

## 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. The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.*

Belting wanted, single or double, 30 ft. 28 in.; 65 ft. 24 in.; 52 ft. 16 in.; 42 ft. 20 in.; 37 ft. 8 in. State particulars, price, condition, etc. E. A. Galindo & Co., 40 Dey St., New York city.

Hotchkiss Improved Mechanical Boiler Cleaner. Removes all sediment from steam boilers, thereby preventing incrustation. Send for circular. Jas. F. Hotchkiss, 84 John St., New York.

Superintendent wanted, well skilled in use of wood-working machinery. Address Skill, Box 773, New York.

Position wanted as Chemist or Assayer in a Chemical or Manufacturing establishment or Smelting works, by a graduate of School of Mines, Columbia College. Best of New York city references. Address A. Meissner, 98 William St., New York.

Rubber Hose, Emery, Baxter Wrench, and Soapstone Packing. Greene, Tweed & Co., 118 Chambers St., N. Y.

Rules for Engineers and Firemen, and the Removal of Scale in Boilers. Send for circular. Rankin & Co., 50 Federal St., Boston.

The \$4 Drill Chuck sent free on receipt of price. A. F. Cushman, Hartford, Conn.

Wanted—Parties with Capital to Manufacture on Royalty, or other ways, a patented new Musical Instrument, consisting of sixty-six bells piano key-board and pedals. Send stamp; full particulars will be given. Good references. Address patentee, C. G. Buttkeireit, Des Moines, Iowa.

Books relating to Architecture, Civil Engineering, Electricity, Electric Light, Drawing, Gas, Heat, Hydraulics, Mining, Sanitary Engineering, Steam Engine, Turning, Water Supply, etc. Catalogues free. E. & F. N. Spon, 446 Broome St., New York.

Alden Ore Crushers and Pulverizers, six sizes, \$45 to \$1,500. E. T. Copeland, 30 Cortlandt St., N. Y. city.

Saw Mill Machinery. Stearns Mfg. Co. See p. 77.

See Stockwell Screw and Machine Co.'s adv., p. 76.

For Best Quality Brass and Composition Castings, address E. Stebbins Mfg. Co., Brightwood, Mass.

For Sale.—A N. Y. Steam Engine Co. 21 inch heavy Snotter, in good order. Address Southwark Fo. & M. Co., Phila., Pa.

Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Asbestos Board, Packing, Gaskets, Fibers, Asbestos Materials for Steam & Building Purposes. Boiler & Pipe Covering, Asbestos Pat. Fiber Co., limited, 194 B'way, N. Y.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole m'frs., H. Lloyd & Son & Co., Pittsburg, Pa.

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Apply to J. H. Blaisdell for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

Our new Stylographic Pen (just patented), having the duplex interchangeable point section, is the very latest improvement. The Stylographic Pen Co., Room 13, 169 Broadway, N. Y.

Safety Linen Hose for Warehouses, Steamboats, and Hotels, at reduced rates. Greene, Tweed & Co., N. Y.

Advertising of all kinds in all American Newspapers. Special lists free. Address E. N. Freshman & Bros., Cincinnati, O.

Skinner & Wood, Erie, Pa., Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

Sweetland & Co., 126 Union St., New Haven, Conn., manufacture the Sweetland Combination Chuck.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass.

For the best Stave, Barrel, Keg, and Hoghead Machinery, address H. A. Crossley, Cleveland, Ohio.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

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

Stave, Barrel, Keg, and Hoghead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 52 and 94 Liberty St., New York.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Hydraulic Jacks, Presses and Pumps. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

4 to 40 H. P. Steam Engines. See adv. p. 63.

Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

Sheet Metal Presses. Ferracute Co., Bridgeton, N. J. Burgess' Non-conductor for Heated Surfaces: easily applied, efficient, and inexpensive. Applicable to plain or curved surfaces, pipes, elbows, and valves. See p. 234. Eclipse Portable Engine. See illustrated adv., p. 62.

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

Peck's Patent Drop Press. See adv., page 76.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 77. Blake "Lion and Eagle" Imp'd Crusher. See p. 77.

Improved Solid Emery Wheels and Machinery, Automatic Knife Grinders, Portable Chuck Jaws. Important, that users should have prices of these first class goods. American Twist Drill Co., Meredithville, N. H.

Wanted—First-class Iron Lathe, 20 to 24 in. swing, 17 to 20 ft. bed. Wm. Anderson, 23rd and Wood St., Phila. For Standard Turbine, see last or next number.

Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'frs, 23d St., above Race, Phila., Pa.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y.

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

\$400 Vertical Engine, 30 H. P. See page 93.

Wanted—The address of 40,000 Sawyers and Lumbermen for a copy of Emerson's Hand Book of Saws. New edition 1880. Over 100 illustrations and pages of valuable information. Emerson, Smith & Co., Beaver Falls, Pa.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 93.

For Wood-Working Machinery, see illus. adv. p. 93.

For Separators, Farm & Vertical Engines, see adv. p. 93.

Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. L. S. Graves & Son, Rochester, N. Y.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 92.

For Patent Shapers and Planers, see illus. adv. p. 93.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 413.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 93.

Patent Steam Cranes. See illus. adv., page 92.

Hydraulic Cylinders, Wheels, and Pinions, Machinery Castings; all kinds; strong and durable; and easily worked. Tensile strength not less than 65,000 lbs. to square in. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 93.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 93.

C. J. Pitt & Co., Show Case Manufacturers, 226 Canal St., New York. Orders promptly attended to. Send for illustrated catalogue with prices.

Catechism of the Locomotive, 625 pages, 250 engravings. The most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for a catalogue of railroad books. The Railroad Gazette, 73 Broadway, New York.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 94.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Solomon's Parallel Vise. Taylor, Stiles & Co., Riegelsville, N. J.

Penfield (Pulley) Blocks, Lockport, N. Y. See ad. p. 92.

## Notes & Queries

### HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) G. H. M. writes: I have a photo-negative from which I wish to print pictures. I have done such work before, but have forgotten the strength of the solutions. Of what strength should the silver solution be? Of what strength the gold and hypo? How should the pictures be washed? and should the face of the negative be covered with tissue paper? Are the pictures soaked in any solution before putting them in the toning solution? A. Sensitizing bath, nitrate of silver, 5 drachms; water (distilled), 5 oz.; nitric acid, 2 drops; pure kaolin, 1 oz. Dissolve the silver nitrate, agitate with the kaolin, let settle, and use the clear liquid. Expose the dried sensitized albumen paper to the vapor of ammonia in a dark box for ten minutes. Wash the prints well in clear running water, then tone in 10 oz. water (distilled) containing gold chloride, 4 grains; acetate of soda,  $\frac{1}{4}$  oz., filtered. Fix in water, 1 pint; hyposulphite of soda, 8 oz., filtered. Do not use tissue paper.

(2) W. H. S. asks: How can I make acetate of nickel? A. Precipitate an aqueous solution of acetate of nickel with excess of a solution of carbonate of soda, settle, decant the liquid, wash the precipitate, and dissolve it in warm acetic acid. Concentrate by evaporation, and crystallize the salt—acetate of nickel.

(3) A. H. M. writes: 1. Give me a cheap air and water-tight process for making an umbrella air and water proof, which will be as good as a rubber umbrella. A. See p. 368 etc., seq., Spon's Workshop receipts. 2. Can you tell me how to set eyes by the insoluble gelatin process? A. Boil the cloth in weak aqueous solution of glue, then in strong decoction of sumac. 3. Can photographs be burned on porcelain, glass, or crockeryware? If so, how; or can you mention a book telling anything about it? A. Transfer a well (gold) toned print on a thin gelatin back, to the slightly gummed surface, by wetting the back. Then burn in the muffle. We know of no book on the subject. 4. What kind of liquid soap is petroleum soluble in oil or

partly soluble? A. None that we know of. 5. There is a brilliant leather varnish, I think composed of shellac, gum, camphor, alcohol, and asphaltum. Can you tell me how it is made? A. We do not know the composition of this particular varnish.

(4) H. G. T. asks (1) for information as to what would destroy a little green insect called aphids. They cover the tender buds of a honeysuckle. A. Use a dilute aqueous solution of sulpho-carbonate of potash. Apply with a finely perforated sprinkler. 2. Do you know of anything that will rid the pantry of red ants (very small)? A. Have you tried Dalmatian insect powder, or a strong solution of sugar with three parts borax? 3. Do you know of any party that manufactures or deals in apparatus for pumping by horse power? A. See column of Business and Personal. A small advertisement therein would perhaps procure the desired information.

(5) C. asks for a method of preserving photographs, and also a receipt for renewing photographs that have faded. A. Keep them behind glass and away from the light as much as possible. All ordinary photographs are apt to fade by long exposure to light, and cannot be easily re-developed by chemical means.

(6) O. E. P. writes: In "Notes and Queries," July 24, 1880 (1), "F. J. B." wants to know how to keep pencil drawing from rubbing out. Having been through the same experience fifteen years ago, I will venture to advise him to use varnish made of bleached shellac and alcohol. Use 95 per cent alcohol and the best shellac to be had; macerate 24 to 36 hours, and strain. Apply with a flat camel's hair brush. Pencil drawings made on manila paper will shrink badly after varnishing, but good drawing paper will come out all right, and if properly varnished may be washed with soap and water when soiled without injury to the lines. Some drawing paper, of an open texture, requires to be sized with a warm aqueous solution of isinglass before varnishing.

(7) F. A. L. writes: In SCIENTIFIC AMERICAN, No. 4, for July 24, "F. J. B." asks for a solution to prevent pencil drawing from rubbing. I think he will find a thin solution of white shellac sprayed on with an atomizer (a 25 cent one is good enough) the easiest method.

(8) J. McM. writes: A distillery near this city, being short of water, desires to lay a five inch iron pipe to a large spring about 3,600 feet distant from the pool they now draw their water from. The standard height of the spring or fountain is 15 feet higher than the top of strainer on the present pipe in the pool. There is a rise from the fountain (about 850 feet from same) of 24 feet, and from there to the pool (about 2,750 feet) a descent of 39 feet from said highest point, making the fall from the fountain as stated, 15 feet from fountain to outlet. The overflow pipe at the pool outlet is 5 feet below the surface of the fountain. Queries: 1. Is it necessary to have a stop valve in the pipe at the fountain? A. No. 2. Is it necessary to have an exhaust pump at the high point? A. Yes. 3. Is it necessary to have a globe valve at the outlet? A. There should be a valve to control the delivery of the water. 4. When filled with water, and the outlet valve opened, will the water continue to run on the siphon principle; and is there any trouble, provided the pipe is air tight, in a successful operation of said pipe on the siphon principle? The ascent from the fountain to the height named is gradual and the descent is gradual. A. Yes, if the pipe is perfectly tight. In laying the pipe we would advise you to sink it in the ground at the highest point as much as possible to reduce the lift.

(9) F. B. asks: At what date was telegraphing practically used in the United States, also in England? A. The first public exhibition of Morse's telegraph in this country was on September 2, 1837. The first working line was built between Washington and Baltimore in 1843-44. On May 27, 1844, the first dispatch was sent. The Morse system was introduced into Europe in 1845.

(10) E. D. T. asks for a recipe for ink powder that will make good black writing ink by dissolving in cold water, so as to be fit for use in a few hours or less. A. Tannic acid, 7 ounces; sulphate of iron (copperas), 1 pound; gum arabic,  $\frac{1}{2}$  pound; sugar (white),  $\frac{1}{4}$  pound; powder as finely as possible; rub all together, adding a few drops of clove oil.

(11) F. H. M. asks: How is wood alcohol made? A. It is obtained mixed with pyroligneous acid (crude wood vinegar) from the destructive distillation of wood. When this is heated in a still the first portions distilling are impure wood spirit. This purified by several rectifications (redistillations) yields common wood naphtha. The empyreumatic matters, acetone, etc., which it contains may be removed by heating it in a still over a water bath with an excess of chloride of calcium as long as volatile matters escape (impurities), then distilling the remainder with a quantity of water equal to the spirit taken. Rectification of this dilute spirit over lime yields pure wood naphtha—methyl alcohol.

(12) J. H. M. says: We have had some discussion over the safety of a lightning rod, and would like to have your opinion. The rod is on the spire of one of our churches, about 155 feet from the ground to point of spire. The rod is of  $\frac{1}{2}$  inch square wrought iron, and without insulation of any kind, but fastened about every 2½ feet by an iron spike driven into the wall or roof. The points are not soldered in any way, but the lower piece is pointed and hooked into an eye in the upper piece. We do not know how the rod is grounded. Do you consider this a safe rod? This spire has been struck once by lightning that we know of. The solder on the cross on top was melted, being the only injury sustained. A. If the rod is thoroughly grounded it may do; but it is not large enough to carry very heavy discharges of electricity, and unless enlarged there is liability to damage. The rod should be  $\frac{3}{4}$  of an inch square, or four times the present size, and all the joints should be thoroughly soldered, so as to make a continuous rod as nearly as possible. If you put on three more rods of the size you have, that would do. The most important part of every rod is the bottom or underground connection. The lower end of the rod should

be well connected with a metallic water pipe or gas pipe, or the electrical conducting body having an extensive surface that is in contact with the earth.

(13) D. F. S. writes: I have seen many inquiries about siphons in the column of answers to correspondents. I had some experience with them and find them more difficult things than they are generally supposed to be. The way to get the air out of the neck is to have a cell at the bend on top like an inverted bottle, with a stop cock in the neck. The air will collect in this cell and can be taken out by turning the cock and then filling the cell with water and closing it and again turning the cock. In siphons of large diameter the discharge end must be in water to prevent air from going in. Running water soon fills them with air on account of the small bubbles. A ram is better in such places. The places are not plenty where they are needed, and generally something else would answer better. That is my experience.

(14) C. H. B. asks: Will electricity in transit over or through a wire, or passing along a wire, emit sparks? or will it ignite combustibles that may surround a wire when passing through the same? A. If the wire is used as a lightning conductor, the current is likely to take the nearest ground, and wherever it leaps a space there will be a spark sufficient to ignite combustible substances. An ordinary battery current will not escape from a wire with a spark except when actual contact is made and broken between the terminals of the conductor.

(15) E. S. P.—An analysis of Smith Bros.' borax (slightly effloresced) gave: anhydrous borax, 53.01 per cent; water, 46.24 per cent; chlorides, 0.71. A sample of fine English borax (also slightly effloresced) gave: anhydrous borax, 58.63 per cent; water, 41.15 percent; chlorides, 0.22 per cent.

(16) C. N. M. writes: In an argument, I contended that, in looking at the moon through a telescope first, and then through an empty tube of same dimensions—although illusory—it seemed really to the eye, to take a longer time for the moon to pass from sight while looking through the empty tube, than it did the telescope. The other party held out that there was no apparent difference in either. I tried to explain that the difference was caused in being magnified and bringing the object nearer to the eye. Which is right? A. You are right. The apparent motion of the moon is magnified in the same proportion as its disk is magnified, so that with the lenses in the telescope tube, the moon would pass much more rapidly out of the field than with the empty tube.

(17) G. J. S. writes: Thinking it an advantage to have the water consumed by our boilers by register rather than by yearly rent, we would like to find out the amount used at present, and would, therefore, respectfully ask you to inform me how many gallons of water will be consumed per hour per horse power at 75 lb. steam pressure? A. If your boiler and engine are reasonably good and properly run, you will require between 3 and 3½ gallons of water per hour per horse power.

(18) F. W. S. asks: 1. Can an engine with a cylinder say 2 inches diameter and 4 inches stroke, be constructed upon the principle of the small oscillating toy engines that would be of any utility for driving machinery? A. Yes, to work one-half to three-fourths horse power. 2. What should be the boiler capacity for size above given? A. Should have 10 to 12 feet face surface.

(19) E. A. B. asks (1) how outriggers are made for raceboats? A. Outriggers are generally made of iron  $\frac{3}{8}$  inch to  $\frac{1}{2}$  inch diameter, with the offset required and bolted to side of boat. 2. Is a boat 16 feet in length and 2 feet beam large enough for two oarsmen? A. 2 feet beam is not sufficient, it should be at least 3 feet.

### COMMUNICATIONS RECEIVED.

On the Hydraulic Mineral Belt of Texas. By J. D. On Mechanical Measures for Affecting the Water. By G. H. B.

Not a Serpent. By J. A. C.

Stone Implements. By S. C. G.

On the Thermal Telephone. By G. W. McP.

[OFFICIAL.]

## INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

July 13, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Agricultural boiler, J. W. Hudson.....	229,891
Air compressing engine, E. Hill.....	229,821
Animal shears, J. G. Corey.....	229,872
Animal trap, J. L. Ramaley.....	229,913
Aspirator, W. Autenrieth.....	229,786
Auger, hollow, G. N. Stearns (r).....	9,293
Axle box, car, A. Higley (r).....	9,295
Axle lubricator, S. Broadbent.....	229,859
Axle skein, vehicle, J. C. Sebring.....	229,920
Baby chair strap, M. W. Blacker.....	229,946
Bale tie, J. White.....	230,093
Baling press, T. D. Kane.....	229,892
Ballot box, Crowe & Hester.....	229,865
Bed bottom, J. R. Pafford.....	230,045
Bedstead frame leg, G. Steinson.....	230,078
Bedstead, invalid, L. Prince.....	229,910
Belt tightener, Rinehart & Albertson.....	229,841
Belt, woven endless, S. W. Baker.....	229,939