

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 publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

Blake Crushers, all sizes, with all the best improvements, at less than half former prices. E. S. Blake & Co., Pittsburg, Pa.

Comb Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 333.

To Thrashing Machine Manufacturers.—The best, cheapest, and most durable Grain Tally. Can be attached to separators. Measures and registers correctly. Shop rights or entire patent for sale. Address A. H. Seavey, North Huron, Wayne Co., N. Y.

Agency Wanted to introduce some Novelty into Canada by a gentleman of ability. Address "Novelty," Aylmer, Ont.

The Friction Clutch Captain will start calendar rolls for rubber, brass, or paper without shock; stop quick, and will save machinery from breaking. D. Frisbie & Co., New Haven, Conn.

Flanges, Pulleys, etc. P. Prybil, 467 W. 40th St., N. Y.

You can get your engravings made by the Photo-Engraving Co. (Moss' process), 67 Park Place, N. Y., for about one-half the price charged for wood cuts. Send stamp for illustrated circular.

Hoisting Machinery of all kinds a specialty.

Castings of Crucible Steel, solid, act same as bar steel. Specialty: Cast Cast Steel Plow Shares. Agricultural Wrought Steels of every description. Write us. Read, McKee & Co., Limited, Pittsburg, Pa.

For Sale.—Patent Automatic Planer Knife and Tool Grinder. Also Patent Friction Clutch and Pulley. Address E. S. Fernald, Saco, Me.

A Firm in Scotland, representing a New York Leather Belting House, are anxious to obtain another representation for American goods. Address B. J. H., P. O. Box 2701, New York.

Presses, and Dies that cut 500,000 fruit can tops without sharpening. Ayar Machine Works, Salem, N. J.

For Sale.—One Horizontal Steam Engine, 20' x 48'; one 18' x 42'; one 15' x 36". Atlantic Steam Engine Works, Brooklyn, N. Y.

Wood Turning Lathes. P. Prybil, 467 W. 40th St., N. Y.

Light and Fine Machinery contracted for. Foot Lathe Catalogue for stamp. Chase & Woodman, Newark, N. J.

Empire Gum Core Packing is reliable; beware of imitations called Phoenix. Greene, Tweed & Co., 18 Park Place, N. Y.

Box-bell, \$1 50. Bell, Battery, and Push Button, \$3. All first-class. H. Thau, 128 Fulton St., N. Y.

Situation Wanted.—Have had ten years' experience as mechanical superintendent of a large sewing machine business. Understand mechanical drawing, tool making, etc. Best of references. Particulars by letters. Address K., Box 254, Guelph, Ontario, Canada.

The Genuine Asbestos Steam Pipe and Boiler Coverings are the most durable, effective, and economical of any in use. H. W. Johns Manufacturing Company, 87 Maiden Lane, New York, are the sole manufacturers.

A Gentleman, now Foreman in a large Manufactory, possessing inventive ideas, a first-class draughtsman, theoretical and practical machinist, desires to change his present position for one in which he may have a better chance to employ his skill in all kinds of scientific or industrial machinery. Address, for ten days, F. Lambert, 365 12th St., South Brooklyn, N. Y.

See Staples & Co.'s advertisement of Non-Congeealable Lubricating Oils on inside page.

Metallic Articles Colored in Single or Rainbow Colors. New Process. High cost metals imitated in cheaper metals. Gardner Mfg Co., Newburyport, Mass.

For best Fixtures to run Sewing Machines by Power, address Jos. A. Sawyer & Son, Worcester, Mass.

Thomas D. Stetson, 23 Murray St., New York, serves as Expert in Patent Suits.

The Baker Blower ventilates silver mines 2,000 feet deep. Wilbraham Bros., 2318 Frankford Ave., Phila., Pa.

Wheelbarrows.—The "A. B. C. boiler" will outlast five ordinary barrows. \$24 per doz. A. B. Cohu, 187 Water St., N. Y.

Park Benjamin's Expert Office, Box 1009, N. Y. Recipes and information on all industrial processes.

To stop leaks in boiler tubes, use Quinn's Patent Ferrules. Address S. M. Co., So. Newmarket, N. H.

Nickel Plating.—Sole manufacturers cast nickel anodes. Pure nickel salts, importers Vienna Lime, crocus, etc. Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

The Secret Key to Health.—The Science of Life, or Self-Preservation, 300 pages. Price, only \$1. Contains fifty valuable prescriptions, either one of which is worth more than ten times the price of the book. Illustrated sample sent on receipt of 6 cents for postage. Address Dr. W. H. Parker, 4 Bulfinch St., Boston, Mass.

Wright's Patent Steam Engine, with automatic cut-off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburg, Pa., for lithograph, etc.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Steam Excavators. J. Souther & Co., 12 P.O. Sq. Boston. Bradley's cushioned helve hammers. See illus. ad. p. 302.

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

Noise-Quitting Nozzles for Locomotives and Steamboats. 50 different varieties, adapted to every class of engine. T. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

Stave, Barrel, Keg, and Hoghead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

Solid Emery Vulcanize Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

For best low price Planer and Mather, and latest improved Sash, Door, and Blind Machinery. Send for descriptive catalogue to Rowley & Hermance, Williamsport, Pa.

Eclipse Portable Engine. See illustrated adv., p. 318.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 269.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Latest improved methods for working hard or soft metals, grinding long knives, tools, etc. Portable Chuck Jaws and Diamond Tools. Address American Twist Drill Co., Woonsocket, R. I.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y. Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Sawyer's Own Book, Illustrated. Over 100 pages of valuable information. How to straighten saws, etc. Sent free by mail to any part of the world. Send your full address to Emerson, Smith & Co., Beaver Falls, Pa. Eagle Anvils, 9 cents per pound. Fully warranted.

Repairs to Corliss Engines a specialty. L. B. Flaners Machine Works, Philadelphia, Pa.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 30.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

The Horton Lathe Chucks; prices reduced 30 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn. \$400 Vertical Engine, 30 H. P. See page 350.

No gum! No grit! No acid! Anti-Corrosive Cylinder Oil is the best in the world, and the first and only oil that perfectly lubricates a railroad locomotive cylinder, doing it with half the quantity required of best lard or tallow, giving increased power and less wear to machinery, with entire freedom from gum, stain, or corrosion of any sort, and it is equally superior for all steam cylinders or heavy work where body or cooling qualities are indispensable. A fair trial insures its continued use. Address E. H. Kellogg, sole manufacturer, 17 Cedar St., New York.

Emery Wheels for various purposes, and Machines at reduced prices. Lehigh Valley Emery Wheel Company, Weissport, Pa.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife works specialty. Also manufacturers of Solomon's Parallel Visa. Taylor, Stiles & Co., Riegelsville, N. J.

Magic Lanterns and Stereopticons of all prices. Views illustrating every subject for public exhibitions. Profitable business for a man with small capital. Send stamp for 80 page illustrated catalogue. McAllister, Manufacturing Optician, 49 Nassau St., New York.

Patent Steam Cranes. See illus. adv., page 351

National Steam Pump. Simple, reliable, durable. Send for catalogue. W. E. Kelly, New Brunswick, N. J.

Renshaw's Ratchet (short spindle) uses taper and square shank drills. Pratt & Whitney Co., Hartford, Ct. Electro-Bronzing on Iron. Philadelphia Smelting Company, Philadelphia, Pa.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

Mineral Lanes Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 349.

Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, Pa.

Catechism of the Locomotive, 635 pages, 250 engravings. The most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for a catalogue of railroad books. The Railroad Gazette, 73 Broadway, New York.

The only economical and practical Gas Engine in the market is the new "Otto" Silent, built by Schleicher, Schumm & Co., Philadelphia, Pa. Send for circular.

Steam Engines, Automatic and Slide Valve; also Boilers. Woodbury, Booth & Pryor, Rochester, N. Y. See illustrated advertisement, page 285.

Microscopes, Optical Instrm's, etc. G. S. Woolman, 116 Fulton St., N. Y.

NEW BOOKS AND PUBLICATIONS.

VAN NOSTRAND'S SCIENCE SERIES. New York: D. Van Nostrand. Price 50 cents.

Numbers 45 and 46 of these reprints are respectively: Thermodynamics, by Henry T. Eddy, C.E. Ph.D., of the University of Cincinnati; and Ice Making Machines, translated from the French of M. Ledoux, mining engineer. The former aims to give a brief and logical exposition of the fundamental and simplest applications of thermodynamics; the latter discusses theoretically the conditions of effective working of the three classes of ice-making machines.

RESUME OF YELLOW FEVER. (Quarantine and Home Sanitation.) By A. Clendinning, M.D.

Abstract of report by Dr. Clendinning, as chairman of Committee of Intelligence, District Society of Bergen County, New Jersey, first printed in the Transactions of the State Medical Society. The author has brought together a good many facts in the history of yellow fever, which he finds well described by Hippocrates, 2,240 years ago. He does not believe that the disease is always imported, and denies the efficacy of quarantine to prevent its occurrence when local conditions are favorable.

A CATECHISM OF THE MARINE STEAM ENGINE. By Emory Edwards. Illustrated. Philadelphia: Henry Carey Baird & Co. 12mo, 374 pages. Price \$2.

Offered as a practical work for practical men, especially for young and inexperienced engineers, mechanics, and firemen, who wish to adopt marine engineering as a

profession. For such men it is likely to prove very serviceable. They will at least find no trouble in understanding what the author has to say, his language being admirably simple, direct, and free from mathematical or scientific affectation.



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.

(1) O. R. writes: Your recipe on shoe dressing is very good. I find that the different ingredients give a good black liquid, which makes the leather smooth, soft, and black, but without gloss. Can you inform me how to obtain a gloss? A. Increase the percentage of shellac and ammonia.

(2) H. C. asks how much fall would be required in a ditch to carry the water three miles an hour, provided the ditch is straight. A. The flow of water in the ditch would depend upon the character of the soil and smoothness of the surface. 2. Could you refer me to some reliable work that treats on running water and ditching, etc.? A. "Fanning on Water Supply Engineering" is a good work.

(3) "Atlas" asks how to mount maps on cloth, and best kind of paste and fabrics for purpose. A. Stretch smooth factory cloth upon a frame and coat it with glue size. Before this dries, apply a strong flour paste to the back of the map and lay it smoothly on the cloth. Let it remain until perfectly dry. If the map is to be varnished, apply two or three coats of isinglass size, and after it becomes thoroughly dry flow on a coat of varnish consisting of balsam of fir diluted to the proper consistency with turpentine.

(4) J. P. asks: 1. Can a current of electricity be generated by an electro-dynamic machine, without the use of either a battery or permanent magnets to charge the machine with? A. Yes; see SUPPLEMENT, No. 161. 2. What is the electromotive force of the Grenet battery when first connected? How long after it is put in action will it maintain its strength, and to what extent will the force of current decrease? A. 1.095 volt. The strength of the current diminishes quite rapidly if the battery is allowed to remain in action any considerable length of time continuously. It is not adapted for a continued use, but where a strong current is required occasionally for a few minutes at a time it answers a good purpose. 3. What form of battery best combines strength of current, constancy, and economy? A. Bunsen's, or some of its modifications.

(5) E. M. C. asks: Is there an easy way of distinguishing between 8vo, 12mo, 16mo, 18mo, and other sizes of books, by those not practical printers, and what is it? A. Count the pages between printers' signatures (letters or figures) at the foot of pages.

(6) O. M. S. asks: Is a lightning rod supported upon large insulators and having no ground connection, supported by any scientific authority that you know of? A. No.

(7) J. S. B. writes: The yachts in use here, of which there are many, are built on a flat model. They are very broad beam, the beam in some cases being about 2-5 of the length, and usually light draught. They are without keels, but furnished with center boards. Now, I am thinking of building a yacht, upon a deeper and narrower model, with keel. How will the two compare for speed? And how would it do to make the keel in latter model in whole or part of iron, heavy enough so that ordinarily no other ballast will be needed? My object in this is to bring the center of gravity as much below the water line as possible, as it seems to me that by so doing we would be able to sail closer to the wind without going over. Would my plan have that effect? A. The mere form of midship section does not determine the best model. What you propose would probably be fastest in deep water and strong winds, but the light draught fastest in light winds. The iron keel is good and should be heavy; do not make your cross section too full below.

(8) F. M. D. asks what is the horse power of an engine of 6 1/2 inch cylinder, 14 inch stroke, 70 lb. pressure, 180 revolutions. I am running an engine of that size, there has been quite a dispute about it. One man said it was a four horse, another said 20. I think it about an 8 horse. A. If you are working 70 lb. pressure on the piston, whole stroke, the available power is about 24 horse power. By actual calculation it is 32 horse power; deducting 25 per cent for friction and other losses, leaves 24 horse power.

(9) "Inventor" writes: I want to connect an engine or engines to a shaft running 390 or 400 revolutions per minute; how small ought the cylinders to be to give me 8 or 9 horse power, and what size upright tubular boiler will furnish steam? Can I run the engines with success? How many engines are necessary? A. A 6 inch cylinder and 8 inch stroke will give you the power you want. A vertical tubular boiler should have at least 220 feet heating surface. To run at such high

speed successfully, everything must be well proportioned and nicely fitted.

(10) J. F. asks: What is the best method of easily and economically separating in large quantities of salt water, the calcium magnesia, etc., so that the salt will remain pure? A. There are three methods employed for separating salt from calcium magnesia, etc.: a, by evaporation of the water by aid of the sun's heat; b, in winter by freezing; c, by artificial evaporation. The first method is generally used on the coast lines of southern Europe. The arrangement of the salines or salt gardens is as follows: On a level sea shore is constructed a large reservoir, which by a short canal communicates with the sea, care being taken to afford protection against the inroads of high tides. The depth of water in these reservoirs varies from 0.3 to 2 meters. The sea water is kept in the reservoir until the suspended matter has been deposited, and is then conveyed by a wooden channel into smaller reservoirs, from which it is conducted by underground pipes to ditches surrounding the salines, where the salt is separated from the water. The salt is collected, placed in heaps on the narrow strips of land which separate the ditches from each other, and sheltered. As these heaps are left for some time, the deliquescent chlorides of magnesium and calcium are absorbed in the soil, consequently the salt is comparatively pure. If the salt water is derived from salt wells or springs, the brine is immediately boiled down. This boiling generally requires several weeks, the scum being removed and the soda and calcium sulphates deposited removed with perforated ladles. As soon as a crust of salt is formed on the surface of the liquid a temperature of 50° C. is maintained. At this stage the salt is gradually deposited at the bottom of the pan in small crystals, and being removed, is put into conical willow baskets, which are hung on a wooden support over the pan to admit of the mother liquor (which contains the greater part of the magnesium and calcium chlorides) being returned to it. Finally, the salt is dried and packed in casks.

(11) G. S. T. writes: A reservoir is 60 rods distant, descent 40 feet. One pipe of 1 1/2 inch bore contracted to 3/4 inch just at the lower nozzle, the other pipe of 1 1/2 inch bore for 20 rods, 1 inch bore for the next 20, and the last 20 rods of 3/4 bore. Which of the above will convey more water? A. In a 1 1/2 inch pipe contracted just at the outlet the friction will be least.

(12) T. M. J. asks: 1. Will the water, if conveyed to the boiler in a 2 inch pipe, force itself into the boiler against a greater steam pressure than (say) in a 1/2 inch pipe? A. No. 2. In "Peck's Natural Philosophy" there is an illustration of how a cask was bursted, by filling the cask with water from the top of a tube 34 feet long. Will the heavier weight of water in a large pipe not add materially to pressure per square inch at the lower end of the pipe? A. No. 3. Could I overcome any resistance in the boiler by letting the water into the boiler through a funnel or a small hole on the principle of an injector? A. You cannot, unless you use an injector.

(13) J. R. H. asks: 1. Can exhausted steam be used to heat up a workshop? A. Yes. 2. In what way does it affect the working of an engine? A. Produces a little back pressure on the piston. 3. And what per cent of power is lost between exhausting through a pipe 20 feet long, and one 120 feet long? A. Difference is not appreciable if pipe is large.

(14) G. E. T.—You will find directions for making batteries in SUPPLEMENTS, Nos. 157, 158, and 159.

(15) W. H. B. asks, Does the microphone strictly magnify the sound or only transmit it? A. It merely transmits it.

(16) C. K. M. asks: 1. What is the best method of magnetizing a rat tail file 15x3/4? A. Inclose the file in a helix made of about 50 feet of No. 16 insulated wire, and connect the helix with 4 or 6 cells of carbon battery. 2. Can I magnetize it with an ordinary Daniells battery, by wrapping it with insulated copper wire? A. Yes, by using 6 or 8 cells.

(17) S. G. McM. asks: 1. Will a telephone that is constructed as described in SUPPLEMENT, No. 142, work when the coil is made of No. 30 wire? If not, will it with No. 32? A. No. 30 wire is too coarse. No. 32 might answer, but the results would not be satisfactory. Use No. 36. 2. What size should the connecting wire be if made of copper? A. No. 18 will do.

(18) A. S. B. asks: How can I take grease out of marble? A. Mix sal-soda with two parts of quicklime in powder, moisten the mixture with soft cold water, coat the marble with this, and let it remain twelve hours. Then wash with water and a little soap if necessary.

(19) J. D. asks: How can I make an alloy of copper which will attach itself to glass, metal, or porcelain? A. 20 to 30 parts finely blended copper (made by reduction of oxide of copper with hydrogen or precipitation from solution of its sulphate with zinc) are made into a paste with oil of vitriol. To this add 70 parts of mercury and triturate well; then wash out the acid with boiling water and allow the compound to cool. In ten or twelve hours it becomes sufficiently hard to receive a brilliant polish and to scratch the surface of tin or gold. When heated it becomes plastic, but does not contract on cooling.

(20) A. L. C. asks why a piece of paper cannot be blown off the end of a tube if it is simply placed over the tube at one end with nothing to fasten it. A. This phenomenon occurs only when the tube has a flange or its equivalent around the discharge opening. The adherence of the paper to the end of the tube is due to a vacuum formed on the surface of the card by the lateral discharge of air. This subject is fully treated in an article on the ball puzzle in SUPPLEMENT, No. 51.

(21) A. H. asks: Where on the globe will the new year 1880 be greeted or welcomed first? A. In New Zealand most probably; possibly a little earlier at some English missionary station in Polynesia. Eastern Siberia is ruled out of the reckoning by the Russian calendar; and our Alaskan islands by their taking their time from San Francisco.