

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.

In the new "Trautwine's" the articles are systematically arranged, so that an article may often be found without the aid of the new and very full index.

"How to Keep Boilers Clean." Send your address for free 88 page book. Jas. C. Hotchkiss, 120 Liberty St., N. Y.

Wanted—20 or 25 horse power upright engine. Must be in good order. Write, giving dimensions and price, "W." Mattoon, N. Y.

Pump Catechism tells practically how to set up, adjust, run any pump in market. \$1.00. Practical Pub. Co., Room 8, 5 Dey St., New York.

Patent for Sale.—Only improvement ever made in plated knives. M. A. Morehouse, Wevertown, N. Y.

Fine Models. Haven, 211 Mulberry St., Newark, N. J.

To Let—Part of large store, 43 Dey St., New York.

Stationary and Boat Engines, Boilers, best made, cheapest price. Address Washburn Engine Co., Medina, Ohio.

For the latest improved diamond prospecting drills, address the M. C. Bullock Mfg. Co., 133 Jackson St., Chicago, Ill.

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.

For Sale—Machine shop plant, in operation. Best tools. Address Chas. W. Griggs, 175 Dearborn, Chicago.

The Australian-American Trading Co., 20 Collins St., West Melbourne. Sole agencies for American novelties desired. Correspondence solicited. Care of Henry W. Peabody & Co., Boston.

The Knowles Steam Pump Works, 113 Federal St., Boston, and 98 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

Link Belting and Wheels. Link Belt M. Co., Chicago.

The Railroad Gazette, handsomely illustrated, published weekly, at 73 Broadway, New York. Specimen copies free. Send for catalogue of railroad books.

Protection for Watches. Anti-magnetic shields—an absolute protection from all electric and magnetic influences. Can be applied to any watch. Experimental exhibition and explanation at "Anti-Magnetic Shield & Watch Case Co.," 18 John St., New York. F. S. Giles, Agt., or Giles Bro. & Co., Chicago, where full assortment of Anti-Magnetic Watches can be had. Send for full descriptive circular.

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

All Books and App., cheap. School Electricity, N. Y.

Supplement Catalogue.—Persons in pursuit of information of 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.

Woodworking Machinery of all kinds. The Bentel & Margendant Co., 116 Fourth St., Hamilton, O.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. \$100 "Little Wonder." A perfect Electro Plating Machine. Sole manufacturers of the new Dip Laquer Kristaline. Complete outfit for plating, etc. Hanson, Van Winkle & Co., Newark, N. J., and 92 and 94 Liberty St., New York.

Wanted—A Draughtsman. Address "Mechanic," P. O. Box 773, N. Y.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Catalogue of books on civil and mechanical engineering, electricity, arts, trades, and manufactures, 116 pages, sent free. F. & F. N. Spon, 35 Murray St., New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y.—Pumps for liquids, air, and gases. New catalogue now ready.

Planing and Matching Machines. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Wanted—A Good Machinist to act as Millwright in an iron works. Address B. W. M. P. O. Box 773, N. Y.

Iron, Steel, and Copper Drop Forgings of every description. Billings & Spencer Co., Hartford, Conn.

We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure asbestos goods of all kinds. The Calumers-Spence Co., 419 and 421 East 8th Street, New York.

Curtis Pressure Regulator and Steam Trap. See p. 45.

New Portable & Stationary Centering Chucks for rapid centering. Price list free. Cushman Chuck Co., Hartford, Conn.

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

60,000 Emerson's 1886 Book of superior saws, with Supplement, sent free to all Sawyers and Lumbermen. Address Emerson, Smith & Co., Limited, Beaver Falls, Pa., U. S. A.

Safety Elevators, steam and belt power; quick and smooth. D. Frisbie & Co., 112 Liberty St., New York.

The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describing water works machinery, and containing reports of tests, on application.

Stearns new bench drill. Low priced, highly finished. Used by all mechanics. Immense numbers sold. See advt., p. 301.

Iron and Steel Wire, Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.

Astronomical Telescopes, from 6" to largest size. Observatory Domes, all sizes. Warner & Swasey, Cleveland, O.

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

Send for new and complete catalogue of Scientific Books for sale by Munn & Co., 361 Broadway, N. Y. Free on application.

NEW BOOKS AND PUBLICATIONS.

THE DESIGNING OF ORDINARY IRON HIGHWAY BRIDGES. By J. A. L. Waddell. John Wiley & Sons, New York.

The object of this work is mainly to reduce the labor of designing bridges, thus facilitating the work of engineers, and to present the matter with sufficient detail and minutiae of plans and data for estimating cost to form a compendium of information of high value to county commissioners and others who have the responsibility of erecting public bridges. The plates in the book are remarkably full and complete, showing and naming every member of bridges of the Pratt and Whipple systems, which constitute ninety per cent of all American iron highway bridges; and the tables give not only exact sizes of all the parts, but also the most economic dimensions of panels and trusses, etc. Students in bridge engineering will likewise find in this volume a valuable assistant, as the author has long been prominent as a teacher of civil engineering, and explains his subject with great clearness.

COMPARATIVE PHYSIOLOGY AND PSYCHOLOGY. By S. V. Clevenger. Janesen, McClurg & Co., Chicago.

This book is a "discussion of the evolution and relations of the mind and body of man and animals." It is the work of a physician, with the object of elaborating, as far as possible, a mental science reconciling the observations of anatomists, psychologists, and pathologists, for the more intelligent treatment of insanity. Besides years of personal investigation, the author has been a diligent student of Darwin and Herbert Spencer, of Huxley and Tyndall, and endeavors to throw such light upon his subject as the results of their reasoning and experiments suggest.

\*\* Any of the above books may be purchased through this office. Send for new catalogue just published. Address Munn & Co., 361 Broadway, N. Y.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names 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 in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) W. G. R. asks (1) how to make a starch enamel for stiffening collars, cuffs, etc. A. Use a little gum arabic thoroughly dissolved in the starch. 2. A good cough sirup. A. Put 1 quart hoarhound to 1 quart water, and boil it down to a pint; add two or three sticks of licorice and a tablespoonful of essence of lemon. 3. A "paste" metal polish for cleaning and polishing brass. A. Oxalic acid 1 part, iron peroxide 15 parts, powdered rotten stone 20 parts, palm oil 60 parts, petrolatum 4 parts. See that solids are thoroughly pulverized and sifted, then add and thoroughly incorporate oil and petrolatum. 4. Cough candy or troches. A. Tincture of squills 2 ounces, camphorated tincture of opium and tincture of tolu of each 1/4 ounce, wine of ipecac 1/2 ounce, oil of gaultheria 4 drops, saffras 3 drops, and of aniseed oil 2 drops. The above mixture is to be put into 5 pounds of candy which is just ready to take from the fire; continue the boiling a little longer, so as to form into sticks.

(2) J. W. asks (1) how to oxidize silver. A. For this purpose a pint of sulphide of potassium, made by intimately mixing and heating together 2 parts of thoroughly dried potash and 1 part of sulphur powder, is used. Dissolve 2 to 3 drachms of this compound in 1 1/2 pints of water, and bring the liquid to a temperature of from 155° to 175° Fah., when it is ready for use. Silver objects, previously freed from dust and grease with soda lye and thorough rinsing in water, plunged into this bath are instantly covered with an iridescent film of silver sulphide, which in a few seconds more becomes blue black. The objects are then removed, rinsed off in plenty of fresh water, scratch brushed, and if necessary polished. 2. Was a census taken in Massachusetts about 1770? If so, where can the returns be found? A. The first national census was taken in 1790, and the first independent Massachusetts census in 1857.

(3) C. D. F. asks what a sample of wax sent is composed of, and a receipt for moulding wax for artists. A. To determine the composition of the sample would require an analysis. For a moulding wax try the following: Melt over a moderate fire 100 parts of yellow wax, and add 13 parts of Venetian turpentine, 6 1/4 parts of lard, 7 1/4 parts of elutriated bole. Mix thoroughly, pour the mixture gradually into a vessel containing water, and knead it several times with the hands. The wax must be melted at a temperature sufficiently low not to create bubbles. Add Indian red if desired for color.

(4) W. J. W. asks where he can get a light and cheap lapidary's outfit. A. This class of appliances is not on sale. A frame with wheel, shaft and spindle, placed in a vertical position, with two or three lead laps, one for coarse emery, one for fine emery, and one for polishing, also a lap made with end wood on a chuck for polishing, and a leather polisher, desirable for rounded work, are all that is needed. A thin disk of copper mounted on ordinary lathe spindle is used for slitting with emery. If you wish to use diamond dust, a sheet steel disk, very thin, should be used. Any machine shop can produce these.

(5) C. H. F. asks how the conducting power of heat in metals compares with that of glass. A. Glass is a poor conductor of heat for transmission. Iron transmits thirty times more heat than glass under the same conditions. Brass is about midway between iron and copper, copper being eighty times better as a conductor than glass.

(6) J. J. P. asks: Would the dynamo described in SUPPLEMENT 161 produce the same amount of current if the layers of wire on the field magnets were wound in parallel circuit? A. With the present armature, no. 2. What size wire would be necessary to wind the armature for plating? A. Armature No. 14, field magnet No. 14, or with two No. 16 wires wound parallel.

(7) J. C. P. writes: At the bottom of page 278 of your last edition (No. 18) there is the following statement: "The outer terminal of the coil is connected with one of the screws, and the inner terminal of the same coil is connected with the screw in the next bar in order in the commutator cylinder." If this was done, how is the circuit made through the armature? A. The inner end of one coil is connected with the outer end of the adjacent coil at the screw of the commutator bar, so that the circuit is from one coil to the commutator bar, then back to the outer end of the next coil, then through this coil to the next commutator bar, thus back to the next coil in order and so on, thus completing the closed circuit of the armature. This point is clearly stated in the article referred to.

(8) D. F. F. asks the formula for the paper torpedoes sold on 4th of July. A. The explosive material is fulminate of mercury.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted,

May 10, 1887,

AND EACH BEARING THAT DATE.

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

Table listing inventions with patent numbers, including Acid, production of a new naphthylamine-mono-sulphonic, Weinberg & Siebert, 362,600; Aerated beverages, tablet for, S. R. Divine, 362,727; Aerated waters, producing, S. R. Divine, 362,728; Air ship, P. C. Campbell, 362,606; Alarm, See Electric danger alarm; Alphabet case, A. M. Safford, 362,665; Anchor, land, T. Nevison, 362,774; Animal trap, H. J. Seymour, 362,732; Anvils, horseshoe vice attachment for, J. Dwyer, 362,614; Armor plates, manufacture of compound, A. Wilson, 362,806; Ash or garbage can, C. M. Brion, 362,804; Auger, earth, J. Wells, 362,563; Axle lubricator, J. L. Yost, 362,965; Axle, vehicle, J. M. Brosius, 362,486; Axle, vehicle, T. G. Mandt, 362,756; Axle, wagon, C. M. Regan, 362,689; Back band hook, A. Dennis, 362,498; Bag, See Traveling bag; Bag fastener, Mitchell & Thomas, 362,772; Bag holder, D. S. Wing, 362,807; Baling press, W. E. Bradley, 362,713; Baling press, E. Buttersfeld, 362,875; Baling press, G. Ertel, 362,884; Bar, See Cutter bar; Barbed nail or spike, C. Kerrison, Jr., 362,848; Battery, See Electric battery. Secondary or storage battery. Voltaic battery; Beds, air spring bottom for, J. Patterson, 362,628; Belt, apparel, S. Bretzfeld, 362,628; Belting, manufacturing wire, Emerson & Midgley, 362,577; Belting, wire, Emerson & Midgley, 362,578; Bicycle, J. W. Emulsion, 362,600; Bicycle wheel, W. S. Kelley, 362,514; Bicycles, handle bar fastening for, J. B. McCune, 362,763; Billiard ones, machine for trimming the ends of, W. H. Mueller, 362,526; Blind or shade, window, M. G. Mitter, 362,524; Blinds, guide frame for sliding window, G. Poppert, 362,864; Boat, See Sectional boat; Boats or other vessels, knee for, H. H. Buck, 362,487; Boiler, See Steam boiler. Wash boiler; Boilers, water cleaner for, J. W. Hyatt, 362,841; Bookbinding, T. C. Love, Jr., 362,754; Book holder, T. Hansen, 362,741; Book, manifold copying, J. L. O'Connor, 362,529; Bottle, mullage or liquid glue, W. H. Rodden, 362,857; Box, See Journal box. Paper box; Box fastener, A. H. Gaertner, 362,831; Box fastener, E. Schandain, 362,920; Bracket, See Scaffold bracket; Brake, See Car brake. Cornice brake. Gin brake; Bricks, tiles, etc., composition for, M. Marx, 362,769; Bridle, Sutton & Terry, 362,591; Broiler, J. Battis, 362,463; Buckle, A. Wahra, 362,739; Buckle, belt, L. Sanders, 362,686; Buckle for saddles, girth, P. J. Peasey, 362,685; Buckle, harness, I. Roraback, 362,540; Buckle, strap, C. F. Allen, 362,595; Burner, See Gas burner. Lamp burner; Butter package, S. Bnyth, 362,676; Buttonhole cutter, L. A. Carson, 362,817; Cable, wire, A. J. Morham, 362,649; Camera, See Photographic camera; Can, See Ash or garbage can. Creaming can;

Table listing inventions with patent numbers, including Car brake, J. A. Neichter, 362,773; Car mechanism, cable, T. L. Johnson, 362,685; Car motor, street, J. P. Sparks, 362,795; Car seat lock, J. Kirby, Jr., 362,891; Cars, bunk for railway, C. C. Wood, 362,898; Cars, cuspidor for railway, T. Straker, 362,507; Cars, grain door fastener for railway, J. H. Heckman, 362,800; Cars, holder for address cards or labels upon railway, Kellogg & Penrose, 362,842; Carpet stretcher, W. Sexauer, 362,791; Carpet stretcher, G. P. Woodworth, 362,863; Carriage bow spring rest, W. S. Coleman et al., 362,918; Carrier, See Dental disk carrier. Game carrier; Case, See Alphabet case. Cell case. Cigarette case. Show case. Watch case; Casting plumbers' traps, apparatus for, C. E. Heiss, 362,694; Cell case, E. C. Bowser, 362,711; Centerboard fitting for boats, E. H. Barney, 362,702; Chain and lever power, O. H. Smith, 362,543; Chain attachment, watch, F. W. Brueckner, 362,718; Chain elevator, endless, C. Chase, 362,671; Chair, W. C. Tait, 362,736; Check, baggage, C. M. Drinker, 362,882; Check hook, harness, P. Penner, 362,523; Chill mould, J. W. Seigh, 362,546; Chopper, See Cotton chopper; Churn, A. Haessly, 362,506; Churn, J. N. Schwalen, 362,543; Churn motor, G. W. Thomson, 362,797; Cigarette case, F. S. Kinney, 362,845; Clocks, circuit controller for self-winding, C. H. Pond, 362,902; Closet, See rth closet; Clutch, friction, I. G. Hooper, 362,837; Clutch, friction, J. Kirk, 362,636; Coal screen heater, F. L. Shallenberger, 362,795; Coal scuttle, W. Freudenberg, 362,616; Cock, cylinder, H. R. Whomes, 362,804; Cock gauge, Shaw & Toole, 362,546; Coffee and tea pot attachment, G. S. Spring, 362,650; Coffee pot, J. K. Cummings, 362,878; Coins therefrom, combined box or chute and means for intermittently discharging, E. W. Furrell, 362,896; Collar and neck strap coupling, breast, S. F. Smith, 362,549; Coloring matter, trimethylethylthionin blue, E. Ullrich, 362,592; Column rest, J. S. Broughton, 362,716; Comb, See Weaver's comb; Cornice brake, G. C. Keene, 362,749; Cotton chopper, Sanford & Peavy, 362,541; Coupling, See Collar and neck strap coupling. Hose coupling. Thill coupling; Cradle, child's, P. E. McDonald, 362,644; Cradles or chairs, motor for rocking, T. J. Morris, 362,850; Creaming can, S. G. Baldwin, 362,812; Cultivator, S. W. Decker, 362,876; Cultivator, E. M. Kissell, 362,517; Cupboard catch, I. C. Williams, 362,806; Curtain fixture, C. Bell, 706; Cut-off and spout, W. Exner, 362,917; Cut-off, rain water, W. A. Buckton, 362,488; Cutter, See Buttonhole cutter. Vegetable cutter; Cutter bar, J. H. Daniel, 362,622; Cyclometer, W. R. Duteuple, 362,863; Cyclometer, J. G. Pool, 362,858; Dental disk carrier, H. C. Register, 362,783; Dental polisher, J. B. Wood, 362,808; Desk, portable, J. M. Shinn, 362,589; Direct-acting engine, J. Pracy, 362,856; Disinfecting sewage, apparatus for, J. J. Powers, 362,857; Door threshold and weather strip, Woolbridge & Frasure, 362,639; Drawers, M. C. Yarwood, 362,565; Dredge and excavator, R. R. Osgood, 362,587; Dredging machine, J. E. Crockett, 362,877; Drier, See Fruit drier. Malt drier; Drill, See Grain drill. Rock drill; Drilling machine, A. Gordon, 362,618; Dyestuff from tetrazo-diphenyl yellow red, F. Bayer, 362,813; Dyeing, T. Holliday, 362,886; Dyeing, etc., apparatus for, T. Hauschel, 362,630; Earth closet, C. D. Lane, 362,637; Eaves trough, J. L. Holton, 362,596; Egg beater, C. W. Staumbaugh, 362,868; Egg case machines, feeding mechanism for, J. H. Batchelder, 362,423; Electric battery, O. Lugo, 362,647; Electric battery, D. Misell, 362,584; Electric danger alarm, automatic, J. J. Ghegan, 362,739; Electric machine regulator, dynamo, E. T. & D. Higham, 362,510; Electric resistance, variable, J. M. Stearns, Jr., 362,859; Electro dynamic motor, C. J. Van Depoele, 362,796; Elevator, See Chain elevator; Elevator, A. G. Pae, 362,653, 362,654; Elevator gates, operating, W. Maus, 362,781; Engine, See Direct-acting engine; Engine cylinder, water escape device for, A. L. Ide, 362,629; Engine, etc., device for securing, J. M. Eder, 362,700; Extension table, F. Hagen, 362,608; Face register, W. J. Rigney, 362,538; Fatty bodies, process of and apparatus for saponifying and decomposing, L. Rivier, 362,866; Faucet hole and stopper combined, W. J. Woodley, 362,800; Feed water heater, P. Rossiter, 362,904; Feeder and purifier, boiler, J. W. Hyatt, 362,840; Feeder, boiler, J. Austin, 362,480; Felt, actuating wet, R. Smith, 362,673; Fence post anchor, V. Findling, 362,501; Fence posts, machine for trimming, J. E. Laycock, 362,638; Fence, wire, J. M. Vanover, 362,911; Fences, device for constructing wire and picket, J. J. Doughman, 362,824; Fiber, machine for cleaning vegetable, T. Villamor, 362,683; Fifth wheel, W. W. Grier, 362,504; Filter beds, apparatus for purifying, J. W. Hyatt, 362,839; Fire escape, Murphy & Lynn, 362,527; Fire extinguisher, hand, L. Bradley, 362,485; Floral piece, illuminated, R. E. Wilson, 362,691; Folding seat, U. L. Collins, 362,720; Folding table, T. H. Eulass, 362,825; Folding table, C. A. Main, 362,522; Fringe, C. Weinberg, 362,689; Fruit drier, G. A. & C. F. Fleming, 362,736; Fruit picker, M. H. Murphy, 362,650; Game apparatus, M. Muringer, 362,698; Game carrier, P. Cunningham, 362,879; Game table, W. R. Davis, 362,811; Gas and preventing its explosion, apparatus for detecting leakage of, Martin & Budd, 362,623; Gas burner, J. A. Dearborn, 362,497; Gas burner, C. S. Ford, 362,829; Gas governor, S. J. Wakeley, 362,656;