

ENGINEERING INVENTIONS.

Mr. De Witt C. Cumings, of Carthage, Jefferson County, N. Y., is the patentee of an improved counter shaft, including an independent short shaft in line with the counter shaft, intended to secure better alignment, do away with the ordinary loose pulley, and provide means for better lubrication.

A bearing for the spindles of amalgamating pans has been patented by Mr. Andrew Wallace, of Leadville, Col. The invention covers an improved contrivance of devices for centering and tightening the sliding jackets of the grinding mullers, with a spindle of angular or flat sided shape, on which the hollow space of the jacket fits, with adjusting wedges and screws for centering and tightening.

A car coupling has been patented by Mr. Hugh Graham, of Dartmouth, Nova Scotia, Canada. There are sliding blocks and springs in the sockets of the drawheads, to hold the links up level and to hold up the coupling pins for self-coupling, the blocks having spring latches so they may be easily set for holding up either the links or pins, with various other improvements, whereby the cars may be coupled or uncoupled without going between them.

A car coupling has been patented by Mr. Frederick E. Grothaus, of Boerne, Texas. Two coupling hooks are pivoted on a projection from the bottom of the car, passing through a guide slot, and connected with a vertically movable bar for raising them; the coupling hooks are raised and their free ends pressed together, and when released they swing downward and their free ends are separated to allow the hooks to catch on the front posts of the coupling box on the opposite car.

MECHANICAL INVENTIONS.

A turning machine has been patented by Mr. Albert T. Booth, of Meriden, Conn. This invention consists of a sliding tube in a revolving tube, the latter having a nipple on the end which contains a chuck fixed on the end of the sliding tube, and the sliding tube having bevel projections on its inner end, thus making an improved machine for turning metal or wood.

AGRICULTURAL INVENTIONS.

A hay stacker has been patented by Mr. John M. Coe, of Sloan, Iowa. This invention covers a novel construction and combination of parts to take hay from the ground, elevate it to the desired height, and then drop it upon the stack, to be stowed away by an attendant.

A rice drill has been patented by Mr. Arthur De L. Middleton, of Charleston, S. C. There are seed boxes outside of the wheels, so seeds can be planted along the edges of drains or ditches, all the seed boxes are provided with covers, and there are various novel devices and peculiarities of construction and arrangement.

MISCELLANEOUS INVENTIONS.

A wagon running gear has been patented by Messrs. John B. Spry and Thomas Barry, of Valparaiso, Ind. The invention covers some novel details in the construction and combination of parts, to increase the strength and durability of wagon gearings.

A portable folding parlor bowling alley has been patented by Mr. William M. Goodenough, of Newark, N. J. It is formed of a series of sections hinged or otherwise attached to each other, with a folding box at one end adapted to receive the balls that have been rolled at the pins.

A package and book holder has been patented by Mr. Charles Huff, of St. Louis, Mo. It consists of a combination of right angular wire frame, a spring frame pivoted thereto, a handle, cross piece, and rack, all making a convenient carrier and holder for books and packages.

A baling press has been patented by Mr. Simon P. Harbaugh, of Cumberland, Md. This invention consists of a novel construction whereby the baling of cotton, hay, and other substances is facilitated, and it may also serve as a platform scale to weigh the bales as they are discharged from the press.

A saw handle has been patented by Messrs. Rufus H. and William D. Shumway, of Lebanon Springs, N. Y. In combination with the handles of cross cut saws are plates made to form longitudinal grooves, cross grooves, and locking cavities, with a saw blade holding hook to engage with the walls of either of the cavities, with other novel features.

An ear corn feed regulator has been patented by Mr. Samuel E. Marsh, of Tarkio, Mo. It consists of pronged wheels and a discharging shelf arranged with the chute and hopper of an elevator carrying belt on the hopper of a storage crib, for feeding corn regularly to the buckets of the elevator, or from different sections of the crib.

A trace bearer for pad skirts has been patented by Mr. Simmons D. Taylor, of Carthage, N. Y. The bearer consists of an elongated loop or metal frame, by which the trace is prevented from wearing off the skirt, and the bearer will last longer than the usual trace bearer, which is facilitated by a special construction and arrangement of parts.

A saw table gauge has been patented by Mr. Henry L. Hopkins, of Caro, Mich. This is an attachment for scroll sawing machines, a parallel wayed frame, with ways therefor, being secured to the sawing machine in a vertical plane nearly at right angles to the plane of the saw, and a saw table being pivoted in the parallel frame.

A propeller for small boats has been patented by Mr. John B. Kibler, of Minneapolis, Minn. A bottomless socket, with an upright post adjustably secured therein, is attached to the side of the boat, and this is made to sustain a paddle bar to be operated by a crank within the boat, by which the latter may be propelled in any desired direction.

A well bucket fixture has been patented by Mr. Frank L. Howell, of Neligh, Neb. This invention

relates to sheet metal well buckets with a bottom ring supporting the valve, and the valve having a stem on its lower side for raising it, and the improvements cover improved construction and arrangement of the ring and valve.

A corkscrew has been patented by Mr. William E. Alvord, of Appleton, Wis. The corkscrew is formed on the lower end of a rod contained in an externally threaded tube, which in turn is contained in an internally threaded tube, the object being to construct the corkscrew that the cork can be extracted without requiring the operator to pull on the corkscrew.

A friction clutch has been patented by Mr. William H. Rascoe, of Plattsburg, N. Y. In combination with a shaft is a loose wheel with recesses containing rollers, against which blocks rest, which are pressed by springs against the rollers, causing the rollers to bind on the wheel or shaft when the wheel revolves in one direction, but not when revolving in the reverse direction.

A refrigerator has been patented by Mr. Harvey W. Nash, of Amsterdam, N. Y. The ice box or crate, and other parts in the refrigerator, are so suspended that the water, condensing on such parts, as well as the drip water, cannot follow down the connections to dampen the walls of the refrigerator, thus rendering unnecessary the lining of the refrigerator with metal.

A magazine gun has been patented by Mr. Franklin J. Evans, of Iowa Falls, Iowa. The gun has a reciprocating breech block, with a lever pivoted thereto, and a stop bar in the breech cavity; there is also a lifting lever pivoted under the stop bar, with various other improvements, and the gun may also be used with single cartridges without employing the magazine.

A tailor's pressing machine has been patented by Mr. Edward Walker, of New York city. It is made with an ironing board mounted on a carriage adapted to run on a table, above which a smoothing iron is pivoted in a frame suspended from a weighted lever, which can be operated by a foot lever under the table, the double smoothing iron being heated by a gas pipe.

An adjustable trestle has been patented by Mr. Edward Owen, of Jackson, Tenn. It is for the use of carpenters, brick layers, and others, and has a slotted top bar and mortised longitudinal beam below and adapted to receive a frame, whose side bars have internal ratchet teeth, engaged by pawls pivoted to the longitudinal bar; this so fold may be raised or lowered without interfering with the work.

A clasp for holding stockings, shirt sleeves, etc., has been patented by Messrs. Charles F. and William J. Walters, of Gang Mills, N. Y. It is formed of a U-shaped frame, with bends in the shanks, to the inner free ends of which a V-shaped frame is pivoted, adapted to be pressed between the shanks of the other. The same inventors have also patented a stocking supporter and garter, being a device for holding the stocking from a waist belt or corset or other article of clothing. An improved garter has likewise been patented by the same inventors, one which does not cut into the skin or bind on the same, does not tear the clothes, and holds the hose securely.

NEW BOOKS AND PUBLICATIONS.

BRICKS, TILES, AND TERRA COTTA. A Practical Treatise on the Manufacture. By Charles Thomas Davis. Henry Carey Baird & Co., Philadelphia. 8vo, 472 pp. Price \$5.

This covers the manufacture of every important product of clay employed in architecture and engineering, with detailed descriptions of the most modern machines, tools, and appliances, including enameling in polychrome colors. The volume is illustrated by 228 engravings and 6 plates. Brick making is described as conducted in the most ancient times of which we have any record, while the modern processes are treated with the most ample detail, respecting the clays, the preparatory processes, moulding, and burning. The description of brick machines covers those which have been successful in general practice, and there are large views showing the arrangement of the machines, the brick cars, clay elevators, drying sheds, and kilns, in an extensive modern establishment. In the chapter on the enameling and glazing of bricks and tiles, it is stated that the colors now most used for architectural decorations in chromatic brick work are the same, with the exception of buff and brown, as those employed by the ancient Egyptians—red, yellow, blue, sometimes green, and white and black—and the use of oxides in making the modern colors is fully described. Mention is made of the best examples of terra cotta, and its employment and manufacture are treated in detail. Ornamental and art tiles conclude the volume, and of the latter the plates give beautiful illustrations of some of the finest American productions. The extensive and valuable character of this work will be better understood and appreciated by reference to the general contents of the book, which we publish in the advertising columns of our paper this week.

THE ART AGE. Arthur B. Turnure, editor and proprietor, 132 Nassau Street, New York city.

From the title of this new monthly the idea is conveyed that it is a publication probably devoted to paintings, etchings, engravings, etc., which it is not. It is a periodical intended for book collectors and persons having a taste for handsome printing and choice bindings. It is printed on superb paper, and the typography will gladden the heart of any artistic printer.

THE ART INTERCHANGE. Wm. Whitlock, No. 140 Nassau Street, New York city.

This journal, as its name implies, is devoted to decorative art. Every number contains illustrations and designs for persons learning or practicing the art of painting, fans, decorating china, embroidering table covers, curtains, and other household articles. Each number contains recipes and directions for mixing and harmonizing colors. The *Art Interchange* fills a niche in journalism which is not overcrowded, and it should have a good patronage.

THE AMATEUR PHOTOGRAPHER, published by the Rochester, N. Y., Optical Company, is an excellent little monograph, admirably adapted for the guidance of beginners in the photographic art. The elaborate details involved in a complete study of photography are omitted, but it gives simple methods and processes whereby any individual of average intelligence can, with a very small outlay, quickly become proficient in taking landscapes, portraits, etc. The author has endeavored "to make photography simple and popular," and treats of his subject in a plain and practical way, from the manipulation of the instrument to the mounting of pictures.

REPRESENTATIVE LONDON JOURNALISTS is the title of a handsome lithograph recently issued by Messrs. Root & Tinker of New York. It is similar in design to a former picture of the same publishers, grouping the leading American journalists, and gives the editors of eleven of the best known London papers from the *Times* to the *Punch*.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notice.—To Founders, Manufacturers of Stoves, Agricultural Implements, Machinery, Tools, Shovels, Saws, Files, Chains, etc.: We are in receipt of pamphlets which give full description of how the celebrated Connellsville Coke is made, embracing full instructions how to use it, names of the leading foundrymen using it, with their views and opinions; also a complete map of the Connellsville Coke region. These pamphlets will be sent, post paid, upon application to H. C. Frick Coke Company, Manufacturers of Connellsville Coke, Pittsburg, Pa.

Stephen's Vises. Special size for amateurs. See p. 13.

No fisherman wants his attention distracted or his patience tried by acrid, nauseating, narcotized tobacco. He wants something fragrant, mild, grateful, pure, inspiring. The tobacco for the fisherman is Blackwell's Durham Long Cut. It can't tantalize, but will insure comfort, patience, and a happy disposition.

For Steam and Power Pumping Machinery of Single and Duplex Pattern, embracing boiler feed, fire and low pressure pumps, independent condensing outfits, vacuum, hydraulic, artesian, and deep well pumps, air compressors. Address Geo. F. Blake Mfg. Co., 44 Washington St., Boston; 97 Liberty St., N. Y. Send for Catalogue.

Quinn's device for stopping leaks in boiler tubes. Address S. M. Co., South Newmarket, N. H.

Wanted.—Machine shop foreman used to first-class engine work. None except those who can give the best of references need apply. Address M. D. Leggett & Co., Cleveland, O.

Cyclone Steam Flue Cleaner saves Fuel, Labor, and Repairs. "Investigate." Crescent Mfg. Co., Cleveland, O. New and Second-hand Lathes, Drills, Planers, Engines, Shafting, etc. Bought, sold, and exchanged. A. G. Brooks, 261 N. 3d St., Philadelphia.

Hercules Water Wheel—most power for its size and highest average percentage from full to half Gate of any wheel. Every size tested and tables guaranteed. Send for catalogue, Holyoke Machine Co., Holyoke and Worcester, Mass.

If you want the best cushioned Helve Hammer in the world, send to Bradley & Company, Syracuse, N. Y.

Mills, Engines, and Boilers for all purposes and of every description. Send for circulars. Newell Universal Mill Co., 10 Barclay Street, N. Y.

Wanted.—Patented articles or machinery to manufacture and introduce. Lexington Mfg. Co., Lexington, Ky.

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 45 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

For Freight and Passenger Elevators send to L. S. Graves & Son, Rochester, N. Y., or 46 Cortlandt St., N. Y. "How to Keep Boilers Clean." Book sent free by James T. Hotchkiss, 86 Tohn St., New York.

Stationary, Marine, Portable, and Locomotive Boilers a specialty. Lake Erie Boiler Works, Buffalo, N. Y.

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

The Hyatt filters and methods guaranteed to render all kinds of turbid water pure and sparkling, at economical cost. The Newark Filtering Co., Newark, N. J.

Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippet & Wood, Easton, Pa. "The Sweetland Chuck." See ad. p. 396.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Electrical Alarms, Bells, Batteries. See Workshop Receipts, v. 3, \$2.00. E. & F. N. Spon, 35 Murray St., N. Y.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent agency, 361 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y. Curtis Pressure Regulator and Steam Trap. See p. 12.

Gear Cutting. Grant, 66 Beverly St., Boston.

We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure asbestos goods of all kinds. The Chalmers-Spence Co., 419 East 8th Street, New York.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Emerson's 1884 Book of Saws. New matter, 75,000. Free. Address Emerson, Smith & Co., Beaver Falls, Pa.

Hoisting Engines. Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Barrel, Keg, Hoghead, Stave Mach'y. See adv. p. 14.

Munson's Improved Portable Mills, Utica, N. Y.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 14.

Blacksmith Drilling Machines for 1/4 to 1/2 inch diameter, \$22.50. Pratt & Whitney Co., Hartford, Ct.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, Send for catalogue to Rowley & Hearnance, Williamsport, Pa.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 13.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 236.

The Porter-Allen High Speed Steam Engine. Southwark Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all, either by letter or mail, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) E. K. asks: Is a 5 volt incandescent electric lamp equal to 5 candle power? If not, how many candle power is it equal to? A. It would hardly be equal to 5 candle power. The construction of the lamp has much to do with its illuminating power. The exact equivalent of a volt in candle power cannot be stated.

(2) E. H. I. writes: I see in SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, in giving directions for making an induction coil, it directs making the secondary coil in two sections. Will not one do just as well, or almost as well? A. When the coil is made in two sections, there is less danger of internal discharges. If you make your coil continuous, you will have to make the insulation very perfect and secure.

(3) E. V. D. asks: 1. What is the temperature of steam under pressure of one atmosphere, under two atmospheres, three, etc.?

A. 1 atmosphere.....	251°
2 "	276°
3 "	295°
4 "	311°
5 "	324°
6 "	335°
7 "	345°
8 "	355°

2. Will "live steam" impart heat more quickly than steam as it is condensing? A. Live steam at high pressures only gives out heat by condensation, unless superheated. The word live only means steam from the boiler, as distinguished from steam from the exhaust.

(4) W. E. S. asks: In order to steer a boat clear of obstacles in a current (particularly in rapids) with which it is going and down which its course lies, is it necessary that there should be a propulsion of the boat independent of that which is caused by the current? In other words, in the case stated, is the rudder obeyed only when the boat is going (by means of steam or other independent agency) at a speed greater than that of the current? A. The boat must go faster (or slower) than the current to be able to influence its course by the rudder.

(5) J. F. P. asks, to settle an "argument," Which will most increase the power of a locomotive 16 inches diameter, 24 inches stroke—to add 1 inch to stroke or 1 inch to the diameter? A. One inch added to the stroke would add one-twenty-fourth to the power, and one inch added to diameter would increase the power one-eighth, or three times as much as adding one inch to the stroke.

(6) B. B. T. writes: We have two sets of boilers, 30 feet apart. No. 1 is 16 feet long, 48 inches diameter, and has twenty-four 0.5 inch tubes. No. 2 are two boilers connected by steam dome and mud drum, 24 feet long, 36 inches diameter, with two 13 inch flues. No. 1 furnishes more steam than we need for engine, and as we carry the same pressure on both sets could we connect by a pipe? If so, what size would you advise, and where connect it? A. You can connect them by a pipe not less than 4 inches diameter, but you must keep your safety valves, gauge cocks, etc., on both sets of boilers the same as if worked separately. There should also be stop valves in the steam pipes, outside the safety valve, so that either set of boilers can be shut off if necessary.

(7) A. C. asks a remedy for the roaring noise produced by the condensation of steam in cold water, the end of the pipe expanding into a coil. A. Have a drain cock at the end of the coil to draw off the condensed water, and not let the steam discharge into the tank, or preferably, place a false bottom across

the tank, with small holes, and place on top of the bottom 3 or 4 inches thickness of clean gravel; then discharge the steam below the bottom.

(8) A. S. asks: Will 12 spokes 6 inches wide, $\frac{1}{2}$ inch thick, wheel 7 feet in diameter, sustain the weight of a traction engine weighing 7,000 pounds? 6 spokes are placed crosswise of the tire, 6 are placed with the tire, with a 14 inch tire. Will it be strong so as to drive the engine? A. We suppose you mean 12 spokes in each wheel; if so, we think they would be quite sufficient for the weight.

(9) T. D. B. asks: 1. How can I get the silver out of a gelatino-bromide emulsion which is turned sour and become as thin as water? A. Treat as described on page 4898 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 307. That is, add salt solution, thereby obtaining silver chloride, this can be fused in a crucible with borax, giving rise to metallic silver. 2. Can the bichromate of potash solution which has been used in a battery, and of course contains a quantity of zinc, be put to any use, or can any salts be crystallized out, and if so what salts? A. Evaporate your solution till it becomes quite concentrated, when the potassium bichromate will crystallize out. 3. Can you explain how the current in a medical electric machine is produced when you connect one end of primary wire with one end of secondary? A. Your query is not quite specific enough. You may get only the extra current of primary, or both the current and the induced current from the secondary. 4. What use can old pyrogallie acid and ammonia developer be put to which has been used to develop plates and has not been kept in air tight bottle? A. They are of no further value; the ammonia has all volatilized, and it would hardly pay to attempt to work over the pyrogallie acid. 5. How can a dry plate be saved which has been exposed but not developed? I have heard they can be used by putting in a bath of something. A. We are not familiar with any process by means of which this object can be obtained. See the Photographic Notes, on page 275 of THE SCIENTIFIC AMERICAN for November 3, 1883.

(10) R. P. asks: 1. Which is the most constant, has the greatest electromotive force and least internal resistance—the Bunsen nitric or Bunsen chromic acid battery? A. Bunsen's nitric acid battery yields a current of 1.964 volts and Bunsen's chromic acid battery a current of 2.038 volts. The chromic acid battery is preferred on all accounts. 2. How many feet of No. 28 German silver wire would have a resistance of one ohm? A. You do not say whether your wire is measured by the American or English wire gauge. Probably about 15 inches of No. 28 by American wire gauge would measure 1 ohm, but a great deal depends upon the quality of the German silver. You should have a sample of your wire measured.

(11) B. S. asks: 1. What size boat and propeller wheel for an engine $2\frac{1}{2}$ bore and 4 inches stroke to obtain the best results? A. Boat 15 to 16 feet long by 3 feet wide and 16 to 18 inches deep. Screw 18 inches diameter by 27 inches or 28 inches pitch. 2. Speed I should get with 80 pounds of steam. A. If good model and plenty of steam, about $6\frac{1}{2}$ miles to 7 per hour. Boiler should have 55 to 60 feet fire surface. 3. I would like to know the size wire that is used on spark coils such as are used for electric gas lighting. A. It depends something on the amount of work you intend to do with your coil. Probably No. 18 would answer your purpose.

(12) H. R. W. asks: 1. How much weight will an ordinary watch spring hold up when it is pulled out full length? A. Watch springs are tempered in coil, so on straightening out they would bear much less than the weight they would hold if tempered straight. It would probably be safe to estimate their breaking strain so straightened out as equal to at least 100,000 pounds per square inch of sectional area, but there are no figures as to this point. 2. Where can eucalyptus seed be obtained? A. For eucalyptus seed, address Department of Agriculture, Washington, D. C.

(13) C. C. H. asks if a sample of serpentine inclosed would have any value, and the dimension of blocks that would be most desirable. A. Serpentine has been used occasionally for building purposes. We know of several churches built of this material that are much admired for their peculiar color and contrast. You might make arrangements through our architects for furnishing the serpentine for special work. A visit among architects with large samples would no doubt bring business to you. It is too soft for ornamental work except where it might take the place of gypsum or alabaster, with which it would make a fine contrast, as in polished vase work.

(14) H. P. T. asks: What is the cause of and remedy for discoloration of slate roof? The roof is something on the French style, topped out with a tin roof. Can it be rust or the paint used in painting the tin? It gives the slate an extremely bad appearance. Thinking it was iron rust, as the roof had been previously neglected, I tried acetic acid, etc., on the slate, but it had no apparent effect on it. A. Try oxalic acid 1 part, crystallized water 6 parts, by weight. Wash the slate with a swab and the acid, then wash with clean water. Oxalic acid is poison, and a powerful eradicator of stains.

(15) G. B. F. asks: Can you give some statistics regarding domestic and foreign manufacture of umbrellas and parasols, annual production, exports and imports? A. Umbrellas and canes were manufactured in 1880, in the United States, according to the census, to the value of \$6,917,463. The exports of umbrellas, parasols, and sunshades for 1883 were \$3,562. The value of imports in this line is not stated separately in the customs returns.

(16) H. R. W. writes: I have a small row boat, flat bottom and pointed at both ends, which I wish to run by steam. The boat is 18 feet long, $3\frac{1}{2}$ wide, and about $2\frac{1}{2}$ high. 1. What kind and size of engine do I need? A. Vertical inverted engine, $2\frac{1}{4}$ to $2\frac{3}{4}$ inch cylinder by 3 inch stroke. 2. How high a rate of speed can be attained by screw, and size of screw for such a boat? A. Probably about 6 miles an hour, with good boiler; screw 15 inches to 16 inches diameter. 3. Would coal or oil be the best fuel? A. Coal is the best.

(17) C. F. H. asks: What would be the cheapest and simplest plan to pump water into a tank, and if there is a hot air pump that is cheap and durable, also whether there is a windmill that lies down flat and can be covered with a roof? A. A hot air pump will probably be as cheap as and easier to manage than any other device except the windmill. We know of no windmills in the market that have a roof, or what are called horizontal mills. The best mills are those that stand square up to the breeze.

(18) E. A. H. says: The inside walls to the basement of my house are rough brick, and dampness from the earth outside comes through. Is there anything I can put on the walls to prevent it? A. Rake out all the joints and clean the wall thoroughly; then plaster it carefully half an inch thick with a mortar made of Portland cement one part, sand one part. To be applied in a dry time, when no water is coming through the wall. The mortar is held up by the wall, and any considerable thickness of mortar tends to drag itself off by its own weight. The more the mortar is worked into the joints, the better. The cellar bottom may be covered with same material, but should be two inches thick.

(19) W. R. C. writes: I have a small double engine with two 5 inch by 5 inch cylinders, with 24 inch driving pulley and 12 inch pulley on shafting. Will you give me the horse power, at 150 revolutions per minute, 80 pounds steam pressure? A. About $7\frac{1}{2}$ horse power, allowing 60 pounds average pressure on the pistons. If there is an average pressure on the pistons of 80 pounds, the power will be about 10 horse power.

(20) J. G. J. asks: Please let me know through your correspondence column what speed could be attained from engine of the following dimensions, namely: 4 driving wheels, diameter 4 feet 10 inches, cylinder 15 inches, length of stroke 24 inches, steam pressure 140 pounds, pulling three coaches? A. Too many important particulars affecting the speed are omitted; an answer to the question as stated would be largely hypothetical.

(21) M. G. asks if there is a solution by which flies can be kept away from show windows and mirrors. A. Not that will have any permanent effect; their number can be reduced by using fly paper and various kinds of traps.

(22) J. M. J. asks: How can paint be removed from a boiler? I have tried muriatic acid, but it don't seem to have any effect. A. Take 1 pound American pearl ash, 3 pounds quick stone lime; slake the lime in water, then add the pearl ash, and make the whole about the consistency of paint. Apply this to the boiler, and allow it to remain on the paint for twelve hours. Three pounds of common washing soda dissolved in boiling water and applied hot by means of a common paint brush is said to soften paint in a very short while, so that it can be removed with a stiff scrubbing brush. A few ounces of potash added to the solution is said to increase its efficiency.

(23) F. A. K. asks: Can you tell us of any method by which the rust on the inner surface of tin cans can be covered up? We have had several things recommended, the latest of which is silicate of soda with an admixture of tin, but this does not give the exact color we want; it gives the cans the appearance of having been painted, which is the very thing we wish to avoid. A. We do not think that any method sufficiently cheap can be obtained. By dipping the cans in a bath of hydrochloric acid possibly some of the iron rust would be dissolved off, and at the same time a bright surface imparted to the cans. It would be most efficient if heated.

(24) G. W. C. asks: What is the sticky stuff called piping which is put in rubber overshoes? A. We presume you refer to the rubber cement used to close up openings. This consists of fine shreds of native India rubber, dissolved in good benzine free from oil.

(25) J. C. H. asks: Is there any cheap method by which asbestos felt can be made waterproof? That is, saturated completely and thus rendered impervious to water? Can this be done and the material still be at all pliable, or will it be rendered stiff? If the felt can be made waterproof in sheets, and boxes or tanks are desired to be made of it, what material should be used to cement the joint seams or corners? A. We think the following would accomplish your purpose. A mixture is prepared consisting of 60 parts of resin, 80 parts of tallow, 5 parts of wax, and 5 parts of turpentine. Soak the asbestos felt in this mixture, and it will become waterproof. Several processes for waterproofing cloth may be found in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 317, which will afford you some information on this subject. This lining cannot be cemented, but only joined by same or similar material; we should think asbestos not a very suitable material for tank lining.

(26) J. H. N. says: It is stated that there is a process for eliminating the methyl from the alcohol in methylated alcohol, but it is very expensive. Can you give me that process? I have already tried a great many processes, but they have not been attended with sufficiently satisfactory results. A. For the purification of impure alcohols there are principally three methods. First, that of L. Naudin by electrolyzation. This process is described with illustrations in SCIENTIFIC AMERICAN SUPPLEMENT, No. 343. Secondly the method of Raoul Pictet by cold and by vacuum, which with illustrations can be found in SCIENTIFIC AMERICAN SUPPLEMENT No. 299; and finally the method by Eiseman. A report descriptive of these methods is given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 328. Alcohol can sometimes be purified by rectifying over fused acetate of soda; from four to six drachms are sufficient for every gallon. The salt can easily be used over again after being purified by solution in water, filtering through charcoal, evaporating, and fusing.

(27) W. J. C. asks: Does the glazing of the granite ware which is now so extensively used for teapots, water pails, etc., contain lead? And if so, is there any danger of lead poison from it? A. Certain of the enamels contain arsenic, others lead, some tin, etc., so

that some may be considered safe while others are dangerous. Lead poisoning is somewhat a matter of personal constitution.

(28) C. M. Co. ask the recipe for Lea & Perrin's sauce. A. The following is said to be the recipe. Mix together $1\frac{1}{2}$ gallons white wine vinegar, 1 gallon walnut catsup, 1 gallon mushroom catsup, $\frac{1}{2}$ gallon Maderia wine, $\frac{1}{2}$ gallon Canton soy, $2\frac{1}{2}$ pounds moist sugar, 19 ounces salt, 3 ounces powdered capsicum, $1\frac{1}{2}$ ounces each of pimento and coriander, $1\frac{1}{2}$ ounces chutney, $\frac{1}{4}$ ounce each of cloves, mace, and cinnamon, and $6\frac{1}{2}$ drachms assafoetida dissolved in one pint brandy, 20 above proof. Boil 2 pounds hogs' liver for twelve hours in 1 gallon water, adding water as required to keep up the quantity; then mix the boiled liver thoroughly with the water; strain it through a coarse sieve. Add this to the sauce.

(29) G. P. asks about the process of printing in gold leaf or metal in practice among the manufacturers of gentlemen's neck wear. A. Brass stamps of suitable device are used. The spots to be impressed are coated with the white of eggs and gold leaf spread over the locality, then the stamps are beaten and pressed on the material; after which the surplus gold leaf is evenly rubbed off.

(30) A. T. McI. asks: Can you inform me of any liquid chemical preparation that after having been applied to paper will remain invisible for a period limited from about three to four minutes, and then become visible and remain so? A. By writing with a solution of silver nitrate and then exposing the same to the ordinary action of light, that is sunlight, it will become dark and remain so. The silver nitrate must be preserved in a dark place, and it is kept in a colored bottle as a usual thing.

(31) A. T. S. asks how to make the magnesium wire or sheet. A. Commercial magnesium is prepared by reducing magnesium chloride, or the double chloride of magnesium and sodium or potassium with sodium. The double chloride is prepared by dissolving magnesium carbonate in hydrochloric acid, adding an equivalent quantity of sodium or potassium chloride, evaporating to dryness, and fusing the residue. This product, heated with sodium in a wrought iron crucible, yields metallic magnesium containing certain impurities from which it may be freed by distillation. This process is now carried out on a manufacturing scale, and the magnesium is drawn out into wire or formed into ribbon for burning.

(32) G. R. L. asks for a receipt for transparent cement, such as used to repair glass and fine china. A. Canada balsam thinned with a little turpentine, benzol, or ether is the cement used in joining transparent glass, such as lenses, etc. See also SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, for various kinds of cement.

(33) L. W. W. asks: How can tar be separated from the water coming from a tower scrubber at a gas works? The tar is of a very light quality, it being so light that some of it floats on top of the water and is lost. A. Most of the tar will sink, and that which floats is so slight in quantity that we do not think it will pay to attempt to save it; possibly, however, by stirring it with heavier tar from the hydraulic main it will be collected and sink with it.

(34) J. F. L. asks for a receipt for removing the gloss of diagonal cloth. A. We do not suppose this can be satisfactorily accomplished on a hard finished cloth; steaming is sometimes tried, but the effect is only slight and not permanent.

(35) L. S. asks for a formula for a stain, and method of applying same, that will make a good imitation of red cedar, on elm or other light colored woods. A. Either of the following will probably answer: 1. Boil $\frac{1}{4}$ pound madder and $\frac{1}{4}$ pound fustic in 1 gallon water; brush over the work, when boiling hot, until properly stained. 2. The surface of the wood being quite smooth, brush over with a weak solution of aquafortis, $\frac{1}{2}$ ounce to the pint, then finish with the following: Put $4\frac{1}{2}$ ounces dragon's blood and 1 ounce soda, both well bruised, to 3 pints spirits of wine, let it stand in a warm place, shake frequently, strain, and lay on with a soft brush, repeating until of proper color; polish with linseed oil or varnish.

(36) A. F. L. asks for the cost of the St. Louis Bridge, and also of the Brooklyn Bridge. A. The St. Louis Bridge cost \$6,537,000. Brooklyn Bridge cost in round numbers, \$15,500,000. These amounts include the approaches, but do not include interest. With interest added up to date of completion, the cost of the Brooklyn Bridge was about \$21,000,000.

(37) C. W. G. asks (1) for a No. 1 polish for wood. One that will remove specks, and fill up to some extent scratches, etc., and that would polish and dry quickly. A. Gum shellac 8 ounces, gum mastic 1 ounce, gum sandarac 3 ounces, alcohol 40 ounces. Dissolve the last two in the alcohol, then dissolve the shellac and pour off the clear for use. Filling composition consists of size and whiting brought to the consistency of putty. 2. A good zinc polish (fluid), one that will clean and polish quickly and is lasting. A. Use glycerine or creosote mixed with dilute sulphuric acid; hydrochloric acid diluted may also be used. 3. A good fluid for polishing and cleaning the copper drains for glasses used in saloons, they being wet continually, and hard to keep bright. A. Copper can be cleaned by using old nitric acid diluted, or use soft stone and rotten stone, made into a stiff paste with water and dissolved by gently simmering in a water bath. Rub on with a woollen rag and polish with dry whiting and rotten stone. 4. The best plating fluid for silver and nickel, without the battery. A. See answer to query No. 28, in the SCIENTIFIC AMERICAN for May 24, 1884.

(38) H. G. asks if there is any simple way of treating cord and rope so they will not rot when exposed to the weather. A. Immerse the cordage in a solution of 60 or 60 parts water and one part mercuric chloride (corrosive sublimate). This is said to preserve it from decay. We believe that standing rope is frequently treated with tar for a similar purpose, and an application of tallow is said to be beneficial for running rope.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

June 24, 1884,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Acid, apparatus for concentrating sulphuric, M. Willett.....	301,033
Adding machine, W. C. Smalstig.....	300,809
Amalgamating pans, bearing for the spindles of, A. Wallace.....	300,920
Amplifier, G. F. Schild.....	300,304
Annunciator, telephone call, C. W. Howard.....	300,976
Awning, L. Fox.....	300,962
Axle nut, vehicle, H. B. Gibbon.....	300,965
Bag frames, manufacturing imitation leather covered, R. W. Chapman.....	300,763
Baling press, S. P. Harbaugh.....	300,866
Bark peeling machine, F. Merziger.....	300,996
Bark stripping machine, F. F. Angermair.....	300,829
Basin and soap box, combined wash, F. E. Arnold.....	300,630
Battery. See Secondary battery.	
Bed bottom, D. Bennett.....	301,042
Beer, clarifying, E. Kersten.....	300,591
Bell, sleigh, D. A. Rich.....	300,896
Belt fastener, A. B. Lagrelle.....	300,985
Belt fastener, J. B. Norton.....	300,793
Belt fastener, J. W. Pugh.....	301,070
Belt fastener, Wolf & Manning.....	300,825
Belt shifter for iron planers, W. Gleason.....	301,054
Bench dog, C. C. Johnson.....	300,780
Bit brace, W. A. Ives.....	301,058
Bit stock, J. S. Fray.....	300,771
Boat. See Row boat.	
Boiler. See Steam boiler.	
Bolt holder, M. Hatfield.....	300,968
Boot and shoe bottoms, bleach and stain brushing machine for, White & Harrington.....	300,819
Boot and shoe heel burnishing machine, G. F. Cass.....	300,949
Boot and shoe sole or heel plate, J. M. Dexter.....	300,854
Bottle stopper, F. Burns.....	300,945
Bowling alley, portable folding parlor, W. E. Goodenough.....	300,862
Box covers, device for securing, F. M. Watrous.....	300,326
Brace. See Bit brace.	
Brake. See Vehicle brake.	
Brooches, device for fastening removable pins to, G. E. Butin.....	300,762
Broom holder, C. P. Ball.....	300,333
Broom holder, O. Ludwik.....	301,062
Bucket fixture, well, F. L. Howell.....	300,977
Buildings, construction of, E. Gilbert.....	300,961
Bundling machine, H. Mereweather.....	301,064
Burner. See Gas burner. Gas or oil burner.	
Button hook holder, J. Fye et al.....	301,053
Button, link, T. W. F. Smitten.....	300,910
Buttons, etc., from plastic materials, manufacture of, W. C. Abbott.....	300,984
Candy cutting machine, J. Kreischer.....	300,873
Car brakes, vacuum cylinder for railway, L. P. Lawrence.....	300,877
Car coupling, Compton & Lane.....	300,765
Car coupling, Coon & Hahn.....	301,046
Car coupling, J. H. Dustman.....	301,045
Car coupling, H. Graham.....	300,868
Car coupling, F. E. Grothaus.....	300,864
Car coupling, R. Morris.....	300,789
Car coupling, J. Murray.....	300,885
Car coupling, A. E. Stearnman.....	300,916
Car, railway, J. F. Batchelor.....	300,937
Cars, electric motor for railway, A. W. Adams.....	300,823
Carbon conductors, manufacture of, E. Weston.....	301,024
Carpet stretcher, J. L. Barrett.....	300,754
Carriage top, H. Higgin.....	300,971
Carriages, light frame for, H. Higgin.....	300,973
Carrier. See Hay carrier.	
Cartridge loading machine, R. Poole.....	301,003
Case. See Pencil case.	
Cash carrier, automatic, F. A. Allen.....	301,040
Caster, W. Koch.....	300,782
Casting ornamental plaques, etc., mould for, J. H. Harding.....	300,967
Castings, moulding apparatus for, J. E. Davies.....	300,853
Cement for giving a cheap and durable metal coating to papier-mache, plaster-of-Paris, clay, etc., liquid, F. Philipp.....	300,890
Cement, hydraulic, J. Murphy.....	300,790
Cigar press, G. Massie.....	300,994
Clasp, C. F. & W. J. Walters.....	300,924
Cleaner. See Drain cleaner.	
Clothes drier, A. L. Benedict.....	300,755
Clothes wringer, W. I. Fitch.....	300,860
Clutch, C. Dancel.....	300,969
Coal hod, G. A. Bowers.....	300,944
Cock, steam or water, J. A. Nicholson.....	300,792
Collar pad, horse, F. F. Kanne (r).....	10,492
Coloring matter from dinitrophenol, production of, F. Kruger et al.....	300,874
Colter, rolling, C. R. Hartman.....	300,775
Cooking utensil, C. M. Bonneau.....	300,839
Cooler. See Liquid cooler.	
Corkscrew, W. E. Alvord.....	300,936
Corn feed regulator, ear, S. E. Marsh.....	300,991
Corn sheller, A. Kiger.....	300,872
Coupling. See Car coupling. Thill coupling.	
Cover holder for jars, milk cans, etc., M. Alston.....	300,835
Cultivator, C. L. Schoenstedt.....	301,011
Cutter. See Pipe cutter.	
Dental floss holder, G. E. Greene.....	301,055
Desk, D. Shuler.....	301,014
Die stock and die, N. Sawyer.....	300,901
Distillation of oil, apparatus for the continuous, H. C. Smith.....	300,811
Ditching machine, T. Willsea.....	301,034
Drag, adjustable marine, J. W. Collins.....	300,764
Drain cleaner, G. W. Immel.....	300,870
Drier. See Clothes drier. Fruit drier.	
Drill. See Rice drill.	
Dry closet, F. F. Street.....	301,018
Dynamometer, A. Wilson.....	300,821
Electric circuits, junction device for, E. Weston.....	301,029
Electric circuits, safety strip for, E. Weston.....	301,030
Electric conductors, connector for, E. Weston.....	301,026
Electric machine, dynamo, J. B. Blair.....	300,835
Electric machine, dynamo, E. Weston.....	301,025
Electric motor, W. Adams.....	300,827
Electric regulator, E. Weston.....	301,028
Electrical circuit breaker, E. Weston.....	301,023
Electrical conductor, E. Weston.....	301,031
Elevator guard, H. C. Wilcox.....	300,932
Embalming apparatus, A. S. Lovett.....	300,989
Engine. See Gas engine. Rotary engine.	
Traction engine.	