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 systemath cally 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 vour address for free 88 page book. Jas. C. Hotchkiss, 120 Liberty St.,

Wanted-20 or 25 horse power upright engine. Must be in good order. Write, giving dimensions and price, W.,"Matteawan, 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,

For the latest improved diamond prospecting drills, address the M. C. Bullock Mfg. Co., 138 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 93 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, pub. iished 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 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 SCI-ENTIFIC AMERICAN SUPPLEMENT sent to them free The SUPPLEMENT contains lengthy articles empracing the whole range of engineering, machanics, and physical science. Address Munn & Co., Publishers, New York.

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

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. \$100 "Lattle Wonder." A perfect Electro Plating Machine. Sole manufacturers of the new Dip Lacquer 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, W. 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 de-

scription. Billings & Spencer Co., Hartford, Conn. We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure sahestos goods of all kinds. The Chalmers-Spence Co. 419 and 421 East 8th Street, New York.

Curtis Pressure Regulator and Steam Trap. See p. 45. New Portable & Stationary Centering Chucksfor rapid centering. Price list free. Cushman ChuckCo., Hartford,

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

60,000 Emerson's 1886 E 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 ma chinery, and containing reports of tests, on application. Stearns new bench drill. Low priced, highly finished. Used by all mechanics. Immense numbers sold. See

Iron and Steel Wire, Wire Rope, Wire Rope Tram ways. Trenton iron Company, Trenton, N. J.

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

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

Send for now and odenplete catalogue of Scientific Books for sale by Mage &Co., #1 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 minutize 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. Jansen, 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 in sanity. Besides years of personal investigation, the author has been a diligent student of Darwin and Herbert Spencer, of Huxley and Tyndall, and endeavore 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.



HINTS TO CORRESPONDENTS.

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 Iuformation 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 tarch 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 ¼ ounce, wine of inecac % ounce, oil of gautheria 4 drops, sassafras 3 drops, and of aniseseed oil 2 drops. The above mixture is to be put into 5 pounds of candy which is 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 drachms of this compound in 1% pints of water, and bring the liquid to a temperature of from 155° to 175° Fah., when it is ready for use. Sliver 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 polshed. 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 waxtry the following: Melt over a moderate fire 100 parts of yellow wax, and add 13 parts of Venetian tur-pentine, 61% parts of lard, 721% 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 beused. 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 fer 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 presentarma ture, 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 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

(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 nore 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 unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the Upited States and all foreign countries may be hadon application, and persons contemplating the securing of pateuts, either at home or shroad, are invited to write to this office for prices which are low, in accordance with the times and our ex-tensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 861 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted,

May 10, 1887.

AND RACH PRARING THAT DATE [See note at end of list about copies of these patents.]

Acid, production of a new naphthylamine-mono Aerated beverages, tablet for, S. R. Divine...... 362,727 Aerated waters, producing, S. R. Divine....... 362,729 Alarm. See Electric danger alarm. Alphabet case, A. M. Safford...... 362,665
 Anchor, land, T. Nevison.
 362,774

 Animal trap, H. J. Seymour.
 362,792

 Anvils, horseshoe vise attachment for, J.
 . 362,614 Axle lubricator, J. L. Yost...... 362,865

 Axle, vehicle, J. M. Brosius
 362,496

 Axle, vehicle, T. G. Mandt
 362,756

 Axle, wagon, C. M. Regan
 362,659

 Back band hook, A. Dennis
 362,498

 Bag. See Traveling bag.
Bag fastener, Mitchell & Thomas...... Bar. See Cutter bar. Barbed nail or spike, C. Kerrison, Jr...... 363,848 Electric battery. Secondary or storage battery. Voltaic battery. Beds, air spring bottom for I. Patterner..... Belt, apparel, S. Bretzfield.

Beiting, manufacturing wire, Emerson & Midgley 32, 57 Ricycles. handle bar fastening for, J. B. McCune.. 362,763 Billiard enes, machine for trimming the ends of,
W. H. Mueller..... Blind or shade, window, M. G. Mitter...... Blinds, guide frame for sliding window, G. Pop-..... 362,854 pert..... Boats or other vessels, knee for, H. H. Buck..... 362,487

 Bookbinding, T. C. Love, Jr.
 362,754

 Book holder, T. Hansen.
 362,741

 Book, manifold copying, J. L. O'Connor.
 362,529
 Bottle, mucliage or liquid glue, W. H. Rodden 362 857 Box. See Journal box. Paper box. Box fastener, E. Schandein 362,920 Bracket. See Scaffold bracket. Brake. See Car brake. Cornice brake. Gin Bricks, tiles, etc., composition for, M. Marx..... 362,759
 Bridle, Sutton & Terry
 362,591

 Broller, J. Battis
 362,463
 Buckle, A. Wahra..... 362,799

 Buckle, belt, I.. Sanders.
 962,686

 Buckle for saddles, girth, P. J. Pefley
 362,686

Camera. See Photographic camera

Can. See Ash or garbage can. Creaming can.

Car brake, J. A. Neichter....... Car mechanism, cable, T. L. Johnson 362,663 Car motor, street, J. P. Sparks 862,796 Cars, cuspidorfor railway, T. Straker..... 369,907 Cars, grain door fastener for railway, J. H. Heck-Cars, holder for address cards or labels upon railway, Kellogg & Penrose...... 362,842 Carpet stretcher, W. Sexauer...... 362.791 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.

 Chair, W. C. Tait
 362,796

 Check, baggage, C. M. Drinker
 363,882

 Chill mould, J. W. Seigh...... 362,546 Clutch, friction, I. G. Hooper...... 362,53

Coal scuttle, W. Freudenberg 362,616 Cock, cylinder, H. R. Whomes 362,804 Cock gauge, Shaw & Toole 367,546 Coffee and tea_pot attachment, G. S. Spring...... 363,550 means for intermittently discharging, E. W. ... 962,896 Furrelt

Collar and neck strap coupling, breast, S. F. Coloring matter, trimethylethylthionin blue, E. lomb. See Wesver's comb.

Cradle, child's. P. E. McDonald...... 362:614 Cradles or chairs, motor for rocking, T. J. Morris. 362,850
 Creaming can, S. G. Baldwin
 262,812

 Cultivator, S. W. Decker
 362,575
 Curtain fixture, C. Bell.....

Cut-off and spout, W. Exner..... 363,917 Cutter bar, J. H. Daniel....

 Dental polisher, J. B. Wood.
 \$62,908

 Desk, portable, J. M. Shinn.
 \$62,589

Drill. See Grain drill. Rock drill.
 Bayer
 \$62,813

 Dyeing, T. Holliday
 \$62,835

Egg case machines, feeding mechanism for, J. H.
 Batchelder
 362,432

 Electric battery, O. Lugo
 362,847

Electric danger alarm, automatic, J. J. Ghegan. 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...... 362,798

Elevator. See Chain elevator. Rievator gates, operating, W. Maus............... 362,761 Direct-acting engine.

Engine erlinder, water escape device for, A. L.

Extended table, F. Histogezu. 362,605 362,809 le*..... Feed water heater, P. Rossiter.....

Fence posts, machine for trimming, J. E. Lay-

Fire escape, Murphy & Lynn 363,527
Fire extinguisher, hand, L. Bradley 363,485 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.
 \$62,736

 Game carrier, P. Cunningham. 362,879 Game table, W. R. Davis.

Gas and preventing its explosion, apparatus for