

BUSINESS AND MANUFACTURING ITEMS.

SILK.—A large Boston silk-weaving concern is reported to be about to remove its machinery to Paterson, N. J.—One of the largest silk mills in Paterson, says the *Press*, has lately been taking a hundred or more hands, besides introducing additional machinery sufficient to set up a large mill, running on full time, and turning out large quantities of silk. *Per contra*, many of the other mills are nearly stopped.

LEATHER.—A tanner in New York is experimenting in tanning cat-fish skins, which it is thought will make good leather. The cat fish of the Western waters, it is said, sometimes weigh from one to two hundred pounds.—It is time that our ratskins were beginning to be utilized. At the present enormous price of gloves, our inventors and manufacturers ought to be equal to doing something with our undeniable plethora of raw material in the shape of rats. Rat catching for the glove makers is a great business in Paris and other European cities. Our rats want reconstructing, badly.

IRON.—The Newburyport Arms Company has commenced turning out rifles and pistols.—A new machinists' tool manufactory has been started at Providence.—The Badger Iron Works, New York City, have just completed two carriages for 20-inch guns, weighing 12 tons each, for the Chilean Government. The guns are to be cast at Pittsburg.—After a suspension of three months, the rolling mills in Youngstown have resumed operations at the old wages.—The iron sand of New Zealand is to be smelted on a patented plan by a company formed for the purpose, and operations will be commenced without further delay.—The Cornwell Iron Works, near Cedar Bluff, Ala., have resumed the production of their superior quality of iron, which will be shipped to New York in pig.—A new railroad rolling stock manufacturing company has been incorporated in Dayton, Ohio.

COTTON, ETC.—The Renfrew (South Adams) Manufacturing Company are putting up a mill, 150 feet long by 66 wide, with two wings, each 40 feet by 56, and will run 260 looms.—The cotton mills of Columbus, Ga., burned during the war, are mostly rebuilding and will resume operations in the course of the present year.—The Falls City Manufacturing Company, Louisville, Ky., propose to increase their capital by \$50,000 and eventually to \$1,000,000, and to take another large factory for their linen works, and to manufacture flax machinery for their mills.

RAILROADS, ETC.—The gross earnings of the Erie Railway for 1866 were over fourteen and a half millions (\$14,596,413 09) against nearly sixteen and a half millions (\$16,462,227 90) in 1865. Net earnings, \$3,743,273 05; net decrease from 1865 \$964,559 52. The falling off is attributed to the stoppage of the Government war business and the general stagnation following the war. The company operate 784 miles of road, have 371 locomotives and 6,000 cars, a capital stock of \$25,111,210, a funded debt of \$22,429,920, and property amounting at cost to \$54,287,874 49. A dividend has been declared of 4 per cent on common and 7 per cent on preferred stock.—The Hudson River Railroad Company have recently created new stock equal to the whole amount of the old (\$7,000,000) making their capital now \$14,000,000 in addition to \$5,550,000 funded debt. Fifty per cent on each share of new stock is allowed to the old stockholders as accumulated profits (including April dividend) and the other half, raised in cash, is to be applied to the improvement of the station property in St. John's Park and of the whole line from New York to Albany.—The Oregon Central Railroad is intended to connect the steamship landing on the Columbia River with the head of the Willamette Valley, 150 miles. It has a land grant of 12,800 acres per mile and a State subsidy of \$10,000 per mile in gold-bearing bonds, for the first 100 miles. The work is to be commenced at once and finished in three years.—The new Suspension Bridge at Niagara is to be located on the American side near the gas works; on the Canada side a short distance below the Clifton House. The stockholders organized on the 2d ult. The preparation of materials has been commenced, and the bridge is to be erected in the course of the summer.—The first 305 miles of the Union Pacific Railroad were graded, bridged and ironed with a heavy T-rail and supplied with depots, repair shops, stations, locomotives, cars and all the necessary appurtenances of a first-class road for \$50,000 per mile.—The St. Paul and Chicago Railroad (capital, \$6,000,000, to be completed in two years) is to connect St. Paul with the Chicago and Milwaukee roads at Winona, 101 miles, and run thence 50 miles to the Iowa State line. It has a land grant of 904,960 acres, nearly an air line from Chicago to St. Paul, and very light grades. Beyond St. Paul, the St. Paul and Pacific line runs nearly straight to the Hudson's Bay Company's territory, and is already in operation 76 miles.—The Persian telegraph is to be completed from Teheran to the Turkish frontier, by the end of June.—After ten years' warfare, the Great Western and Grand Trunk Railways of Canada have come to an agreement on rates and fares.

WOOLEN.—There are five hundred woolen factories in the State of Indiana, some of them having over three hundred thousand dollars invested.—The stockholders of the Amesbury (Mass) Woolen Mill Company have decided to sell at auction the entire corporate property which cost about \$140,000. The company is heavily in debt.

MISCELLANEOUS.—The *Chicago Journal* says that one of the leading architects estimates at least three million dollars' worth of contemplated new buildings entirely abandoned or indefinitely postponed on account of the eight-hour movement.—The tobacco manufacture of New York City and the suburbs is an enormous business, said to exceed that done in any other staple, and to be second only to cotton as an export, selling \$100,000,000 annually, employing 25,000 persons, and conducted by 1,613 firms.—A new paper mill is to be built

at Elmira this summer, and a new tannery.—High street, Columbus, is to be paved with the Nicolson pavement, at a cost of \$80,000.—The Western farmers are sowing flaxseed very extensively the present season.—The Board of Engineer Officers detailed under the Act of Congress to form a plan of improvement of the Hudson below Albany, have decided to proceed with the plan formerly adopted and partially carried out.—The city of Chicago is deepening the Michigan and Illinois Canal by an excavation through solid limestone ten feet deep and eight miles long, so that boats can float out of Chicago River into the canal without a lock, and a current will be formed in the Chicago River to the great improvement of that stream. The work will be completed in about two years. The Washington street tunnel is also going forward.—Free water power and freedom from taxation for five years, has been voted to new manufacturers on the Molunkus River, near Sherman Mills, Aroostook county, Me.—Dam and mills are going forward in Andover, Me., on Black Brook, also a starch factory on Gardiner's Brook.—The various Holyoke (Mass.) Mills unite in mitigating dull times for their employees by economy in board; the prices established in the corporations being \$3 50 for males, and 2 50 for females.—On the dissolution of the large furniture manufacturing firm of Mitchell & Rummelsburg, Cincinnati, by the death of Mr. R., the surviving partner recently threw the establishment into a co-operative stock concern, with a capital of \$2,000,000 in \$100 shares, a considerable part of which was taken by the workmen.—The salt manufacture has been resumed at the old mills near Emporium, N. Y., with the advantage of the Buffalo and Washington Railroad.—Harmony Mills, Cohoes, N. Y., have in one building two unobstructed rooms measuring 70 by 625 feet and 612,500 cubic feet, and five in another building, 72 by 560.—A paper mill is going up in Butler county, Ohio; cost \$100,000.—Little Rhode Island employs \$33,000,000 of manufacturing capital and produces \$103,000,000 worth of goods in a year. Considering the state as one complex Yankee machine, the attentive spectator will perceive issuing from its different mouths every second in working hours nearly ten yards of cotton cloth, nine yards of calico, one yard of woolen cloth, one dozen of shoe and corset lacings, one yard of worsted braid, and a spool of thread; a horseshoe and a gross of screws every four seconds, beside other matters too numerous to mention.

Correspondence.

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

The Recoil of Guns.

MESSRS. EDITORS:—In the article on "The New Steam Gun Carriage," page 350, the following part appears not entirely correct, viz:—"A ball moving at 1,000 feet per second of initial velocity, weighing 450 pounds, exerts a force equal to 450,000 foot-pounds. If the gun and carriage weigh 50,000 pounds, they will have an initial velocity of 9 feet per second and a force of 450,000 pounds, which must be absorbed before they are completely brought to rest."

The energy of the ball is correctly calculated at page 302,

$$\frac{450}{2 \times 32.15} \times 1,000^2 = 6,998,444 \text{ foot-pounds.}$$

Energy of gun and carriage

$$\frac{50,000}{2 \times 32.15} \times 9^2 = 62,967 \text{ foot-pounds.}$$

Total energy exerted by powder = 7,061,411 foot-pounds.

Assuming the charge at 40 pounds, the effect above overcoming resistance of atmosphere is 170,000 foot-pounds per pound of powder, which agrees with table page 302.

Taking the distance traveled through by the ball till leaving the muzzle at 12 feet, the total average pressure is $7,061,411 \div 12 = 590,951$ lbs. on an area of 176 square inches, or 3,357 lbs. per square inch above atmospheric pressure.

Owing to the high degree of expansion, the initial pressure in the gun must be perhaps ten times as large or more, say 35,000 pounds per square inch. The area of the 11-inch cylinder taking up the recoil is 95 square inches. If the piston moves one foot before stopping, the average pressure will be $62,997 \div 95 = 662$ pounds per square inch: at four feet motion, 165 pounds. Further calculations without more complete data, and disregarding friction, are of no value.

The difference between the energy transmitted to the ball and that imparted to the gun and carriage is by no means in opposition to the laws of Newton, as some of your correspondents appear to think.

The expression, "a force equal to 450,000 foot-pounds," is objectionable. It appears to be settled among engineers that whatever is expressed in foot-pounds is called "work" or "energy," while a "force" is given in pounds or other unit of weight.

Washington, May, 1867, }
Third Div. Q. M. General's Office. }

Electricity in Iron Smelting.

Of all the remarkable applications of electro-magnetism which have been made within the past three or four years says the *Athenaeum*, the most remarkable is perhaps the one now talked about, namely, the use of an electro-magnetic current in the smelting of iron. We hear that the experiment has been tried at one of the leading ironworks in Sheffield, and with complete success. The mode of operation as roughly described, is to place a fixed electro-magnet opposite an opening in the side of a furnace, to excite the magnet by means of a Smee's battery, and to direct the current of magnetism into the molten metal. The effect is surprising; the metal appears to bubble and boil, the melting is expedited, which economises fuel, and the quality of the iron is so much improved

that for toughness and hardness it can hardly be equalled. It appears that some, if not all the impurities which remain after the ordinary process are driven out by the use of magnetism; consequently, this new application of the occult element may be regarded as full of promise, for all who work in iron. All of which is to be taken with a grain of salt.

Vitrified Photography.

De Mothay and Marechal have produced a new method for fixing vitrified photographic images in porcelain enamel, glass, etc. The article is first varnished with a solution of 4 parts of caoutchouc in 100 of benzol, with the addition of one part normal collodion. After drying, a second coating of iodized collodion is poured over the first, and unites intimately with it. It is then immersed in a bath of nitrate of silver, and the image is produced either by camera or superposition, developed by any of the usual agents, and fixed by two successive baths, one containing a solution of an iococyanide, and the other an alkaline cyanide. It is next steeped for some instants in a solution of protoxide of iron, pyrogallic acid, or any other substance that will reduce the salts of silver. The image is intensified by the action of pyrogallic, gallic or formic acid, or sulphate of protoxide of iron mixed with an acid solution of nitrate of silver: requiring four to six applications for images to be seen by reflection, and twelve to fifteen for those to be seen by transparency. During this operation the image is washed three or four times in alternate baths containing iococyanides and alkaline cyanides, and then, immediately afterward, in sulphate of protoxide of iron, pyrogallic acid, or other reducer of salts of silver. The consecutive baths are to dissolve the non-adherent silver precipitated over the whole plate in each reinforcing bath, while intensifying the fixed image. The washings in the reducing bath, rendering the metallic surface neutral, increase powerfully the subsequent action of the re-inforcing bath. The image is now immersed for several hours in a bath of chloride or nitrate of platinum, or in alternate baths of chloride of gold and nitrate of platinum, or again in a bath of chloride of gold, according to the color desired. During this steeping, the silver of the image is partly replaced by platinum or gold or a mixture of both. The platinum bath gives eventually by vitrification a greenish black, the alternation of platinum and gold yields black, and the gold alone results in gilt images. Next the image is washed in a solution of alkaline cyanide, or a concentrated solution of ammonia; then covered with a thick varnish of caoutchouc or gatta percha, and heated in a muffle, when the organic matters are consumed and the metal left. Finally, the image is covered with a silicic or boracic glaze, and brought to an orange red heat by which it is vitrified, and unchangeably fixed.

Illustrated Patent Office Report for 1865.

We are indebted to Messrs. E. R. Jewett & Co., publishers, Buffalo, N. Y., for a bound volume, Part II, Illustrated Mechanical Report for the last part of the year 1865.

The engravings are well executed, the inventions clearly defined and the entire work a marvel of neatness. These Reports which Messrs. Jewett & Co. have published for a number of years are in great contrast in point of execution to most of the public documents issued under the direction of Congress.

We hope the Commissioner of Patents will exert all of his influence to award the continuance of the publication to Messrs. Jewett & Co., who have done the work so acceptably.

Recent American and Foreign Patents.

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

BOUQUET STAND AND HANDKERCHIEF HOLDER.—A. D. Frye, New York City.—This invention relates to a new and ingenious arrangement whereby the beauty and value of a bouquet of natural flowers is greatly increased by its combination with the beautiful designs of art. The bouquet is formed on a highly ornamental tubular holder which may either be held in the hand or be made to stand of itself; the lady at the same time is relieved of the trouble of holding her handkerchief while the handkerchief itself is receiving the perfume of natural flowers.

CAR COUPLING.—John D. Anderson, Corry, Pa.—This invention relates to a new and improved method of coupling railroad cars.

ROTARY STEAM ENGINE.—J. H. Van Sandt and J. J. Hunt, Princeton, Ind.—This invention relates to the manner in which an uninterrupted action of the steam upon the shaft of a steam engine is obtained whereby the objections to a crank and the difficulty experienced from dead center is overcome.

METHOD OF CONVERTING AND MULTIPLYING MOTION.—H. Burk, Mineral Point, Ohio.—This invention consists in forming an eccentric or zig-zag channel in the sides of a wheel that is attached to and revolved by a rotating shaft, and in constructing a pitman so that it shall receive a rectilinear motion from the wheel by having its end fitted to the irregular groove before mentioned.

SAWING MACHINE.—Henry Hassenpflug, Huntingpton, Pa.—This invention relates to a portable sawing machine which is to be chiefly used for cross cutting, and for cutting cord wood, and forscroll work, but which may also be changed so as to be used for ripping. The invention consists chiefly in the self-feeding apparatus whereby the wood is gradually fed to the vertical reciprocating saw; also in such a construction of the parts that the distance between the ends and the fulcrum of the lever by which the saw is operated can be changed at will, so as to increase or diminish the power or the speed of the machine as may be desired.

GANE PLOW.—L. B. Lathrop, San Jose, Cal.—This invention relates to a new plow which is constructed with a view of reducing manual labor in plowing and to secure an ease of draft not heretofore attained.

BATH TUB.—John Carroll, New York City.—The object of this invention is to construct a bath tub of sheet metal and wood in such a manner that it will be durable, light, and easily packed for transportation.

PENCIL SHARPENER.—Hubert Burgess, San Francisco, Cal.—The nature of this invention consists in constructing a device by which slate and lead pencils, also crayons, may be sharpened in the most perfect and expeditious manner.

APPARATUS FOR REMOVING WATER AUTOMATICALLY FROM THE HOLDS OF VESSELS.—H. L. Stibbs, Savannah, Ga.—This invention has for its object to furnish an improved apparatus by means of which water may be removed from the holds of vessels automatically.

MACHINE FOR STAMPING CLAY DOOR KNOBS, ETC.—George Lawton, Treuton, N. J.—The object of this invention is to construct a machine whereby door knobs and other articles of clay may be formed or stamped in the most simple and efficient manner, completing the door knob or other articles as far as the working in clay is concerned.

WAGON-BRAKE LOCK.—Thomas Urle, Springfield, Iowa.—This invention relates to an improvement in the construction of locks for operating the brake on a wagon wheel.

CORSET.—James P. Love, New York City.—This invention consists in laying each steel of a corset between two flaps which are left on the corset, and in then hooking the outer flap to the body of the corset so that the steel is firmly held in place.

BUTTER WORKER.—S. H. Wade, Montgomery Center, Vt.—This invention has for its object to furnish an improved machine for working butter, cheap, simple in construction, durable, and not liable to get out of order, and which will do its work quickly and thoroughly.

TANNING APPARATUS.—Abraham Steers, New York City.—This invention relates to an apparatus in which the hides or skins are distended upon a cloth within a wired frame of suitable metallic substance, whereon they are subjected to the action of reciprocating platens or faces of rammers, in such a manner that they are repeatedly compressed, the spent tanning liquor squeezed out, and fresh tanning liquor of the requisite strength admitted to their tissues, the process of tanning being thereby most materially accelerated with a great saving of time and labor.

HOISTING APPARATUS.—Joseph A. Dayton, New London, Conn.—This invention has for its object to furnish an improved machine for use in store houses and in other places for hoisting heavy weights with a comparatively small exertion of power, and which shall be simple in construction, strong, and not liable to get out of order.

ROTARY ENGINE.—Thomas Banta, Hoboken, N. J.—This invention has for its object to furnish an improved rotary engine so constructed and arranged as to utilize the expansion of the steam and avoid the difficulties arising from the back pressure caused by the condensation of the steam upon the interior surface of the cylinder, and its subsequent expansion into steam.

GATE.—Gideon S. Granger and William Northrop, Wayland, N. Y.—This invention has for its object to furnish an improved gate so constructed and arranged as to require no hinges, and which may be raised up so as to allow small stock, such as sheep and hogs to pass through, while it prevents the passage of cattle, horses, etc., and so as to prevent its being clogged by snow.

WINDOW SASH FASTENER AND LOCK.—Ezra Johnson, Joliet, Ill.—This invention has for its object to furnish an improved window sash fastener and lock so constructed and arranged that it will hold the sash at any desired elevation; and which when the sash is closed will hold it securely locked.

DRAFT EQUALIZER FOR HORSE POWER.—Arcibald Stewart, Troy, Wis.—This invention has for its object to prevent breakages in the machinery of threshing and other machines driven by horse power, from the strain caused by the sudden starting or jerking of the horses.

CLUTCH.—Albert Beth and Gayton Hall, Adam Center, N. Y.—This invention relates to a device, which is to be used for suspending hay forks from rafters, but which may also be used advantageously for other similar purposes. The invention consists in the use of a metal frame, from which a swivel hook is suspended, to which the fork or other article may be hung. Two pointed rods are secured to the top of the frame, one being attached to a sliding brace, that is operated by a screw; these points can be brought against the opposite sides of any rafter or beam, and thus the clutch is held on the rafter and supports the fork by the swivel hook.

SECURING THE TINES OF HAY FORKS OR RAKES.—J. P. W. Riley.—Montrose, Pa.—This invention relates to a new manner of securing the tines or prongs of hay or manure forks, rakes, potato hooks and other similar articles, to the handle. This consists in making the tines or prongs out of two pieces, and scarfing the same together, within a mortise or slot in the handle, and driving keys or wedges behind them, so that they will be securely fastened to the handle. Should one of the tines break it can be easily renewed without throwing all away.

HARROW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a harrow of that class which relate and are commonly termed revolving harrows. The invention consists in a novel construction and arrangement of the parts composing the same whereby the harrows are allowed to rise and fall, to conform to the inequalities of surface over which they may pass, and also rendered capable when required, of being secured in a higher or lower fixed position, so that the teeth may penetrate more or less deeply into the earth.

SPINDLE.—Joseph Smith, Loth, Belgium.—The object of this invention is to regulate the tension of the thread as the same winds on the bobbins, spools or tubes in machines for spinning, doubling and spooling wool, cotton and other fibrous materials whereby a softer thread is obtained than on the spinning machines constructed in England under the name of cap frames.

APPARATUS FOR TEMPERING STEEL SPRINGS.—Ira N. Bevans, Litchfield, Conn.—This invention relates to an apparatus which steel springs are tempered by drawing them through a vessel containing melted lead. In ordinary apparatus of this kind, the spring on leaving this vessel, is wound on a drum which receives a positive revolving motion by gear wheels or belts, and as the spring winds on the drum, it is drawn through the melted lead. By this operation the operation of tempering the springs is not uniform, because the diameter of the drum increases and the spring is drawn through the lead quicker and quicker so that it becomes too soft at the beginning and remains too hard at the end of the operation.

STUMP EXTRACTOR.—Isaac Pardee, Vineland, N. J., and R. C. Parvin, Forest Grove, N. J.—This invention relates to a machine for extracting stumps, elevating stone, and lifting or raising other heavy bodies. It consists of two ack bars fitted in a socket provided with pawls, and placed loosely upon a suitable framing, the rack bars having a lever attached to their lower ends, and all so arranged that a very simple, economical, and efficient device for the purpose specified is obtained.

FAUCET.—Alexander Brinckmann, New York City.—This invention consists in applying a spring to the spigot of a faucet, and also in applying stops thereto, whereby the faucet, when opened to draw liquid from a cask or vessel, will be immediately closed to stop the flow when the hand is withdrawn from the handle of the spigot, and the faucet be allowed to close entirely to stop any flow of liquid, or, when the faucet is applied to water pipes, be allowed to remain a trifle open to admit of a small stream of water flowing to prevent the freezing thereof during the winter season.

CUTTING BOLTS AND RIVETS.—Walter Britton, Abingdon, Ill.—This invention relates to a device for cutting bolts and rivets, and consists in a peculiar construction of parts, whereby a very simple, portable, and efficient device is obtained for the purpose.

MACHINE FOR SPLITTING WOOD.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a machine for splitting wood for fire-kindling purposes, and it consists of two reciprocating V-shaped knives or cutters, and a swinging holder, arranged in certain relation with a hopper and operator, whereby wood may be split into small or thin square pieces very expeditiously, and with but a moderate expenditure of power.

SURFACING OR LEVELING RAILROAD TRACKS.—S. L. Porter, Rochelle, Ill.—This invention relates to a new and improved device for the purpose of surfacing or leveling the tracks of railroads.

RAILROAD CAR SEAT.—Jesse S. Wheat, South Wheeling, West Va.—This invention relates to an improvement in railroad car seats, and consists in certain devices for reversing and holding the back of a seat in different positions of elevation or inclination to adapt it for the support and comfort of the person occupying the seat, instead of being confined to one position, as reversible seats are of ordinary construction.

LOCOMOTIVE PILOT.—B. F. Partridge, Jr., Columbus, Ky.—This invention relates to an improvement in the construction of a pilot for a locomotive engine, and consists of a series of inclined rollers on the sides of a wedge-shaped frame, similar in its general form to the pilot usually attached to the front of locomotives for the purpose of clearing the way of obstructions on the railroad track.

WHEAT DRILL.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a drill for drilling in wheat and other grain. It consists in the use of a rotary shaft, provided with pins, in connection with a seed-distributing slide, all arranged to effect the desired end.

MANUFACTURE OF CHEESE.—Sylvester Greene, Rome, N. Y.—This improvement relates to the means employed for expressing the whey from the curd, whereby the rich or buttery portion of the curd is retained. It consists in placing in the box or vessel, in which the curd is produced as usual by the application of rennet, a perforated plate and a strainer, if necessary, the plate, and also the strainer, if one be used, resting upon the curd, and by their own gravity alone, or with additional weight if necessary, be made to exert a very gradual pressure on the curd, so that the whey will pass up through the perforated plate.

MACHINERY FOR CUTTING WOOD MOLDINGS.—George S. Hudson, Ellensburg, N. Y.—This invention relates to improvements in machinery for cutting waned and serpentine wood moldings.

FLOW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a new and improved plow of that kind designed to be attached or applied to a frame mounted on wheels, and to consist of one or more plows. The invention consists in a novel construction and arrangement of parts whereby the plow is placed under the complete control of the operator or driver.

CUTTING SHEET LEAD.—S. E. Chubbuck, Roxbury, Mass.—This invention relates to a new means for cutting sheet lead transversely during the rolling or milling process, whereby said work may be done with the greatest facility.

SLEEPING-CAR BED FOR RAILROADS.—J. Wyatt Reid, New York City.—This invention relates to a novel method of constructing and arranging the beds in a railroad sleeping car, and consists in forming the beds of canvas or other suitable material, attached to rods or chains in such a manner that they may be conveniently suspended for sleeping in, and taken down and packed away as may be necessary.

ADJUSTABLE SHOE SOLE AND LIFT.—Charles B. Loveland, Elizabethport, N. J.—This invention relates to improvements in the manufacture of shoes, boots, etc., and consists in attaching an extra sole to a single sole by means of a metal plate fastened with screws, and also inserting a metal plate lift and tap secured to it in such a manner that the metal plate lift and tap on the heel of the shoe on the one foot may be shifted and adjusted to the shoe on the other foot in order to equalize the wear on the sides.

HORSE HAY RAKE.—Israel L. Bullock, Mercy, Ind.—This invention relates to a revolving horse hay rake, and it consists in a novel arrangement and application of the rake whereby it may be actuated or controlled by the feet of the driver, and with the greatest facility.

DEVICE FOR TRANSMITTING MOTION.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a mechanical device for transmitting a reciprocating motion from a rotary shaft, and it consists in the employment or use of a belt slipper in connection with a cam, on idle and working pulleys, and gearing.

MACHINE FOR CUTTING SLATE.—J. W. Durgin, Bangor, Maine.—This invention relates to a machine for cutting slate for roofing purposes, and it consists of a knife attached to a suitable bed-piece, and of such a shape as to cut the slate in the form required, the knife being attached to the bed-piece by pivots, and operated through the medium of a lever or treadle.

CLOTHES-WASHING MACHINE.—Robert Rooke, Empire City, Oregon.—This invention consists in a series of pounders arranged in connection with a rotating perforated tub which is placed within a fixed or stationary tub, the pounders and rotating tub being operated from one and the same driving shaft, and all so arranged that the clothes may be cleansed very expeditiously and in a perfect manner.

CORN PLANTER.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a machine for planting corn and other seed in hills or drills, and it consists of a novel seed-distributing device and a covering mechanism to accomplish the desired end.

DEVICE FOR HOLDING CLAPBOARDS.—William H. Cummings and Isaiah Babcock, Boonsboro, Iowa.—The nature of this invention consists in a new and useful clamping device for gaging and holding weather-boards or siding when put on a building for the purpose of securing them on each other evenly and expeditiously.

BALE TIE.—Henry Lampson, London, England.—This invention consists in so arranging two metal loops or rings, which are similar in form to the "sliding loops" of leather used with leather straps, that by means of these loops or rings the ends of the metal bands are firmly held and clamped.

METHOD OF CHILLING OIL.—John E. Richardson, New York City.—This invention relates to a new manner of chilling all kinds of oils so that they may be kept in a fluid state after having undergone this process. It is adapted more particularly to the production of paraffine from petroleum or other hydro-carbon liquids, but may also be used with the same effect in the treatment of lard from animal oils.

VEHICLE.—John S. Campbell, Newton, N. Y.—This invention consists in making the body of a carriage or sleigh, and also the carriage wheels or sleigh runners of hard rubber in such a manner as to produce a durable and elegant carriage or sleigh with comparatively little trouble or expense.

THE MANUFACTURE OF SULPHURIC AND OTHER ACIDS.—John Hughes, Brooklyn, N. Y.—This invention relates to an apparatus for concentrating sulphuric acid to any desired degree; and which may also be used for any other kind of acid.

Answers to Correspondents.

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

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

E. R., of Wis.—The earth has the form of an oblate spheroid, of which the equatorial diameter is about twenty six miles longer than the polar. The bulging out toward the equator is generally conceded to be due to the centrifugal force of the earth's revolution. The water in the equatorial ocean is about thirteen miles higher than in the polar ocean. The ocean current moving from the north pole southwardly is running up hill (up hill being defined away from the center of the earth) and if the current travels to the equator, it has run up thirteen miles. A river running south in the northern hemisphere has a tendency to wear on its western bank.

J. W. L., of N. Y.—The force given out by condensed air on expansion is precisely equal to the force which was used in the compression, provided that none of the heat of compression has been lost. The form of vessels used or the rate or manner of compression or expansion, do not affect the question one way or the other.

H. H. B., of Iowa.—Your proposed chimney 48 feet high by 30 inches diameter will surely give you draft enough to burn saw dust.

J. Mc. C., of Wis., is much annoyed by leakage of valves of his engine. The valves are brass and these seats iron. The leakage is caused by the unequal expansion of iron and brass. The valves should be replaced by iron valves. Brass valves are now generally discarded.

G. B. N., of Texas, asks how he can consume the smoke from his boiler furnace made by burning pine shavings. Construct behind your fire box a combustion chamber through which the smoke must pass and feed it with atmospheric air through apertures the sizes of which may be controlled by dampers.

H. H., of Wis.—We are not responsible for the published opinions of our correspondents, and in the case you quote we differ with the writer if he means what he says in the portion of the sentence you quote; that "a boiler will make steam faster when the pressure is high than when it is low, with the same fire." Probably his meaning is to be seen in the remainder of the sentence; "so it is economical to carry a high pressure—even if it is not necessary to do the work—and to work the steam expansively." It has been pretty well established that it is economy to use high pressure steam, but we do not think the same fire will generate more under a pressure of 100 lbs. than under one of 50 lbs.

L. J. O., of Minn., is troubled by the overflow or the creeping over of the oil in his lamps, and wants a remedy. The smearing of the upper part of the lamp with a substance which is repulsive to oil might be effectual. Try the white of an egg or gum arabic.

C. F. R., of Conn., sends us a sample of printing paper made from sedge or marine grass grown in Norwalk harbor. When cured the hay is sold for \$3 per ton. The paper is manufactured by Henry Betts, Norwalk, Ct.

R. V. M., of Conn.—You cannot make the best quality of sealing wax, if you omit the shellac. Sealing wax without shellac is brittle.

D. L. M., of N. J.—Spirit varnishes have often been used as substitutes for ordinary blacking for shoes, and answer admirably for one or two applications. The objection to the continual use of the varnish is that its resinous matter fills up the pores of the leather rendering it stiff and rough.

R. S., of N. Y.—There is no standard recipe for making what is called Babbitt metal. The name simply indicates an alloy of certain properties or uses without reference to its exact composition. Antimony generally enters into the composition, but is not essential. Zinc is nearer in properties to the Babbitt metal than any other simple metal.

S. V. L., of Vt.—There are many exceptions to the law that alloys melt at a temperature below the mean melting points of its constituents. . . . wrought iron may be melted, and cast into molds, but the operation is not practicable on account of the intense heat required. If we could easily produce the heat to melt wrought iron, what could we melt it in or keep it in?

R. G. G., of N. Y.—Telegraph wires are now every where made of iron. A perfect coating of the iron with copper would no doubt be useful, but more for the purpose of protecting the iron from rust than for increasing the conducting power.

S. B., of Ill.—A blow pipe produces a greater intensity of heat by reason of its furnishing the air for more combustion within a given space and time. Whether a given amount of air should issue into a furnace from two or more tweers, would depend mainly upon the size of the furnace and the work to be done. Where the object is to bring the whole body of fuel into equal and vigorous combustion the greater the division of blasts of air the better. Most blast furnaces may be improved by multiplying the number of tweers.

A. Y., of Vt.—We are not acquainted with a late work on "Natural Philosophy by Prof. Comstock" and therefore cannot give an opinion on the centrifugal pump to which you allude.

P. P. C. C., of Eng.—The specimen of dry lubricant which we have received appears to be a very useful article.

G. S. W., of Pa.—Sends a diagram representing a train of gearing. The first member of the train is a worm or screw acting on a wheel of a hundred teeth. One hundred turns of the worm revolves the wheel once. The axis of this wheel is a worm acting on a second wheel also of a hundred teeth. The axis of the second wheel is likewise a worm acting on a third wheel of a hundred teeth. Suppose the worm No. 1 revolves 100 times in a minute what is the rate of revolution of wheel No. 3?

W. W. & Co., of Texas.—If you think it would pay to manufacture ice in Texas at an expense of say 3 cents a pound for materials, the requisite information may probably be obtained by writing to M. Fosell, manufacturer of Glacier Roulotte, at the Great Exhibition, Paris.

W. B., of Ill., disputes with a friend concerning the philosophy of the siphon, and we are appointed umpire. "Does the siphon work on the same principle as the common suction pump?" Yes. In the pump the lifting of the piston or sucker produces or tends to produce a vacuum, and the pressure of the atmosphere forces the water up the barrel to prevent or fill the vacuum. In the siphon it is the greater weight of water in the long leg, which tends to produce the vacuum, and the pressure of the air which forces the water up the short leg to fill it. The force which raises the water in both cases is the same—the weight or pressure of the air. As the pressure of the air per square inch is only equal to the pressure of a column of air 34 feet high and 1 square inch in section, neither the pump nor the siphon can raise water higher than 34 feet.

F. R., of N. Y.—You ought to have no difficulty in using tinsmith's solder in soldering the connections of the zinc plates of your battery. Use with it the common soldering fluid, a solution of chloride of zinc.

G. W. V., of Miss.—To restore the softness and pliancy of leather which has become hard by having been wet, apply neat's foot oil and rub it in. The luster of morocco is restored by a varnishing with the white of an egg.

E. D. H., of —inquires whether the top of a wagon wheel moves faster than the bottom while attached to an axle tree and running on a road. Certainly it does. On page 251, current volume, April 20, this question was answered in a reply to T. M. S. Jr., of Ga. You can prove it by placing a straight-edge upright at the side of a wheel across the center, and mark on the rim, where the straight edge touches top and bottom, and then draw the wagon forward far enough to turn the wheel slightly. You will find the mark at the top of the wheel has traveled much further from the straight edge, than that at the bottom.

D. A. McK., of Pa.—We think you can break up your casting by drilling a few holes of three-quarters or one inch diameter from six to ten inches deep, filling them nearly to the top with water and then inserting carefully fitted steel plugs to rest on the top of the water. A blow from a heavy drop will probably do the business. In your case the mass of iron is three feet square; perhaps inch holes, drilled ten inches deep, and filled to within two inches of the top would be effective. The steel plug should be about four inches long and fit as nearly water tight as possible.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Manufacturers of clock work to run light machinery send address to A. S. Griswold, Pittsburgh, Pa.

Makers of Brass Lamp Tops address A. Packham, Prestonsville, Carroll county, Ky.

Wanted—Manufacturers of Agricultural Implements of all kinds. See advertisement and address A. P. Smith, Sterling, Ill.

Wanted—The address of Mr. Snow, patentee of Match Safe, dated April 19, 1834. Address J. McClaren, Scranton, Pa.

Manufacturers or dealers in machinery for the manufacture of tubs, buckets and firkins, please send their address to D. S. McDaniel, Kachusa, Lee county, Ill.

Small Emery Balls Wanted.—Address Box 258, Troy, N. Y. Jos. Lees, 417 East 10th street, New York City, alleges that he has valuable improvements in manufacturing gas from coal, and he wishes to engage with some company where his services may be appreciated.