

Business and Personal.

Charge for insertion under this head is \$1 a Line.

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For Sale—Large lot second hand Machinists' Tools, cheap. Send for list. I. H. Shearman, 45 Cortlandt Street, New York.

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It is said that every extensive advertiser has to pay a very large sum for experience before he learns how to invest his money judiciously. It would be better to entrust the business to a responsible Advertising Agency, like that of Geo. P. Rowell & Co., No. 4 Park Row, New York, and thus gain the benefit of experience without cost. Contracts can be made with them as low as with publishers direct.—[Exchange.]

Walrus Leather Wheels for polishing all Metals. Greene, Tweed & Co., 18 Park Place, New York.

A few thousand dollars to invest in the manufacture of some good article, established or new. Address, with full particulars, C. Houghton, Batavia, N. Y.

Parties using tubular Boilers should send to American Vacuum Flue Cleaner Co. for circular. Post Office Lock Box 3967, New York.

For Sale—Propeller Steamboat, 19½ feet long, 6 ft. 2 in. beam; machinery used only six weeks. Engine 47. Price \$750. J. A. Spauld, South Newmarket, N. H.

Machinery Wanted—Edging, Milling, and other Gun Machines wanted, new or second hand. Address E., Box 1758, New York.

For Sale—Two thirds of Foundry and Machine Property, at Raleigh, North Carolina. Best business in the State, and one of the best openings in the South to build up a very large trade. Large lot, fronting on two Railroads and two Streets, with buildings, machinery, tools, patterns and stock. Only shop in the State where Engines are built, and the demand far exceeds the present capacity to manufacture. Also make Cotton Gins and Presses, Mill Gearing, Shafting, Iron Front Work, and 12 to 1500 Plows annually. At present, 35 hands are employed. The business can be increased, so as to be limited only by the capital and energy of owners. Satisfactory reasons given for selling. Address P. O. Box 267, Raleigh, N. C.

Single, Double and Triple Tenoning Machines of superior construction. Martin Buck, Lebanon, N. H.

Wanted—A reliable party to manufacture and sell the Best General Wood Working Machine in use on the Royalty plan. Address No. 59 E. 7th St., Covington, Ky.

The Best Wooden Pulley made; fastens without keys or set screws. Adjustable Dead Pulleys stop loose pulleys and belts when machinery to which they belong is not in motion. Cold Rolled Shafting, Improved Couplings and Hangers. A. B. Cook & Co., Erie Pa.

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Boul's Paneling, Moulding and Dovetailing Machine is a complete success. Send for pamphlet and sample of work. B. C. Mach'y Co., Battle Creek, Mich.

For best and cheapest Surface Planers and Universal Wood Workers, address Bentel, Margedant & Co., Hamilton, Ohio.

Blake's Belt Studs are the best fastening for Leather or Rubber Belts. Greene, Tweed & Co., 18 Park Place, New York.

Saw Ye the Saw?—\$1,000 Gold for Hand Sawmill to do same work with no more power Expended. A. B. Cohu, 197 Water St., New York.

Diamond Carbon, of all sizes and shapes, for drilling rock, sawing stone, and turning emery wheels, also Glaziers' Diamonds. J. Dickinson, 64 Nassau St., N. Y.

The Baxter Steam Engine, 2 to 15 Horse Power. Simple, Safe, Durable, and Economical. "The Best are always the Cheapest." Over One Thousand in use, giving entire satisfaction. Address Wm. D. Russell, 18 Park Place, New York.

Engines, 2 to 8 H. P. N. Twiss, New Haven, Ct.

File-cutting Machines. C. Vogel, Fort Lee, N. J.

Pipe and Bolt Threading Machines. Prices from \$30 up. Address Empire Manufacturing Company, 48 Gold Street, New York.

Johnson's Universal Lathe Chuck. Medal awarded by the Franklin Institute for "durability, firmness, and adaptation to variety of work." Lambertville Iron Works, Lambertville, N. J.

Machine Tools, 2d H'd, for sale: 1—20 ft. Lathe, 2—10 ft. Lathes, 1—9 ft., 1—12 ft., 1—6 ft.; several Speed Lathes, Crank Planer, 2 Upright Drills, 1 Planer, 1 Bolt Cutter, etc. For list, address Forsaith & Co., Manchester, N. H.

Engines, 2d H'd, for sale: Portables, as follows—2—25 h.p.; 1—35 h.; 1—8 h.p.; 1—6 h.p.; 1—4½ h.p.; 1—4 h.p. Also, 50 h.p. Chubbuck Engine, 50 h.p. Boiler, 18 h.p. Boiler, and several small Engines. For list, address Forsaith & Co., Manchester, N. H.

Wood-Working Machines, 2d H'd, for sale: 2 Circular Saw Mills, complete; 1 Up and Down Mill with 2—24 in. wheels, complete; Shingle Mill and Jointer; Lath Sawing Machine; Portable Grist Mill and Cob Cracker; Daniel's Planer; Stationary and also Rotary Bed Planers; Blanchard Spoke Lathe; Blake No. 2 Steam Pump; Japanning Furnace; Suction Blower, etc. For list, address Forsaith & Co., Manchester, N. H.

For best Bolt Cutter, at greatly reduced prices, address H. B. Brown & Co., 25 Whitney Avenue, New Haven Conn.

Second hand Machine Tools for Sale cheap. D. Frisbie & Co., 25 & 28 Grand St., New Haven, Conn.

Bolt Headers (both power and foot) and Power Hammers a specialty. Forsaith & Co., Manchester, N. H.

"Book-Keeping Simplified." The double entry system briefly and clearly explained. Cloth, \$1. Boards, 75 cts. Sent postpaid. Catalogue free. D. B. Waggener & Co., 424 Walnut Street, Philadelphia, Pa.

Hydrant Hose Pipes and Screws, extra quality, very low. Send for prices. Bailey, Farrell & Co., Pittsburgh, Pa.

American Metaline Co., 61 Warren St., N.Y. City.

Grindstones, 2,000 tuns stock. Mitchell, Phila., Pa.

Small Tools and Gear Wheels for Models. List free. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Peck's Patent Drop Press. Still the best in use. Address Milo Peck, New Haven, Conn.

The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$6, with good Battery. F. C. Beach & Co., 246 Canal St., New York, Makers. Send for free Illustrated Catalogue.

Hotchkiss Air Spring Forge Hammer, best in the market. Prices low. D. Frisbie & Co., New Haven, Ct.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa. for lithograph, &c.

Spinning Rings of a Superior Quality—Whitinsville Spinning Ring Co., Whitinsville, Mass.

All Fruit-can Tools, Ferracuta W. K's, Bridgton, N. J.

For best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay, Brooklyn, N. Y.

Mechanical Expert in Patent Cases. T. D. Stetson, 23 Murray St., New York.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

Faught's Patent Round Braided Belting—The Best thing out—Manufactured only by C. W. Army, 301 & 303 Cherry St., Philadelphia, Pa. Send for Circular.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon, 470 Grand Street New York.

The Lester Oil Co., 183 Water St., N.Y., Exclusive Manufacturers of the renowned Synovial Lubricating Oil. The most perfect and economical lubricant in existence. Send for Circular.

Temples and Oilcans. Draper, Hopedale, Mass.

For 13, 15, 16 and 18 inch Swing Engine Lathes, address Star Tool Co., Providence, R. I.

Three Second Hand Norris Locomotives, 16 tons each; 4 ft. 8½ inches gauge, for sale by N. O. & C. R. R. Co., New Orleans, La.

Agents—100 men wanted; \$10 daily, or salary—selling our new goods. Novelty Co., 300 Broadway, N. Y.

For Tri-nitroglycerin, Mica Blasting Powder, Electric Batteries, Electric Fuses, Exploders, Gutta Percha Insulated Leading Wires, etc., etc., result of seven years' experience at Hoosac Tunnel, address Geo. M. Mowbray, North Adams, Mass.

Genuine Concord Axles—Brown, Fisherville, N.H.

Price only \$3.50.—The Tom Thumb Electric Telegraph. A compact working Telegraph Apparatus, for sending messages, making magnets the electric light, giving alarms, and various other purposes. Can be put in operation by any lad. Includes battery, key, and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 246 Canal St., New York.



F. J. will find Professor Böttger's recipe for a depilatory on p. 107, vol. 30.—F. R. S. can make a colorless varnish by the process described on p. 150, vol. 29.—J. T. W. will find that the field camera is described on p. 58, vol. 31.—A. J. T. will find that induction coils are described on pp. 215, 218, 303, 378, 379, vol. 30.—R. N. will find a full description of the process of lithography on p. 298, vol. 31.

(1) W. H. says: I have found in California a deposit of almost pure silicate of alumina. It is entirely free from any metal, and contains about 2 per cent of silicate of magnesia. Is there any use for it? A. It could be used for filling the walls of fireproof safes; and if it could be easily handled and cut into blocks, it might be employed in the lining of furnaces, or in similar cases where great heat is encountered.

(2) P. I. O. asks: If a ball of iron, or other substance of greater specific gravity than water, be placed in a vessel (of sufficient strength) full of water, and submitted to powerful hydraulic pressure, would the pressure cause the water in the vessel to float the ball? A. Yes, if the water were sufficiently compressed. It would, however, require a machine of extraordinary strength, as a pressure of 1 atmosphere only increases the density of water about 0.0000033.

(3) W. H. R. asks: Will a mark on a tree indicating high water be permanent, or higher up by the growth of the tree? A. If the tree has attained its growth, the change in the position of the mark will be scarcely perceptible. In other cases it may change considerably. We have heard of "blazes" made on trees which were afterward found to be high above the reach of a "blazer" on the ground.

(4) J. T. H. asks: If a belt slips, does it slip on the driving pulley or the one driven? A. In most cases, but not always, on the driven pulley.

(5) H. C. S. says: I made a piece of leather hose 4½ feet long and 2½ inches in diameter, and put a water pressure upon it of 275 lbs. to the square inch. Would a length 50 feet long, all things being equal, stand the same pressure? A. Yes.

(6) W. J. F. asks: How many square feet of cooling surface are usually allowed per horse power in a surface condenser? A. It is a common rule to allow from ½ to ¾ as much condensing surface as the heating surface of the boiler.

(7) G. S. C. asks: What makes some steam boilers, if the water is cold when the fire is started, give a clacking and hammering noise internally? A. It is no doubt due to sudden expansion of parts of the boiler, caused by the circulation of the water as it becomes heated.

(8) W. R. H. says: I read that Lieutenant Hitchcock of the United States Coast Survey discovered what is apparently a spring of fresh water at sea. Are there any more localities in the ocean where fresh water can be obtained? A. Fresh springs in salt water are by no means uncommon. We remember to have seen one in a creek in North Carolina, the water of the creek being quite salt.

(9) J. B. says: We use salt water in a steam boiler. We have no condenser, and do not know how to make one. We can get sulphurous water, but think that will be as hard on the boiler as salt water. What would you advise? A. It will be necessary for you to blow off frequently, so that the saturation of the water in the boiler does not become very high. Even with this precaution, scale will form in the boiler, and should be removed every few weeks.

(10) J. E. H. says: Some time ago I saw a recipe in the SCIENTIFIC AMERICAN for cleaning guns by using quicksilver. It stated that the quicksilver would form an amalgam with the lead in the barrel of the gun. I have tried it and have signally failed. I then took some shot and put in the mercury to see if it would form an amalgam; and the shot still remain in it as perfect as when first put in. What is wrong? A. If you will melt the shot you allude to, and draw off the clear metal from the oil and plumbago with which they are covered, you will have no difficulty in combining it with the mercury. For the same reason you will see that it is necessary to first remove all the carbon, etc., from the interior of the barrel of the gun before the required reaction will take place.

(11) L. G. P. asks: What kinds of gums can be dissolved in sulphuric ether? A. Most gums are soluble in ether.

1. How can I color collodion? A. Use any of the aniline colors. **2. What will dissolve collodion after it is dry? A. Ether containing a little alcohol.**

(12) J. H. S. asks: 1. To how many grains (by weight) of best rifle powder is one grain of good gun cotton equal? A. One part by weight of gun cotton is equal in projectile power to 45 or 5 parts of gunpowder. **2. How is gun cotton manufactured for use in fire arms?** A. The cotton is steeped in a mixture of equal parts of strong sulphuric acid, specific gravity=1.84, and fuming nitric acid for about 15 minutes. Gun cotton has not been adopted in practice as a good substitute for gunpowder; its large bulk, coupled with the fact that the explosion is attended with the evolution of much water and nitrous acid, render it inconvenient as a substitute for powder. **3. Is it more dangerous than gunpowder?** A. Yes; gun cotton is liable to spontaneous combustion. In some cases it has been known to ignite at a temperature of 43°. A small magazine filled with gun cotton in the Bois de Vincennes, Paris, was exploded by the sun's rays. The combustion of gun cotton, unlike gunpowder, takes place almost instantaneously, and for this reason it is liable to injure or rupture the fire arm in which it is used.

(13) F. W. B. asks: Are there any acids that will eat into or soften the surface of rocks? A. Most of the materials forming rocks are either partially or wholly soluble in acids, or mixtures of acids. They are not all soluble in the same acid. As you failed to state any particular variety of rock, we must omit giving you here a complete dictionary of solubilities.

(14) B. H. W. asks: What substance is used to cement the seams of gas bags? A. For this purpose a cement used is obtained by dissolving gum rubber in hot naphtha, which is then allowed to evaporate until of the consistence of a thick paste. The seams are cemented with this, and placed under great pressure for some time. They are then (usually) countercovered by a strip of the same material as the bag. This is fastened on by means of the above cement, so as to form a binding. When this is finished, it is again placed under pressure. A bag, so prepared, will stand 600 lbs. pressure, and is generally warranted to stand 1,000 lbs.

(15) E. E. asks: What would be the best to fill an ice box between the outside and inside of the box? A. Charcoal.

(16) W. C. asks: Is there a chemical that will dissolve gutta percha, and will dry as fast as bisulphide of carbon? A. Bisulphide of carbon is by far the best solvent for gutta percha, we believe, thus far discovered; but if the gum be digested for some time in hot naphtha, a solution in that liquid may be obtained. But as naphtha, like carbon bisulphide, is an extremely volatile liquid, and when its vapor is mixed with air forms a terribly explosive mixture, it follows that, to obtain the desired solution without a prodigal waste of the solvent and its accompanying danger, it is necessary that the materials be enclosed in a strong, airtight vessel, and heated over a water bath so as to insure a uniform degree of temperature, which should not be allowed to exceed 100° Fah.; and even then we should not consider the above method free from danger in inexperienced hands.

(17) C. G. H. says: On April 13 I was carrying an umbrella in a snowstorm. I touched the frame of the umbrella and received a spark of electricity. On presenting my finger, I could plainly see a spark ½ of an inch long. What is the cause? A. Occasionally, during a snowstorm such as you mention, or when for some reason the air is extremely dry and the atmosphere becomes very highly electrified, like strange electrical phenomena often occur. Your umbrella, in this case, probably acted the part of Franklin's kite, and your body formed the conducting link to the earth.

(18) E. W. P. asks: How can I make powdered charcoal into a porous cake for use as a filter? A. One method consists in pulverizing animal charcoal until reduced to an impalpable powder. This is mixed with a definite proportion of Norway tar, and a compound of other combustible substances. The combined materials are then properly amalgamated with liquid pitch, and the whole kneaded up into a homogeneous plastic mass which admits of being molded into slabs or blocks of any required dimensions and shape. These blocks, having been allowed to dry and

harden, are subsequently carbonized by being subjected to a process of incineration by heat; and in this manner all the combustible ingredients are burnt out, leaving nothing behind but the animal charcoal in the form of a block of charcoal, permeated throughout by innumerable pores.

(19) W. H. says: 1. You say that, by coating a room with oxide of zinc and glue size, and when dry, coating with a solution of chloride of zinc, I can obtain a good gloss; must there be any glue in the chloride solution to bind it? A. It is not necessary. **2. What strength of solution of chloride is required?** A. Use a strong solution. **3. Chloride of zinc is extremely dear here. Is there any substance that can be used to produce same results and be cheaper?** A. We do not know of any substitute other than good varnish. **4. Does the above compound affect colors? A. Yes; some colors are apt to be partially bleached when mixed with it.** **5. Is the chloride of zinc hard to make?** A. No; dissolve metallic zinc or its oxide in a small quantity of hydrochloric acid until it will dissolve no more; this solution is then ready for use. When applied to the coating of zinc oxide, it combines with it to form a subchloride or oxychloride of zinc, which is neutral. **6. Is silicate of soda a strictly waterproof substance?** A. It is not. **7. What can I add to its brittleness to keep it from becoming cracked and mealy when exposed to the air a short time?** A. We do not know that you can better it at all. **8. Could I use this mixture on plastered walls to keep water from staining through kalsomine?** A. It might be made use of for this purpose, but we do not think it would be very lasting. **9. Would it peel off in damp places?** A. Yes.

(20) E. C. S. asks: When it is exactly noon at any given point on a given meridian, is it exactly noon at every other point on the same meridian? A. Yes. **2. I read that the variation in the length of the solar day is owing to two distinct causes, the inequality of the earth's motion around the sun, and the inclination of its axis to the plane of its orbit; and that from these two causes arises the difference between sun time and clock time.** I can see how the earth's unequal motion may make the solar day more or less than 24 hours; and I can see how the inclination of its axis may affect the time of sunrise and sunset, and the length of day and night; but I cannot see how it affects the length of the solar day or makes sun fast and slow. A. If the books state that the variation of the length of the solar day is due to the inclination of its axis to the plane of its orbit, they can only allude to the variation in the duration of daylight from summer to winter; and if they speak of the inequality of the earth's motion around the sun, they mean the yearly motion, during which the earth recedes in spring time from the sun, and retards her velocity, while in the fall she approaches the sun, and accelerates. The daily rotation is perfectly uniform, as proved by observations of the stars, which show that the sidereal days, of which the length is only 23 hours and 56 minutes very nearly, never vary in length. The difference between solar time and the time of a well regulated clock would not exist if the earth's yearly orbit were a circle, and her yearly motion uniform. This difference, which is commonly described in the almanacs as "sun fast" and "sun slow," is caused by the inequality in the yearly motion of the earth, by which the apparent motion of the sun along the signs of the zodiac (and which, on an average, is 59 minutes and 3 seconds of a degree per day) becomes retarded or accelerated: the difference of this apparent irregular motion, with that of a sun whose apparent motion is regular, constitutes the difference between the so-called solar time and mean time. For instance, from June to September, the earth recedes from the sun, and its velocity is retarded, and the sun's apparent motion along the zodiac is also retarded, so that the statement in the almanac, "sun slow," is correct.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On Commercial Sponges. By S. H. T.
- On Flower Growing. By W. H. M.
- On the Tides. By A. McN.
- On Disasters at Sea. By J. F. J.
- On the Locomotive. By J. F. J.
- On Railway Rails. By J. P. T.

Also enquiries and answers from the following: C. N. F.—S. T.—L. D. D.—A. W.—P. F. M.—C. N. F.—F. W. J.—B. S. K. O.—C. F. A.—E. J. F.—W. L. D.—C. J. B.—C. S.—C. D. G.—S. G., Jr.—H. S.—J. P. M.—E. F. O.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Who sells dynamite, dualin, and litho-fracteur? Who sells steam engine indicators? Why do not makers of watch-making machinery advertise in the SCIENTIFIC AMERICAN? Where can pure tallow, for cylinder lubrication, be obtained?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.