

Business and Personal.

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John T. Noye & Son, Buffalo, N. Y., are Manufacturers of Burr Mill Stones and Flour Mill Machinery of all kinds and dealers in Dufour & Co.'s Bolting Cloth. Send for large illustrated catalogue.

Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

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Steel Castings from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

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The Turbine Wheel made by Risdon & Co., Mt. Holly, N. J., gave the best results at Centennial test.

Best Machinists' Tools, Pratt & Whitney, Hartford, Ct.

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Chester Steel Castings Co. make castings for heavy gearing, and Hydraulic Cylinders where great strength is required. See their advertisement, page 94.

For Boulton's Paneling, Moulding, and Dovetailing Machine, and other wood-working machinery, address B. C. Machinery Co., Battle Creek, Mich.

Alcott's Turbine received the Centennial Medal.

Wanted.—A new Horizontal Slide Valve Engine, cylinder 18 inches, diameter 30 to 36 inches stroke. Address, with detailed description and lowest cash price, Box 1597, Philadelphia P. O.

The Niles Tool Works, Hamilton, O., have second-hand Machine Tools in first class order for sale.

Friction Clutches warranted to drive Circular Log Saws direct on the arbor; can be stopped instantly; also Upright Mill Spindles, Safety Elevators, and Hoisting Machinery. D. Frisbie & Co., New Haven, Conn.

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For Extra Tempered Springs for Machinery, Sewing Machines, Locks, and all special purposes, address C. T. Schoen, Wilmington, Del.

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

Wanted.—A purchaser for Patentable Inventions. W. R. W., Lincolnton, N. C.

The "Niles Engine" is eminently well suited for all purposes requiring an engine from 2 to 12 horse power. The boiler and engine are both erected on the same substantial and ornamental base, but are otherwise not connected except by the necessary piping. They are complete power outfits, and are strictly first class in design, material, and workmanship. Address Niles Tool Works, Hamilton, Ohio.

Wanted.—Makers of Improved Wood-working Machinery and Rice Cleaning Machinery to send particulars and prices to J. M. Lyon, Singapore, via China.

\$5 to \$50 per day to Agents. D. L. R. Co., Londale, R. I. Vertical & Yacht Engines. N. W. Twiss, New Haven, Ct. Patent Scroll and Band Saws. Best and cheapest in use. Cordesman, Egan & Co., Cincinnati, O.

Bound Volumes of the Scientific American.—I have on hand about 300 bound volumes of the Scientific American, which I will sell (singly or together) at \$1 each, to be sent by express. See advertisement on page 93. John Edwards, P. O. Box 773, N. Y.



(1) G. O. A. writes: Is there a practical bicycle made at present; that is, one which would enable a man of ordinary muscular development to travel a distance of 20 miles on a good country road in less time and with less fatigue than he could do it on foot? A. We think it is doubtful, but would be glad to hear from correspondents who can contribute items drawn from personal experience.

(2) M. P. F., writing from Edinburgh, is anxious to obtain information as to the progress in building steam yachts in America, and asks (1) for plans and estimates, particularly of boilers? A. We have published particulars of a number in the SCIENTIFIC AMERICAN and the SUPPLEMENT. 2. I have a pair of engines, cylinder 5 inches in diameter, 6 inches stroke, with a return tubular boiler, working pressure 100 lbs. Please give me your advice as to size of boat for the above, to get at least 12 knots an hour in smooth water? A. Make a boat about 25 feet long. 3. What size and form of propeller would you recommend? A. As great diameter as possible, 3 1/4 to 4 feet pitch.

What are the proportions of a hard white alloy? A. Sheet brass, 32 parts; lead, 2; tin, 2; zinc, 2; by weight.

(3) G. G. asks whether there is any way of making soft castings out of hard iron, or any mode of reducing the hardness in the process of melting? A. No.

(4) A. Y. asks: Are there maps printed or stamped on leather? A. We do not know of any.

What will produce luster on black tin? I use it to coat the inside of cast hollow ware, and I find that some brands dull down too much in cooling? A. Put a little resin on the ware.

(5) R. H. E. writes: I wish to become an aeronaut, but my means are limited and I know of no professional to address upon the subject. Would it be practicable for me to construct a balloon and use it without the aid of a regular aeronaut? What would be the dimensions and cost of one capable of carrying one man? A. See SCIENTIFIC AMERICAN, vol. 32, p. 64.

(6) T. C. asks whether it would be necessary to protect from internal corrosion a boiler having a pipe condenser made of galvanized iron pipe and using fresh water, by coating inside with "salt scale"? A. When such condensers are used it is advisable to coat the interior of the boiler with a thin scale.

(7) J. C. W. asks: 1. Which of the two boilers, both built the same, one of 1/4 inch and the other 3/8 inch iron, will stand the most pressure of steam? A. The latter. 2. In a compound engine, does the steam exhaust direct from the high pressure cylinder into the low? A. In some forms it does; more commonly a receiver is employed. 3. Are the pistons of a marine engine the same as those of a stationary engine? A. Yes.

(8) H. H. C. inquires: 1. Can a young man eighteen years of age, with a common education, go on a locomotive as fireman and work himself up to engineer, and what would be the best way for him to proceed? A. Generally shop experience is requisite. 2. What is the average cost per year for locomotive repairs on our largest roads: those that run daily? A. It averages from 5 to 7 cents per mile run.

(9) A. T. V. asks: 1. In Bell's telephone how thick is the soft iron disk? A. 1/32 of an inch. 2. Where is it obtained? A. At any photographic establishment. 3. How much insulated copper wire does it take, and of what size? A. Two ozs. of No. 40 for each spool. 4. Does the large wire have to be insulated? A. No. 5. Using illustrations of Bell's telephone, would a person have the right to make one strictly for own use? A. No.

(10) W. A. asks: How can I best cast small small quantities of brass; that is, what will be my cheapest way of melting it? A. You can obtain sufficient heat at a blacksmith's forge. Use a plumber's crucible.

(11) O. M. asks: Will it injure an emery wheel to use water in grinding? A. Ordinarily, yes. There are emery wheels with which water can be used.

(12) M. J. B. inquires the method of calculating the angle of convergence of meridians and the true way of running out a parallel of latitude? A. Consult some standard work on surveying.

(13) U. C. asks: In running a 4 x 5 inch cylinder engine at 200 turns per minute, with 50 lbs. steam pressure, I should exhaust into an iron tank having a capacity of 4 cubic feet, and allow the exhaust steam to escape from the tank under a pressure of 3 lbs. to the inch on the tank. What would be the temperature of the exhaust steam in the tank? A. About 222° Fah.

(14) P. D. H. writes: Would you be good enough to give me a formula to find the size of a feed pump for a boiler of a given dimension? A. Knowing the speed of the pump and the volume of water it must deliver per hour, multiply this volume by 2; then it is required that diameter of plunger in feet x stroke in feet x strokes per hour = cubic feet of water required per hour x 2. Now assume either the diameter or the stroke, and the other dimension can be determined from the above equation.

(15) V. P. K. writes: I have just built a kiln for drying grain, 9 x 9 feet inside, 47 feet high, with six floors or nether pans. There is a coal fire in the basement, the gases passing up around the pans. Since the Barclay street explosion the question has been: Is there any danger in entering the kiln with a light? The gas does not prevent the workmen from remaining within the kiln without difficulty. A. As we understand the arrangement, there does not seem to be any danger in the use of a light, but by employing a safety lamp you can settle the matter beyond question.

(16) H. B. asks: Will a railroad train stop quicker when the brakes are put on hard enough to stop the wheels from turning, so that they slide on the rail, or will the train be brought to a standstill, quicker by putting the brakes on so that the wheels can still turn a little under it? A. In the latter way.

(17) D. W. L. writes: I have a boat 21 feet long and 4 feet 6 inches beam, with a horizontal boiler 48 inches long and 33 inches diameter. Which would drive the boat the faster, a double engine with two 3 x 3 cylinders, or a single 4 x 4 inch cylinder, and what size propeller would I need? A. For the same number of revolutions per minute, the single engine will give the most power. Use a screw with as large diameter as possible, and 3 feet pitch.

(18) H. E. G. asks: 1. Please give me a simple method for raising tall smokestacks and setting them up in the boilers? A. The most convenient way is to rig up shears and to hoist the stack into position. 2. Please explain the use of the air pump on condensing engines? A. It removes the air and vapor from the condenser. 3. What is meant by superheated steam? A. Steam which has a temperature greater than is due to the pressure.

(19) E. A. J. asks: How does the water in a 2-flue boiler, under a pressure of 120 lbs. to the inch, stand? A. At about 350° Fah.

(20) P. O. writes: I propose having a pair of high pressure stationary engines built for hoisting out of a mine, one third more power than I want to work on one shaft—cylinders 20 x 48, 60 lbs. steam, to cut off at half stroke. Which will be the most economical way of running them, 20 strokes per minute, or 40? A. The latter, as we understand your question.

(21) S. B. B. writes: We have a coil heater with 60 feet of 2 inch heavy pipe bent. The pump forces the water through the coil to the boiler, and when the water leaves the coil it shows 212°. Now, if we put in a second coil of 1 1/4 inch pipe, 70 feet long, and run the water through it first and to the pump admitting it, to come out of the 1 1/4 at 212° before it enters the 2 inch, what will we gain by it? There is a dispute about the question which we ask you to settle. I think we gain nothing. A. We think you have the right idea.

(22) E. M. S. writes: In drilling holes for blasting purposes, would any advantage be gained by enlarging a hole at the bottom for the purpose of giving the explosive a more distinct bearing? An ordinary drill will make a straight hole, while the drill I have in my mind will make a hole expanding at the bottom, giving a bearing which cannot be had by using an ordinary drill, and as far as I am able to see, the same amount of explosive will do more work. Is this the case? A. We think it is doubtful whether any material advantage will be derived by the proposed method; but of course it can only be definitely settled by experiment.

(23) J. E. C. asks: How much head will a 3/4 inch stream require to raise the same amount of water 25 feet, using the most improved water wheel? A. About 42 feet.

(24) F. T. asks: What can I do to mellow a soil that is of a stiff clayey nature? A. Plow it up as roughly as possible, so that the frost may penetrate it.

(25) O. W. asks: How can I anneal brass wire to prevent its breaking when used to make rivets? A. Heat it to a dark red and quench it in salt water.

(26) J. J. says: I am making some forgings with dies under a small steam hammer, and the scale hammers into the skin so that they are difficult to turn in the lathe. Can you suggest a remedy? A. After the forging is finished heat it to a low red heat and file off the scale with a coarse half round file.

(27) B. S. says: I have some fuchsias which I desire to bloom about the middle of May. How shall I treat them to make them bushy plants? A. Put the fuchsias, pots and all, in a damp place sufficiently protected to prevent their freezing, and let them remain there in the dark, if convenient, until about the middle of March. Then re-pot them, water freely, and cut off the stems to about three inches above the mould. Pinch the ends off the first shoots when they are 6 inches long.

(28) R. R. says: What is the best mould to strike slips of plants in, and at what temperature should the atmosphere be kept for them at this time of year? A. Strike them in pure sand, such as builders' sand. Keep well moist and at a temperature of about 50° Fah.

(29) R. J. says: I have made a small hydraulic pump, and when it is under pressure the water oozes clear through the cast iron cylinder. How can I prevent this? A. Take a ball pene hammer and pene the casting all over on the outside. This will close the pores and stop the oozing.

(30) F. K. asks: What is the addendum of a gear wheel? A. The height of the tooth beyond the pitch line.

(31) W. H. H. G. says: If S. M. B. (49) will leave off one pair socks and put a very little red pepper in the toe of each boot he will need to complain no more. Cotton socks if his feet sweat.

(32) E. T. W. asks: Will you, to settle a controversy, please define what lightning is? A. It is the name of the discharge, accompanied by light, of a large quantity of static electricity, produced by the action of Nature.

(33) D. F. F. says: The sulphur from our refinery is brittle, and in order to prevent loss in shipping we are obliged to pack it in bags or boxes. Is there any simple process by which it may be hardened sufficiently to admit of shipping in bulk, loose? A. The sulphur will be somewhat less brittle if re-heated for a short time at a temperature of 470° Fah., and cooled as quickly as possible. If sulphur at this temperature is run directly into water, it assumes the tough, flexible allotropic condition, which, after some time, resumes the yellow crystalline character.

Can we convey water 2 miles in a 1/4 or 3/4 inch iron pipe up and down hill—from a spring to our works—spring being 1,000 feet above works? A. The loss of flow by friction in such a line would be very considerable and subject to frequent interruption from the accumulation of air in the elevated portions to be tapped.

(34) N. R. S. writes: 1. In your issue of September 22, under the head of "Electro-Silicic Light," you allude to secondary couples. Will you oblige an uninformed reader by describing the mode of constructing such couples? A. See SUPPLEMENT No. 5, p. 65. 2. Will you also kindly inform me in what book or books I can obtain the best history in detail of the more famous electro-motors? A. We do not know of any work especially devoted to this subject; each step in this direction is described in our columns. See p. 184 of the issue of SCIENTIFIC AMERICAN of September 22, 1877.

(35) J. M. asks: How is a steam engine started when the crank is at its dead point? A. By moving the crank over the center by muscular power, applied in any way that is convenient and safe.

How is a copper wire insulated? A. By winding the wire with cotton or silk, or coating it with a non-conductor, such as shellac or rubber or gutta percha, or any way in which the wire is separated from different parts of its own length, or from other conductors by a non-conductor.

(36) F. P. writes: How can I make an electric bell ring as follows: I want to wind a copper or gold wire around a thin rubber tube a few times, and use this so that the bell will be made to ring by electricity when the rubber tube is blown full of air, thereby causing the tube to expand quite hard against the wire. A. Allow one end of the wire that is wrapped on the rubber tube to project, so that when the tube is expanded by the air, this projecting end will move. Then connect one binding post of your electric bell with the other end of this wire, and connect the other binding post of the bell with one pole of the battery; the other pole of the battery must be connected with a metallic point, so that when this projecting end moves it will touch the metallic point, and thereby close the electric circuit and cause the bell to ring.

1. Has there ever been a practical engine invented that has only one steam chest and yet cannot be dead-centered? A. None that have been generally considered practically useful. 2. Can steam be used again after it has passed through the cylinder? A. Yes. 3. Could it be used in another cylinder? A. Yes. 4. Would it perform the same amount of work as in the first cylinder? A. That will depend on the pressure of the steam and the size of the first cylinder, also as to whether the steam is used in the second cylinder expansively or by condensation. See our issue of the SCIENTIFIC AMERICAN, September 29, 1877, p. 191.

(37) K., Mo., asks: Is the iron plate which composes the diaphragm of the mouthpiece of a telephone soft iron or hard iron, and also how thick is it? A. The diaphragm is made of rather hard iron, and is 1/16 of an inch thick.

Where will sound proceeding from a stage be best propagated, in a building with a smooth interior, without ornaments, etc., or in one with ornaments and galleries? A. The one without ornaments.

(38) C. H. C. asks if there is any way to harden an iron casting without warping the face after the surface has been pene'd? A. No.

(39) M. A. P. & Co. ask for information relative to the ornamentation of glass by the sand blast? A. Sand driven by an air blast of the pressure of 4 inches of water will completely grind or depolish the surface of glass in ten seconds. If the glass is covered by a stencil of paper or lace, or by a design drawn in any tough elastic substance, such as half-dried oil, paint, or gum, a picture will be engraved on the surface. Photographic copies in bichromated gelatin from delicate line engravings have been thus faithfully reproduced on glass. In photographic pictures in gelatin, taken from Nature, the lights and shadows produce films of gelatin of different degrees of thickness. A carefully regulated sand blast will act upon the glass beneath these films more or less powerfully, in proportion to the thickness of the films, and the gradations of light and shade are thus produced on the glass. In the apparatus used air rises through a curved tube, carrying the sand up with it, which is thrown into the air tube by an endless belt of scoops arranged in the lower part of the angular box. The sand is carried up by the air and brought over and down the front air tube, where it discharges with great force upon the surface of the glass, which is contained within the front box and is carried by a belt gradually forward under the blast.

(40) C. C. asks: 1. What metal or mixture of metals should be used for making wiped joints on lead pipes? A. Use ordinary soft solder, 1 part lead, 1 tin. 2. What is the black paint composed of with which the parts near the joint are painted before the joint is made? A. Zinc dissolved in muriatic acid is often used.

(41) A. L. S. asks: What would you consider the horsepower of an engine whose dimensions are as follows: Diameter of cylinder, 6 inches; length of stroke, 17 inches; number of revolutions, 125; of pounds' pressure, 30; cutting off at 3/4 stroke? A. About 18 horse power, effective.

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

W. A. M.—No. 1 is trap containing pyrites. No. 2.—The sample is quite rich in copper—calcopyrite, copper glance, etc.—and lead sulphide. The ore is probably