminated at night so that the hours may be seen, (like those on the City Hall clock) by night as well as day. The general arrangement is nearly similar in character to the present ferry-houses. That is there is a main central building where the foot passengers enter and where the ferry fees are taken; behind which are the usual rooms for ladies and gentlemen. At the extreme sides are also entrances for foot passengers and between these and the central main building are the covered suspension carriageways to the bridges. As soon as this structure is completed the Union Ferry Company will proceed to erect similar fire-proof structures at the South and the Hamilton avenue ferries on the New York side. This example deserves to be copied by all the other ferry companies, and we trust it will also be extended to the objects we recommended long ago, namely, fire-proof wharf-stores for the protection of merchandise in the course of discharge from vessels and for shipment.

HOE'S NEW PRINTING PRESS.

Newspapers are, most essentially, an American "institution," and it is only through the extraordinary facilities afforded by the press-maker for their rapid production, that they can be printed so cheaply that nearly every family in the land is enabled to peruse them. In the country, especially, publishers require a printing machine that is simple in its mechanical parts, and which can be readily adapted to the various calls made upon them for job work, when the regular weekly issue has been run off. To do job work, however, it has been necessary heretofore to have separate presses for special purposes, and it has long been an object with inventors to produce a press which should combine, as far as possible, a number of peculiarities which would render it capable of being used for many different kinds of printing. This desideratum has been attained, and we think from what we have seen of the performances of the press illustrated on another page, that it will prove a promising candidate for popularity. It is designed expressly for country newspaper publishers, who cannot, as they well know, confine their business to one class of work. The press runs remarkably easy; we took hold of the fly wheel and readily drove the apparatus with one arm. This is an extremely important feature where steam power is not convenient. Those interested in this matter will thank us for calling their attention to it.

POISONOUS COFFEE.

In consequence of the great advance in the price of coffee—amounting to some two hundred per cent over former rates—many cheap substitutes for it have been recently manufactured and offered in the market. Rye coffee, consisting of roasted rye, sometimes mixed with a little genuine coffee and chicory, has been the principal substitute and is extensively sold. A case of poisoning has recently occurred in a German family in South Brooklyn, which is said to have resulted from the use of rye coffee. It has been investigated by Dr. Baur, the health officer of that district, who has made a report on the subject. He states that Dr. M. Palmedo informed him of the case, and he visited the family and found Mr. George C. Croft, his wife, two of his daughters and one son under the influence of what he supposed was a poison. Other members of the family had been affected, but had become convalescent. One of the young ladies was very ill, her face was bloated, she appeared as if affected with dropsy, and was at times delerious and feverish. Dr. Baur, with Dr. Palmedo, instituted a search for the cause, and his suspicions rested upon some rye coffee which the family had been using. Chemical analysis and microscopical examinations being impracticable, he tested its effects upon a dog. The animal to which the dose was administered exhibited symptoms similar to those of the persons in Mr. Croft's family, and upon this evidence, together with the flavor of the coffee, Dr. Baur has concluded that the rye coffee contained a poisonous ingredient, and he intimated, although he does not assert positively, that there was ergot in it. He found out the store where it had been sold, and condemned the whole stock on the grocer's premises. Dr. Baur cautions the public against the use of rye coffee. He states that this grain when pure makes a harmless substitute for coffee, but ergot and other poisonous seeds grow up with it, and unless these are separated the coffee made from it is dangerously poisonous. It appears to us that Dr. Baur has left this question in an unsatisfactory condition, according to his published report, for he has not positively asserted that he found any specific poison in the rye coffee which he examined, and his conclusions are just as legitimate against the use of rye for bread as they are against its use for coffee.

AMERICAN STEEL.

We have frequently urged upon our metallurgists and iron manufacturers the importance of engaging in the production of steel to supply all our wants in the arts. Success has attended the efforts of several parties who have engaged in the manufacture of steel west of the Alleghanies, and we see no reason to doubt that similar success would attend like efforts in other parts of our country. In Pittsburgh there are several estalishments in which steel is made, and it has taken the place of coarse English and German steel which had been used in the fabrication of the cheaper sorts of implements and tools. The Pittsburgh steel is equal in quality to the same foreign grades, while its cost is less, hence its use is becoming very general in the West. All the finer sorts of steel, however, are still imported in great quantities from England; also much of the more common qualities for the Eastern sections of our country. Now, it appears to us that all the steel we require could and should be manufactured on this side of the Atlantic. We have all the necessary natural elements for producing every quality of it. The best English steel is not made from native iron but from imported Swedish and Russian brands. Long experience and acquired skill with cheap fuel are the advantages which have made England the steel manufactory of the world. In several sections of the United States there are unlimited supplies of the same ores as those of Sweden, and fuel is more abundant than in Great Britain. The very best qualities of steel can be made here from native ores, and it only wants enterprise, capital and skill to establish and conduct the manufacture of fine American steel with success. There are many inducements for entering upon this business at present. The tariff is a premium to capital and industry, and the steel trade is not like an ephemeral business that changes with the fashions; it is as fixed as the very hills.

This has been called "the age of iron," and the next will be "the age of steel," because steel is yet destined, from its very nature, to supersede iron in a thousand various applications. It is much stronger than iron, and for several purposes it is far more durable. Its greater cost has been one of the main reasons for its more limited application, but improvements in its manufacture will yet be made so that it will be produced at cheaper rates, and then it will be more generally used. Already steel axles and tires for locomotives have superseded, in a measure, those formerly made of wrought iron; and when steel can be made and forged in large masses it will be employed for all the large shafts and working parts of marine and other engines. If steel could be produced at $100 per tun, capable of bearing a strain of forty tuns on the inch, bridges double the span of those made of iron would be erected.

For all machines and structures where welding is not required, steel is far superior to wrought iron. We import all the steel for manufacturing our wire, saws, axes and fine tools of every description. These are permanent applications of this metal for which it will always be used; but, beside these, new applications of steel are being made constantly. Thus several tracks of steel rails have been laid in England, and these have now been tested for about four years with the gratifying result that they are about as good to-day as when laid down, and they last as long as three sets of iron rails. It is probable that all the railway lines in the world will yet be laid with steel rails. Just think of fifty thousand miles of railway in America yet to be furnished with steel rails. Their first cost is greater but they are the cheapest rails in "the long run." English and French civil engineers are now advocating their use, and their general application cannot be long delayed. A very flattering prospect, we think, is presented to those who early engage in the manufacture of American steel.

NEW STEAM PASSENGER CARS.

We have frequently advocated the employment of steam as the motive-power of common passenger cars for city railroads, because a steam car is as easily controlled as one drawn by horses, and it is therefore equally as safe while it is far more economical. A combined steam and passenger car for short lines of railway, to obviate the use of a separate locomotive drawing a train, we have also spoken favorably of. Such a car we illustrated and described on page 257, Vol. V (new series), of the Scientific American, on which occasion we said; "The time is not far distant when passenger cars combining the engine will become general on most of our small railroads." We now chronicle the adoption and employment of three such cars on the Jersey City and Bergen Point Railroad—a line about four miles in length. Each car is 26 feet 9 inches in extreme length and 7 feet 9 inches in width. The seats extend along the sides, leaving a wide space in the middle, and it is heated by steam pipes running under the center of the floor. At the front end the engine room is partitioned off from the passenger apartment. The machinery, consisting of two small inverted cylinders, each 5½ inches in diameter and 10 inches stroke, is yoked to the pinion that gears into the driving wheel, and the tubular boiler, 27 inches in diameter, is situated at the other side of the engine-room, leaving an ample middle space between for the engineer and brakesman. The water tank is underneath the seats, and thus all the mechanism, boiler and adjuncts, are compacted in a very small space. An improved truck enables the car to turn curves of 60 feet with ease, although the wheels are situated 13 feet apart. At Bergen Hill the grade is about 200 feet, yet this steam car ascends it easily, and upon a level it can run at the rate of 16 miles an hour. A trip in one of these cars has satisfied us that in style of finish, comfort and cleanliness, this system is a great improvement over any of the horse-railroad cars in this or any other city, and the managers of the Jersey City and Bergen Point Railroad deserve credit for enterprise in having adopted them.

MILK.

We have a vivid recollection of seeing, during the early years of life, the maids returning from the farm-yard, in the cool gray twilight of the summer evening, bearing foaming pails of milk warm from the cow; this pastoral scene has been renewed in our mind at various intervals, when we have been so fortunate as to secure a few days in the country. There is a popular tradition in the mind of our citizens that the substance which is delivered to them, matutinally, is a legitimate product of the cow, that it is unalloyed, and is what it purports to be—milk. Alas! what delusions are these! the most consumptive, asthmatical, lop-horned female of the herd would disdain to own such a thin and watery dilution of the early beverage of childhood as is daily sold in the streets of this city. Once, and not long ago either, our dead walls and fences were covered with flaming placards which denounced all dealers of swill milk, and diluters of the same (think of it, ye bovines—diluted swill milk!) to be guilty of a penal offence, for which, upon conviction, they should be punished. The police were appointed inspectors of the milk stands, and had authority to bring to trial any one whom they suspected of transgressing the law; and we fondly hoped that the day was at hand when swill milk and its allies would be stricken out forever from the long list of abuses which are suffered, unchecked, to overide us. At first all went well, and a few unhappy Dutchmen were brought to trial, suffered the painful ordeal of an exposure to the public gaze, were fined fifty dollars and let loose from justice, only to sell swill milk with renewed assiduity and without loss of time. How could they otherwise recover that portion of their gains which had been taken from them? And so the farce goes on; the public are daily served with a modicum of a bluish-whity fluid, an analysis of which we dare not attempt; it might be used advantageously on washing day for clearing linen, but it certainly is not fit to be put in the human stomach.

It is estimated that the entire milk crop of the United States, for the year 1862, reached $160,000,000. New York State produces as much milk (and water) as all the New England States, together with New Jersey, Delaware and Maryland. It would seem that with all this expenditure, and at the price demanded—six cents a quart—we might have the beverage for which we ask in vain. It would be unjust to say that no pure milk comes to this city, but it is a hereditary and an inherent vice of milkmen to dilute their milk most lavishly; doubtless they fear that in its natural state it wou'd be too rich for the stomach, and hence their liberality in the article of water.

THE COMBINATION OF PAPER-MAKERS.

The recent increase in the price of printing paper has created no small excitement in the business community. By the conjoint action of the paper-makers at a meeting held by them, last fall, at the Astor House, in this city, it was then and there recommended that the prices of paper be forthwith increased to certain fixed rates. This recommendation was adopted; and before the sun rose again, the prices of paper were, by a singular unanimity on the part of the manufacturers, raised exorbitantly. This proceeding drew the attention of the public to the material for paper-making; and by a natural sequence it entered into speculation, which imparted a fictitious value to rags, waste paper and crude material of all kinds. The result of this raid and research among musty old documents and rag bags was an immense quantity of paper stock, which it was fondly hoped and indeed emphatically asserted would reduce the price of printing-paper, at least, to moderate figures, or to rates in some way corresponding to the condition of the currency. Unfortunately, however, this anticipation was not realized; the market became overstocked with refuse paper; the price of rags fell and substitutes for cotton, of one kind and another, were proposed and many of them employed. Notwithstanding all these occurrences the prices of paper remain as high as ever, and the association of paper-makers declare that the charges that are made of combination among them to sustain prices are unfounded. They turn the point of the assertion, by a foolish quibble, upon the word "recommend," as as if that in the connection had not the same signification as "resolved." If they are not united what is the need of an association among them, and why may not one or two or more individuals sell their productions at from half to one cent less per pound than the others, unless it be that there is some secret understanding mutually, the proper term for which has not yet been discovered?

There is, however, another side to the question and that is the action taken by the publishers of the country; they represent a powerful interest and are in direct opposition to the paper-makers on the subject of unjust agreement; they too, have had a meeting, and—as a foil to the combination, understanding, or what not, of the manufacturers—have petitioned Congress to repeal the duty on foreign paper, so that the necessary supplies may be obtained from abroad. Their action is again opposed by the paper-makers, who assert that this is unjust and also unpatriotic. In a bit of special pleading these gentlemen set forth the disadvantages which would result to the country at large if such a dangerous precedent as special legislation upon manufacturing interests is adopted.

We think that the prospective danger is very much overrated, and is not by any means so great as the present injury which is being inflicted through the action of the monopolists on the best interests of the people. The curtailment of the reading privileges of our community, entailed by the high price of paper, is no small hardship and one which they cannot bear patiently. The action of Congress upon the matter can be averted by the paper-makers themselves, should they see fit to throw themselves into the imminent deadly breach which they see opening in the policy of the Government upon this matter; only let them lower the price of paper to a standard which will give a fair profit on the material, time and capital involved, and our pressmen and others interested will willingly accede to the demand; they are not unreasonable and ask no sacrifices from paper-makers, and it is but fair that a similar spirit should be exhibited on the other side. We cannot see how it is that there can be no resolution or its equivalent to maintain exorbitant prices. The materials for paper-making grow in every State and can be worked up by improved processes into suitable paper. Rags are scarce, it is true; but straw is plenty, and yet straw paper is sold at prices far beyond its legitimate value. We do not wish to impeach the veracity of the gentlemen composing the association, but there are some facts which conflict so materially with their stand upon this matter that they will

have to be satisfactorily explained before we can believe that no joint action exists in regard to the subject under discussion. Here is one of the mysteries referred to :—

The Philadelphia *North American* says :—"Printing paper of ordinary qualities sells at this moment from 20 to 22 cents a pound. Its legitimate price is about 9 cents. Between the price of paper materials and the manufactured article there is nothing like an adequate proportion. A large commission merchant recently received a consignment of rags from Havana. Knowing the exorbitant price of paper, he expected to realize a handsome sum for the consignors. He visited successively all the paper-makers in this section of the country and corresponded with those more distant. The utmost he could obtain for them was 5½ cents per pound. All the paper mills are stocked with material ; waste paper for manufacture has been thrown upon the market by thousands of tuns, and yet the price of printing paper is kept up by speculation, or something else, to 22 cents per pound. Here is a mystery that requires explanation. Who will give it?"

DISAFFECTION AT THE BROOKLYN NAVY-YARD.

Mr. John Faron, so long the master machinist at the Brooklyn Navy-yard, has been elected Comptroller of Brooklyn, and his former office was therefore vacant. The naval authorities examined several local engineers for the position, but as they were found wanting in some respects, it was deemed expedient to send to Key West for a Mr. Cogswell, who had been or was in a similar position there. This was done, and this gentleman is now the master machinist at the Brooklyn Navy-yard. This appointment was received with a very ill grace by certain parties, and they, resolving to make trouble for the new foreman, have come together and indited the following letter addressed to the men in the Navy-yard :—

SIR—This letter is sent to you who are a workman in the Navy-yard. If you believe in loyalty to your brother workmen, mechanics and laborers, leave the yard on the very day the abolition boss commences his crusade against operatives for party purposes. The Government for which we work well and hard has ransacked the whole nation to find an abolition master machinist. Better mechanics by far than he is were examined, but their political principles did not suit Mr. Lincoln. And all New York State could not find a man fit for the dirty work of making merit secondary to party. Massachusetts bred the man, and Cogswell is his name. He tried to discharge 150 men last week, but the Acting Commandant could not sanction such a step in Admiral Paulding's absence. When that officer returns, the abolition tyrant, who has no thought for the families who he may visit with desolation in midwinter, will make his attempt. We have no hope from Admiral Paulding, because if he interposed for us, Secretary Welles would come to the rescue. Now, we want you to lay down your tools the day the first large discharge is made, if you should escape the edict of this Cogswell, who intends to begin by discharging a batch of Democrats at a time, until all are gone. If all hands refuse to work, at once inquiries will be made, the Press will look behind the scenes, and the villanies contemplated may be exposed. In union there is strength. Remember all the firesides which may have cause to bless you, if you obey.

YOUR FELLOW-WORKMAN.

It would appear from the testimony of the letter itself, that it is high time some of the men in the yard were discharged, and that their places were filled by sensible men. We cannot think, however, that the men alone are to blame for writing and circulating such a stupid and silly document as the one referred to. We do not know Mr. Cogswell, but we do know that, whatever his antecedents may be, the plan pursued is the one of all others which will create friends and sympathizers for him, even among those politically opposed to him. This mixing of politics with the practical workings of our Government yards is a mischievous feature, and will soon lead to trouble if persisted in. The workmen of the Brooklyn Navy-yard have been unfortunate in their manifestations toward the Government ; several times in the course of the war, they have been before the public on charges of disaffection, &c., and at one period numbers of them were discharged for refusing to take the oath of allegiance. From this record it would seem that the appointment of Mr. Cogswell—provided he will reform the management of the naval workshops at Brooklyn, and make them workshops and not places for political discussion and intrigue—comes not a day too soon. We sincerely hope that those persons who instigated the mechanics to this step will repent of it, and repair the mischief before it is too late. The language of the letter is extraordinary, and more fitted for the region about Norfolk than this part of the country ; and if the workmen follow the advice of their instigators and quit their employment in mid-winter, they will certainly regret it when the domestic desolation which will follow their silly acts makes itself felt.

SUPERIORITY OF CORNISH PUMPING ENGINES.

In the annual report just published of Isaac S. Cassin, Chief Engineer of the Water Department in Philadelphia, we find very strong testimony in favor of the Cornish engine over other common condensing engines for the purpose of pumping water. It is stated in the report that four steam engines are employed at the Spring Garden Works, for pumping water ; three of which are common condensing engines, the fourth is a genuine Cornish engine, built by I. P. Morris & Co., at a cost of $30,000. The total quantity of water pumped at these works in 1862, was 3,038,527,420 gallons, of which quantity the three older engines pumped 1,897,391,360 gallons, and the Cornish engine 1,141,136,060 gallons. In the performance of this work, the three common engines consumed 5,777,571 lbs. of coal, while the Cornish engine consumed only 2,547.161 lbs. It thus appears that for the same quantity of work performed the Cornish engine only consumed about one half the fuel. Mr. Cassin says respecting the operations of the latter engine :—

"By a carefully conducted and accurate experiment, made during the past year, it was ascertained that with the consumption of one tun of coal the Cornish engine, No. 4, raised 999,274 gallons into the reservoir, while with the same quantity of coal, engine No. 3, the least efficient of the three old engines, raised 517,969 gallons. Nos. 1, 2 and 3, are condensing engines, driving double-acting pumps, those of Nos. 1 and 2 delivering 160 gallons each, per revolution of the engine, and that of No. 3 delivering 150 gallons per revolution. The engine No. 3 can deliver into the reservoir 2,500,000 gallons per twenty-four hours. The Cornish engine, termed No. 4, is capable of delivering into the same reservoir 5,000,000 gallons in the same period of time—twenty-four hours. It will be seen from this comparison that engine No. 3, with a capacity of 2,500,000 gallons per day, occupying more space than engine No. 4, of double the capacity, consumes nearly the same amount of fuel." The amount required for repairs and other incidental expenses, as well as the fact that a smaller number of hands are necessary in running this description of engine, give them a very decided advantage. The Chief Engineer represents that it is in all respects the interest of the city to adopt exclusively the use of Cornish engines, similar in construction to No. 4.

The average duty (for the year) of the Philadelphia engines is very low, being only 32,998,333 lbs. of water raised one foot high to the 100 lbs. of coals. This is not half the duty which can be performed with a Cornish engine.

AN IMPORTANT PATENT SUIT---COAL-OIL LAMPS.

IRVLN A. WILLIAMS *versus* JONATHAN MAYHEW AND OTHERS DOING BUSINESS AS THE "BUFFALO STEAM GAGE COMPANY."

This was an action at law brought against the defendants for the infringement of a patent granted to the plaintiff for an improved mode of constructing lamps for burning kerosene or coal oil, "known as Williams's Coal-oil Burner." The invention claimed by the patentee consists of a peculiar combination of perforated metal cylinders or plates for supplying air to the interior and exterior of the flame, with a circular hollow wick tube ; and the evidence put in at the trial, on the part of the plaintiff, showed that the arrangement patented by him is essential to the beneficial operation of all lamps of the class in controversy in the suit. The defendants had violated the patent by making and selling large quantities of coal-oil lamps ("head lights") for locomotive engines.

A number of witnesses, called by the plaintiff's counsel, testified that they were well acquainted with the practical operation of the patented lamp ; and that it gave a more brilliant and powerful light than any other locomotive lamp they had ever seen. They also stated that it was superior to gas and every thing else in use for "head lights," and that it enabled the engineers to see switches and objects along the track of a railroad at a much greater distance than any other locomotive lamp previously known.

The defendants contended that the invention was not new ; and their counsel put in evidence a large number of prior patents and extracts and drawings from books ; also several old lamps which were alleged to have been used before the plaintiff's invention. These the counsel and the "experts" for the defense claimed were the same as the invention which the plaintiff had patented, and would answer the same purpose. They also contended that the lamps which the defendants had manufactured were, in their construction and arrangement, substantially different from the invention described in the plaintiff's patent and were therefore no infringement of it. They further set up that one Samuel E. Cleveland, of Buffalo, was the first inventor of the very lamp in controversy, and that they had become the sole owners of the right to use it by assignment from him.

During the trial a number of questions arose, of interest to all concerned in the manufacture, use, or sale of coal-oil lamps, relative to the nature and operation of such lamps and also to the extent and character of inventions which preceded that of the plaintiff.

The cause came on to be tried in the Circuit Court of the United States for the Northern District of New York, before the Hon. N. K. Hall and a jury, at Albany, on January 28, 1863. Many witnesses were examined on each side, and all the questions arising in the case were fully argued by the respective counsels.

The defendants, among other points relied upon by them, contended that the plaintiff's patent was limited to the employment of *two* perforated cylinders as one of the members of his combination ; and that as they had employed but one, the patent could not reach over them. But the Court overruled them, and instructed the jury that, as matter of law, upon the language of the plaintiff's claim, his patent covered one, two or more of such cylinders, in combination with the other elements of his invention. They also contended that, as to the second claim of the patent, they had used less than the whole of the combination therein set forth, and that, therefore, the plaintiff could not recover under this claim. But the Court charged the jury that it was a question of fact for them to decide, whether the defendants' lamps contained substantially the invention set forth in the plaintiff's second claim.

The jury brought in a verdict for the plaintiff upon all the issues, finding that the invention was novel and the patent valid ; that the defendants' assignor (Cleveland) was not the first inventor of the lamp in question, but that the plaintiff *was*, and that the defendants had infringed both of the plaintiff's claims.

S. D. Cozzens and A. G. Williams, of New York, were counsel for plaintiff. E. B. Forbush, of Buffalo, and M. Smith for defendants.

APPLICATION FOR THE EXTENSION OF A PATENT.

Wire-strengthened Spoons.—William Mix, of Prospect, Conn., obtained a patent on May 1st, 1849, for an improvement in making wire-strengthened spoons ; and he has applied to the Commissioner of Patents for the extension of that patent for a term of seven years. The testimony will close on March 30th, and the petition will be heard at the Patent Office on April 13th.

Persons who wish to oppose the extension of this patent should attend to it without delay. Copies of the claims in this case will be promptly forwarded from the Scientific American Patent Agency upon the receipt of $1.

PERSONAL.—We are gratified to notice that the Senate has confirmed the re-appointment of P. H. Watson, Esq., as Assistant Secretary of War. Mr. Watson has discharged the duties of this important office for the year past, with distinguished zeal and fidelity ; and his re-appointment and confirmation are honorable testimonials to his fitness for the position. We could wish that all our public offices were filled with men of equal worth and integrity.

GOLD diggings are reported to have been recently made in New Zealand, which far exceed those of California and Australia in richness.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Shipper Lever for Looms.—The lever commonly used in power looms for shipping the belt from the fast to the loose pulley, and *vice versa*, and otherwise stopping and starting the loom, has its lower portion made to constitute a spring, and this spring is very liable to be broken by the violent concussion to which the lever is subject in the movement effected by the said spring for stopping the loom, and when it is broken, the stoppage of the loom until the lever and spring have been taken off, carried to the smith for repair and put on again, results in serious loss to the manufacturer. Another difficulty is, that the spring cannot be adjusted to give it more or less tension while it remains attached to the loom. The object of this invention is to obviate both of these difficulties ; and to this end it consists in the combination, with each other and with the loom, of a rigid lever, an independent spiral or conical volute spring and an adjustable fulcrum. George W. Hathaway, of Hinsdale, Mass., is the inventor of this device.

Sewing Machine.—In the application of reversible feed mechanism to a shuttle or other "lock stitch" sewing machine, the two threads are simply interlaced when the feeding movement is in one direction but are crossed and form a kind of half knot when the said movement is in the reverse direction, and the consequence is, that the degree of tension of the upper thread that is requisite to bring it tight on the upper surface of the cloth, and make it draw the under thread tight up into the cloth when the feeding movement is in the first-mentioned direction, is not sufficient to produce the same effect when it is reversed, but leaves the upper thread loose on the upper surface of the cloth and the under thread straight on the under surface, the reason being that in the latter case the friction of the threads is so much greater ; or, if the tension should be sufficient to draw the upper thread tight and the under one far enough into the cloth when the feed movement is in the last-mentioned direction, it would draw the under thread through the cloth when the movement was in the first-mentioned direction. Hence, in order to make good work in sewing back and forth, the tension of the needle thread requires to be varied every time the direction of the feed movement is changed. This invention consists in so combining the device which produces the tension with the device by means of which the feed movement is reversed, that by the act of changing the direction of the feed movement the tension is varied in such a manner as is rendered necessary by such change of direction. N. Jones, of La Porte, Ind., is the inventor of this improvement.

Drum.—This invention relates to a new and useful improvement in military side (or small) drums, and consists in constructing the drum in such a manner that its head and reverse may be braced separately or independently of each other, thereby preventing the reverse, which is the head not beaten upon and which is generally formed of inferior material, from being unduly strained, a contingency which is liable to occur in drums of ordinary construction, in bracing the head proper, in consequence of one bracing cord being connected to both bracing hoops, thereby causing both the head and the reverse to be braced simultaneously, and the latter to be unduly strained or stretched before the forward is brought to a proper degree of tension to insure a good or perfect tone. The invention further consists in a novel manner of applying the cords to the bracing hoops, whereby the former are kept free from contact with the heads and the latter thereby, as well as the cords, prevented from being injured by abrasion. The inventor of this improvement is John Dermond, of Louisville, Ky.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 4, 1863.

Reported Officially for the Scientific American.

***** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.**

37,559.—Manufacture of Felt.—S. M. Allen, Boston, Mass. :

I claim combining ordinary felting materials like fur, wool, &c., with a short fiber made or reduced in such a manner from long staple fibrous materials like flax, hemp, jute, silk, china grass, and similar substances, as to have the peculiarities hereinabove described, whereby, when so combined, they can be felted together by any suitable felting process.

37,560.—Bedstead-fastener.—Dwight Babcock, Seneca Falls, N. Y. :

I claim, as a new article of manufacture, the coupling hook, C, provided with the double points, d d', for use on the opposite sides of the bedstead, substantially as described.

37,561.—Bank-note.—J. M. Batchelder, Cambridge, Mass.:

I claim the fixed scale or column of figures, as 1 2 3 5 10, occupying the whole breadth of the bill, or extending from side to side of a border or embossed space, in combination with a series of lines, marks or rays radiating from that figure of the scale that represents the denomination or value of the bill.

I also claim the combination of a single colored figure of the scale, with the denomination figure of the bill made of the same color, substantially as herein described.

37,562.—Machine for Framing Lucifer-match Splints for Dipping.—Anson and E. B. Beecher, New Haven, Conn. :

We claim, first, The employment of a flexible binding tape or band, in combination with a drum adapted to be rotated by a mandrel and removed therefrom, substantially as described, as a means of forming a spiral frame of match splints for dipping, substantially as hereinbefore set forth.

Second, In combination with a frame-drum moved by friction, the endless band and pressure roller, or equivalent feeding mechanism, for the purpose of holding and paying out the flexible binding tape to the frame, substantially as described.

Third, In combination with the frame-drum, binder, setting and feeding mechanism, the friction drag, or its equivalent, for the purpose of stopping the frame when the feeding and setting mechanism is disconnected from its motive power.

Fourth, The receiving cylinder grooved across its periphery with grooves suitable to take in and hold only a single match splint, each substantially as described.

Fifth, The wire brush, or its equivalent, in combination with the receiving cylinder, substantially as described.

Sixth, In combination with the setting wheels and receiving cylinder, the count wheel, substantially as described.

Seventh, The setting wheels, in combination with the frame-drum and binding tape, substantially as described and substantially for the purpose of setting the splints in the coils of the binding tape, as set forth.

Eighth, In combination with the feeding and setting mechanism, the clutch and system of levers, or their equivalents, whereby the frame is stopped when splints are not supplied at the proper time, and set in action again by the splint itself, substantially as described.

37,563.—Telegraphic Apparatus.—Giovanni Caselli, Florence, Italy :

I claim the combination of the spring, u, and the micrometric screw, V*, with the pendulum of the regulator, P'', substantially in the manner herein shown and described

The employment of the marking device, consisting of the oscillating lever, y, screws, b b', slides, d' d', styles, v v', and tablets, t t, or their equivalent parts, combined and operating together, substantially as herein shown and described, with the pendulum, A B, as set forth.

The employment of the copying device, consisting of the segment rack, s, bar, h i, levers, h' h', styles, v v', and intermittent drum, A B, or their equivalent parts, combined and operating together substantially as herein shown and described, and the pendulum, A B, as set forth.

37,564.—Corn Planter.—H. Cassidy, Putnam, Ohio :

I claim the combination of the chambered hoppers, I, spring slides, J, wheels, E, shares, G H, and side beams, A, with each other and with the central beam, C, all in the manner and for the purpose herein shown and described.

37,565.—Explosive Projectile.—J. M. Connel, Newark, Ohio :

I claim, first, Expanding the packing, l, by a combination of the force of the expanding gas and of the resisting action of separated incline planes, substantially as and for the purposes set forth.

Second, The inclined beads or ribs having flutes between them, in combination with a looseiy-fitted expansible seat, substantially as and for the purpose set forth.

37,566.—Percussion-exploder for Shells.—J. M. Connel, Newark, Ohio :

I claim, first, Suspending a plunger upon a projecting stem, b, of the screw plug, A, in the manner and for the purpose set forth.

Second, So applying a shell-exploder to a shell, that when the latter strikes obliquely, or sidewise, the said "exploder" shall be ignited by a leverage impact against the rear of the screw-plug, in the manner substantially as described.

37,567.—Door Latch.—J. H. Cooper, Philadelphia, Pa. :

I claim the latch, L, in combination with the knobs, k' and k'', and shank, A, when the latch turns on an axis parallel to that of the door, and when the latch is opened by pushing or pulling the knobs in the manner described.

37,568.—Car Brake.—D. S. Cross, Cincinnati, Ohio :

I claim, first, The arrangement of driving axle, G, sliding and revolving windlass, F, ratchet and pawl, H K, clutch, I J, armed shaft, L M M', and self-releasing attachment, N n n', in the described combination with the brake chain, E, the whole being combined and operating as and for the purposes set forth.

Second, In the described combination with the above, I claim the cam-headed lever, O, connected to the pawl, and operating substantially as set forth.

Third, The provision of toggle, P Q, and rollers, T T' T'', or their equivalents, in the described combination with the consecutive cars, and with the main brake chain, E, for the equalization of tension of the said chain, in the manner set forth.

37,569.—Weighing Apparatus.—A. B. Davis, Philadelphia, Pa. :

I claim, firstly, A graduated beam, E, connected to the platform of a scale, in combination with any desired number of supplementary graduated beams, so arranged that, by the appliances herein described, or any equivalent to the same, any one or all of the said supplementary beams can be connected to or disconnected from the main graduated beam, for the purpose specified.

Secondly, Arranging the graduated beam, E, and its supplementary graduated beams within a box or casing, furnished with doors and locks, substantially as described, and having such openings that, while the attendant can observe the movements of any of the supplementary beams from the outside of the casing, he cannot gain access to the beams themselves or gain a knowledge of the weights determined by the beams

Thirdly, The stirrup, J', suspended from the graduated beam, E, and provided with knife-edged bearings, k, for the reception of the supplementary beams, substantially as and for the purpose herein set forth.

Fourthly, The levers, M, arranged in respect to the supplementary graduated beams and stirrups, J', substantially as and for the purpose herein specified.

37,570.—Military Drum.—John Dermond, Louisville, Ky. :

I claim the hoop, B, attached centrally to the cylinder, A, in combination with the two bracing cords. F E, and the two bracing hoops, E E, all arranged substantially as shown, to form an improved military or side drum.

I further claim making or boring the cord holes, c, in the bracing hoops, E E, in a direction parallel or nearly so with the axis of the cylinder, A, and about at the centers of the bracing hoops, as and for the purpose set forth.

37,571.—Sails of Vessels.—Daniel Fitzgerald, New York City :

I claim, first, The self-adjusting sails, A, constructed and arranged substantially as above described.

Second, The collapsing jib, B, constructed and arranged substantially as above described.

Third, The collapsing circular sail, C and D, made to fold like a fan, constructed and arranged substantially as above described.

Fourth, The mid-jib, between the two bowsprits, as constructed and described.

Fifth, Suspending a circular sail, D, between the mast and bowsprit or on a jib-hook, constructed and arranged substantially as above described.

37,572.—Paddle Wheel.—W. C. Ford, Brooklyn, N. Y. :

I claim, first, The arrangement of the prismatic buckets, e f and g, in the manner and for the purposes specified.

Second, I claim the construction of the prismatic sheet metal buckets, with the flanges, 3 3, and arm-hole, 4, for the purposes and as specified.

37,573.—Paper Bag Machine.—J. J. Greenough, New York City :

I claim, first, Forming a paper bag or other envelope by cutting the the form or blank therefor from a strip or roll, by circular knives, as herein described, and then folding the same between a series of rollers, without stopping the paper to perform either of the functions, the whole being combined and arranged substantially as and for the purposes set forth.

Second, I also claim cutting the edges of the paper in an irregular line to shape the form or blank by the cylindrical cutters, in combination with folding machinery for making bags, &c., by a continuous operation, as above specified.

Third, I also claim the combination of the "waste" rollers, W, or their equivalent, for insuring the separation of the parts, and removing the waste from the machine, with the cutters, substantially as described.

Fourth, I also claim printing or embossing the paper while it is stretched and held tight on both sides of the printing apparatus, while being printed, as herein described, when the same is connected with machinery for making bags and envelopes for the purposes specified.

Fifth, I also claim conveying the form or blank for a bag or envelope through the preliminary operations of forming the envelope, and before serving the same from the strip of paper from which it is cut, substantially as and for the purposes set forth, when the bag is formed by passing the material through a series of rollers, substantially such as is herein set forth.

Sixth, I also claim embossing the line of the seams of bags, or other envelopes, where they are joined by adhesive material, for the purpose of cementing the seams more perfectly, and concealing the joints, as set forth.

Seventh, I also claim turning the side fold of the blank, cut as herein described, before the bottom fold, so as to bring the side fold on the inside of the bag or envelope, and securing the same to the cut lap or side, by which a neater joint is made.

37,574.—Grubbing Machine.—Joseph Frey, Battle Creek, Mich. :

I claim the adjustable and movable cast-iron shackle for pulling trees with the roots, in combination with the reversible wrought-iron clevis, or its equivalent, the clevis being guttered, and I also claim the adjustable and movable cast-iron shackle for pulling stool or cap grubs, in combination with the hook on the reversible wrought-iron clevis.

37,575.—Vulcanizing Lamp.—B. W. Franklin, New York City :

I claim the construction of a lamp with two or more adjustable compartments, connected with gauze-wire wicks, that shall, when graduated, evolve the proper degree of heat to vulcanize india-rubber and other vulcanizable gums, without the use of thermometers, steam gages, or other tests, constructed substantially as above described and for the purposes set forth.

37,576.—Beehive.—H. A. Hannum, Cazenovia, N. Y. :

I claim the board or cover, B, with the parallel bars, m, and strips or cleats, n, arranged and combined as shown, so that the board or cover may be detached from the bars, m, when necessary, and also used in connection with them when desired, as herein specified.

[The object of this invention is to obtain a bee-hive which will admit of the bees being very readily hived in it, and also admit of being thoroughly ventilated and the filth allowed to escape freely from it. The invention also has for its object facilities for thoroughly examining the combs and manipulating or handling the same, as circumstances may require.]

37,577.—Shipper Lever for Looms.—G. W. Hathaway, Hinsdale, Mass. :

I claim the combination with each other and with a loom, of the rigid lever, B, the spiral or volute spring, D, and the adjustable fulcrum, a, substantially as and for the purpose herein specified.

37,578.—Extract of Malt, &c., for making Beer, Ale and Porter.—Thomas Hawks, Rochester, N. Y. :

I claim a concentrated portable preparation of wort, mixed with and shielded by the sirup of cane sugar, either with or without the addition of gelatine, for increasing its security against the influence of atmospheric changes, substantially as and for the purposes above specified.

37,579.—Grinding and Pressing Grapes, Apples, &c.—C. B. Hutchinson, Auburn, N. Y. :

I claim the construction and arrangement of a grinding mill and press together, combined and operating substantially as herein specified.

I also claim the open discharge depression, F, across the face of the case, opposite to the grinding wheel, in combination with said grinding wheel, arranged and operating substantially as and for the purpose herein specified.

In combination with said depression, F, I also claim the peculiar construction and arrangement of the teeth, h and h', and spiral, wedge-shaped hopper, as herein set forth.

I also claim the guide stem, N, projecting vertically from the removable follower, K, and sliding in a lock, p, or its equivalent, for the purposes specified.

I also claim the combination of the curb, I, having openings or slots in the lower portion only, with the concave follower, K, and guide stem, N, substantially as specified.

37,580.—Sewing Machine.—N. Jones, La Porte, Ind. :

I claim so combining the device which produces the tension with the device by means of which the direction of the feed movement is changed, that by the act of changing the direction of the feed movement the tension is varied in such manner as is rendered necessary by such change of direction, substantially as herein specified.

37,581.—Lamp.—S. J. Kelly, Pemberton, N. J. :

I claim the combination of the doubly-perforated and flat topped cone or deflector, F, the two parallel flat-wick tubes, E E', shafts, G G', milled head, H, disconnected elevating wheels, g g', and connected cog wheels, h h', the latter having no contact with the wicks, when the said parts are constructed and arranged as herein shown and described, and operate in the manner and for the purposes specified.

[This lamp is provided with two parallel flat wicks which are so arranged as to be raised or lowered simultaneously by means of a single thumb wheel, and produce two distinct flames of any size required.]

37,582.—Motive Power.—Frederic Kettler, Milwaukie, Wis. :

I claim the arrangement and combination of a wind wheel with hammers, 15, weights, 12, levers and toothed wheels, arranged and

constructed as herein described, for the purpose of driving various kinds of machinery.

37,583.—Bridle.—A. H. Langholz, Chicago, Ill. :

I claim the combination of the nose and jaw band, E, with the hook, G, at each end, when arranged with the head stall, and fastened by the hooks to the top of the bit, as herein described, for the purposes set forth.

37,584.—Machinery for Coating Thread of one Fiber with another Fiber.—Alphonse Loiseau, Bernay, France :

I claim the arrangement of machinery for coating or covering a core with a thread of wool, or for surrounding a core of any material with a thread of any desired material, hereinbefore described and illustrated in the accompanying drawings.

37,585.—Sewing-machine Needle.—John Madden, Youngstown, Ohio :

I claim, as a new article of manufacture, the sewing-machine needle, constructed as herein set forth.

37,586.—Journal Box.—W. T. Morrow, Chicago, Ill. :

I claim the arrangement of the adjustable liner wedge, B, in combination with a journal box, A, constructed and applied substantially as and for the purposes set forth.

[This invention consists tn the arrangement of an adjustable wedge capable of being slipped between the guides on the face or over flanges on the edges of the driving box of a locomotive or of the journal box of any other axle, in such a manner that by means of said wedge any wear occurring on the face of the box can be compensated without removing the box.]

37,587.—Apparatus for Threading Needles.—James O'Kane, Philadelphia, Pa. :

I claim, first, The cam, C, so formed, graduated and arranged in respect to the hole, c, in a plate, a, to which the cam is hung, that the eyes of needles of different sizes may, by the aid of the cam and its graduations, be brought to coincide with the said hole in the plate, for the purpose specified.

Second, In combination with the graduated cam or its equivalent, I claim the slide, D, with its notch, i, the whole being arranged and operating substantially as and for the purpose described.

Third, The flexible lip, B, arranged on the plate, a, in respect to the hole, c, in the said plate, and the notch, i, in the slide, D, substantially as and for the two-fold purpose described.

37,588.—Water Meter.—John Percy, Albany, N. Y. :

I claim a balance valve, as constructed, for the purpose described.

I also claim the arrangement and combination substantially in the manner and for the purpose set forth in the above specifications, of the following apparatus, viz., the valve chamber, P, with its valves, v and v', and stem, T, the chamber, D and E, the cylinders, F and G, with their pistons, H & J, connected with the beam, L, the valve, I and K, connected with the beam, M, the valve, N and O, also connected with the beam, M o, operating valves, I and K, the lever, U attached to the valve shaft, T, the detents, 1 and 2, with their pins, ; and 7, lever, 3, attached to the shaft of the beam, M, with the trip-6 ping levers, 4 and 5, spring, W, operated by the beam, M, in order to operate the lever, v, the lever, X, as connected with apparatus measuring the water, forming together a complete water meter.

37,589.—Bedstead.—D. U. Pratt, Cleveland, Ohio :

I claim making bedsteads with the side rails and support for the slats, four inches, more or less, higher at the head than at the foot, as and for the purpose herein set forth, the same being a new article o manufacture.

37,590.—News Distributor.—J. H. Pratt, New York City:

I claim combining with a balloon, mechanism which is capable of throwing off or delivering news sheets into the air, during the flight of the balloon, for the purpose set forth.

37,591.—Process of Manufacturing Enameled Fruit Jars and other Vessels.—Horatio Reed, Jersey City, N.J.:

I claim the lining of a metallic can while in a red-hot state with glass, which is blown in a hot state into a metallic can.

37,592.—Machine for Spreading Japan, &c., over Fabrics.—Ferdinand Sautermeister, Newark, N. J.:

I claim the use of a drum or cylinder with its surface roughened by sand, gravel, pounded glass, or any like substance, for carrying forward cloths in the process of japanning or painting.

I also claim the spring bars, G, and the roughened rollers, L and M, when used in combination with the cylinder.

37,593.—Machine for Corrugating Metals.—S. J. Seely, Brooklyn, N. Y.:

I claim, first, So operating, retaining and corrugating dies together in a machine for corrugating sheet metal, that the retaining die forms the first corrugation and takes into the corrugations formed successively by the corrugating die, substantially as and for the purpose set forth.

Second, The organization of means, substantially as herein described, for the purpose of corrugating sheet metal, the said organization consisting of the frame, A, bed, B C, with dogs, the female dies, the male dies with sash beams, the toggle levers, or equivalents, adjustable crosshead, and the gearing or its equivalent, constructed and arranged as set forth.

Third, In a machine for corrugating metal, operating substantially as described, I claim the adjustable crosshead with its hand screws and guide screws, for the purposes set forth.

37,594.—Step Ladder.—D. J. Stagg, New York City :

I claim the standing or supporting frame, A, in combination with the step ladder, either or both of them, connected to the frame, A, substantially as shown to admit of the adjustments herein set forth.

[This invention consists in combining one or more step ladders with a standing frame or support, the parts being constructed and arranged in such a manner that the frame will, at all times, serve as a support for the ladder or ladders, and admit of the same being adjusted in an inclined position for use, and also admit of the same being drawn or folded compactly within the frame when not required for use.]

37,595.—Cover for Preserving Vessels.—Israel Stratton, Philadelphia, Pa. :

I claim the plate, B, its annular flange, b, screwed stem, C, and ring, e, of gum elastic or other suitable material, in combination with the yoke, D, and its projections, d, when the said yoke serves the purpose of a nut, and when the whole is constructed and applied to the mouth, A, of the vessel, and its flange, a, as and for the purpose herein set forth.

37,596.—Valve for Steam Engines.—Daniel Teeter, Hagerstown, Ind. :

I claim, first, The rotary valve, G, constructed as herein represented and described in combination with the steam ports, 1, 2, 3, 4, in the valve seat of the double cylinder, D, when said ports are arranged and the rotary valve adapted to operate in connection with them, in the manner and for the purpose set forth.

Second, The T-headed spindle, H, beveled cog wheels, c g, and shaft, I, in combination with the loosely-fitted beveled gear wheel, j', feather, n, and gear wheel, O, when arranged in the manner and for the purpose specified.

Third, The bevel pinion, j, fitted loosely on the end of the shaft, I, and attached to it by means of a feather or pin, n, fitting a radial mortise in the hub of the pinion, j, in the manner described; in combination with the fixed cog wheel, m, and toothed segment lever, J, adapted for reversing the motion of the engine by changing the relative position of the valve on its seat, substantially as described.

[This invention consists, first, in the combination of a peculiarly constructed rotary valve with the ingress and egress parts of a double steam cylinder, whereby the engine is adapted for movement in either direction. Second, in a peculiar arrangement of devices for imparting motion to the rotary valve. Third, in certain means provided for changing the relative position of the valve on its seat, thereby adapting the engine for movement with like efficiency in either direction.]

37,597.—Blind Fastening, &c.—Wenzel Toepfer and Herman Rugee, Milwaukie, Wis. :

We claim, first, The sliding bar, D, connected with the lower butt, B, of the blind through the medium of the link, C.

Second, Securing said bar, D, or preventing the casual movement of the same, and at the same time locking the blind by means of the notch or recess, j, pressure rod, k, and the opening in the face plate, F, as herein shown and described.

Third, The rod or shaft, G, provided at one end with the arm, H, and at the opposite end with the lever, I, connected with the slide, T, in combination with the pin, q, on the arbor, r, of the knob, L, the lip, o, on the slide, T, and the lever, P, and rod, O, attached to the blind, B, all arranged to operate as and for the purpose herein set forth.

[This invention relates to a new and useful arrangement of means for opening and closing window blinds and adjusting their slats, opening and closing them, from the inner side of the window within the compartment, without the necessity of raising the sash.]

37,598.—Fastening for Door Latches.—J. F. Tozer, Binghamton, N. Y.:

I claim the plate, H, attached to the inner side of the collar, E, and having a segment removed or cut off from it so as to leave a straight edge or surface, b, in combination with the bearing, J, and key or wedge, K, all arranged and applied to the door, and in such relation with the knob arbor, A, to operate as and for the purpose herein set forth.

[This invention relates to a new and improved catch or fastening, to be applied to the knob-arbors of locks and latches, in order to prevent the turning of the knob-arbors from the outer side of the door, and thereby convert the ordinary latch-bolt of a lock into a secure fastening, so as to dispense with the use of extra inside bolts, which are generally used on doors to guard against the picking of the locks.]

37,599.—Lamp Burner.—James Wolstenholme, Providence, R. I. :

I claim surrounding the under side of such flanch with a space of confined air for the purpose of preventing the cooling effect upon the flanch of ascending air currents, substantially as described.

37,600.—Lamp Burner.—H. C. Hunt (assignor to himself and G. W. Devin), Ottumwa, Iowa :

I claim, first, The elastic drum, J, constructed substantially as shown, so as to grasp and retain properly in position the chimney, L, and cone or deflector, K, and also admit of being fitted snugly on the disk, C, and readily detached therefrom, as herein shown and described.

Second, The rotating disk, C, fitted on the top of the lower part, B, of the burner, in combination with the stationary rack, c, on the flange, b, of B, and the pinion, H, on the serrated wheel shaft, G, all arranged to operate as and for the purpose herein set forth.

Third, The spring, d, formed by slitting or cutting the wick tube, D, as described, and having such a relative position with the serrated wheels, F E, to operate for the purpose set forth.

37,601.—Machine for Rolling Metals.—J. B. Mignault, A. B. Southwick and Charles Spofford, of Ballard Vale, and Albert Marshall, of Lawrence, Mass., assignors to the Whipple File Manufacturing Company, of said Ballard Vale :

I claim the above-described machine for rolling metals, consisting essentially of the rolls, a, and gears, H, upon the traversing carriage, in combination with the stationary patterns and rack-bars, operating in the manner substantially as set forth for the purpose described.

37,602.—Window-sash Fastenings.—Anthony M. Smith (assignor to Gilbert Sayres), Jamaica, N. Y.:

I claim the jointed swivel hasp, A, in combination with the swivel hook, D, and eccentric, j, arranged and applied to the sashes to operate as herein set forth.

[This invention relates to an improved window sash fastening of that class which are applied to the centre of the lower cross rail of the upper sash and to the center of the upper cross rail of the lower sash, and which are designed to lock or secure the sashes in a closed state. The object of the invention is to obtain a fastening of the kind specified which cannot be operated upon and unlocked from the outer side of the window.]

37,603.—Grinding File Blanks.—Alpheus B. Southwick (assignor to the Whipple File Manufacturing Co.), Ballard Vale, Mass.:

I claim the method of connecting the crank, I, with the wheel, G, by means of the pin, h, whereby the blank may be inserted in the holder without stopping the machine.

I also claim the combination of the spring, t, and screw i, with the hand-wheel, T, and roller, R, for the purpose of graduating the force with which the article is pressed up to the stone as set forth.

37,604.—Adhesive Plaster.—Joshua Melvin, Lowell, Mass.:

First, In combination with a gelatinous preparation and a backing of cotton or other fabric, I claim the use of a film of caoutchouc or analogous elastic and impervious material interposed between the gelatine and the backing to prevent the former from penetrating the latter and adapt the plaster to be rolled without injury.

Second, Spreading a gelatinous preparation upon a foundation of caoutchouc or analogous elastic and impervious material in the manufacture of adhesive plasters substantially as set forth.

[This invention is adapted for the production of roller bandages or of plaster to be used in the usual manner. The elasticity and softness of the plaster are preserved by preventing the penetration of the backing by the adhesive material.]

REISSUES.

1,391.—Applying Pressure to Top Rollers of Drawing Machines.—Noah E. Hale, Nashua, N. H. Patented Nov. 8, 1859 :

I claim my improved combination, or mechanism for applying pressure to and relieving from it, the top rollers of one or more sets of drawing rollers, the said mechanism consisting of one or more bars, G, the lever, J, the weight K, the lifting lever, L, the notched bar, N, and hanger, O, or their mechanical equivalent or equivalents, the whole being applied to the said top rollers substantially in manner and so as to operate therewith as described.

1,392.—Mode of Raising Sunken Vessels.—Casper Krogh & M. G. Hogness, Kroghville, Wis. Patented Oct. 21, 1862 :

We claim, first, The employment of inflexible lifters applied outside of the vessel, when arranged, constructed and operating substantially as and for the purposes set forth.

Second, The employment of the flexible chambers inside the vessel for preventing damaged vessels from sinking, when constructed and operated substantially as herein as delineated and described.

Third, The arrangement of the connections of the air pipes for the admission of air into the lifters at or near the bottoms thereof substantially as and for the purposes herein delineated and set forth.

Fourth, The weighted flexible pipes, f f, applied to the lifters, and operating substantially as and for the purposes herein shown and described.

1,393. (Div. A.)—Grain Drill.—Lewis Moore, Ypsilanti, Mich, formerly of Bart, Pa. Patented April 18, 1848, and extended :

I claim, first, The box plates, F', employed to adjust a seeding cylinder or seeding cylinders in respect to the hopper bottom or other suitable part of the machine, to regulate the supply of grain substantially as set forth.

Second, The combination and arrangement of the levers, C, bars, C' P, and journals, p, with the hopper, B, frame, A, and supports, g, for moving the hopper and sowing cylinders in the arc of a circle substantially as and for the purpose set forth.

Third, The combination of the chains, O, with the tubes, L, and bar C', of the hopper-frame, by which the tubes are raised or lowered simultaneously with the turning of the hopper on its axis as described.

[This invention consists first in an improved mode of regulating the supply of seed in cylinder drills, and secondly in a peculiar device for throwing the seeding mechanism in and out of gear.]

1,394. (Div. B.).—Grain Drill.—Lewis Moore, Ypsilanti, Mich., formerly of Bart, Pa. Patented April 18, 1848, and extended :

I claim, first, A drill tooth provided with one or more flanges near its upper end by means of which it is both pivoted and braced to the drag bar in such a manner as to dispense with the use of a separate brace bar or its equivalent.

Second, Bracing a pivoted drill tooth to its drag bar by means of a wooden pin held within or against a flange or projection upon the tooth and adapted to break in the event of the said tooth striking an immovable obstacle.

Third, Attaching the curved plate or nosing, L', to the front of the drill tooth by means of a dovetail overlapping the top of the said nosing and a screw or rivet lower down.

[This invention consists in a new mode of attaching drill teeth or hoes to their drag bars, the advantages being that the teeth admit of ready adjustment in their angle or pitch, and in the event of striking an immovable obstacle will yield without danger of the breakage of any of the parts.]

1,395. (Div. C.)—Grain Drill.—Lewis Moore, Ypsilanti, Mich., formerly of Bart, Pa. Patented April 18, 1848, and extended :

I claim the combination of the adjustable perforated gauge plate, C, with two or more holes or series of holes of different capacity when the said gauge-plate is so arranged as to cut off the flow of seed from one capacity of opening and transfer it to another substantially as herein set forth.

[The object of this invention is to admit of readily adapting a machine to sow any kind or quantity of grain.]

1,396.—Butt Hinge.—John F. Townsend, Westfield, N. Y., and P. P. Pratt, Buffalo, N. Y., assignees of said J. F. Townsend. Patented Nov. 4, 1862 :

We claim the base, or sustaining portion, A, of the hinge consisting of the leaf, h, projecting radially or centrally from the knuckle, e, and pin, f, and having screw holes, i i, countersunk on each side thereof, the whole arranged and operating substantially as described, and for the purpose herein set forth.

In combination with the base piece, A, thus formed we also claim the movable piece, B, with its leaf projecting tangentially from the socket, in such a manner, that by inverting it, it is adapted to right and left use, as herein specified.

1,397.—Stove.—John G. Treadwell & Wm. Hailes (assignor to Wm. Hailes & Ellen T. Treadwell), Albany, N. Y. Patented May 7, 1861 :

We claim, first, A base-burning-coal-supply-reservoir stove, or furnace, so constructed that the products of combustion do not pass up around and above the supply reservoirs nor up through the grate, but down outside of the fire-pot, toward the base of the stove and out through a main draft flue which leads directly from a space or chamber about the lower part of the stove—all for the purpose set forth, and substantially as described.

Second, The contracting of the discharge end of the coal-supply reservoir, the expanding of the fire-pot and the extending of the flame passage downward—for united operation in a base-burning-coal-supply-reservoir stove or furnace, essentially as set forth.

Third, A fire-pot resting on a base, and imperforated on its inner or outer circumference, or from its inner to its outer circumference, and so constructed and applied with respect to a coal-supply reservoir, that an inclosed horizontal chamber for the free expansion and circulation of the flame and gases is formed all around and outside of the contracted discharge, and above the upper edge of the fire-pot substantially as and for the purpose set forth.

Fourth, The descending passage or passages in combination with the continuous flame expansion and circulation passage, and a main draft flue leading out of the base or lower part of the stove or furnace, substantially as set forth and for the purpose described.

Fifth, Constructing the fire-pot of a base burning coal-supply-reservoir stove or furnace, with an imperforated circumference and in form of a trumpet-mouth at its upper portion, in combination with descending flame passages, substantially as described, and for the purpose set forth.

Sixth, Constructing the metal of the fire-pot, with a gradually decreasing thickness from the center of its depth, both up and downward, substantially as described.

Seventh, A detachable ring in combination with a fixed ring flanch of a coal-supply reservoir, for the purpose of confining the fire brick or other fire-proof substance, on the lower part of the reservoir.

Eighth, The combination of a perforated jacket or casing, a coal-supply reservoir with a contracted discharge, a fire-pot with a flame expansion chamber around and above its upper edge, and a descending flue or flues and a main draft flue, substantially as and for the purpose described.

Ninth, The combination, in a base-burning-coal-supply-reservoir stove, of a descending flue or flues and a perforated casing, substantially as and for the purpose set forth.

Tenth, In a base-burning-coal-supply-reservoir stove or furnace, we claim a branch flue opened and closed by a damper above the base of the fire-pot, in combination with a descending passage or passages leading to the lower part of the stove, and with the main draft flue leading out of the lower part of the stove, substantially as and for the purposes set forth.

Eleventh, The weight constructed and applied in connection with the damper valve in the manner and for the purpose set forth.

Twelfth, The combination of the perforated jacket or case, the reservoir for coal, the fire-pot, the descending flue or flues, the hollow space about the base of the stove and the chimney flue; whereby the base of the stove is heated by direct heat of the flame or gases, and the upper part of the stove by radiated heat acting upon the circulating air, substantially as described.

EXTENSION.

6,063.—Baking Apparatus.—John P. Hayes, Boston, Mass. Patented Jan. 30, 1849 :

I claim a cooking or baking apparatus having several parallel baking chambers, with divided horizontal flue spaces between them communicating with vertical flue spaces on each side of them, substantially as herein-above described and so as to make the smoke &c., pass around said chambers, as above set forth. I also claim connecting said chambers with each others by the combination of the turning registers, c' c' c', in their backs with the vertical hollow shaft, d' d', in the manner and for the purpose herein above set forth.

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Receipts.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

Invariable Rule.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the Government fee.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

New Pamphlets in German.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The Scientific American being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would

adopt the style of binding used on the old series, *i. e.*, heavy board sides, covered with marble paper and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row New York.

Notes and Queries

H. S., of Philadelphia.—The cause of roaring and vibrating in steam boilers, after they are fired up and before all the water is heated to the boiling point, is fully illustrated and described on pages 254 and 262, Vol. XII (old series) of the SCIENTIFIC AMERICAN. You can witness the same phenomenon in an open boiler called a "bouking keer," in most cloth bleachworks and calico-printing establishments.

M. R., of Conn.—The method of making oxygen gas from nitrate of soda, to which you refer, as described in the SCIENTIFIC AMERICAN, is not ours, but Mr. Webster's. The gas is not sufficiently pure to be used for inhaling into the lungs. A good galvanic battery is the best agent you can use to actuate an electro-magnet in moving the traveling weight to which you refer.

D. B. T., of Ohio.—Night glasses to be worn on the face are not patentable under such an application, but if you have made an improvement in their construction to adapt them to such a purpose you can secure a patent. In many cases they might be useful to persons traveling at night.

W. H. G., of Mass.—Wooden-soled shoes are manufactured at Chicopee, Mass. The invention has been patented in this country and Europe; and a description will be found on page 378, Vol. IV (new series) of the SCIENTIFIC AMERICAN.

J. H. C., of N. H.—We perhaps misunderstand your inquiry. You ask how to prepare a copper solution to use with Smee's battery, and then state that you have tried without success to precipitate it after dissolving it in nitric acid, using both acids and alkalies in the experiments. The sulphate of copper may be used in Smee's battery, and the copper in such a solution may be precipitated by adding strips of iron to it. The copper falls down in powder.

C. T., of Pa.—The white cement used for marble and fine brick fronts of buildings is prepared by burning nodules of indurated marl and a species of argillaceous limestone in conical lime-kilns. When properly roasted it is ground to powder and packed in barrels to keep it from moisture. For your special purpose you should purchase a small quantity of it.

J. J. B. of Ill.—Glass is melted and molded into numerous articles, but it does not flow like molten lead. With respect to dropping a ball through a hole extending through the center of our globe, we do not wish to take up any more of our space in discussing the question.

C. H. R., of Philadelphia.—It is perhaps true, as you suspect, that tubercular consumption is produced by a parasitic plant. The subject should be further investigated.

L. L., of Pa.—Tredgold's work is the best on the marine engine, but it is very expensive and has not been re-published in America.

J. B., of Maine—It is the ammonia in your soap that gives it the offensive odor. You should either omit it in the composition or use an aromatic oil to counteract the unpleasant smell.

F. H. S., of Md.—At some future time we may obtain the desired information for you respecting salt-boiling. At present we have nothing new on the subject.

C. M. W., of N. Y.—The cold air feed-pipe of a furnace should always be smaller than the smoke-pipe, because air expands to double its volume for every 491 degrees of temperature to which it is heated.

J. H., of Ill.—In concentrating cane sugar sirup, the great object is to prevent scorching, which discolors the juice, hence the sirup is concentrated in our refineries in vacuum pans in which it boils at a low temperature. Sheet-iron pans will answer your purpose cheap evaporators, such as those which are used for concentrating maple tree sap. A small quantity of lime water should be mixed with the freshly-expressed juice to prevent fermentation, then it should be evaporated in shallow pans at as low temperature as possible.

B. D. S., of Va.—The size of a turbine wheel depends upon the quantity of water that is to pass through it. Under your five-foot head to drive two run of 4½ feet stones, grinding wheat, the openings of a center-vent wheel should have an area of 1,200 inches. This also allows for driving all the attendant machinery. About one-twelfth more water is required for grinding corn.

O. C. H., of Conn.—There is no published work devoted to the art of bronzing exclusively. Bronze powders are chiefly imported from Germany.

G. H. C., of Iowa.—Buffalo robes which have become hard may be rendered soft and pliable by treading upon them on a floor, then moistening them with water by the use of a sponge and stretching them out upon boards when they have become uniformly soft. Before they become dry they should receive a coating of tallow, containing about one ounce of bees-wax to the pound. This preparation should be put on the flesh side, moderately warm and in a warm apartment, after which the whole surface should be rubbed hard with a block of wood covered with a piece of leather.

C. D., of Mass.—It is very difficult to temper steel iron springs and small pieces of steel wire equally by first heating them in a mixture of oil and resin, and afterwards tempering by drawing the wire through flame. If, after hardening the wire in the usual manner, you would place it in an oven heated to about 55° Fah., then cool it, you would secure a more equal temper.

T. D. S., of Pa.—The most common black varnish employed for harness consists of thin lac varnish colored with ivory black. It is injurious to the leather as it tends to make it hard and brittle. The best way to treat leather harness, we think, is to polish it first with good common blacking, then coat it with a composition consisting of one pound of tallow, one ounce of beeswax and about one-fourth of an ounce of gum-lac or common resin in powder. Apply it warm, but not too hot.

G. C., of Conn.—We advise you to send us an advertisement of your needle, for publication in our paper. We cannot consent to do gratuitous advertising for any one.

F. H. S., of Baltimore.—We cannot attend to the business of introducing your invention to the notice of the Post-office Department. Our time is so completely absorbed that we cannot attend to such negociations.

G. G., of Md.—Valves of similar character to what you describe have been applied to steam engines. The old four-way cock described in the histories of the steam engine and used more than half a century ago is an example. It is possible, however, that there may be useful novelty in the construction of your valve and that it may be patentable, but of this we cannot judge without drawings.

F. G. W., of C. E.—We have already given all the information in our possession respecting the composition for making artificial teeth.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 4, to Wednesday February 11, 1863:—

G. W. C., of Ill., $15; D. C. G., of Pa, $40; H. B. M., of N.Y., $10; L. H. O., of N. Y., $25; J. A. B., of Ohio, $15; T. J. P., of Ohio, $25; H. G. H., of Ind., $15; W. W., of Mich., $15; P. L. S., of Pa., $15; E. R., of Mass., $15; S. & P., of N. Y., $15; L. R., of N. Y., $28; M. N. K., of Iowa, $20; V. & W., of Iowa, $20; B. F. A., of Iowa, $20; G & P., of N. Y., $20; D. K., of Pa., $20; J. T., of N. Y., $15; L. W. T., of N. Y., $15; G. D. H., of Ill., $20; G. C. R., of N. Y., $15; M. F. G. of N. J., $15; W. T. E., of N. J., $25; D. C. S., of Conn., $15; E. K. B., of Conn., $15; E. E., of Ill., 15; W. P., of Mass., $15; U. P., of Conn., $25; K. G., of Ind., $15; J. M. S., of Cal., $19; S. C. K., of Mass., $15; A. H. P., of Iowa, $15; J. W., of Mass., $15; A. L., of N. J., $25; S. M. S., of Iowa, $15; P. C. S., of N. Y., $250; F. H. B., of N. Y., $40; J. D., of Ill., $15; G. & M., of N. Y., $44; I. C., of Ill., $45; D. M. D., of N.Y., $20; J. F. R., of L. I., $15; N. D. B., of N.Y., $40; N. F. B., of Pa, $20; F. P. S., of N. Y., $15; R. S., of N. Y. $25; U. H. S., of Ill., $25; M. A. J., of Mass, $15; N. A., of Conn., $60; G. W. A., of Conn., $12; P. & P., of Ill., 15; A. B., of Mo., $25; M. M. of Pa., $150; T. & J., of N. Y., $25; J. P. E., of Pa., $25; L. G. K., of Conn., $15; N. A. & W., of Conn., $15; E. D., of Mich, $25; W. H, W., of R. I., $20; R. M., of N.Y., $40; J. W. M., of Mich., $20; J. H., of Ill., $20; R. G., of N. Y., $15; V. & O., of Pa., $20; D. B. H., of N. Y., $20; E. B. R., of N. Y., $20; E. H., of Cal., $100; N. D. B., of N. Y., $25; A. P., of N. Y., $26; T. S., of Conn., $46.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

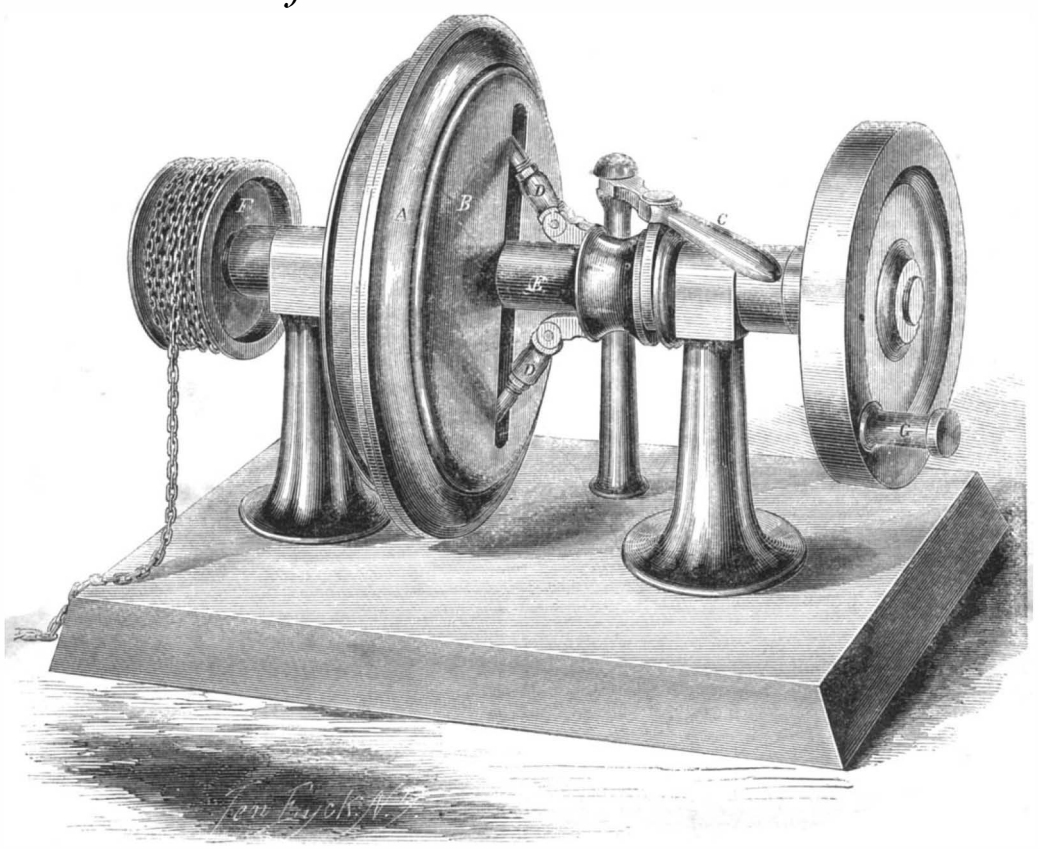
Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, February 4, to Wednesday, February 11 1863:—

L. B., of N. Y.; G. & M., of N. Y.; G. W. A., of Mass.; L. H. O., of N. Y.; W. T. E., of N. J.; J. P. E., of Pa.; T. S., of Conn.; R. S., of N.Y.; R. M., of N. Y.; T. J. P., of Ohio; W. P., of Mass.; A. L., of N. J.; M. N. K., of Iowa; E. D., of Mich.; N. D. B., of N. Y.; G. R. of Ky.; U. P., of Conn.; D. C. G., of Pa.; N. S., of Iowa; A. W. J., of N. Y.; A. P., of N.Y.

Mason's Patent Frictional Clutch.

In very many mechanical operations it is necessary to provide some means whereby power can be suddenly transmitted or arrested in its progress; or where the application of any exerted force can be increased or diminished in its intensity at will. We illustrate herewith an ingenious combination of some of the mechanical powers to effect the object alluded to. The two metal disks, A and B, are connected with each other internally by sliding plates, which are V-shaped on their outward ends (shown at A', Fig. 2), and fitted accurately to a recess of an arm in place when the whole machine revolves. The nuts, *a'*, are provided to alter the pressure of the frictional plates, H. The center, L, takes into a recess formed for it in the end of the shaft opposite to it, tending, when in place, to preserve the continuity of the shafting unbroken. The dotted lines show the position of the several parts when they are not in contact with the main disk, A. It will be seen that when the lever connected with clutch or coupling is thrown over so that the lever is at right angles with the shaft, the edges of the sliding plates are pressed outwardly by the arms and thrown into

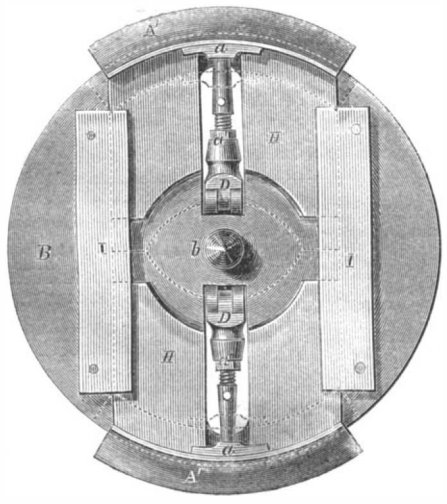
Fig. 1



MASON'S PATENT FRICTIONAL CLUTCH.

opposite character turned out of the internal circumference of the disk A. These plates are thrown into connection with the grooves just mentioned by the lever C, and the toggle joints D. The latter are connected with the lever by the coupling sliding on the shaft E. The drum, F, is connected with the chain to the work operated on, and the power is applied to overcome the resistance at the crank-pin, G. Fig. 2

Fig. 2



shows a plan of the sliding plates and the manner of their attachment to the toggles more fully. In this view, the slotted disk, B, has the sliding plates, H, connected to the toggles heretofore mentioned. The dotted lines show clearly the lap of the guide-plates, I, and the relative positions of the same with reference to the frictional sliding plates, H. Upon the inside of these plates will be seen a small block, *a*, where the end of the toggle arms terminate in the ball joints; this block is also slotted and retains the forcible contact with the groove to which they are fitted. The power being then applied to the crank-pin, revolves the whole machine as if it were one piece. When the lever is thrown back so that it forms an oblique angle with the shaft, the drum alone revolves, and the engine, or whatever moves the gearing, is stationary. As we have remarked previously, these machines are very useful, and when properly made, extremely efficient; we can endorse the philosophical and mechanical principles embraced in this machine as peculiarly applicable for the purpose. They are applied for drawing cars up inclined planes, for hoisting purposes, and might be adopted with good results on small propellers. This invention was patented on Feb. 25th, 1862, by Wm. Mason, of Providence, R. I., and further information can be had by addressing him at that place.

Elder Flower Ointment and Oil.

In the London "Pharmacopœia" the flowers are directed to be boiled with the lard in making unguentum sambuci. By this process the odor of the flowers is entirely destroyed and the ointment acquires an empyreumatic smell from the action of heat on the flowers. To obviate this result, and to make an ointment possessing the pleasant odor of elder flowers, I beg to suggest the following process, which I have found effectual:—

Melt the lard at the lowest possible temperature at which it assumes the fluid form and introduce into it as many flowers as the melted lard will cover. Macerate them at the above temperature for twelve hours, and then strain off the lard through a piece of linen without the least pressure; repeat this operation three or four times. By this means an ointment will be made, when the lard is cold, which represents that which the college really intend it should be.

The oil of elder flowers requires no heat for its preparation, and is prepared precisely as the ointment, with the exception of the heat, as the only object of its use is to obtain the menstruum in a fluid form, and besides, its employment on any other ground is objectionable, especially as it volatilizes the odorous principle of the flowers.—*Septimus Piesse.*

PENNSYLVANIA CENTRAL RAILROAD.—From the annual report of this railroad for the last year we learn that its total earnings amounted to $10,304,290; and its total working expenses to $5,431,072. It is 358 miles in length from Philadelphia to Pittsburgh. The total number of passengers carried over it during the year was 1,143,418; the number of tuns of freight transported upon it was 2,223,051, including 835,146 tuns of coal.