

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 Medart Pat. Wrought Rim Pulley. See adv., p. 284. Gardiner's Pat. Belt Clamp. See illus. adv., p. 285.

Light Tramway Engines, flexible wheel-base, wood or iron rails. Address W. A. Gilday, 54th St., Phila., Pa.

German Corn Remover will allow nicer fitting boots. Take no other. Sold by druggists. 25 cts.

Grain Nickel, Nickel Anodes Rolled or Cast, Nickel Salts. Greene, Tweed & Co., 118 Chambers St., N. Y.

For Sale.—Two Locomotive Boilers, by Danl. W. Richards & Co., 92 Maugin St., New York.

If your brain is overtaxed, use Van Bell's "Rye and Rock." It forms carbon.

Cutters for Teeth of Gear Wheels formed entirely by machinery. The Pratt & Whitney Co., Hartford, Conn.

Portable Railway Track and Cars. Contractors, Planters, Miners, send for circulars. Francis W. Corey & Co., 5 & 7 Dey St., New York; 95 Washington St., Chicago, Ill.

Why be tortured with hard or soft corns? German Corn Remover cures every time. For sale by all druggists.

Emery, Glue, Composition, Pumice, and all Goods for Polishing Metals. Greene, Tweed & Co., New York.

Essay on Inventions.—What qualities will make them profitable, and how to incorporate these qualities in inventions. 25 cts. postpaid. Address N. Davenport, Valparaiso, Ind.

Second-hand Lathes, Planers, Boring and Turning Mills, good as new, for sale cheap. Apply to Barbaroux & Co., Louisville, Ky.

For the best Jig Saw Blades, go to Wm. Cuddy, 108 Hester St., New York.

If your boiler foams, it is caused by impurities suspended upon the surface of the water. It is a foul proceeding, and can be entirely obviated by the Hotchkiss Mechanical Boiler Cleaner. 84 John St., New York.

Improved Skinner Portable Engines. Erie, Pa.

"Rival" Steam Pumps for Hot or Cold Water; \$32 and upward. John H. McGowan & Co., Cincinnati, O.

Skinner's Chuck. Universal, and Eccentric. See p. 268. Safety Boilers. See Harrison Boiler Works adv., p. 252.

Inventors sending a three cent stamp to Inventors' Institute, Cooper Union, New York city, will receive a copy of the *Industrial News* free.

The Eureka Mower cuts a six foot swath easier than a side cut mower cuts four feet, and leaves the cut grass standing light and loose, curing in half the time. Send for circular. Eureka Mower Company, Towanda, Pa.

The Newell Universal Mill Co., Office 7 Cortlandt St., New York, are manufacturers of the Newell Universal Grinder for crushing ores and grinding phosphates, bone, plaster, dyewoods, and all gummy and sticky substances. Circulars and prices forwarded upon request.

Pure Oak Leather Belting. C. W. Army & Son, Manufacturers, Philadelphia. Correspondence solicited.

Jenkins' Patent Valves and Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 262 Dover St., Boston, Mass.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

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

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr. & Bros., 531 Jefferson St., Philadelphia, Pa.

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

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

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.

Clark Rubber Wheels adv. See page 236.

Presses, Dies, Tools for working Sheet Metals, etc. Fruit and other Can Tools. E. W. Bliss, Brooklyn, N. Y.

For the Cheapest Process of Manufacturing Bricks, see Chambers Bros. & Co.'s adv., page 254.

Cope & Maxwell Mfg Co.'s Pump adv., page 252.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 252.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 252.

For Thrashing Machines, Engines, and Horse Powers, see illus. adv. of G. Westinghouse & Co., page 253.

The I. B. Davis Patent Feed Pump. See adv., p. 269.

Moulding Machines for Foundry Use. 33 cent net saved in labor. See adv. of Reynolds & Co., page 269.

The Sweetland Chuck. See illus. adv., p. 269.

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

For best Duplex Injector, see Jenks' adv., p. 269.

The American Electric Co., Proprs Mfrs of Thompson Houston System of Electric Lighting the Arc Type. See Bentel, Margedant & Co.'s adv., page 285.

Clark & Heald Machine Co. See adv., p. 286.

For the best Diamond Drill Machines, address M. C. Bullock, 80 to 88 Market St., Chicago, Ill.

Blake "Lion and Eagle" Imp'd Crusher. See p. 284.

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

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

50,000 Sawyers wanted. Your full address for Emerson's Hand Book or Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa.

Peerless Colors—For coloring mortar. French, Richards & Co., 408 Callowhill St., Philadelphia, Pa.

See Special Bolt Forging Machine Notice, page 300.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 284.

For the manufacture of metallic shells, cups, ferrules, blanks, and any and all kinds of small press and stamped work in copper, brass, zinc, iron, or tin, address C. J. Godfrey & Son, Union City, Conn. The manufacture of small wares, notions, and novelties in the above line, a specialty. See advertisement on page 253.

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

For all kinds of Special Rubber Goods, address Akron Rubber Works, Akron, O.

Gear Wheels for Models (list free); Models, Experimental Work, etc. D. Gilbert & Son, 212 Chester St., Philadelphia, Pa.

Gould & Eberhardt's Machinists' Tools. See adv., p. 284.

For Heavy Punches, etc., see illustrated advertisement of Hilles & Jones, on page 284.

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 253.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke & Son, 40 Cortlandt St., N. Y.

4 to H. P. Steam Engines. See adv. p. 286.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 285.

Long & Allstatter Co.'s Power Punch. See adv., p. 285.

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

Rowland's Vertical Engine. Wearing parts of steel. Broad bearings. F. C. & A. E. Rowland, New Haven, Conn.

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.

Tyson Vase Engine, small motor, 1-33 H. P.; efficient and non-explosive; price \$50. See illus. adv., page 284.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 285. Totten & Co., Pittsburg.

Use Vacuum Oil Co.'s Lubricating Oil. Rochester, N. Y.

Lightning Screw Plates and Labor-saving Tools, p. 286.

Good Machinists and Vise Hands wanted. Address Watertown Steam Engine Company, Watertown, N. Y.

Catechism of the Locomotive, 625 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.

Eclipse Fan Blower and Exhauster. See adv., p. 285.

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(5) J. P. M. asks: Which do you consider best for the arch of press, a heavy cast iron one or a lighter one of cast steel, malleable iron or a wrought iron forging? A. Use steel or wrought iron. They will spring under the pressure and not break.

(6) G. A. W. asks: 1. How can I get the manganese oxide out of some coke, which I had in a Leclanche battery? A. Coarsely powder and wash in a gentle stream of water. With care the lighter coke may be washed away from the heavier oxide. 2. Can you refer me to a paper which describes the ice machine? A. See "Ice Making and Ice Machines," SUPPLEMENTS 85 and 91.

(7) J. C. B. asks: What composition is used in the manufacture of articles made of sawdust, for holding the particles together? A. Blood, or blood freshly mixed with a little finely powdered lime. Weak glue size has also been used with sawdust in a similar manner. The articles are moulded under heavy pressure.

(8) D. Bros. ask: Can you inform us where to get some red indelible ink to use with stamps on linen? A. Liquefy 1 pint of balsam of capivi by aid of heat, and gradually stir in 2 ounces of thoroughly dry white curd soap, cut in thin shavings, and stir until properly diffused. Then introduce a sufficient quantity of vermilion, and stir occasionally until cold. This ink is suitable for stamps.

(9) J. H. W. asks: 1. Please give some formula by which I can prevent the fungus growths on cedar trees. A. Wash the trunks occasionally with lime water. 2. How can I cheaply extract nitrogen from the air and hydrogen from water? A. Pass dry air slowly through granular charcoal heated to redness in an iron tube, then through several copper tubes containing red hot oxide of copper, then over dry slaked lime. The hot carbon forms carbonic acid and carbonic oxide with the oxygen of the air; the carbonic oxide is converted into carbonic acid by the oxide of copper, and the carbonic acid is absorbed by the lime leaving nearly pure nitrogen. Pass steam through a large quantity of red hot iron turnings; a portion of the steam is decomposed by the hot iron. The hydrogen resulting may be collected in a reservoir with the unchanged steam, the latter condensing on cooling. 3. If hydrogen is compressed to one-half its natural volume will it be one-fourth as light as air or one-seventh? A. About one-seventh as heavy.

(10) R. T. asks: Which are the best acids for tin, lead, and antimony, or an acid for a composition of these three metals together? A. A warm mixture of 1 part nitric and 3 parts hydrochloric acid will dissolve these metals with the greatest facility.

(11) A. R. writes: Having broken my 17x21 glass bath from top to bottom (the zigzag or center lines show the breakage), I would like to know if you have any su e means of cementing it together. I have thought of gutta percha, but as this should be put on hot, I am afraid that parts would get cool. I have also thought of this strata cement. Would it resist nitric acid? A. Dissolve shellac in alcohol enough to form a liquid of the consistence of molasses. Clean the parts dry, smear them with this, press the parts firmly together, and allow to remain under pressure twenty-four hours; then coat the inside over the joint with a strong solution of gutta percha in benzole, and let it harden before wetting. The shellac solution should be perfectly smooth and free from lumps.

(12) E. L. H. asks: How can a physician's thermometer be tested to know if it is correct? A. Only by comparison with the indications of a standard thermometer under similar circumstances.

(13) R. H. C. asks: What is the proper temperature for an incubator? A. 104° Fah.

(14) R. H. B. writes that A. S. R. will find on page 57, vol. xli., SCIENTIFIC AMERICAN, an elaborate article on the "Manufacture of Indian Arrow-heads," by F. H. Cushing.

(15) A. S. writes: We have standing throughout our factories water barrels in case of fire. The water in these, after long standing, becomes offensive, and I should judge unhealthy. Will you please tell me what preparation put in fresh water will keep the water sweet for any length of time? A. The solution of a quarter pound ordinary green copperas (sulphate of iron) in each barrel of water is recommended.

(16) E. H. asks: Is it necessary to have the brass tubing or condenser of a steam yacht tinned? If so, how is it done? A. It is better to have them tinned. You can purchase them already tinned much better and cheaper than you can do it yourself.

(17) H. E. asks: Will polished steel plated by being immersed in a solution of sulphuric ether and gold chloride last long? A. The film of gold deposited in this way will not wear as well as an electro deposit. See page 116 current volume.

(18) E. D. V. writes: You recently advised to use No 30 copper wire for acoustic telephone. My experience suggests otherwise, and I submit it. No. 32 is generally sold for this use. On a very short line No. 30 would answer, but on lines of usual length it will break too easily between supports, and too many supports interfere with the transmission of sound. On a line of 3,600 feet I use No. 22, and six supports between the terminal ends; that is, supports are 500 feet apart. The wire has stood for four years, worked well, and no breakage. No. 30 would not do at all. I have tried many varieties of telephone—wood, metal, leather, and cloth for diaphragm; steel, iron, and copper wire. No. 22 copper wire, and wood diaphragms, one-sixteenth inch thick and 3 inches diameter, make the best combination. Chamois skin for longest lines makes best diaphragm, but it soon needs replacing. Steel wire produces too much roaring.

(19) R. B. writes: About two years ago I put down in my well a double cylinder pump. The hose at the end of the suction pipe is 18 feet from the pump (water level only 6 feet). The water has to be forced 75 feet high in a tank which is 12 feet above the well and ground level. The suction pipe is 3 inches, delivery

pipe 2 1/2 inches, each cylinder of pump 4 inches diameter, stroke 8 1/2 inches. The pump worked well for six months, but since then has worked by fits and starts; that is, it will work for half an hour, and suddenly stop forcing water; it always draws water as high as the pump, but will not force it up. I have had some of the best pump fitters at work at it and they can do nothing. There is no leak whatever anywhere; all joints are tight. The pump is worked by a three horse power horse wheel. Can you or any of your correspondents say why the pump will not work, and what I should do to get it to work? A. There is probably some defect in the delivery valves which permits the water to fall back into the pump on the return stroke.

(20) C. B. C. asks for a receipt for making ink fireproof, and also one for making paper fireproof. A. We know of no means by which ordinary paper may be made practically fireproof. Paper made of pure asbestos fiber resists a high temperature without material alteration. An ammoniacal solution of nitrate of silver, colored with a little India ink, will preserve a legible copy when written with on such paper and subjected to strong heat. Ordinary writing inks cannot be made fireproof.

(21) G. C. F. asks: 1. Is pulverized raw lime better than burned slaked lime as a fertilizer? A. The old slaked lime is best. 2. How much pressure can be produced at the bottom of 1,000 feet of tubing in an artesian well by a rotary pump with a cylinder one foot in diameter run at 200 revolutions per minute pumping air? A. The limit to the pressure would depend entirely upon the perfection of the pump and of the joints and connections of the pipe.

(22) H. B. S. Co. writes: We have two steam pumps running at our store for the purpose of exhibition. They pump Schnykill water from a tank in the cellar and return it to the same tank continuously. The water, although in constant circulation during the day, becomes very offensive. We have been unable to correct the trouble with lime, etc. Please suggest something that will keep it sweet and harmless, without injuring the working parts of the machinery. A. A small quantity of copperas (ferrous sulphate) will not injure the pumps and will deodorize the water.

(23) A. P. H. asks (1) for a receipt for a good harness blacking oil. A. Melt together 2 oz. asphaltum and 3 oz. beeswax; remove from the fire and add 1/2 oz. fine lamp black and 1/2 dr. of Prussian blue in fine powder; then reduce to a thin paste with neat-foot oil.

(24) P. P. writes: I have several hundred pounds of metal, principally lead, with some tin and antimony, which comes from a smelter but is not refined, and therefore does not run freely. Can you tell me of a cheap process to accomplish this, or will you name some work from which I may obtain the desired information? A. Melt and heat the metal nearly to redness in No. 2 well annealed sand pots, and for every 10 lb. metal stir in (gradually) about 6 oz. dry nitrate of soda. Cool somewhat and skim off the dross before pouring. Save the latter for reduction, as it contains much lead oxide, beside stannic and antimonious oxides.

(25) E. E. P. asks how to dissolve isinglass. A. If you mean fish gelatin, dissolve in hot water, after soaking over night in a little cold water. Mica, sometimes improperly called isinglass, cannot be dissolved without decomposing it.

(26) A. G. B. asks how to make ammoniated opodeldoc. White soap, cut in small shavings, 2 lb.; camphor, 5 oz.; oil of rosemary, 1 oz.; oil of organum, 2 oz.; wine spirit, 1 gallon. Heat over a water bath until solution is effected, cool somewhat, strain, and add 11 oz. ammonia water. Bottle and stopper immediately.

(27) R. G. asks for a receipt for making a paint for roofs, etc., composed of coal tar or pitch, and ground slate or oxide of iron. A. Melt in a capacious iron vessel for at least four hours, 28 lb. each common pitch and asphaltum; then gradually stir in 20 lb. of finely powdered and dry iron oxide or red ochre, and continue the heat another hour or until a drop of the mixture on cooling rolls up very hard. Then remove from the fire, let cool somewhat, and stir in gradually (to avoid accident) a sufficient quantity of good benzine.

(28) J. C. B. asks: Has the question of the formation of ice been conclusively settled, that is, whether it forms on the upper or lower surface? A. Ordinarily ice forms at the surface of water. On cooling, water contracts in volume—becomes denser—until it reaches a temperature of about 39° Fah.; if cooled below this point it gradually expands—becomes lighter—until at about 32° Fah., it congeals. Water chilled at the surface contracts and sinks, the warmer and lighter water rising to the surface. This continues until the whole body of water is chilled to 39° Fah. From this point to 32° the colder water remains at the surface and there congeals. In shallow and turbulent water ice sometimes forms at the bottom, and, becoming attached to stones, rocks, etc., does not rise. See answer to D. M., page 202 (21), current volume.

(29) D. S. writes: In the construction of wrought iron cylinders, as the flues or shell of a boiler, what is the correct rule for the shrinkage, or, in other words, how much is allowed for the bending of the iron over and above the circumference of a given circle? For instance, for a shell 60 inches diameter, 1/2 inch thickness of iron, how many inches of iron will it take to form the above? A. If the iron is laid out correctly for 60 inches diameter inside, it is supposed that in the bending the outer part of the plate will draw or stretch to its proper length.

(30) R. L. S. asks: 1. Can you give me a solution that will take the taste out of pine wood vessels? A. Washing with hot dilute hydrochloric acid (acid 1, water 3) will in a measure effect this. They should be thoroughly washed with hot water after this treatment. 2. Have you a receipt for making a paste that will make labels stick on a polished surface for any length of time? A. See answer to R. S., page 203 (26), current volume; also cements, SUPPLEMENT, No. 158. 3. Is there any method, besides sealing air tight and



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.