

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 Ide Automatic Engine, A. L. Ide, Springfield, Ill. Steam Pumps. See adv. Smith, Waile & Co., p. 30.

Contracts taken to manuf. small goods in sheet or cast brass, steel, or iron. Estimates given on receipt of model. H. C. Goodrich, 66 to 72 Ogden Place, Chicago.

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 35 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

Engines, 10 to 50 horse power, complete, with governor. \$250 to \$350. Satisfaction guaranteed. More than eight hundred in use. For circular address Heald & Morris (Drawer 127), Baldwinville, N. Y.

Best Squaring Shears, Tinners', and Canners' Tools at Niagara Stamping and Tool Company, Buffalo, N. Y.

Lathes 14 in. swing, with and without back gears and screw. J. Birkenhead, Mansfield, Mass.

The Best.—The Dueber Watch Case.

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, 261 Broadway, New York.

Farley's Directories of the Metal Workers, Hardware Trade, and Mines of the United States. Price \$3.00 each. Farley, Paul & Baker, 530 Market Street, Phila.

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

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.

Lists 29, 30 & 31, describing 4,000 new and 2d-hand machines, ready for distribution. State just what machines wanted. Forsyth & Co., Manchester, N. H., & N. Y. city.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J. "Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. Forsyth & Co., Manchester, N. H.

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

25' Lathes of the best design. G. A. Ohi & Co., East Newark, N. J.

"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 84 John St., New York.

Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, New Haven, Conn.

Water purified for all purposes, from household supplies to those of largest cities, by the improved filters manufactured by the Newark Filtering Co., 177 Commerce St., Newark, N. J.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill.

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3083, New York city.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Machinery for Light Manufacturing, on hand and built to order. R. E. Garvin & Co., 139 Center 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.

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 Curtis Pressure Regulator and Steam Trap. See p. 12.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 14. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 12.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 14. Lightning Screw Plates, Labor-saving Tools, p. 14.

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

Drop Forgings of Iron or Steel. See adv., page 46.

Drop Forgings. Billings & Spencer Co. See adv., p. 45.

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

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

50,000 Emerson's Hand Book of Saws. New Edition. Free. Address Emerson, Smith & Co., Beaver Falls, Pa.

Eagle Anvils, 10 cents per pound. Fully warranted. Gould & Eberhardt's Machinists' Tools. See adv., p. 45.

Barrel, Keg, Hogshead, Wheel Mach'y. See ad., p. 46. The Lehigh Valley Emery Works Co., Lehighton, Pa., sell a new Stove Plate Grinder, with transverse motion, and an Automatic Planer Knife Grinder, with a cup wheel. Cuts and descriptions sent upon application.

Drop Hammers, Power Shears, Punching Presses, Die Sinks. The Pratt & Whitney Co., Hartford, Conn.

Catechism of the Locomotive. 625 pages. 250 engravings. Most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for catalogue of railroad books. The Railroad Gazette, 73 B'way, N. Y.

For best low price Planer and Matchery, and latest improved Sash, Door, and Blind Machinery, send for catalogue to Rowley & Hernance, Williamsport, Pa.

The Porter-Allen High Speed Steam Engine. South-work Foundry & Mach. Co., 430 Washington Ave., Phil. Pa. The Sweetland Chuck. See illus. adv., p. 46.

Improved Skinner Portable Engines. Erie, Pa.

Catalogues free.—Scientific Books, 100 pages; Electrical Books, 14 pages. E. & F. N. Spon, 35 Murray St., N. Y.

NEW BOOKS AND PUBLICATIONS.

A MANUAL OF MARINE ENGINEERING. By A. E. Seaton, Charles Griffin & Co., London; D. Van Nostrand, New York.

This is a volume of 440 pages illustrated with numerous tables and with engravings reduced from working drawings. The design is to supply a manual showing how to apply theoretical principles to the designing and construction of marine engines and their machinery, as determined by the practice of leading engineers. While the book is composed with consideration for inexperienced mechanics, it is very thorough and comprehensive, and appears to be particularly valuable to the draughtsman and constructive engineer, although the mechanical engineer will find much in its pages of use in his department.

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 the office Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) T. H. asks: Can a person make for his own personal use an article that is protected by patent right without infringing on the inventor's right? A. The general rule is that no one may make, use, or sell a patented article without the consent of the patentee. But the rule has exceptions: 1. Any person may make a patented article for experiment, that is, to ascertain, bona fide, if the article will operate as set forth in the patent. 2. Any person may make a patented article for the purpose of determining whether the statements in the patent are true. 3. Any one may make a patented article to be used in connection with new improvements as a model before the Patent Office.

(2) H. and M. ask for a formula for the preparation of a good polishing liquid to apply to name plates of bronze (not "phosphor"). A. First remove all scratches with emery paper or cloth, and then rub, using a buffer, a mixture of tripoli and sperm oil.

(3) C. H. W. writes: 1. I noticed in your answers to correspondents that corrosive sublimate will preserve birds' eggs. How am I to make a solution of it that will preserve the eggs and prevent the white ones from turning black? A. Corrosive sublimate is soluble in 6 parts cold water, in 3 parts hot water, in alcohol, and in ether. Coat the eggs with the solution by using a camel's hair brush. 2. Will alcohol freeze when diluted one-half? A. The water will freeze, leaving the alcohol fluid.

(4) A. X. L. De C.—Parisian copying ink: A strong solution of logwood extract is treated with one per cent of alum and then with as much lime water, so that a permanent precipitate is formed. Some drops of weak calcium chloride are added, so that a perceptible bluish black color is attained, and hydrochloric acid is added drop by drop until a red solution is obtained. A little gum with half of one per cent of glycerine is added. To remove the ink from the chromograph, cold water and a sponge will suffice.

(5) W. A. G.—To polish agates for specimens: Grind the surface upon a true grindstone until you get a fair, smooth surface. Then rub them on a sole leather strap nailed to a board; wet the leather with water and apply crocus or rouge. The polishing must be done wet to give a fine gloss.

(6) J. D. G. asks: How much coal ought a good boiler to require per hour per horse power? How much water ought 1 pound of coal to evaporate into steam at 100 pounds pressure? How many square inches of grate surface for one horse power boiler? How many pounds of water required for each horse power? Will glass pressing against a wire rope wear the rope out as quick as brass would pressing against the rope? A. A first class boiler should produce 1 horse power per hour with the consumption of 6 pounds of anthracite coal; 1 pound of coal should evaporate from 9 to 10 1/2 pounds of water at 100 pounds pressure when doing light work. If water foams in boiler, it will be carried over in a vesicular state or as wet steam, and indicates a larger percentage than is due to the power produced. In large boilers one-half to three-fourths of square foot of grate surfaces is allowed per horse power. In boilers under 10 horse power, 1 foot to the horse power. It requires about 62 pounds water to the horse power per hour.

(7) H. B. writes: I am going to work a marble quarry in Canada; will you please state where I can see the best appliances both for quarrying and sawing, in operation. A. Marble quarrying is carried on extensively in Vermont, near Rutland. Probably the

finest appliances for sawing and dressing are to be found in the large marble works of New York and vicinity.

(8) R. S. writes: A mill dam is 1,000 feet from mill and 50 feet above it; we want to know which will give the most power with the same amount of water—to run it on an incline straight to mill, or to run it nearly level to mill and then perpendicular: Water to run in iron pipe and full capacity. A. Run it nearly level to the mill; you will then have the benefit of the whole fall. If run in a pipe, you lose the head required to overcome the friction of the pipe.

(9) A. D. asks: 1. Can you tell me how to bleach celluloid articles (restore their whiteness after they become yellow from exposure)? A. Sapollo can be used for this purpose. The manufacturers of celluloid furnish a preparation called celluline for this purpose. 2. What is the best sign writer's black, and how mixed to dry glossy and not oil the paper? A. This sign writer's black can be procured already mixed of desirable quality from large paint houses in this city. 3. What is the best oil for belting, and how applied? A. Castor oil is the best for this purpose, but any oil is of doubtful utility. 4. What happens to belts (on light work) that are not oiled? A. Nothing except usual wear. 5. What oil injures leather most? A. Kerosene is the most injurious oil to use. 6. How can bright iron be protected from rust? A. See SCIENTIFIC AMERICAN SUPPLEMENT, page 6270, No. 393.

(10) R. S. G. asks: What diameters are required for two rubber cylinders, say 10 or 12 feet long inflated with air, in order to sustain a weight of three hundred pounds in water? It is my intention to use these cylinders under a light framework as a raft or catamaran to fish in lakes in the north wilderness should they prove more portable than a canvas canoe. A. To immerse them about half their diameter, should be 10 inches diameter and 10 feet in length.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

H. M. M.—No. 1 is pyrite (iron sulphide) in quartz. No. 2 is quartz. Gold is generally found in pyrite or in quartz.—J. W. U.—No. 1 is a slate containing pyrite (iron sulphide). No. 2 is a compact sandstone containing pyrite. No. 3 is a close grained sandstone showing specks of iron sulphide. Nos 4 and 5 are different varieties of the same mineral as No. 3, with pyrite running through them. They are all of no apparent value except the building purposes.

COMMUNICATIONS RECEIVED.

On Guided Balloons. By T. F. S. T. The Doctrine of Numbers. By G. B.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

July 10, 1883,

AND EACH BEARING THAT DATE.

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

Table listing inventions with names and patent numbers. Includes: Aerial navigation, apparatus for, J. C. R. De Souza; Air, apparatus for separating nitrogen from atmospheric, J. F. Bennett; Air compressor, W. A. Babcock; Album, A. J. Megee; Amalgamator, W. & H. R. Hawkins; Angle iron, W. Lorey; Annunciator, oral, J. Ireland; Axle bearing, car, I. P. Wendell; Axle box lid, car, W. J. Ball; Axle lubricator, A. D. Howe; Axles, self-adjusting bearing for car, O. S. Stearns; Bagasse furnace, E. Williams; Banjo, A. Lopes; Battery, See Galvanic battery; Bedstead, wardrobe, F. Schmidt; Beer chip cutting and reaming machine, B. Rice; Bell, gong, W. S. Foster; Belt fastener, H. C. Hart; Belt shifter, G. H. Motley; Berth, self-leveling ship's, W. Wells; Blackboard, O. M. Mitchell; Board, See Blackboard; Boat knee, D. True; Boiler hoe, J. Preston; Boilers, making, W. L. Brownell; Book binding, A. J. Megee; Boot and shoe edge trimmer, H. F. Rooney; Boot or shoe fastener, B. T. M. Hunley; Boot or shoe sole, A. A. Brooks; Bottle stopper, C. H. Bennett; Bottle stopper, S. S. Newton; Bottle stopper fastener, B. D. Marks; Box, See Match box; Brake, See Car brake, Vehicle brake; Brake lock, C. C. Clay; Bread cutter, N. Chapman; Brick, tile, etc., kiln and furnace for burning, Culbertson & Endaly; Bricks, etc., manufacture of, B. Loomis; Bridle blinder, D. Kaltenbacher; Broom support, J. Groble; Buckle, harness, W. C. Agnew; Bung for beer barrels, A. C. Jameson; Bung for casks, barrels, etc., W. W. Jackson; Burial casket, G. W. & S. S. Comee; Burner, See Oil burner; Button, M. Bray; Button, sleeve, E. S. Mason; Cake-frying device, J. M. Andrae; Camera stand, J. H. Altheide; Can, See Milk can, Oil can; Cane and camp chair combined, S. N. McGaughey; Car brake, Lederer & Marks; Car ciner, J. L. Boyer; Car coupling, G. Maulick; Car coupling, P. F. Panabaker; Car coupling, T. Sparks; Car door, A. W. Zimmerman;

Table listing inventions with names and patent numbers. Includes: Car door fastening, Briggs & Dougherty; Car door, grain, J. J. Treat; Carroving, freight, J. C. Wanda; Car seat, Paulding & Maybeck; Car step, street, B. J. J. Townsend; Car, stock, H. C. Hicks; Car ventilation, W. Bedell; Carboy support, acid, A. D. Puffer; Carbureter, L. P. Mills; Carding engines, mechanism for vibrating the fly or offer combs of, B. A. Dobson; Carpet exhibitor, A. Peterson; Carrier, See Cash and bundle carrier, Endless chain carrier; Case, See Shot case; Cash and bundle carrier, Read & Dawson; Castings, making molds for steel, B. F. Watkins; Chain, drive, A. Assmus; Chair, See Rocking chair; Chair, A. W. Eichelberger; Chair, J. R. Hawley; Check, baggage, J. A. Thompson; Check, draft, note, etc., H. Bodley; Cheese vat, G. H. Goethchins; Chopper, See Cotton chopper; Christmas tree stand, G. Pannster; Churn, L. B. Wilson; Cleaner, See Wheat cleaner; Clock escapement, A. Lawrence; Cloak crusher, S. Cole; Cloth cutting machine, P. Howe; Cloth cutting machine, hand knife, E. Dredge; Clothes washer, C. A. Dodge; Coach pad plate, E. A. Cooper; Cook, stop, J. Howes; Collars and cuffs, manufacture of, E. K. Betts; Coloring matter from xylidine, basic, C. Martius; Coloring matter to fibrous material, machine for applying, H. W. Vaughan; Commode, J. Rundback; Cooking utensil, J. Eyer, Jr.; Coop, poultry, H. J. Haight; Corn shelter, hand, J. G. Warren; Cornstalk cutter, Contancin, Scott, & Stumpff; Cotton chopper, R. R. Pace; Cotton chopper and scraper, W. R. Russell; Cotton condenser, F. M. Sewell; Cotton gin and linter saws, machine for filing, W. H. Blanchard; Cottonpress, R. R. Tugwell; Cotton scraper, W. H. Mercer; Coupling, See Thill coupling; Croquet set, E. D. F. Farley; Crucibles, protecting plumbago, W. Tatham; Crusher, See Cloak crusher; Cultivator, W. B. Patterson; Cultivator and harrow, combined, J. P. Howe; Curtain fixture, F. M. Kelly; Cutter, See Bread cutter, Cornstalk cutter, Sewing machine thread cutter; Cutter bars, elastic cushion for, E. J. Blood; Dental drill hand piece, R. M. Ross; Digger, See Posthole digger; Distillation of hydrocarbon oils, process of and apparatus for the fractional, H. Frasch; Ditching machine, G. Meader; Dividers, C. Johnson; Doll, L. B. J. Wishard; Door, Benson & Fogle; Door hanger, W. Grace; Door lock, J. Savole; Door opener, pneumatic, A. T. Smith; Draught equalizer, E. E. Stevenson; Drawing, map, J. M. B. Sill; Drier, See Fruit drier, Tobacco drier; Drill, See Hand drill, Manure drill, Rock drill; Drilling machine, J. Rieppel; Drum, heating, H. G. Williams; Dust pan, J. F. Wynkoop; Ear ring wire, W. E. Liddle; Eccentric bearing, D. H. Lord; Ejector, L. B. Fulton; Electric carbon, H. Frasch; Electric circuit breaker, automatic, L. J. Phelps; Electric conductor, H. D. Rogers; Electric light tower, B. F. Orton; Electric machine, dynamo, J. E. Giles; Electric machines, armature for dynamo, W. P. Freeman; Electric underground cable, F. A. Smith; Electric wires and adjusting the wires in the same, ventilating conduit for, W. Hendley; Electric wires, conduit for underground, J. DuShane; Elevator, See Grain elevator, Hay elevator; Elevator bucket, H. W. Caldwell; Elevator safety stop, F. P. Canfield; Endless chain carrier and distributor for coal, etc., Lesouard & Lotan; Engine, See Rotary engine, Traction engine; Exercising apparatus, electrical, W. T. McGinnis; Fabric, A. Aronson; Fan, mechanical, Denechaud & Reynolds; Fanning mill, C. S. Beebe; Fats, refining, J. Hobbs; Feed water heater, T. R. Butman; Fence, barbed, O. O. Phillips; Fence, iron, H. L. Jones; Fence, portable, J. H. Cox; Fence post iron, R. J. Carson; Fertilizer distributor, J. P. Johnston; Fertilizers, apparatus for desiccating animal matter for, H. Breer; Fibrous and other substances, machine for obtaining and treating, S. P. Smith; File, bill, A. Henderson; Filter, J. W. Callard; Filter, J. Howes; Filter, cooler, and refrigerator, combined, W. E. Templeton; Fire escape, G. W. Looney, Sr.; Fire escape, H. Rensch; Fire escape, Ripczynski & Tisch, Jr.; Fire escape, E. Solomons; Fire extinguisher, C. C. Walworth; Fire extinguisher and fire alarm system, electric, C. E. Buell; Fire extinguisher, automatic, C. L. Delmage; Fire kindler, W. J. Babb; Fishing apparatus, L. Kessler; Forge, portable, J. P. Holt; Fruit drier, W. F. Hale; Fruit drier, A. W. Walker; Fruit drier, solar, W. P. Kirkland; Fulling mill, R. H. H. Hunt; Furnace, See Bagasse furnace, Metallurgical furnace, Plumber's charcoal furnace; Furnace and the art of working the same, J. Henderson; Furnace for the manufacture of carbon, H. Frasch;