

Business and Personal.

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The best Pattern Letters now before the public are manufactured by S. E. Adamson, No. 5 Dey St., N.Y. City. Send Stamp for Catalogue and Price List.

Chucks—Our Chucks are of the very best material & workmanship. Fairman & Co., Baltimore, Md.

Screw and Drop Presses, Fruit Can Dies and Dies of every description. Thomas & Robinson, Clun., O.

We have a Packing Box Factory in Michigan, and want some party in New York to sell and deliver to city trade, we furnishing shooks. Address, with reference, A. G. Bissell & Co., E. Saginaw, Mich.

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Patent No. 126,693, for Steel Spring Lamp Chimney Cleaner. Price only \$1,000. L. Granger, Patente, Armada, Mich.

Wanted a good machinist, with small capital, to engage in manufacturing and repairs. Nearest shop 18 miles; only shop in county. Or will sell—all new. Ladd & Parker, Elmore, Ohio.

Buy Improved Car Machinery of Gear, Boston, Mass.

For Sale—An established manufacturing (wood working) business, in one of the best sections of country in Illinois. Capital required, \$8,000; more can be used. Or will take in partner. Address H. Bevis, Virginia, Ill.

Wanted—The address of every intelligent reader of the SCIENTIFIC AMERICAN, to whom will be sent free a specimen number of the Illustrated Phenological Journal. Address S. K. Wells, Publisher, 389 Broadway, New York.

The Safety Valve—Buy B. M. Johnson's Safety Valve Guide. Any person can learn all they wish of the Safety Valve. Price \$1.50, post paid. Address Box 128, Post Office, Greenpoint, L. I.

Indispensable to every Manufacturer and Machinists—Boston Journal of Commerce; send for a specimen copy. \$3 per year.

Machinists' grindstones, Mitchell, Phila.

Pulleys ground cheaper and better than by turning. Suitable grits by Mitchell, Philadelphia.

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Wanted—Agents to travel and sell "Stillwell's Pat. Lime Extracting Heater," and "Eclipse Turbine Water Wheel," on commission. Liberal inducements to good parties. Stillwell & Bierce Manufacturing Company, Dayton, Ohio.

Small Printing Press Wanted—C. S. Bennett, Crawfordville, Iowa.

Buy Gear's Improved Car Boring Machine, Boston, Mass.

Belting as is Belting—Best Philadelphia Oak Tanned. C. W. Army, 301 and 303 Cherry Street, Philadelphia, Pa.

Wanted—Superintendent, capable of managing a manufacturing establishment embracing a general Foundry business, Architectural Iron Work and Machinery. Must be a first class man of practical experience. Address A. H. Massey, Cleveland, Ohio.

For the best Endless Bed or (Farrar) Surface, address Davis, Hatch & Co., 436 North 12th Street, Philadelphia, Pa.

Wanted—An experienced manufacturer of Door Locks and light hardware, with \$10,000 Capital, to take charge of Shops. Edward Rowe, Jr., Mansfield, Ohio.

Tin Ware Manufacturers should see the patent Weighing Scoop. For Sale, or Worked on Royalty. D. H. Priest & Co., 3 Tremont Row, Boston, Mass.

J. R. Abbe, Manchester, N. H., sells Bolt Vises.

Millstone Dressing Diamond Machine—Simple, effective, durable. For description of the above, see Scientific American, Nov. 27th, 1869. Also, Glazier's Diamonds. John Dickinson, 64 Nassau St., New York.

Circular Saw Mills, with Lane's Patent Sets; more than 1200 in operation. Send for descriptive pamphlet and price list. Lane, Pitkin & Brock, Montpelier, Vermont.

We wish to correspond with some party who understands bleaching and refining oils. Any one who can bleach a dark, mixed oil, so as to make it a clear, merchantable article, will be well paid for doing it, or for the process. Samples sent on application to Lock Box 199, Pawtucket, R. I.

To Purchase—A large amount of Second Hand Machinery. Any parties having Engine Lathes, Iron Planers, Drills, &c., in large numbers, who wish to dispose of them cheap for cash, will find a purchaser on application to W. A. James, Roche & Spencer, 273 South Canal Street, Chicago, Ill.

Peck's Patent Drop Press. For circulars, address the sole manufacturers, Milo, Peck & Co., New Haven, Conn.

For 8, 10, 12 & 15 horse Steam Engines, with Link, cut-off, and reversing motion, address, for circular, E. West, Lockport, N. Y.

Tree Pruners and Saw Mill Tools, improvements. Send for circulars. G. A. Prescott, Sandy Hill, N. Y.

Five different sizes of Gatling Guns are now manufactured at Colt's Armory, Hartford, Conn. The larger sizes have a range of over two miles. These arms are indispensable in modern warfare.

Fire Clay and Limestone Mills, which wear longer than any others made, cast to order by Pittsburgh Casting Co., Pittsburgh, Pa. All work warranted.

The Berryman Manuf. Co. make a specialty of the economy and safety in working Steam Boilers. I. B. Davis & Co., Hartford, Conn.

Carpenters—For Sale, a Sash Factory, run by water power, at a lumber landing, with a profitable run of trade. For particulars, address P. O. Box No. 2, Charlestown, Jefferson County, West Virginia.

For 2, 4, 6 & 8 H. P. Engines, address Twiss Bros., New Haven, Conn.

The Berryman Heater and Regulator for Steam Boilers—No one using Steam Boilers can afford to be without them. I. B. Davis & Co.

Needle and Clock Machinery of every description of the most Improved Styles. Hendeby Bros., Wolcottville, Ct.

Shafting and Pulleys a specialty. Small orders filled on as good terms as large. D. Frisbie & Co., New Haven, Conn.

All Fruit-can Tools, Ferracute, Bridgeton, N. J. English Patent—The Proprietors of the "Heald & Cisco Centrifugal Pump" (triumphant at the recent Fair), having their hands full at home, will sell their Patent for Great Britain, just obtained. A great chance for business in England. Address Heald, Cisco & Co., Baldwinville, N. Y.

Read the article on "The Machinists," now being published in the Boston Journal of Commerce. Send for Specimen Copy.

American Boiler Powder, for certainty, safety, and cheapness, "The Standard anti-Incrustant." Am. B. P. Co., Box 797, Pittsburgh, Pa.

Williamson's Road Steamer and Steam Plow, with rubber Tires—Address D. D. Williamson, 32 Broadway, N. Y., or Box 1809.

For Steam Fire Engines, address R. J. Gould, Newark, N. J.

Brown's Coal-yard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable, W. D. Andrews & Bro., 414 Water St., N. Y.

Always right side up—The Olmsted Oiler, enlarged and improved. Sold everywhere.

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

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrew's Patent, inside page.

Gauges, for Locomotives, Steam, Vacuum, Air, and Testing purposes—Time and Automatic Recording Gauges—Engine Counters, Rate Gauges, and Test Pumps. All kinds fine brass work done by The Recording Steam Gauge Company, 91 Liberty Street, New York.

Hydraulic Presses and Jacks, new and second hand. E. Lyon, 470 Grand Street, New York.

Machinists—Price List of small Tools free; Gear Wheels for Models, Price List free; Chucks and Drills, Price List free. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Boynton's Lightning Saws. The genuine \$500 challenge. Will cut five times as fast as an ax. A six foot cross cut and buck saw, \$6. E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor.

Absolutely the best protection against Fire—Babcock Extinguisher. F. W. Farwell, Secretary, 407 Broadway, New York.

Steel Castings "To Pattern," from ten lbs. upward, can be forged and tempered. Address Collins & Co., No. 212 Water St., N. Y.

The Berryman Steam Trap excels all others. The best is always the cheapest. Address I. B. Davis & Co., Hartford, Conn.

For best Presses, Dies and Fruit Can Tools, Bliss & Williams, 118 to 120 Plymouth St., Brooklyn, N. Y.

Covering for Boilers and Pipes. The most economical and durable article in use. Took first prize at American Institute Fair. Van Tuyl Manufacturing Company, 528 Water Street, New York.

A Superior Printing Telegraph Instrument (the Selden Patent), for private and short lines—awarded the First Premium (a Silver Medal) at Cincinnati Exposition, 1872, for "Best Telegraph Instrument for private use"—is offered for sale by the Merchants' Mfg and Construction Co., 50 Broad St., New York. P. O. Box 6865.

Notes & Queries

1.—G. T. P. says: How can I make good red sealing wax?

2.—T. E. B. asks: How can I remove clinkers from the inside of a stove?

3.—E. R. asks what is the best way of resuscitating a person apparently drowned?

4.—W. T. H. says: Please let me know what is put on the tin oval butter kettles to make them look like silver, and how it is made and applied.

5.—T. G. asks: Will some one give full directions for making a solid emery wheel 1/4 inch thick and 6 or 8 inches in diameter for cutting slots in rough castings?

6.—P. asks for the *modus operandi* of producing "Grecian painting," also for the transparent varnish for the same.

7.—J. M. asks for a method of treating old oil paintings, which have been almost obliterated by frequent and bad varnishing; also for the best way of treating a painting on panel of which the wood is cracked.

8.—G. E. H. claims to have a process for tinning cast iron, which he has tried with success both on finished and rough castings. He asks: Has nothing of the kind been done before, and if not, to whom is it of the most value?

9.—E. H. asks: What is proper speed per minute for a common wood turning lathe, and also for a circular saw from 8 to 12 inches in diameter? What is the best method of tempering cast steel for common wood cutting tools?

10.—P. P. has often observed such birds as eagles, hawks, and turkey buzzards, and wishes to know how they can gyrate and ascend by a spiral course without any motion of their wings and tails. As a phenomenon utterly at variance with the laws of gravitation, P. P. thinks it deserves investigation.

11.—H. says: I have a great many horses with tender feet, having what I call corn on the inside of the heel of the fore feet. I have been trying many ways to cure it, and I wish to know if there is any certain remedy, and what it is the cause.

12.—L. says: I have a house organ which troubles me by giving every pulsation of the bellows feeders when less than half the instrument is in use. The reservoir for wind is three feet six inches by three feet, rising twenty-two inches, with two feeders of the usual construction. Can any correspondent tell the cause or its remedy?

13.—W. H. says: Is there such a society as a co-operative grocery store in this country, from which we can get a copy of the constitution and bye laws? If so, where is it, and what is its name?

14.—S. W. P. asks: What system of phonography is most used by the reporters of the press at the present time? Which is the easiest to learn, and can phonography be well learned without a living teacher?

15.—A. S. G. says: I recently saw a receipt for liquid glue in the SCIENTIFIC AMERICAN, stating that nitric ether would dissolve glue. I have had some white glue soaking in this ether for nearly three weeks, and find no solution; the glue has become leathery, with no further change. Can you tell me anything practical about this?

14.—A. K. asks: Are there any power looms for weaving sackcloth of the Mexican "istle," and machinery for transforming that fiber into the necessary thread, in existence? Istle is a very hard and cross grain fiber, about as stiff and thick as horse hair. The threads used for sacking are two cord and 1/2 inch diameter, making 3 to 4 meshes to the inch. The sacking is now all made by hand, and I would like to know if and where any simple machinery, to make such coarse fabric, is to be had.



G. S. T. says: My mouth is full of your praise! You are at the pinnacle of wisdom, and are ever ready to impart instruction to your subscribers. Please tell me (1) how I shall prepare a black board upon the wall of a room? I have read and racked my brain without success, and, without your help, I will abandon the task. 2. Which arrangement of a stove pipe is the better, a straight slanting or a perpendicular and then a horizontal one? Which would secure the best draft? Should the chimney be contracted at the top or a little enlarged, and should it be closed just below where the pipe enters it? 3. Am I right in believing that some glass is not a non-conductor of electricity? I find it impossible to construct a Leyden jar of the ordinary fruit jar or bottle green glass. 4. How long before the United States mail will remove my anxiety by bringing on my SCIENTIFIC AMERICAN of February 15? Answers: The editorial countenance is sufficed with blushes as the compliments of our gushing correspondent become fully comprehended. 1. Scud for the preparations of the dealers in silicate slate; or mix shellac varnish with any slightly gritty material and lay on rapidly with a brush. 2. The fewer the bends the better. Make the chimney straight. It does not pay to attempt a deviation from the uniform sectional area. 3. Some glass, especially that containing iron oxide or the oxide of lead in considerable quantities, is stated by President Morton and other authorities, is sometimes quite a good conductor. A hard glass, without iron or lead in excess, is the best non-conducting glass. Good non-conductors, such as are used in insulating the best submarine wires and in insulators, are better than any glass. 4. "For ways that are dark and tricks that are vain" commend us to some of the agents of the Post Office department. Do not despair, however.

J. M. W. says: 1. Can you tell me the composition of printers' ink, both black and in colors; also the composition of inking rollers? 2. Can you tell me whether, in stuffing animals, the natural eyes are ever left in? Answers: 1. Printing ink is essentially a combination of lamp black and oil; the best is obtained from the smoke of naphtha and boiled linseed oil. The rollers are made of glue and molasses. 2. Apply to some reputable taxidermist. We have many enquiries of this nature, and our readers can probably find replies to them by watching our advertising columns.

G. W. K. asks for some idea of the first cost, and cost per day of the calcium light. Answer: About \$50 first cost for apparatus, and 50 cents to \$1 an hour to run it.

A. B. S. says: I have a dispute with a friend or mine with regard to a piece of rubber. My friend maintains that it is devulcanized, "that the mere trace of sulphur that it contains is not in chemical union with the rubber, that the quality of the rubber is not injured and that it is in a suitable condition for manufacturing purposes." I maintain that the rubber is not devulcanized or only slightly so, that its quality is injured, and that it is not in a condition to be worked into rubber fabrics. We refer the matter to you, and upon your decision rest three years' subscription to the SCIENTIFIC AMERICAN. Answer: To decide this question, an analysis would be necessary, and our time is too much occupied to allow us to do it.

E. R. S. asks: 1. By what means can ordinary writing ink be given that intense, shining gloss which some kinds have? I have a small ink well in one of the desks at school, made in the ordinary way of glass within zinc, in which after the ink has stood several days, it is found to have this gloss. I suppose the zinc must produce some chemical action in union with the acid in the ink. 2. Can you inform me in what way a letter should be addressed to the Emperor of Russia, and how it should be sent? Answers: A fine gloss is imparted to ink by the use of gum arabic solution. For copying, the following is a good recipe: Mix thirty grains of extract of logwood, seven grains of crystal soda, and half an ounce of water. Boil till dissolved; then, while stirring well, add thirty grains of glycerin, one grain bichromate of potash previously dissolved, and four grains of powdered gum arabic. 2. A letter sent by mail addressed to the Emperor of Russia, St. Petersburg, would reach its destination if prepaid.

J. M. asks how to treat oiled walnut wood to polish it without varnishing. Answer: The directions given on page 72 of our volume XXVI. will no doubt serve your purpose.

L. F. A. L., of Cal. The only metallic substances in the minerals you send are pyrites and oxide of iron. It is an old idea to propel vessels by means of endless belts of paddles. Placing floats around the edges of boats, filled with cork or inflated by air as you propose, is also very old.

W. H. W. asks: Will shrinking a cast steel tire of ordinary thickness on the circumference of a cast iron locomotive driver affect the central hole of the latter? Answer: We presume not. Ask the skillful railroad superintendent at the Marquette railroad repair shops to try it and send us results.

B. N. C. would like to know if there is a rule for cutting patterns, such as tin and sheet iron workers use. Answer: Study the "Sheet Metal Worker's Instructor," by Warn.

P. J. C. sends a mineral specimen found imbedded in limestone, and asks what it is. Answer: The mineral you send is iron pyrites.

J. J. C. comments on our reply to J. H., who asked how the outside wheel of a locomotive or car on a curve keeps pace with the inside wheel, on account of the distance to travel being greater, both wheels being fast on the axle. Our answer was: "With wheels of equal size, having cylindrical bearing surfaces, one or both must slip on the rail. The wheels of the cars on railroads are coned to avoid the difficulty, their diameter on the outer edge of their bearing or tread being less than that of the portion of the tread next the flange. In turning a curve the wheels ride toward the outer rail, and thus, to some extent, if not wholly, this tendency to slip is prevented." J. J. C. says: I claim that coning of the wheel is more of a damage than a benefit in rounding a curve, for this reason: The wheels, being in pairs of equal diameter, will roll the flange of the outer wheel hard against the outer rail and set so tight to the head of the

rail that the wheel on the inner side, merely touching the top portion of the rail, will slip, being the easier of the two. Any one can demonstrate the fact by the experiment of taking one wheel of 30 inches and another of 28 inches diameter, and keying them on to an axle. Then move them forward on a level floor, and they will describe a circle; but take two pairs of such wheels and construct a car truck, the wheels being fastened as truck wheels are. Now push this truck forward over a smooth surface, and it will be found upon examination that the small wheels have slipped and the large ones have traveled in a straight line. This proposition will convince any mechanic that the coning of car wheels is a damage rather than a benefit to the safety of traveling on the rail. Answer: Our correspondent's experiments confirm fully our former statements.

C. C. says to J. D. W., who asked of what material a mold for casting a small engine cylinder should be made: I have a good cylinder that I cast in a mold made of pine wood. Take a block of the length you wish your cylinder to be, bore a hole through it, and put in a core. Cut through one side for your valve seat, make some small pieces of wood to the shape and size you want your ports to be and fasten them into each end of the core, and fix your exhaust to the bottom of the mold. Cover the ends and side and pour in your metal. I used block tin with a little zinc, mixed.

C. T. says, in answer to T. C. M., who asked for directions for gliding on marble, porcelain, etc.: I use, for sizing, equal parts of elastic copal varnish and fatty linseed oil slightly diluted with turpentine. The time required to produce the requisite "tack" is about 24 hours. Barbers' shaving mugs have been treated in this way with success; but, if the articles are such as require repeated washing and rough usage, it may be well to cover the glazed portions with a coat of good varnish.

S. L. D. replies to S. T. W., who asked how to transfer engravings on glass: First coat the glass with a varnish composed of balsam of fir diluted with turpentine, then press the engraving on smoothly and evenly, being careful to remove all air bubbles; let it stand for about 24 hours, then dampen the back sufficiently to allow the paper to be rubbed off by the forefinger, rubbing it till a mere film is left on the glass; then varnish again. When dry, it is preferable to put a yellow paper on the back of it, next the varnish, which adds greatly to the beauty of the picture.

H. A. B. says: I am taking the position of engineer in a steam saw mill, and there is a dispute, between myself and the man who is building the furnace, as to the proper place for the wall to strike the boiler (a tubular one); he contends that the wall should strike the boiler above the upper water gage; while I contend that it should strike the boiler a little below the lower water gage, as I think that it is dangerous to have the fire strike the boiler at any point above the water line. Answer: Our correspondent is right. No part of the steam space should be left exposed to the action of the hot gases and flame from the furnace until, at least, they are reduced in temperature, nearly to that of the steam itself and far below the temperature at which iron is perceptibly weaker than when cold.

C. M. S. asks: How can I calculate the effective heating surface of an upright cylindrical boiler, with horizontal water tubes arranged across the fire chamber? Answer: Determine it by measuring the total area of all surfaces exposed to the directly or indirectly communicated heat of the furnace gases, and proceed as directed in replies to earlier correspondents.

B. M. P., who asks for the best thing to remove scale from steam boilers, should read our advertising columns and especially the answers to correspondents. In the latter, directions for treating particular cases are constantly being published.

R. O. B. asks: How can I collect small particles of lead from dross and ashes cheaply? Oil answers very well, but it is too costly. Answer: Fuse the lead with some cyanide of potassium in a crucible.

F. H. asks: Can a valve which has sufficient lap to cut off at one half of the stroke be set so as to admit steam correctly when the crank is upon either center, and shut off the steam when the piston has traveled an equal distance from either end of the stroke? Answer: No. The obliquity of the connecting rod will prevent perfect equality of cut off.

J. F. B. says: Knowing that strange and singular freaks of steam engines are interesting to you, I will tell you of one in our place, that puzzled us for some time. The cylinder is 14 inches bore by 36 inches stroke, with a common slide valve, using steam the whole length of stroke, making 41 revolutions per minute. About two weeks ago, she commenced by making a strange crackling noise in the cylinder, increasing until it seemed as if she would break everything to pieces. Steam poured from every joint that, at other times, was tight, and she slowed down in speed until she scarcely moved. The fly wheel trembled as though about to fall in pieces. But the moment steam was shut off, it only for an instant, she would start up again all right, and the trouble would probably not occur again for one or two hours. At some times it would be more severe than others. Everything seemed to get loose during the difficulty, and all the keys would have to be set up after each occurrence. I took off the cylinder head, found the rings a little slack, and set them out; but the next day, she was as bad as ever. The two boilers are 42 inches in diameter and 26 feet long, having two 13 inch flues in each. Can you tell me what the difficulty is? Answer: The difficulty arises from excessive priming, we presume and will probably knock out a cylinder head or do worse damage if the trouble is not remedied.

J. P. S. says: How many inches does the lawful bushel used in Pennsylvania in measuring coal contain? Answer: The standard United States bushel is that which contains 2150.4 cubic inches, when level full; when heaped up to standard height, 6 inches, it contains about 2,700 cubic inches. Usually 28 bushels are reckoned to the ton.

N. L. T. asks: Why is it that the shadows cast by an object from two different lights, as those of the moon and of a candle, on a white surface are of different colors? The difference is most distinct when the object is placed on a line between the two lights. Answer: The colors of the lights being different, they together illuminate all of the white surface, not the shadow, with a tint which is compounded of both. The shadows are each illuminated by the light from only one of the two sources, and each therefore differs in tint from the general field, as well as from the other.

C. D. R. & Co., say: We have a 12x20 inch plain slide valve engine, cutting off at about 1/4 stroke and running at 80 revolutions. Would it be economy to speed up to 125 revolutions with the same valve? Answer: If more power is required than the engine can now develop, it would be proper to speed up as proposed. If the boilers are reliable at higher pressure, carry five pounds more steam to make up for friction of pipes and passages at the greater speed. Watch the crank pin and other journals. They may heat at a higher speed.