

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.

Engines, 10 to 50 horse power, complete, with governor. \$250 to \$550. Satisfaction guaranteed. Six hundred in use. For circular address Heald & Morris (Drawer 98), Baldwinville, N. Y.

Send for illustrated catalogue of Electrical Instruments, Supplies, and Books for Electricians and Amateurs. I. N. Hopkins & Co., 267 Broadway, New York.

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Engine Castings, Wm. Rich, 231 Vine Street, Philadelphia, Pa.

Air Pumps for High Pressure, Hand, or Steam Power, at low prices. C. Beseler, 218 Center Street, New York.

American Fruit Drier. Free Pamphlet. See ad., p. 110.

72" Independent 3 Jaw Chucks, \$42; 48", \$36; 24", \$30. Warranted best in the world, and sent on trial. American Twist Drill Co., Meredith, N. H.

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Drop Forgings of Iron or Steel. See adv., page 109.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Co., Buffalo, N. Y.

Paragon School Desk Extension Slides. See adv. p. 109.

Brass & Copper in sheets, wire & blanks. See ad. p. 109.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

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

Blind Wire and Borers. B. C. Davis, Binghamton, N. Y.

Eagle Anvils, 10 cents per pound. Fully warranted.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 109.

Draughtsman's Sensitive Paper. T. H. McCollin, Phila., Pa. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 108.

See New American File Co.'s Advertisement, p. 110.

Combined Concentric and Eccentric Universal and Independent Jaw Chucks. The Pratt & Whitney Co., Hartford, Conn.

Steam Pumps. See adv. Smith, Vaile & Co., p. 109.

Books for Engineers. Catalogues free. E. & F. N. Spon, 44 Murray Street, New York.

The Berryman Feed Water Heater and Purifier and Feed Pump. I. B. Davis' Patent. See illus. adv., p. 93.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 94.

Bostwick's Giant Riding Saw Machine, adv., page 93.

Red Jacket Adjustable Force Pump. See adv., p. 94.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 94.

Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 92.

4 to 40 H. P. Steam Engines. See adv. p. 94.

Drop Forgings. Billings & Spencer Co. See adv., p. 77.

Cope & Maxwell M'f'g Co.'s Pump adv., page 77.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 14.

Small articles in sheet or cast brass made on contract. Send models for estimates to H. C. Goodrich, 66 to 72 Ogden Place, Chicago, Ill.

Improved Skinner Portable Engines. Erie, Pa.

Combination Roll and Rubber Co. 68 Warren street, N. Y. Wringer Rolls and Moulded Goods Specialties.

Pure Water furnished Cities, Paper Mills, Laundries, Steam Boilers, etc., by the Multifold System of the Newark Filtering Co., 177 Commerce St. Newark, N. J.

"Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. Forsaith & Co., Manchester, N.H.

List 28, describing 3,600 new and second-hand Machines, now ready for distribution. Send stamp for same. S. C. Forsaith & Co., Manchester, N.H., and N.Y. city.

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.

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

First Class Engine Lathes, 20 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

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

Jas. F. Hotchkiss, 84 John St., N. Y.: Send me your free book entitled "How to Keep Boilers Clean," containing useful information for steam users & engineers. (Forward above by postal or letter; mention this paper.)

Steel Stamps and Pattern Letters. The best made. J. F. W. Dorman, 21 German St., Baltimore. Catalogue free.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

Wood Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

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

Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y.

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.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Presses & Dies (fruitcans) Ayar Mach. Wks., Salem, N.J.

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.

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) C. C. asks: 1. How to recrystallize nitrate of silver crystals? A. Dissolve the silver nitrate in a small quantity of hot water in a shallow porcelain dish, and let the liquid evaporate slowly in the air. 2. Where can I find the action of the Holtz electrical machine explained? A. Consult any recent elementary work on physics. 3. How many cells of the Bunsen battery are necessary for an electric light to light a small room? A. It depends a good deal upon the nature of the lamp employed. Thirty cells can be made to produce a good light.

(2) T. S. asks: 1. How much power would it require to drive a boat 16 feet long, 3 feet deep, and 8 feet wide? How much difference would it make to have it 2 1/2 feet deep, with a screw propeller? A. An engine about 3/4 inches by 3/4 stroke, for driving propeller. Two and a half feet is deep enough. 2. How many men would it take to make a one horse power? A. Six men are usually allowed.

(3) Mrs. E. R. B. writes: I have seen descriptions of nickel plating in the SCIENTIFIC AMERICAN, and I would like to nickel plate some steel or brass knives and forks. But the description was not explicit enough for me to try it. Can you give the process, or tell me how to get full directions? A. See electrometallurgy, in SUPPLEMENT, No. 310.

(4) E. G. T. asks (1) for a cement for joining wood and iron, as to fasten in the ends of spring curtain rollers. A. Try the following: Melt together equal parts of gutta percha and shellac. Use hot. It should be well mixed together and not overheated. 2. Is there any solution with which to saturate paper, and having been dried, to be changed in color by the passage of electricity? A. Paper charged with colorless potassium iodide and starch is sensitive to the passage of electricity. Paper charged with ferrocyanide of potassium and in contact with an iron stylus or needle becomes colored (blue) by the passage of electricity through it from the latter.

(5) T. J. N. writes: I have two gallons of old gold solution. By precipitating the gold with muriatic acid, can I add it to the new solution? They are both cyanide solutions. If not, how can I get the gold out of the old solution? A. To obtain the pure metallic gold from the old bath add a slight excess of muriatic acid, heat nearly to boiling (under a hood or out of doors to avoid poisonous gases evolved) then add a strong solution of copperas (iron sulphate), until no further precipitate forms. The precipitate is pure gold. When washed in hot water it may be redissolved in aqua regia (nitric acid 1, hydrochloric acid 3 parts, and the solution evaporated to dryness over the water bath. This yields gold chloride, which may be added to the new bath.

(6) F. P. N. asks: 1. Can hard water be used in the manufacture of vinegar from sweetened water? A. Yes, if not too hard, though soft water is better. 2. Could hard water be softened cheaply so as to be available? A. No. Boil the water and let it cool before using.

(7) E. D. S. asks: 1. How can I construct an electric light for a dwelling house, four burners? A. See "Simple Electric Light Apparatus," in SUPPLEMENT, No. 149. 2. Would I have to use power, and if so, what kind? A. No; though power could be used to advantage. 3. Could I use clock work? A. It is not practicable.

(8) J. O. K. asks: 1. Will you be kind enough to give me a receipt for a durable whitewash for outside work? If such can be had, would also like to use various colors? A. See "A Durable Whitewash," page 52, vol. xiv. 2. Where can the phosphorescent paint be bought, and is it costly? A. Address any large dealer in paints and colors. 3. Would the paint show distinctly on a sign at night? A. It would not shine, but would glow quite distinctly if properly applied.

(9) R. D. asks: Will you please inform me, through inquiry column in SCIENTIFIC AMERICAN, what is used to give dark bronze the black appearance? The indented part of the bronze is dark and the surface is polished. A. Cleanse thoroughly the parts to be colored and moisten them with a solution of equal parts of perchloride of iron and copper dissolved in a small quantity of soft water. Rinse in water and repeat if necessary.

(10) J. W. F. writes: I have a new laboratory table made in my recitation room for use in chemical and physical experiments. The top is pine, and I wish to finish it in some inexpensive way to resist acids, etc., that may come from chemical experiments. I would like to finish the table in the color of the wood or a light color if possible. I have heard that in some

laboratories the tables are simply coated several times with linseed oil, I do not know whether boiled or not. Will you be so kind as to tell me whether the oil (boiled or raw) will answer my purpose? If not, what had I better use? A. Linseed oil is a very poor coating for such tables. Good asphaltum or black japan is greatly to be preferred.

(11) L. & S. ask: Please let us know through your columns a good recipe for dissolving aniline dyes for branding boxes, etc., so that the dye will not spread on the wood. A. Dissolve one ounce soap in a pint of hot glycerine, and in this dissolve the aniline color.

(12) C. M. B. writes: Some time ago there was a receipt for court plaster published in your paper. It was something like this (I recall from memory): French isinglass, 1 ounce; warm water, 1 pint; glycerine, 1 ounce; tincture of arnica, half an ounce. I prepared some of this but not with entire satisfaction. Can you give us a receipt for a plain court plaster that will not split and remain flexible? A. Soak isinglass in a little warm water for twenty-four hours, then evaporate nearly all the water by gentle heat. Dissolve the residue in a little proof spirits of wine and strain the whole through a piece of open linen. The strained mass should be a stiff jelly when cool. Stitch a piece of silk or sarsenet on a wooden frame with tacks or thread. Melt the jelly and apply it to the silk thinly and evenly with a badger hair brush. A second coating must be applied when the first has dried. When both are dry apply over the whole surface two or three coatings of balsam of Peru. This plaster remains quite pliable and never breaks.

(13) E. G.—The Government method prescribed for cleaning brass, and in use at all the United States arsenals, is claimed to be the best in the world. The plan is to make a mixture of one part common nitric acid and one-half part sulphuric acid in a stone jar, having also ready a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then removed into the water, and finally rubbed with sawdust. This immediately changes them to a brilliant color. If the brass has become greasy, it is first dipped in a strong solution of potash and soda in warm water, this cuts the grease, so that the acid has free power to act.

(14) J. G. asks: 1. How can a concentrated solution (in water) of soda bicarbonate or soda sulphate be kept in a tin pot without any alteration of the tin and solution? A. A tin or tinned iron vessel is not suitable for such purpose. Better use a lead vessel or line the tin with lead foil. 2. How long can the vulcanized India-rubber endure the action of sulphuric acid (commercial) or fresh carbonic acid? A. If the sulphuric acid is cold possibly half an hour; carbonic acid acts very slowly on hard rubber. 3. Is bicarbonate of soda completely soluble in three times its weight of cold water? A. The commercial salt requires in practice more nearly 4 or 4 1/2 parts of water at 60° Fah., for its complete solution. 4. Why in the Matthews apparatus for soda water do they use marble instead of cheap bicarbonate of soda? Is it only a question of economy? A. Marble dust is very much cheaper than the bicarbonate of soda. 5. If a cylindrical bar pass through a cylindrical ring of India-rubber which fits exactly at the bar, and the India-rubber is kept in place by forming a strong pressure over the bar by a metallic cylinder, can a gas at 150 pounds pressure pass between the bar and the rubber although the bar is kept turning? A. If the rubber packing is properly put in and fits the bar well it will retain the gas—for some time at least—according to the wear of the moving rod or bar.

(15) C. H. A. asks: What part of an iron mooring chain is likely to rust most, that which lies close to the bottom or that part which is near the surface of the (salt) water? A. That which receives the surface wash.

(16) "Inquirer" asks: Will you inform me what things a fireman on a locomotive has to attend to? How old must one be to go as fireman on a locomotive? A. The duties vary on different roads, but he must know: 1. How to make up or start a fire. 2. How to fire, so as to maintain steam with economy of fuel. 3. And to this end he must know how to keep his grate clear and clean. 4. He must learn all the road and signals. 5. How properly to handle the brakes. 6. How properly to clean and oil the engine. 7. Should learn the proper height of water and how best to keep it at that height. 8. Learn to read the steam gauge. There is no fixed age that we are aware of.

(17) H. B. asks: 1. What sized horizontal tubular boiler would be necessary for a small locomotive engine, cylinders 1 inch diameter, 1 1/2 inch stroke? What sized drivers would be best in proportion, and steam pressure per square inch, to insure proper working? A. To have 3 to 4 feet heating surface; drivers 4 to 4 1/2 inches. 2. Does the steam as well as the water enter the glass gauge on boilers; and if so, why does not the pressure break it? A. Yes; because of the small diameter of tube and its thickness. 3. Would a small cylinder made from type metal stand the friction? A. Only for a short time. Better use brass or iron.

(18) S. F. P. writes: I wish to bring soft water about thirty rods from spring to house through a slaty soil. Is there anything better than lead pipe for the purpose? I have a prejudice against lead on account of its poisonous character. I have thought of using plain wrought iron pipe, but am told it will rust out quickly. I have seen heavy lead pipe "rotted" through from outside when placed in contact with small slate stones in a short time. A. The best pipe for your purpose, and one we can recommend, is the plain wood tubes. Lead can be used to advantage only where the water is not to be used for drinking or cooking. Iron rusts out very soon under such circumstances.

(19) E. H. R. asks: Can electricity be stored in the back of a hair brush, the brush of bristles, and its flow induced by the contact of the brush with the human body? A. No; but brushes have been made carrying a small galvanic battery in their backs, with metallic conductors or poles arranged to deliver slight electric currents upon the scalp, when the brush is applied to the head.

(20) W. H. J. asks: Can you give me the portions of articles used to form the black wax used by engravers for filling engraved letters on metal show plates, or if it can be purchased already mixed, and where it can be obtained? A. It is prepared by melting and boiling asphaltum until it begins to harden (when cooled on the test stick), and then adding well boiled linseed oil with about 5 per cent of litharge. It can be purchased from almost any large dealer in painter's supplies.

(21) G. L. G. writes, in answer J. M. F., who asks how to soften and harden rubber: Rubber rings or pipe stems of either rubber or horn can be bent any desired shape by oiling the part to be bent with fish oil (or any kind of oil will answer), and then holding it over a lamp until it is heated thoroughly, when the part will be found soft and pliable, and should be held in the desired shape until cool when it again becomes hard. Care should be taken not to put the article in the flame or burn it.

(22) J. W. G. asks: 1. Can you give me a recipe for a polish (dry or liquid) to prevent brass from tarnishing or to polish? A. Brass is best protected from tarnishing by coating it with a lacquer. This lacquer is generally composed of shellac dissolved in alcohol—shellac 1 ounce; alcohol 3/4 pint. This lacquer is variously colored by tincture of turmeric, saffron, and dragon's blood. 2. Also for stencil for wood work, black, blue, and red? A. For black, dissolve half an ounce of soap in two-thirds of a pint of good glycerine, and add to this a very strong aqueous solution of nigrosine to produce the proper color. For blue, use aniline blue, 6B, in a similar manner. For red, use a strong aqueous decoction Brazil wood with the glycerine and soap, increasing the soap if necessary.

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

C. D. B.—It is native magnetic iron sulphide with quartz.—M. R. L.—1. Manganiferous hematite. 2. An alloy of iron with a little copper.—A. K. B.—It is a quartz sand containing much iron pyrites and iron oxide. Not valuable.—R. H. H.—It is galena—native lead sulphide—a valuable ore of lead. It contains a trace of silver.—W. A. McF.—The mica according to the sample, is unmerchantable—the laminae are imperfect and contain crystals of biotite.—W. H. G.—No. 1. Quartz and pyroxene. No. 2. Altered quartzose rock containing a little selenite. No. 3. Red jasper. No. 4. Vein quartz with calciferous clay selvage. No. 5. A ferruginous quartz rock. Nos. 2, 4, and 5 may contain traces of precious metals. Assays will be necessary to determine this.

COMMUNICATIONS RECEIVED.

On the Birth and Death of the World. By W. C. A Suggested Improvement in Patent Laws. By F. L. H. On Boiler Explosions. By T. B.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

July 25, 1882,

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 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 261 Broadway, corner of Warren Street, 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.

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