

## Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

"Wrinkles and Recipes" is the best practical Handbook for Mechanics and Engineers. Hundreds of valuable trade suggestions, prepared expressly by celebrated experts and by correspondents of the "Scientific American." 250 pages. Elegantly bound and illustrated. A splendid Christmas gift for workmen and apprentices. Mailed, post paid, for \$1.50. Address H. N. Munn, Publisher, P. O. Box 772, New York City.

We make a Specialty of Fine Machinery & Models for the Centennial, Experimental Machinery, and Patent Office Models. Crook, Herring & Co., corner Center and White Sts., New York.

For Sale—20 in. x 10 ft. Lathe & Chuck, \$275; 20 in. x 8 ft. Lathe, \$200; 16 in. x 6 ft. Lathe, \$140; 9 1/2 ft. Planer, \$440; 5 ft. Planer, \$125; 3 ft. Planer, \$225; No. 1 Brown & Sharpe Screw Machine, \$400. Shearman, 45 Cortlandt St., N. Y.

The Allen Fire Supply Co., Prov., R. I., General Machinists, Brass Founders and Finishers.

A Specialty—Recutting Mill Saw Files. Passaic File Works, Paterson, N. J.

To Let—3d & 4th Story, 50x80, with elevator and power. Brick building, well lighted. Just the thing for Manufacturing Special Machinery. We can furnish castings and forgings. Unsurpassed as a distributing point. Atwell & Masten, Toledo, O.

For Sale—The entire Patent Right for Denn's Gridiron and Cake Baker. Clayton Denn, Frankford, Pa.

Hearing Restored—Great invention. Book free. G. J. Wood, Madison, Ind.

Light Gray Iron Casting—Mfrs, send address to F. D. Bennett, Jackson, Mich.

Makers of Metal Button Machinery, address Smith & Wicks, Baltimore, Md.

Manufacturers of Water Power Elevators will please send circulars to C. F. P. O. Box 1476, N. Y. City.

\$1,000 for any Hand Saw Mill equal to A. B. Cohn's, 197 Water St., New York.

Seeds and Implements—200 Illustrations just out. Enclose 5 cent stamp. A. B. Cohn, 197 Water St., N. Y.

For Sale—125 Horse Power Beam Engine, with parallel motion, suitable for a steamboat. P. O. Box 1203, New Haven, Conn.

Wanted—A situation as Machinist or Blacksmith. Work at both branches if required. Good references. Address T. H. Needham, Palmer Falls, Saratoga Co., N. Y.

Wanted—A small Screw cutting back-gear Lathe—say 12 inch swing, 4 1/2 foot bed. Address, stating price, &c., Robt. Shoemaker, Jr., Church Lane, Germantown, Pa.

Five new and elegant Fretwork Designs for 25 cents. Address J. S. Dickinson, Old Say Brook, Conn.

A Valuable Patent for Sale to the highest bidder. Smith's Improved Awl, for sewing leather without bristles. For Cut and description, see Scientific American of July 31, 1875. Address Sylvester A. Smith, Letts, Louisiana Co., Iowa.

A good price will be paid for Scientific American for July 2, 1870, and February 7, 1874, by W. W. Stapler, Wilmington, Del.

Yocom's Split-Collars and Split-Pulleys are same appearance, strength, and price, as Whole-Collars, and Whole-Pulleys. Shafting Works, Drinker St., below 147 North Second Street, Philadelphia, Pa.

To Manufacturers seeking foreign trade—A gentleman speaking Spanish, Portuguese, and French, seeks engagement, to travel, or for the Centennial. Translations made. Box 2393, Boston, Mass.

For Sale—A large quarry of fine limestone on bank of Hudson River, 4 1/2 miles from New York. Address E. A. Swain, 175 Broadway, New York.

A Mech. Engineer by education, who is a competent draftsman and designer, and has some practical experience, wishes employment. Best References. Address M. E., Jamaica Plain, Mass.

Piles—A sure cure. Sample free, post paid. A trial is its best advertisement. Wonder Worker Medicine Company, Salem, N. J.

Solid Emery Vulcanite Wheels—The Original Solid 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 39 Park Row, New York.

For Sale, to Close an Estate—A Valuable Patent Evaporating Pan for Parlor Stoves. For particulars, apply to Box 52, Troy, N. Y.

1/2, 1, & 2 Horse Engines, \$30, 60, & \$100; Boilers for same, \$75 & \$100. T. B. Jeffery, 253 Canal St., Chicago.

Steel Castings, from one lb. to five thousand lbs. Invaluable where great strength and durability are required. Send for Circular. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

Shingles and Heading Sawing Machine. See advertisement of Trevor & Co., Lockport, N. Y.

Latest and Best Books on Steam Engineering. Circulars free. F. Keppy, Bridgeport, Conn.

Manufacturers! Send for illustrated catalogue of Best Belt Pulleys made. A. B. Cook & Co., Erie, Pa.

Shafting, whole or clamp Pulleys, best style Hangers, 5 to 8 cts. per lb. S. E. Hartman, Worcester, Mass.

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

Water, Gas and Steam Goods—Send eight stamps for Catalogue, containing over 400 illustrations, to Bailey, Farrell & Co., Pittsburgh, Pa.

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

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

Hotchkiss & Ball, Meriden, Conn., Foundrymen and workers of sheet metal. Fine Gray Iron Castings to order. Job work solicited.

Peck's Patent Drop Press. Still the best in use address 410 Peck, New Haven, Conn.

All Fruit-can Tools, Ferracute Wks, Bridgeton, N. J.

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

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

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

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

Diamond Tools—J. Dickinson, 64 Nassau St., N. Y. Temples and Oilcans. Draper, Hopedale, Mass.

## Notes &amp; Queries

R. J. W. can prepare gun cotton by following the formula on p. 232, vol. 31. Cone pulleys can be proportioned by the rules given on p. 180, vol. 26.—F. K. will find a recipe for cement for grindstones on p. 251, vol. 31.—W. C. will find a description of the manufacture of bicarbonate of soda on p. 125, *Science Record* for 1875.—W. N. can proportion his safety valves by the formula given on p. 363, vol. 29.—W. & Co. can produce a fine black finish on German silver by using the method described on p. 288, vol. 31.—W. J. W. will find directions for gilding with leaf gold on p. 347, vol. 31.—J. F. Y. will find a description of salicylic acid on p. 96, vol. 33.—C. F. M. will find directions for refining cotton seed oil on p. 11, vol. 32.—J. E. J. will find directions for calculating the horse power of an engine on p. 33, vol. 33. This also answers J. McD. A cement for fastening leather on pulleys is described on p. 42, vol. 26.—T. H. S. can blue iron by the process described on p. 123, vol. 31.—B. S. S. will find directions for melting small quantities of brass on p. 54, vol. 31.—F. P. will find a good recipe for black ink on p. 92, vol. 33.—W. H. Jr. will find a recipe for marine or waterproof glue on p. 42, vol. 32.—J. M. C. will find directions for gilding on marble on p. 59, vol. 30.—R. A. E. will find some excellent directions for painting carriages on p. 308, vol. 33.—W. A. McG. will find a recipe for yeast on p. 183, vol. 33, and one for baking powder on p. 123, vol. 31.—B. W. S. will find directions for laying out a wind wheel on p. 241, vol. 32.—H. B. will find a recipe for aquarium cement on p. 80, vol. 31.—O. C. L. will find directions for producing the Etruscan finish on gold on p. 363, vol. 33.—P. W. will find an answer to his query as to sizes of boilers on p. 43, vol. 34.—A. B. will find a description of Pharaoh's serpents on p. 315, vol. 32.—R. T. W. will find a recipe for indelible ink for stamping on p. 129, vol. 28. This also answers A. F.—W. P. will find directions for painting outdoor work on p. 409, vol. 31.—W. L. S. will find full directions for burning coal dust economically on p. 107, vol. 32.—I. O. Y. will read the SCIENTIFIC AMERICAN regularly, he will not waste his time over the perpetual motion nonsense.—N. R. H. will find a recipe for a dipping acid on p. 139, vol. 31.—H. R. will find directions for making a tar concrete sidewalk on p. 50, vol. 32.—C. R. will find directions for enameling the insides of iron vessels on p. 362, vol. 32.—E. D. J. will find a description of a depilatory on p. 362, vol. 32.—W. K. will find a recipe for scarlet ink on p. 200, vol. 30.—C. W. can fireproof shingles by the method described on p. 280, vol. 28.—F. R. can tan skins with the fur on by the process described on p. 233, vol. 26.—C. J. can preserve wood from decay by the process detailed on p. 319, vol. 31.—W. D. will find directions for making plaster of Paris on p. 399, vol. 29.

(1) D. L. says: 1. I wish to construct a magic lantern for parlor use. I have a pair of 3 1/2 inch condensers, and I want to know if the object glasses of a large opera or field glass will do for the magnifying lens. They are two inches in diameter, and achromatic. A. Yes. 2. I have also a compound microscope. I should like to throw objects from it upon a screen. Can I attach it to my lantern? A. By using the lowest power objective you have, without the eyepiece, and placing it and the object in the most concentrated portion of the light, you may be able to get a small projection if your light is good. See p. 101, vol. 34.

(2) S. A. asks: 1. Can you give me a recipe for a lead glazing that will stand a white heat for hours? A. The lead glazings are all characterized by their easy fusibility. You will have to look in some other direction for so refractory a glazing as you describe. 2. Has there ever been any instrument for testing the heat used in burning stoneware? A. Yes, various forms of pyrometer have been employed for this purpose. See p. 130, vol. 24.

(3) G. S. T. says: In walling wells with timber, I find that the wood renders the water unwholesome. Is there any remedy for it? A. Yes, char the wood on its surface.

(4) C. T. C. asks: 1. Is it true that benzine will dissolve india rubber? A. Benzine dissolves caoutchouc but sparingly in the cold. Bisulphide of carbon is the proper solvent, but it also dissolves readily in hot naphtha. 2. Can india rubber be colored? A. Yes, by means of the aniline dyes. 3. Will the benzine, when the solution is exposed to the air, evaporate and leave the rubber? A. If an object be covered with either of these solutions as a varnish, on exposure to the action of the air the solvent will evaporate, leaving behind the rubber as a thin pellicle.

(5) G. P. W. asks: What proportion of fish glue shall I mix with common glue in making bait cement? A. Use 2 ozs. isinglass to every 4 ozs. of glue.

(6) M. H. K. asks: We solder rings with various kinds of precious stones in them, with hard solder, by placing them on a block of metal while blowing on them. I claim that the success of the operation is due to the mass and the conductivity of the block of metal, and that therefore the best conductor of heat of equal size is the surest. A friend contends that it is the mass alone, and that the poorer the conductor of heat, the better. Please state which is right. A. The mass and its conductivity should both be taken into consideration.

Which will preserve ice the longer, of two vessels of equal size, etc., one which is kept free from the water that results, or one which the water fills up, mingling with the ice? A. The former.

(7) J. McC. asks: What will prevent aniline red ink from fading? A. This cannot be remedied. Use some other coloring matter.

(8) G. E. E. says: I send you a specimen of graphite. It is at present impure. Is there any process for purifying it? A. No. 2. Does a large deposit of it indicate the neighborhood of coal, lead, or emery? A. No. 3. Considering the enormous consumption of plumbago, and the working out of many graphite deposits, is an immense mine of it likely to become of any value? A. Yes.

(9) R. R. asks: 1. What will prevent the colors running when carpets are washed? A. Carpets whose colors are not properly mordanted or fast cannot be washed without injury.

How can I make a liquid ink eraser? A. Oxalic or hydrochloric (dilute) acids, and sometimes cyanide of potassium, are employed for this purpose.

(10) S. C. D. asks: 1. What apparatus is necessary for measuring the indices of refraction and dispersion of a specimen of optical glass, for calculation of curvature for grinding correct lenses? A. It requires a circle graduated into degrees and minutes, upon which is mounted a telescope similar to the theodolite, with cross wires in the eyepiece. A small table is attached to the objective end, so as to move with it: a narrow vertical slit illuminated by sunlight is placed 10 or 15 feet distant from the instrument. The telescope is then turned on the slit, and the position read off. Then a prism (made of the glass you wish to try, whose angles are known, is placed upon the table in front of the objective, and the telescope turned so that the solar spectrum is seen at the position of smallest deflection: and then the position is again read. From this the index of refraction is determined. The dispersion is found by observing the fixed lines of the spectrum. 2. Should the edges of the disks be finished before or after grinding the lens? A. After. 3. How is the roughing out for lenses of short radius (concave) done, before applying the tool? A. The convex sides may be shaped by grinding off the edges on a flat tool until it nearly fits the templates. The concave side is ground on convex tools. Opticians who have different tools use those of longer curves first.

(11) M. R. C. S. asks: 1. How can I cover small twigs, leaves, and gauzy textile materials with crystals resembling frost or ice? A. Hot concentrated solutions of gum arabic, white sugar, alum, and chloride of ammonium (sal ammoniac) are employed to produce these effects. 2. How can I produce the appearance of icicles? A. Icicles may be imitated by means of pure gelatin (isinglass).

(12) F. W. B. says: I have made some attempts to manufacture sal soda from soda ash, by putting into boiling water all the soda ash it will take up or dissolve, carefully skimming off all the scum that rises, then taking it off to cool; but before it begins to crystallize, I carefully turn it off and leave the sediment. This I repeat three times, and get a clean and clear crystal, but there seems to be quite a waste in the dark sediment left. Is this the best way to make sal soda? A. Crush the crude soda ash into small pieces and calcine in a reverberatory furnace along with a quantity of fine sawdust. Digest the refined ash for some time with clean, hot water (not boiling), draw off the clear liquid into rather shallow troughs, and, by means of a proper ladle, remove the crystal from time to time. The residue is treated to recover the sulphur.

(13) McC. Bros. ask: What substance, when mixed with cane tops and corn tops (out of which and mold a compost has been made) will rot or decompose the said tops, and thus give us a valuable manure? A. Disintegrate the vegetable fibers of the cane tops as completely as practicable, and treat with a suitable quantity of good lime. Sulphate of lime will not answer.

(14) M. L. W. asks: 1. What is the chemical composition of the mineral witherite, and what are its uses in the arts? A. Witherite is a carbonate of baryta. In 100 parts it contains: carbonic acid 22.3, baryta 77.7. It is used in chemical works, in the manufacture of plate glass, and in France in the manufacture of beet sugar. It is also employed in the production of the rarer salts of barium. 2. Are any deposits of it found in this country? A. It is not of common occurrence in the United States, but is found in considerable quantity near Lexington, Ky., with barite.

(15) J. A. H. says: The carrying boards under flour reels are flat, and consequently, in cold weather, with hot air inside and cold air outside, moisture forms on the boards and clogs them with flour. Can you give me a recipe for a varnish that will retain its gloss under these disadvantages? A. Varnishing them would not rid you of the annoyance. It will be necessary for you to jacket them with some non-conducting substance, so as to equalize as far as possible the immediate interior and exterior temperature of the boards, and thus prevent the precipitation of the moisture from the warmer air within.

(16) J. W. T. asks: What are the relative velocities of three planets whose orbits are to each other as 15, 19, and 12, in times which are to each other as 7, 3, and 5? A. If we understand the question aright, the answer will be

|     |    |                  |
|-----|----|------------------|
| 15  | 19 | 12 multiplied by |
| 7   | 3  | 5 respectively.  |
| —   | —  | —                |
| 105 | 57 | 60               |

(17) F. G. H. asks: Will malleable iron rust when in water, or when exposed in a damp place? A. Yes.

I would like to know of a good process for tinning malleable and gray iron castings. A. Pickle your iron castings in oil of vitriol, then immerse

them in muriate of zinc (made by putting in muriatic acid as much zinc as it will dissolve), and then dip them in a mixture of 3 parts tin and 1 part lead.

(18) C. W. S. asks: A friend contends that a locomotive exerts a greater power when the crank is on the bottom center than when it is on the top. I say there is no difference. Which is right? A. You are.

(19) M. H. says: I wish to build an oven for heating wagon tires. Can you give me an idea how to make it? A. Build a circular trough with a fireplace on one side and the chimney over the top of it. The roof may be about 12 inches from the top of the trough, and should be of bars of iron, supporting bricks. In heating the tire, keep it covered all over with wood or charcoal, and revolve it in the fire as usual.

(20) C. W. L. C. asks: 1. At what speed shall I run a smooth disk to saw cold iron and steel? A. About 25,000 feet per minute. 2. What shall I use for belting to drive it? A. Leather.

(21) W. E. D. says: I have been using a steel mill for milling brass screws. It was made of round bar steel 1/2 inch in diameter, with a 3/8 hole drilled in lengthwise to the depth of 1 1/2 inches. While using the mill, it became heated by friction, and I cooled it by pouring water on it. While turning up a screw, the mill exploded with a sharp report: at the same time a puff of steam came out from the hole; it blew out a piece nearly 1/2 inch long and about 1/2 the size of the mill. What was the cause? A. Some of the water used in cooling remained in the hole, and the heat vaporized it; the pin fitted the hole too tight to allow the steam to escape, and hence the explosion.

(22) N. S. B. Jr. asks: 1. What kind of wood will make the best sled runners? A. Lance wood. 2. How shall I bend them? A. Boil them in water. 3. I have a pair of red ash poles 1 x 1 1/2 inches, which I wish to make into runners by bending them up the 1 1/2 inches way. Can I do so safely by boiling them in water for 4 or 5 hours? A. Yes.

(23) C. says: We are building a steamboat for hunting and fishing purposes, to carry a party of 10 or 12. She is to be 50 feet long, 10 feet wide, with 24 inch gunwales, with a flat bottom, and she must not draw over 8 to 10 inches water. Could a propeller be used in so little water, or should side wheels be used? A. Side wheels would be preferable for this case. Make them as large as convenient, if they have fixed floats. 2. What size of portable engine with horizontal boiler is necessary, and what size of side wheels, to attain 5 or 7 miles per hour up stream? A. If a portable engine is used, it will be necessary to introduce gearing, so as to get the proper speed for wheel shaft, in which case an engine rated at 15 or 18 horse power will probably answer, if sufficient boiler be given her.

(24) W. L. McG. asks: What has become of the report of the commission appointed by Congress for ascertaining the causes of explosions of boilers? A. The commission that made the experiments last season has decided, we believe, to keep them private until the whole series is complete.

(25) S. D. P. Jr. says: In operating a steam boiler, the firemen keep a bed of coal about 10 inches deep. They claim to save coal over the plan of working a lighter bed, for the reason that it does not require stirring up so often, and there is, in consequence, less waste of coal through the grate. I will add that the draft is not very strong. The boiler is 4 1/2 x 12 feet, with 71 three inch flues, in brickwork setting. A. It is difficult to give a general rule, as much depends upon the draft, the kind of fuel, etc. But if you have any doubts in regard to the correctness of your firemen's views, you can settle the matter conclusively in a very short time, by experimenting with fires of different thickness.

(26) J. L. G. asks: Would it be practicable to set a boiler 500 yards from the engine, packing the pipes in sawdust? A. It can be set at this distance, if careful provision is made for draining the pipes.

(27) A. C. asks: Will 16 sticks, each 1 foot in diameter and 8 feet long, make a cord? In other words, what is the legal rule for measuring round timber? A. If you are buying the logs as timber, the general rule among lumbermen is to compute the cubic contents according to what the logs will square. In the case of cord wood, there is so much difference of opinion among measurers, and such variety in the decisions of the courts, that it is not possible to tell you what the legal rule is.

(28) R. D. says: I can take apart, put together, and run one form of engine, but have had no experience with any other. If I applied for a license to run such a one as I understand, would I be examined on engines generally (of which I know but little) or for the one I want to run? A. The examination is generally intended to test the candidate's knowledge of the particular boiler and engine of which he desires to take charge.

(29) A. S. says: I am informed that to measure the capacity of a vessel I should weigh the water it will hold, and that for every 8 lbs. of water it will hold a gallon of liquid. Is this so? A. This rule will give a rough approximation. At ordinary temperatures, the weight of a United States gallon of water is about 8.32 lbs.

(30) C. R. says: A 10 inch pipe is laid on an incline 300 feet long, and then a 20 inch pipe on the same incline. If we put a plug or a fire hydrant on each pipe, give them the same opening, and put the same sized nozzle on each, which nozzle will throw the farther? A. The hydrant on the 20 inch pipe should throw a little the farther under the circumstances, because the head required for velocity and friction would not be as great as in the case of the 10 inch pipe.