

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.

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

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Reliable information given on all subjects relating to Mechanics, Hydraulics, Pneumatics, Steam Engines, and Boilers, by A. F. Nagle, M. E., Providence, R. I.



E. W. E. is informed if you will send some more particulars, to make your meaning plainer, we will endeavor to answer the question concerning forging crank axles.—S. L. N. F. is informed that we have already published so much on the "snake" question that we feared to bore our readers. We have received many letters on the subject, and every week adds to the number.—C. B. R., W. D. Z., W. E. D., and others.—For directions for making rubber stamps, see No. 13, vol. 25, p. 203 (26).—C. R. is informed that Mr. Rose has not yet published such a work. The information you desire

can be gained by reading the Nos. of the SCIENTIFIC AMERICAN containing the articles you are interested in.—J. W. W.—Apply to a physician.—W. E. D. asks for a recipe to make eggs of Pharaoh's serpents, and is referred to vol. 34, No. 14, p. 218 (2).—E. L. R. is informed that we are not very favorably impressed with the design of his engine.—R. C. of Canada is informed that he should use gearing in his machine in place of the lever.—S. E.'s inquiries have already been answered.—To inquiry of J. D. about balloons we refer him to p. 64, vol. 32.—W. L. is informed that his calculation of his hay press is correct. But he will not realize all the pressure, in practice, as some will be required to overcome friction of moving parts.—K. Bros. are informed that the question of grate bars can only be answered by themselves. Measure the water and coal used by each boiler in a given time.

(1) M. M. C. says: I wish to make a number of wheels of sheet brass about 3 inches in diameter with a flange 1/4 inch wide turned over so as to be at right angles to the web of the wheel. On one edge of this flange is to be ratchet teeth about 1/16 inch apart, and on the face are to be figures stamped into the brass. Can I stamp out the teeth and figures and then turn the flange over with rollers without impairing the uniformity of the teeth? A. It would be better to turn the flange and then cut the teeth with a wheel-cutting engine or some fixture adapted to that purpose. If the figures are marked before the teeth are cut, there is no danger of injuring by spreading of the metal with figured dies. 2. Can light brass articles be cast in iron chills successfully? A. Use sand for casting small articles.

(2) W. M. asks: Is there anything that will insure or give to steam-heated tar (gas tar) drying qualities? We find it necessary to return our small chain, after tarring, into a steam chest in order to make it, when cold, sufficiently dry to handle. This is objectionable in view of cost, also detrimental to the appearance of chain. A. We know of nothing. Perhaps some of our correspondents can give the desired information.

(3) J. T. asks: 1. What kind of metal is best for what is called a buzz, such as is used for cutting the twisted part of augers? What is the speed required for such a wheel? A. If you have reference to what is called the "tit" or tip of the auger, it is done on a steel wheel running at high velocity, say from two to four thousand per minute, dependent on the size of the wheel. 2. Have case-hardened journal boxes ever been used for a high speed with advantage? A. Yes.

(4) C. J. M. asks: 1. Is there a rule for figuring cone pulleys? Is it necessary to know the distance from center to center? If so, why? A. C. J. M. will find his pulley question fully explained in "Wrinkles and Recipes." 2. I am building an engine, and I have two narrowings with break joints on the piston head. Should they be turned the same size as the cylinder? A. Turn the rings rather larger than the cylinder bore and spring them in. 3. What kind of metal is best for engines and pump rings? How should the joints be made? A. For piston rings cast iron. For pump rings brass.

(5) C. Y. & Co. ask how to copper plate iron castings. A. A cheap method of covering articles of iron with a film of copper without the use of a battery is to clean them and immerse them in an acidulated solution of sulphate of copper, and clean by washing in water. The solution may consist of 3 lbs. sulphate of copper dissolved, and add 2 fluid ozs. of sulphuric acid.

(6) J. E. B. asks for a recipe for the manufacture of parchment paper? A. Dip white unsized paper for half a minute in strong sulphuric acid, and afterward in water containing a little ammonia. Another process is to plunge unsized paper for a few seconds into sulphuric acid diluted with half to a quarter its bulk of water and wash with weak ammonia.

(7) W. H. asks: What is the best fertilizer for celery? A. Apply to some gardener in your vicinity. By what process could I extract gelatin from buffalo hide or cow's hide? A. See "gelatin" in Appleton's "Cyclopaedia."

(8) W. T. W. & Co. ask for information about polishing axes? A. The polishing of axes differs immaterially from other kinds of work that is finished on emery wheels. After the axes are ground, a piece of wood is inserted in the eye to conveniently hold it, and then it is held upon a common emery wheel (made of wood covered with leather and coated with glue and emery). A similar wheel covered with a finer grade of emery is used, and the finishing done on a still finer wheel covered with flour of emery being used. Some axe makers use but one grade of wheel, and varnish the work to prevent rust.

(9) R. S. R. says: I wish a recipe for making bird lime? A. The middle bark of the holly is gathered in June and July and boiled for 6 or 8 hours in water until it becomes soft. It is then put in a heap underground for 2 or 3 weeks, being watered if necessary, and left to ferment until it assumes a mucilaginous state. It is then pounded and kneaded until all refuse matter is worked out. To preserve it, it is kept in an earthen vessel and covered with water.

(10) J. G. asks: What is the Banting system of reducing flesh? A. Mr. Banting reduced his weight by leaving off eating plain bread, potatoes, fat meats, pastry, sweets, salmon, pork, and veal, and restricting his diet to fish, corn beef and mutton, toasted bread or crackers, and fruit. He drank nothing with milk or sugar in it, no wine but claret, and no beer.

Will the cistern water from houses on which pigeons light, after being passed through sand and charcoal, retain any disagreeable odor, or be injured in any way? A. No.

(11) P. B. asks: Will the water rise in a tube or vacuum 4 or 6 inches in diameter as well as 2 inches? A. Yes.

(12) F. L. asks: Who is Mr. Joseph Saxton whose name appears as one of "Our Men of Progress?" A. Joseph Saxton was born at Huntington, Pa., March 22, 1779, died in Washington, D. C., October 26, 1873. In his youth he constructed a printing press and issued

a small newspaper. At the age of 18 he went to Philadelphia, where he found employment with a watchmaker and afterwards with an engraver. His first invention was a machine for cutting the teeth of chronometer wheels. Afterward he constructed the astronomical clock, with compensating pendulum, now in the State House. He constructed many other machines and appliances, but these mentioned were considered sufficient to give him a place among "Men of Progress."

(13) I. L. B. asks: Can you tell me how to clean postage stamps for a collection? A. We must decline to publish recipes for cleaning—removing postmarks, etc.—postage stamps, as it will be obvious that information of this would be taken advantage of by unprincipled persons to defraud the Government. The gum may be removed by soaking in a large quantity of water, and pressing between pieces of filter paper—this will also remove most of the grease and other stains and tend to brighten the colors.

(14) D. F. H. asks: 1. What kind of steel is used for making shoe knives? A. Good cast steel. 2. What oil is used for hardening? A. Any animal oil. Lard oil is generally used. 3. How is the temper drawn, and how low? A. Till the bright surface assumes a red or copper color.

(15) E. H. asks: What ought to be the size of a blower fastened on a 4 inches axle making 85 revolutions a minute, to produce 40 lbs. of pressure, the diameter not exceeding 18"? A. We think it will be necessary to use a positive blower, and the size will depend on the quantity of air you wish to use.

(16) D. B. K. asks if the bearing surface of two hardened globes of 25 feet diameter is greater than two globes of 1 inch diameter? A. If the globes are perfectly hard they will only have a point in contact, whatever their size. In practice, however, if one globe was resting on the other, we think the bearing surface would be greatest for the large globe.

(17) J. P. L. says: How can I compute the thickness of iron or brass in a hollow sphere necessary to stand a given pressure per square inch, the pressure to be applied within? A. Multiply the tenacity of the material in lbs. per square inch, and divide the product by the diameter of the sphere in inches.

(18) H. S. M. says: 1. The steam launch Arrow has wagon top boiler with large flat surfaces, which are stayed with 3/8 inch iron bolts 3 inches between centers; they are riveted into the shell in the usual manner. What is a safe load to use on stay bolts thus placed and fastened, and what pressure is safe on such a boiler? A. The data sent are rather incomplete, but we think the pressure should not exceed 60 lbs. 2. It has a screw 24 inches in diameter and 38 inches pitch. It makes 200 turns per minute. The hull is 28 feet long, with a beam of six feet. She has a moderately "fine run." What is her probable speed? A. From 5 to 6 miles an hour.

(19) C. P. F. says: A. claims that by using foot valves, 1st 28 feet, 2d 14 feet, 3d 7 feet, 4th 3 1/2 feet, 5th 1 1/2 feet from pump, that water can be pumped by suction atmospheric pressure 54 1/4 feet, while B. claims 33 feet is the theoretical, 32 feet the practical limit of pumping water by suction. A. We think B. has about the right idea.

(20) A. D. H. says: I am running an engine of an English make, the bore is 10 inches, stroke 27 inches. What is the horse power? A. You do not give sufficient data.

(21) J. S. B. & Co. ask: Is there any way that air could be purified after being once inhaled, or could oxygen be combined and admitted into a small cell at will, so as to sustain life? A. We think the difficulties to be overcome in realizing your plan, as we understand it, would be very great.

(22) P. J. K. asks for a formula to make rubber adhere to iron or steel? A. There are a number of good cements for this purpose in the market, and we think it will be more satisfactory for you to try some of them.

(23) S. G. F. says, for the best way to construct a penstock and the most suitable size for furnishing water to a 20 inch turbine wheel, the head being 36 feet. A. We think this may answer very well; but as we know nothing of the situation, we advise you to consult an engineer.

(24) To B. E. T. we say that every connection between motor and machinery requires some power to drive it. The amount of loss in your case will depend upon the fitting up of the gears, and any guess we could make from the data sent would be of little value.

(25) H. E. E. says: We are using an engine 9 x 20 that has been running from one to three days in the week since 1861, with no repairs on the piston till last March, when the piston rings were so much worn that we had new ones put in. When first put in the saving of steam was one half, but lately we find the exhaust showing considerable leakage, so in taking out the piston I find the rings worn out again. A. We could not answer definitely without knowing more particulars. It was probable that the cylinder needs reboring. Allowing it to rust is very bad practice, and assists the wear of the rings. You should use sufficient oil to prevent this action, moving the piston slightly if the engine is not used for several days.

(26) H. E. H. asks: Will you inform me of a correct rule for finding the proper sizes of boilers for different sizes of steam engines? A. You will find some notes relating to the subject on p. 225, vol. 32.

(27) J. R. P. says: In a work entitled the "Electrical Theory of the Universe," I find the following: Immerse the prime conductor of a galvanic battery in a pint of water, and it will be converted into two thousand pints of its constituent gases, oxygen and hydrogen; now insert the same conductor into these gases, and it will be contracted back to one pint of water. Now if this change could be done quick enough, and not cost too much, would it not be a good motor for locomotives and other machines? A. Certainly, if.

(28) W. H. M. asks: 1. What is the longest span of suspension bridge in the world? A. We believe

the largest suspension bridge that is completed has a clear span of 1,057 feet. 2. How much is the estimated cost of Brooklyn bridge? A. Between ten and twelve million dollars. 3. What is considered the greatest engineering work (as completed) at the present day? A. It would probably be impossible to name any single work which could be called the greatest in the opinion of everybody. 4. Is cold water pressure harder on a boiler than an equal steam pressure? If so, why? A. Cold water pressure is often more injurious than steam pressure, because with the former the boiler is not in the condition which occurs in actual practice, so that, when it is heated, it may be better able to resist the strain.

(29) I. T. W. says: I am making a steam engine cylinder 1 1/2 inch bore and 2 1/2 inches stroke. What size boiler will it require? A. See pp. 33 and 225, vol. 33.

(30) W. F. says: Will you inform me of the mode of casting iron on to steel so as to form a solid weld? A. Perhaps some of our readers who have experience can aid the correspondent.

(31) J. N. asks: How many feet of pipe heating surface will an upright boiler of the following dimensions furnish economically with an average of 5 lbs. steam? Boiler 5 feet diameter, 151 3/4 flues 7 feet long, 3 feet 4 inches diameter of grate surface. Good draught. A. Such a boiler should evaporate 9 or 10 cubic feet of water an hour. The arrangement of flues mentioned is sometimes advantageous, but not always. You could only determine the question, in your case, by experiment. There is no standard for rating the power of boilers that is generally accepted by engineers.

(32) J. L. K. asks: 1. Is the Thomas steam wheel applicable to marine propulsion, and is it cheaper in construction than an ordinary engine? A. We do not discuss the merits of special manufactures in these columns. 2. What power can I expect from a windmill whose sails (4) are 5 feet x 2 feet in what is generally described as a stiff breeze? I cannot give you the pitch of sails, but presume that part is all right; it was made in London, England, and purchased from a ship wrecked on this coast. A. See p. 241, vol. 32.

(33) J. L. says: Will you give me the process for making rubber stamps? A. The rubber used for stamps may be either the pure gum (caoutchouc) or the sheet rubber, containing about 3 per cent of uncombined sulphur (not vulcanized rubber). In preparing the stamp the form is first set up in clean type well oiled, a retaining rim is set up about the face of the form, and a little thin cream of fine plaster of Paris worked in with a fine camel's hair brush. When all air bubbles have thus been excluded, the thicker plaster is run in to the depth of about three quarters of an inch, and the mould allowed a sufficient length of time in which to harden. The use of strong alum water in place of the clean water used in mixing the plaster will give a much harder mould, but the plaster then is longer in hardening. After thoroughly drying and baking, the mould is placed in a frame of suitable size, the sheet of rubber (about 1/8 inch thick) adjusted on its face, and the whole put in a small screw clamp and heated slowly until the rubber becomes sufficiently softened to admit of being easily forced into the mould by tightening the screw. The subsequent vulcanization of the rubber may be effected by immersing it for a short time in a mixture of 30 parts bisulphide of carbon and 1 chloride of sulphur, and then exposing in a room heated to 70° Fah. until all the sulphide of carbon has volatilized. Immersion in a boiling solution of 9 ounces of caustic potassa in a gallon of water for a few minutes, and subsequent washing in clean water completes the process, and the form is then ready for mounting. If the rubber is sufficiently softened, a very little pressure will cause it to copy the mould perfectly without breaking it. This also answers several other correspondents.

(34) H. C. asks for a recipe for making sealing wax. A. For red wax take shellac 4 ozs., melt and add 1 1/4 ozs. Venice turpentine. Mix and add 3 ozs. vermilion. It can be poured into moulds while melted, or rolled into sticks after it has cooled a little.

(35) N. A. B. says: 1. In the description of a magneto-electric engine on p. 8, vol. 33, I read: "By a suitable commutator, the currents circulating through the coils on the stationary magnet can be sent through those on the armature." Is reference had to the battery current, or the induced ones? A. The battery current. 2. Please tell me how to use the tangent galvanometer? A. The tangent galvanometer of most recent construction is composed of a compass dial five or six inches in diameter, having a fine steel point in the center. Underneath the dial are placed coils, of insulated copper wire of several capacities, designed to measure various currents, from those of great intensity with but little quantity, to those of great quantity with but little intensity. The magnetic needle which is supported on the fine steel point alluded to is composed of a number of thin, oblong steel plates, riveted upon a flat ring of aluminum and so trimmed as to form a perfectly circular disk. The average weight of the needle does not exceed 20 grains. The coils are placed so that the current runs parallel with the meridian of the needle. They are half an inch or more wider than the diameter of the disk. The intensity of currents, as measured by the tangent galvanometer, is proportional to the tangents of the angles of deflection—thus: let an electric current be sent through the galvanometer coil, whose directive force is precisely equal to that manifested by the terrestrial magnetism, and the needle, before at rest upon the meridian, will be deflected 45°; double the current passing through the coil and the needle will cut 63° 30'; with threefold the intensity of current the deflection will be 71° 34'; with fourfold, 76°, etc., according to the law of natural tangents. For measuring resistance, etc., of lines, a set of resistance coils is used in connection with the instrument. 3. As the Camacho electromagnet develops so much power with a comparatively weak current, will it not produce proportionally powerful induced currents? A. Yes, under some circumstances. 4. I purpose making the positive pole for sesquioxide of iron battery in the form of a carbon cell, made as described on p. 129 SCIENCE RECORD for 1875, containing a quantity of the sesquioxide; or in the form of a cylinder composed of coarsely pulverized coke and sesquioxide made similarly to the coke-manganese pole