

Business and Personal

The Charge for Insertion under this head is \$1 a Line.

Hoadley Portable Engines. R. H. Allen & Co., New York, Sole Agents of this best of all patterns.

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

Amateurs and Artizans, see advertisement, page 221. Fleetwood Scroll Saw, Trump Bro's, Manufacturers, Wilmington, Del.

For Sale, cheap—One 60 H.P. Boiler, 40 Engines and Boilers. Address Junius Harris, Titusville, Pa.

Circulars Addressed—Very complete lists of all trades. H. Welsh, 6 Gold St., New York, up stairs.

Wanted—To engage the services of a Practical Man to travel and sell Engines, Boilers, Saw Mills, Machinery, and Machinist's Supplies. Address, with references, Beall Engine and Boiler Works, Cumberland, Md.

Steam Engines—25 per cent. extra power, or an equal saving in fuel guaranteed, by applying the R.S. Condenser. T. Sault, Constl'g Engr', Gen. Agt., N. Haven, Ct.

We call the attention of those interested to the advertisement of Hyatt & Co.'s Varnishes, elsewhere in this issue. The goods are standard, and will never disappoint those who use them.

The N.Y. Plow Co., 55 Beekman st.—Works, Newark, N.J. Agricultural Implements and Iron Castings.

Says the Muscatine (Iowa) Courier: "We have done and are still doing business with quite a number of Advertising Agencies throughout the country, and have no fault to find with them, but Messrs. Geo. P. Rowell & Co. give us more business than any other. Furnishing a large amount of advertising, and paying promptly, has put this house at the very head of Agencies, and has made them a name for honesty, reliability and promptness, which of itself is worth a fortune."

New York Agency wanted for Machinery & Supplies. Best of References. J. J. Bockee, Jr., P. O. Box 5007.

The merits of Mortou's Brass and Copper Sash Chain with patented attachments are worthy of notice. See advertisement, page 221.

An experienced traveling Salesman, who has few equals, is open for something worth \$2,000 a year. Address Box 14, Clear Lake, Iowa.

Wanted—One 2 spindle Edging Machine. Address, with description and price. P. O. Box 2258, New Haven, Conn.

Bargains in Cotton and Woolen Machinery, New or Second Hand. J. J. Bockee, Jr., 20 Cortlandt St., N. Y.

Scientific Books—Send stamp for Complete Catalogue. E. & F. N. Spon, 446 Broome Street, New York.

Enterprise M'fg Co., Philadelphia, Pa., Patented Hardware Manufacturers and Iron Founders. Small gray iron castings, warranted soft and smooth, made to order, and patented articles of merit manufactured on royalty.

A New and Novel Article of Merit—Agents Wanted. Also, Partner to operate Canadian Patent. I. C. Cowles, opposite Post Office, Syracuse, N. Y.

Sure cure for Slipping Belts—Sutton's patent Pulley Cover is warranted to double the work before the belt will slip. See Sci. Am. June 21st, 1873, p. 389. Circulars free. J. W. Sutton, 95 Liberty St., New York.

Something New—Door and Bell Plates—Letters Engraved on Glass. For Beauty and Durability it cannot be excelled. Send for Price List. P. O. Box 443, W. J. Pettis, Providence, R. I.

The Baxter Engine—A 48 Page Pamphlet, containing detail drawings of all parts and full particulars, now ready, and will be mailed gratis. W. D. Russell, 18 Park Place, New York.

Double-Entry Book-Keeping Simplified. The most successful Book on the subject ever published. Cloth, \$1. Boards, 75 cts. Sent post paid. Catalogue free. B. Waggener & Co., 424 Walnut St., Philadelphia, Pa.

A Self-Acting Trap, to rid out all Rat and Animal Creation. Agents wanted. No trouble to sell. For Traps, &c., address John Dilaine, Limestoneville, Monour Co., Pa.

Brass Gear Wheels, for Models, &c., on hand and made to order, by D. Gilbert & Son, 212 Chester St., Philadelphia, Pa. (List free.) Light manufacturing solicited.

Hotchkiss & Ball, West Meriden, Conn., Foundrymen and Workers of Sheet Metal. Will manufacture on royalty Patented articles of merit in their line. Small Gray Iron Castings made to order.

Hand Fire Engines, Lift and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U. S. A.

Drop Press, 3,000 to 4,000 lbs. Send description and lowest price to Kittredge Cornice and Ornament Company, Salem, Ohio.

Electric Burglar Alarms and Private House Annunciators; Call, Servants' & Stable Bells; Cheap Teleg. Insts; Batteries of all kinds. G. W. Stockly, Cleveland, O.

Steam and Water Gauge and Gauge Cocks Combined, requiring only two holes in the Boiler, used by all boiler makers who have seen it, \$15. Hillard & Holland, 62 Gold St., New York.

Scroll Sawyers—If you want the best Jig Saw Blades, get them made by A. Coats, 108 Hester St., N. Y.

Water, Gas, and Steam Goods—New Catalogue packed with first order of goods, or mailed on receipt of eight stamps. Bailey, Farrell & Co., Pittsburgh, Pa.

Price only \$3.50.—The Tom Thumb Electric Telegraph. A compact working Telegraph Apparatus, for sending messages, making magnets the electric light, giving alarms, and various other purposes. Can be put in operation by any lad. Includes battery, key, and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 246 Canal St., New York.

For Sale—Large lot second hand Machinists' Tools, cheap. Send for list. L. H. Shearman, 45 Cortlandt Street, New York.

For Tri-nitro-glycerin, Mica Blasting Powder, Frictional Electric Batteries, Electric Fuses, Exploders, Gutta Percha Insulated Leading Wires, etc., etc., result of seven years' experience at Hoosac Tunnel. address Geo. M. Mowbray, North Adams, Mass.

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

"Lehigh"—For information about Emery Wheels &c., address L. V. Emery Wheel Co., Weissport, Pa.

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

Small Tools and Gear Wheels for Models. List free. Goodnow & Wightman, 28 Cornhill, Boston, Mass.

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

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

Genuine Concord Axes—Brown, Fisherville, N.H. All Fruit-can Tools, Ferracute Wk's, Bridgton, N.J.

Faught's Patent Round Braided Belting—The best thing out—Manufactured only by C. W. Army, 148 North 3d St., Philadelphia, Pa. Sendfor Circular.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E Lyon 470 Grand Street New York.

Barry Capping Machine for Canning Establishments. T. R. Bailey & Vail, Lockport, N. Y.

The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$6. with good Battery. F. C. Beach & Co., 246 Canal St., New York. Wakers. Send for free illustrated Catalogue.

Temples and Oilcans. Draper, Hopedale, Mass.

For 13, 15, 16 and 18 inch Swing Engine Lathes, address Star Tool Co., Providence, R. I.

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

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.

Notes & Queries

G. J. E. will find directions for making rubber hand stamps on p. 156, vol. 21.—H. F. G. (size of boiler), H. P. T. (cut-off of engine), and S. M. R. (horse power of a waterwheel) do not send sufficient data.—I. H. can cement meerschaum by the process described on p. 202, vol. 47.—W. L. S. will find that his queries as to magnetic variation are answered on p. 164, vol. 33.—T. J. W. will find a description of the polyspherical ship on p. 100, vol. 31.—W. F. R. will find a recipe for paste that will not sour on p. 219, vol. 30.—B. J. B. will find an answer to the cannon and ear question on p. 273 vol. 32.—F. H. will find a recipe for bronzing on iron castings on p. 283, vol. 30.—M. A. will find a recipe for black paint for iron fencing on p. 379, vol. 31.—C. will find a recipe for paste on p. 315, vol. 30, and on p. 11, vol. 31.—B. W. D. will find directions for constructing a windmill on p. 241, vol. 32.—M. H. K. is referred to p. 319, vol. 32, for a means of getting rid of ants. Constructing a sundial is described on p. 409, vol. 29.—W. P. K. will find directions for freeing sulphuric acid from water on p. 111, vol. 29.—E. T. can bleach beeswax by the method described on p. 299, vol. 31.—S. A. R. will find directions for making a filter on p. 251, vol. 31.—G. V. can temper springs by the process described on p. 363, vol. 32.—S. L. will find directions for waterproofing cloth on p. 347, vol. 31. For a book on the lathe, try "The Lathe and its Uses."—A. D., D. McG., A. C. D., and R. F. H. will find a full explanation of the mystery of an ice boat traveling faster than the wind on p. 176, vol. 23.—H. S. S. will find a method of ascertaining the amount of water carried over in steam on p. 257, vol. 31.—A. K. will find a recipe for a cement for filling burr stones on p. 251, vol. 31.—J. A. will find directions for making malleable iron castings on p. 133, vol. 29.—D. I. S. can drive away cockroaches by the method described on p. 315, vol. 32.—W. M. H. will find a recipe for yellow lacquer on tin on p. 139, vol. 32.—T. C. P. will find directions for preserving eggs on p. 219, vol. 31.—H. L. S. will find directions for manufacturing aluminum on pp. 99, 116, vol. 32.—H. G. S. will find an answer to his query as to the growth of the beard on p. 362, vol. 32.—A. K. will find the desired information as to the phylloxera on p. 48, vol. 33.—S. A. T. will find directions for extracting glycerin on p. 202, vol. 31. Consult a physician as to the feet troubles.—T. B. will find directions for making bleaching salts (chloride of lime) on p. 91, vol. 32.—V. L. Jr. and A. J. P. will find directions for silvering without a battery on p. 299, vol. 31.—F. M. E. will find an answer to all his queries as to lightning rods on p. 145, vol. 31.—A. E. G. will find a recipe for paraffin varnish on p. 91, vol. 31. Ants may be destroyed by the method described on p. 319, vol. 32.—J. B. M. can prevent rust on iron by the method given on p. 293, vol. 31.

(1) J. N. Jr. asks: In regard to the fire-proof qualities of a safe, do the walls require to be any thicker for a large sized safe, or does 5 inch filling offer the same protection in a large as well as in a small size? A. The same thickness for both sizes will do.

(2) I. L. asks: What is the name of the fastest steamboat in the world, and what is her best time? A. We think about 25 miles an hour has been made on the North river, and this is the fastest time. Perhaps some of our readers may have notes that will be of interest.

(3) T. H. W. says: Please give me through your valuable paper a rule by which I can exactly calculate the departure of a curve from a tangent, the radius and tangent being given, at right angles to each other. A. You want the equation of the curve, which you can obtain from a treatise on analytical geometry, for any of the common curves. In case you do not know the nature of the curve, it must be determined by experiment. The equation of the circle, referred to its center, R being the radius, and x, y, the co-ordinates, is x² + y² = R²

(4) G. L. B. asks: Have I a right to make any patented article for myself? A. No. 1. Does a rifle ball leave the gun before one feels the recoil? A. No. 2. Will the recoil make any difference with the shooting? A. Yes.

(5) D. C. asks: Why does iron not always shrink alike? A. Because it is not homogeneous, being harder and closer in fiber in some places than in others.

(6) C. P. A. says: 1. I have in mind to build a small boat, 40 feet long and 13 feet wide. What size of engine would it take to run it? A. Use an engine of 12 or 15 horse power. 2. Does boiler iron have to be stamped on every plate with the breaking strain and the maker's name? A. The law in regard to stamping boiler plates is as follows: "And be it further enacted: That every such plate of boiler iron or steel, made for use in the construction of steamboat boilers, shall be distinctly and permanently stamped by the manufacturer thereof, and, if practicable, in such places that the marks shall be left visible when such plate shall be worked into boilers, with the name of the manufacturer, the place where manufactured, and the number of pounds tensile strain it will bear to the square inch." This refers to plate subject to a tensile strain.

How are rubber stamps made? A. See p. 156, vol. 31.

(7) R. B. asks: Can water be pumped from an airtight tank, having no vent? A. No.

(8) H. D. M. asks: Can you give us a first class recipe for making Babbitt metal for lining journal boxes? A. It would be better to buy the metal from a reliable manufacturer. We can recommend the use of cast iron boxes, from personal experience and observation.

What is the best style of clutch now known for connecting two lines of shafting, to throw them in and out of gear? A. You will probably find a friction clutch the most satisfactory.

(9) J. O. asks: Can I own and run a steam yacht for my own pleasure upon the Connecticut river and on Long Island Sound, without getting a license? I do not wish to carry passengers for hire. A. You must obtain a license. Apply to the inspector in your district. The fees are: Vessel, \$25; captain, \$10; engineer, \$5.

(10) H. H. says: 1. Following the subjoined directions, I attempted some electro-plating: "Take a \$2.50 piece of gold and put in a mixture of 1 oz. nitric and 4 ozs. muriatic acid (in glass vessel only); when it is all out, dissolve 1/2 oz. sulphate of potash in 1 pint pure rain water, and mix with the gold solution, stirring well; then let it stand, and the gold will be thrown down; then pour off the acid fluid, and wash the gold with two or three waters, or until no acid is tasted on touching the tongue to the gold. Now dissolve 1 oz. cyanuret of potassium in 1 pint pure rain water, to which add the gold, and it is ready for use. Clean the article to be plated from all grease and dirt with whiting and a brush; if there are cracks, it may be necessary to put the article in a solution of caustic potash; suspend it in the cyanuret of gold solution with a small strip of zinc about the width of a common knitting needle." With the exception of using some fully 18 carat gold for the \$2.50 gold piece, I followed directions, but the result was not satisfactory. The deposit was about the color of and very similar in appearance and feel to German silver. What was the cause? How can I, in some simple manner, touch up by electro-plating with gold such things as parts of watch movements, etc.? A. A defective colored gilding may be improved by the help of the following mixture: 3 parts nitrate of potash, 1 1/2 alum, 1 1/2 sulphate of zinc, 1 1/2 common salt. These ingredients are put into a small quantity of water, to form a sort of paste, which is put on the articles to be colored; they are then placed upon an iron plate over a clear fire, so that they will attain nearly a black heat, when they are suddenly plunged into cold water; this gives them a beautiful high color.

(11) W. B. H. asks: How can I find the relative conductivity of different substances? A. You can find them tabulated in De la Rive's work on electricity, and in several others. The process of working them out is somewhat complicated, and requires a great deal of experience to do it accurately.

(12) L. J. W. says: I have tried to electroplate with a battery of 2 zincs and a carbon in dilute sulphuric acid, but I cannot get a good deposit either on metal or a wax mold, the wax mold being well rubbed with pure graphite. The zincs are 3 inches x 6 x 1/2, and the carbon is of the same size. The deposit on the metal is in spots, and brittle, altogether unlike the nature of copper. Please tell me what is the matter. A. Your trouble might arise from several causes. Perhaps your solution is too strong. The best solution is made of 3 parts saturated solution of sulphate of copper and 1 part of sulphuric acid with 10 of water. Perhaps your anode is too large. Try a smaller one. Perhaps your cathode and anode are too near together; try them farther apart; that is, separate your metals farther from the copper plate.

(13) L. S. Y. asks: What chemicals and metals are used in the Hill battery? A. Sulphate of copper and sulphate of zinc are the chemicals, and zinc and copper the metals.

(14) A. B. C. asks: 1. How will I proceed to finish up ash doors and frames in oil polish, after filling with two coats of filling? What material is used, and how many coats are necessary to produce a good job? A. The fineness of the polish depends in a great measure upon the care with which the filling may be rubbed down; the rubbing is indispensable, in fact, to a good finish. For the best work, put on three coats of shellac; after the first coat is hard, rub it down with No. 1 sandpaper; after the second coat is hard, rub down with No. 1/2 sandpaper, and after the third coat, the same. Then put on one or two coats of beeswax dissolved in spirits of turpentine and oil, in some cases three coats. For polished panels, put on three coats of hard flowing varnish, each of the first two coats to stand two or three days until hard, and then be rubbed with rottenstone, the third coat to be rubbed with cotton batting and flour. 2. I have a brick foundation, penciled, and it is ruined from mold. How can I prevent the mold from affecting the paint? A. The mold is caused

from dampness, and this arises either from a close confined position of the wall, or from water rising in the body of the wall from the ground. The only remedy is to remove the cause of the dampness.

(15) M. H. T. & Co. say: In our business we have orders for hooks, etc., that are to withstand the draft of an ordinary locomotive. Will you please give us your idea of the amount an engine with four drive wheels can lift, dead weight, with single purchase? A. About 8,000 lbs. on an average, taking the adhesion at 1/2 of the weight on the driving wheels.

(16) C. F. asks: 1. What is the percentage of phosphorus in phosphorus oil? A. Twelve grains phosphorus are put into 1 oz. almond oil. About 4 grains phosphorus are taken up by the oil. 2. What medical action has it? A. Solutions of phosphorus have been used in small quantities to allay excessive oxidation of the animal tissues. Vitreous phosphorus, taken internally, acts as a powerful irritant poison.

Can corrosive sublimate be made by precipitation of mercurial nitrate by muriate of soda? A. No; the precipitate consists of the subchloride of mercury (calomel).

(17) G. says: 1. I have a boiler carrying 70 lbs. to the square inch with a 3/4 safety valve attached. What would be the pressure on said valve? Will I have any greater pressure on a 3 inch safety valve with the same pressure of steam? A. Pressure on 3/4 valve = 70 x (3/4)^2 x 0.7854; pressure on 3 inch = 70 x (3)^2 x 0.7854, hence the pressure in the second valve is 16 times as great as that on the first. 2. Please give me a rule for finding horse powers of boilers. A. We do not know of any standard for the horse power of a boiler.

(18) P. asks: 1. Can gold leaf be applied to glass without the use of oils? A. Gold size is used for this purpose. 2. How can I transfer a wood cut or steel engraving to glass, so that I can apply colors to the back, and let them strike through? A. See p. 123, vol. 30.

(19) G. F. K. asks: 1. I have built an engine 1 1/4 bore x 3 inches stroke, with a fly wheel weighing 12 lbs. Would a copper boiler 20 inches high x 15 inches diameter, with 4 flues two inches in diameter, heated with 4 lamps, making 60 lbs. steam, run said engine at the rate of 600 revolutions per minute? A. If the lamps are very powerful, we think it may answer. It will have to be forced, however. 2. Please state the thickness the boiler shell should be. A. Make it 1/4 of an inch thick.

(20) C. H. says: I have a 1 inch iron pipe, 480 feet long, to bring water from a spring. The fall is 8 or 10 feet, and the water runs out 3 feet above the ground. I cannot get the pipe to run full of water; it will not run more than half full, though there is water enough to fill it. What is the remedy? A. Probably the pipe has high points, where air collects.

(21) H. N. B. says: I am running a circular saw, with an idle pulley in a horizontal frame, hinged, and working a few inches from the saw pulley. The belt is quite slack, increasing the lap six inches. I apply just sufficient weight on the frame to keep the belt from slipping; it works smoothly and well and almost noiselessly. One lacing has lasted three months on heavy work. The proprietor contends that I am wearing the belt on the outer surface and otherwise injuring it by applying the weight. Is he right? A. The plan you have adopted is a very good manner of applying a tightener. It would probably be somewhat more efficient if you stretched the belt a little tighter; but from your account of the manner in which it operates, there seems to be little reason for making any change.

(22) L. M. says: I say that, if a train of cars runs on a circular track or a curve, the road must be inclined outward if the locomotive draws, and inward if it pushes from behind. My friend says in both cases the road must incline inward. Who is right? A. Your friend.

(23) I. D. C. asks: 1. Will a balloon made in the form of a sphere or a spheroid carry as much weight and ascend with as much ease as if made pear-shaped, the gas and all other things being equal? A. Yes. 2. Is gas of a high illuminating power the best for balloons? A. The lightest gas is the best, hence that having the best illuminating qualities is by no means the best for a balloon. 3. How can I determine the weight which a balloon of a given size will ascend with when filled with coal gas? A. See p. 64, vol. 32.

(24) L. B. S. asks: How can I make an all battery for plating and other purposes? A. Put a copper plate in a glass vessel 8 inches deep, and cover it with crystals of sulphate of copper. Suspend a piece of zinc near the top. Connect insulated copper wire to copper plate and another to zinc. Fill the vessel with water.

(25) I. O. T. asks: 1. Please give me a rule for finding how much and what size of wire I must use on relays, in putting up a short or long telegraphic line. A. Use the purest copper obtainable, and make the sum of the resistances of all the relays equal to the resistance of the rest of the circuit, including that of the battery; this gives the best result when the line is well insulated. There is no simple formula for fixing upon the size of wire that would serve for any and every case whatever; but for local and short circuits, Nos. 18 to 23 are convenient sizes, and Nos. 23 to 32 are generally used for main lines. A current of 0.02 of a weber is a very fair working strength for main line circuits. All the necessary data for ascertaining the resistance of the various sizes of copper and iron wire will be found in J. T. Sprague's work on "Electricity, its Theory, Sources, and Applications," under "Conductivity and Resistance." 2. I have been making an induction coil, 7 x 3 inches, center bundle of wires is 1 inch in diameter; primary coil is of No. 14 wire, about 90 feet long; sec-

ondary coil is of No. 36 silk covered wire, 5,000 feet of it being used. I can detect a very slight residue of magnetism in the iron wires when the current is not passing; should this be? The shock is far from strong. What is wrong? What ought I to expect from such a coil if I add 5,000 feet more to the secondary coil, and a good condenser? A. It would be difficult to tell exactly what is wrong with your coil without inspecting it; properly constructed, however, one of that size should give a very severe shock. From 3/4 to 1 inch per mile of secondary wire is a fair average for ordinary coils, but this varies with the manner of winding and the degree of insulation. 3. My condenser is made of tissue tin foil and paper of a thickness of 400 leaves to the inch; it is made like an interleaved book. It contains 45 square feet, and is well connected with the primary coil: but I get no additional effect. What is wrong? A. Your condenser is properly made, and should add materially to the effect if rightly connected to the primary circuit. Sprague's book, above referred to, gives much useful information in regard to the construction of coils.

(26) L. W. asks: Which is the best book on qualitative analysis? A. Fresenius is a standard work on the subject.

(27) F. B. asks: How can I make a silver bath, for electroplating? A. Dissolve 123 ozs. cyanide of potassium in 100 gallons of water; get one or two flat porous vessels, and place them in this solution to within half an inch of the mouth, and fill them to the same height with the solution; in these porous vessels place small plates or sheets of iron or copper, and connect them with the zinc terminal of a battery; in the large solution place a sheet of silver connected with the copper terminal of the battery. This arrangement being made at night, and the power employed being two of Bunsen's batteries or four Daniell's, the solution will be ready for use in the morning. A small quantity of solution for silvering may be made up from this description. A half ounce of silver to the gallon will do very well. A small quantity may be prepared in an hour.

(28) A. A. H. asks: 1. How can I plate silver without a battery? A. For silver plating on copper, use nitrate of silver and common salt, each 20 grains; cream of tartar, 3/4 drachms. Mix. Moisten with cold water and rub on the article to be plated. 2. Can I make a solution by cutting silver in acid? A. Silver dissolves in dilute nitric acid.

(29) N. S. W. asks: 1. What is the office of the core of wires in an induction coil, as shown in p. 115, vol. 33? A. The object of the core of iron wires is to increase the inductive effect. 2. Where is the connection with the conductors? A. The primary wires are attached to the binding screws at the right of the instrument. 3. What is the necessity of insulated wire if the coil is divided by insulators? A. The wire must be insulated, otherwise the current would leap across from one turn to another. If you will read the article carefully, you will see the object of the secondary coil. 4. If a battery current is connected with the coil, what is the necessity of the current breaker? A. It is by alternately breaking and making contact with the battery that the secondary effects are produced. A constant current through the primary coil would produce no static effect upon the secondary. 5. If the copper wire be immersed in a solution of shellac, is that insulation sufficient for a coil? A. A shellac covering might answer, but silk would be better.

(30) F. C. says: How can I deodorize a swordfish's sword? A. Try washing it with a little benzole or carbolic acid.

(31) L. P. S. says: In your issue of August 28 (in answer to M. V. O., who asks: Does a fan blower require more power to drive it when the discharge pipe is open than when it is closed?) You answer: "The action is the same as in partially closing the discharge valve of a pump. If the same speed is maintained, the resistance is increased." This is contrary to experimental results. If M. V. O. will make his fan belt sufficiently slack to reduce the speed of his fan one quarter or one third, by slipping, when the valve is open, he will find, on shutting the valve, the fan will immediately resume its full speed. This, I think, is due to the changing of the course of the air as it rushes through the fan, from a straight-forward to a rotary motion, which takes considerable power; but when no air passes through the fan, that which is inclosed within it, after having received its initial momentum, keeps it up without any additional power except to overcome the friction on the inside of the air jacket. I have often tried this, and always found it to take more power when the blast is taken from the fan. A. We think you are quite right, when the gate is entirely closed. As to the effect when partially closed, we would like to hear from readers who have made experiments. We are glad you have called attention to the matter, for we always desire to give correct information, and in our answer to M. V. O. we had in mind the action of blowers producing positive blast.

(32) K. asks: Is there a more speedy method of reducing a leaf to its skeleton (without destroying the fiber) than by steeping in pure water for months: a method, by the way, tried by me without success? A. Steep the leaf in a little strong lime water for a short time; spraying the leaf with water will then remove all but the fibers.

(33) J. G. E. asks: Is there any way of making cloth impervious to dust? A. Cloths that have been rendered impervious to moisture are likewise impervious to dust. Pass the cloth through a weak solution of glue and alum; and after passing it between the rollers of an ordinary wringer to remove the superfluous moisture, dry it, first in the air and then in a warm room.

(34) V. L. C. asks: How can I make plaster casts for stereotyping, so that they will not crack when put into heated metal? A. After the plaster cast has hardened, it should be placed in a hot oven in order to drive off all the superfluous moisture. Plates prepared in this way do not crack.

(35) G. C. says: 1. My counter is badly corroded by the action of soda water, and fountains have to be tinned every 3 years. Is there any remedy for this common annoyance? A. You fail to state of what material your counter is composed. If of wood or marble, we would suggest the use of a glass plate. Porcelain or slate topped counters are best where there is a liability of their frequent contact with carbonic acid water. 2. Would a small quantity of soda put in the water before charging prevent the mischief? A. No.

(36) Z. asks: Please explain the electric action in the automatic railway signal in use upon the Boston and Albany Railways. A. The action is produced by the opening and closing of an electric circuit by the movements of the cars upon the rails, and causes the movement of an armature attached to an electromagnet, which strikes a bell.

(37) F. M. W. asks: What is the process for clarifying and purifying lard, grease, and tallow? A. They are subjected to the action of steam at a high pressure in large cylindrical iron vessels. The steam is made to enter the vessel from below in such a manner as to cause a constant agitation of the melted contents. The condensed steam, being heavier than the grease, falls to the bottom of the cylinder, carrying with it the greater part of the impurities, and is drawn off by suitable taps.

(38) W. H. B. says: In your last issue you recommend a correspondent to use iodine in olive oil to prevent the hair from falling out. Will it not discolor the hair and skin? A. Yes; but almost imperceptibly, and for a short time only. The color is not permanent.

(39) J. T. asks: Is any portion of the human tooth ivory? A. No.

(40) G. W. S. asks: 1. What is soluble or water glass? A. Water glass is a variety of glass containing a large proportion of alkaline flux. It is quite soluble in boiling water. 2. Would it answer for making a smooth hard finish on wooden handles, and give a polished surface? A. Water glass might answer the purpose; but it is an efflorescent substance, and would finally become converted into a white powder, if exposed to the air.

What is put in glue size to give it body? A. A little flour and litharge are sometimes used.

(41) C. A. B. asks: What can soft sandstone be saturated with to make it impervious (or nearly so) to water? Coal tar would do but for the color. A. A solution of alum, glue, and litharge has been used for this purpose.

(42) S. A. T. asks: What will prevent the beard from splitting, so that it will grow long? A. Clip the ends frequently.

What makes Limburger cheese have such a very strong and offensive odor? A. It's putrescence.

(43) L. I. asks: Please give me an analysis of crude petroleum. A. Crude petroleum varies in density from 0.820 to 0.782, or 40° Baumé to 48° Baumé. It is a mixture of a great number of hydrocarbons, compounds of carbon and hydrogen, the average proportion of the two elements being: Carbon 85, hydrogen 15. These hydrocarbons differ from each other in volatility. Some are so volatile as to evaporate rapidly at ordinary temperatures, others require a temperature of 700° to 800° Fah. to vaporize them.

(44) G. B. asks: What is a good alloy, resembling silver in weight and appearance? A. Try the following: Tin 4 1/2 lbs., bismuth, antimony, and lead, each 1/2 lb.

(45) C. H. S. asks: How can I cover twine thread, etc., with metallic lead, so that on bending it will keep its shape? A. The process employed in manufacturing long lengths of lead pipe might advantageously be used for this purpose. In this the lead, in a molten condition, is forced by hydraulic pressure through a die, through the center of which a steel mandril, of the required size for the bore, passes. By a little alteration of the mechanism you might substitute twine or thread for the mandril, and decrease the size of the die.

(46) F. C. W. says: G. G. F. can remove glossy spots in black goods by rubbing them with a piece of cloth.

(47) M. W. W. says, in reply to numerous queries as to the size of axle spindles: The almost universal testimony is in favor, within certain ranges, of the large spindles, especially in common freight and farm wagons. This may not arise from the difference in the spindles, and probably does not, but from other causes. In practice, the small sized spindles are usually solid iron, and the spindles are turned, and the boxes bored to fit. The larger spindle is about twice the diameter for the same grade of wagon, that is, a 1 1/2 inch solid iron spindle corresponds to a 3 inch thimble skein, as it is termed, which is usually a cast iron thimble fitted on to a wooden axle, not turned and with the boxes not turned, the fit being much looser than in the case of the solid iron spindle. This may have some effect, but I think the real cause is the greater stability of the wooden axle, retaining its set without springing, generally as long as it lasts; while it is probably rare to find solid iron axles that are not more or less sprung, when of course they run hard. This seems still more reasonable when it is considered that solid iron spindles (when the load is carried on springs, thus reducing the liability to spring the axle) seldom give any trouble. There is also some difference in weight in favor of the wooden axle, though hardly enough to justify the decided preference manifested for it.

(48) E. D. R. says, in answer to J. A. B., who asks if there is a seed called bird pepper: The pods thus called are the capsules and seeds of *Capsicum annuum*, or cayenne pepper, and can be procured in almost any drug store under the name of bird pepper; mocking birds are extremely fond of them when fresh, and eat of them freely, hence the vulgar name. The best are the African bird peppers, and are the same as used for making pepper sauce.

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

D. D. W.—No gold or silver is present. There is a trace of arsenic. The specimen is shale inclosing a yellow powder consisting principally of silica, iron, lime, alumina, and potash.—M. C. S.—It is smoky quartz, of little or no value.—C. C. P.—It is marcasite.—W. W. J.—It is a variety of soft white clay.—A. J. H.—Your specimens have not been received. Forward other specimens, and we will examine them.—R. L.'s specimen has not been received.—No name.—A fine specimen of variegated red jasper or shale.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On Squaring the Circle. By E. C.
On Rapid Transit. By J. H. McH.
On the Extraction of Gold from Ores. By J. T.
On the Weather. By W. B.

Also inquiries and answers from the following:

- A. A. A.—L. H. D.—W. M. R.—J. D. D.—J. J. M.—R. K.—A. G.—F. J. S.—G. B.—G. W.—F. K.—C. D.—F. D. C.—W. M. T.—A. T.—R. B.—E. B. B.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells an efficient rice-hulling machine? Whose is the best firebrick press? Whose is the best dog power, for churning and other light work? Whose is the best rack press for expressing seed oil?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week ending

August 31, 1875.

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Table listing inventions and their patent numbers, including items like Air and fluid regulator, Animal shearing machine, Auger, earth, D. L. Newcomb, Barrels, etc., Chamfering, J. Greenwood, Battery, galvanic, E. A. Hill, Bed sofa, A. Spiegel, Bee hive, S. Hixon, Bee hive, P. Honnell, Berth, swinging, B. W. Brown, Bird cage, J. L. Fisher, Boat, collapsible, E. L. Berthon, Boat, life, L. F. Frazee, Boiler, sectional, B. T. Babbitt, Boiler tubes, securing, J. E. Jerrold, Boilers, bushing tubes of, H. Dusch, Bolt, door, H. J. Iles, Bolting chest, Swisher & Campbell, Bone black revivifier, J. Gandolfo, Book rack, suspension, F. F. Hill, Boot calk, raftman's, R. D. Guilford, Bottle, toilet powder, Williams & Hillhouse, Bridle bit, S. H. Holm, Buckle, S. Wales, Buckle-making machine, H. C. Hickox, Burner, vapor, C. E. Ball, Camera obscura, G. Raphael, Can, sheet metal, J. Herget, Cans, filling and soldering, G. H. Perkins, Car brake, pneumatic, H. F. Knapp, Car bumper, Griffith & Patterson, Car coupling, Hervey & Abrams, Car coupling, Maves & Murphy, Car coupling, N. N. Spafford, Car door, grain, David & Wilding, Car starter, A. A. Jones, Car starter and brake, T. L. Webster, Carstock, W. W. Ker, Car truck, R. Banolas, Car truck, C. H. Cox, Carbuireter, T. H. Harrington, Car, direction, A. E. Thurber, Carpet sweeper, G. S. Gladding, Carriage jack, A. W. Field, Carriage top, G. E. Whitmore, China, etc., ornamenting, S. M. Adams, Chuck for holding eccentrics, W. B. Smith, Churn cap, W. Manee, Cigar machine, W. E. Hennaman, Cigar maker's paste box, M. Wilhelm, Cistern valve and overflow pipe, McGrann et al., Clamp, joister's, W. J. Donley.

Table listing inventions and their patent numbers, including items like Clothes line fastener, H. Moss, Colter attachment, J. S. Johnston, Column, metallic, C. H. Leidy, Congealer or condenser, W. H. H. Mallory, Corn marker, W. F. Senter, Corn sheller, J. S. Foster, Counters to lasts, fitting, L. Coté, Cultivator framé, W. M. Costin, Dental drill, S. S. White, Dental plates, making of, F. & G. G. Hickman, Dental plugger, G. Rehffuss, Dental plugger, E. T. Starr, Diamonds in holders, fitting, J. W. Branch, Die stock, J. J. Grant, Digger, potato, W. E. Babcock, Digger, potato, D. Botsford, Door spring, L. A. Warner, Drawers, rubber, M. Bradley, Drilling machine, rock, C. Ferroux, Dyeing and printing, Sellon & Pinkney, Engine governor, steam, Corbett & Campbell, Engine, locomotive, T. V. Smith, Engine, rotary, A. B. Vandemark, Engine, indicator, steam, J. W. Thompson, Engine, stop motion, T. Evans, Envelopes, making, J. Ball (r), Equalizer, draft, Hunt & Butterfield, Fabric, felt, H. J. and W. D. Davies, Fence barb, wire, J. Haish, Fence post, A. Y. McDonald, Fertilizer distributor, etc., B. Scofield, Fire arm, breech-loading, W. H. Baker, Fire arm, adjustable trigger, H. Watkeys, Fire escape, S. Konz, Flask, molding, Bunnell and Hosley, Folding and perforating machine, W. Daniels, Furnace, B. T. Babbitt, Furnace door, E. H. Ashcroft, Furnace grate bar, E. M. Erdman, Furnaces, preparing gas for, W. S. Gillen, Furnaces, preparing, G. W. Hall, Furniture drawers, anti-friction, J. D. Freese, Gas jets, projector for, J. W. Naramore, Gold, silver, etc., cleaning, G. M. Norwood, Grain cleaner, T. Bühlmann, Grass seeds, gathering, J. R. Symmes, Grate bar, T. Cain, Gun, adjustable rest for, R. T. Hare, Harness hame, J. P. Clopton, Hammer, claw, D. W. Parker (r), Harrow, W. S. Rowland, Harvester dropper, J. Bahuruth, Heater, steam, J. F. McKeeney, Headle frame, E. S. Pike, Hitching post, T. McGuire, Hoe, weeding, A. S. Dunham, Hose coupling, M. M. Lewis, Hydrocarbons, burning, J. Nelson, Ice machines, cleaning, W. H. H. Mallory, Inhaler, nasal, Yates and Treat, Key for locks, L. Griswold, Knife-scouring machine, C. C. Singer, Knitting machine and fabric, F. Furns, Knob rose, J. Moore, Ladder, fireman's extension, S. Konz, Lamp, J. Mayer, Lamp attachment, L. Tobey, Lamp fount, C. F. Linsley, Lamp, miner's, Eynon and Cook, Lamp socket, W. N. Weeden, Lantern, T. B. Osborne, Lasts, fitting counters to, L. Coté, Leather, coating, H. Martyn, Letter box, De Barry and Lunqvist, Lid lifter, T. B. Carpenter, Lock, alarm, L. Griswold, Locomotives, pet cock for, F. A. Casey, Log turner, H. Knowlton, Loom for weaving pile fabrics, E. B. Bigelow, Loom shuttle motion, C. I. Kane, Maize, treating, L. Chiozza, Manures, distributing liquid, E. H. Cummings, Mechanical movement, P. Bellinger, Mill, J. Aubin, Molding flask, Bunnell and Hosley, Molding machine, Bunnell and Hosley, Mouldings, machine for making rope, H. Ganz, Mop and brush holder, C. B. Clark, Motion, converting, J. M. Wilkinson, Muff, head, H. Fürst, Neck tie retainer, G. Burnham, Net, landing, C. F. Nason, Oil cup, J. Graham, Ore sipping machine, D. Nevin, Overalls, G. R. Eager, Packing for stuffing boxes, R. Greenalch, Paper, carbon, A. B. Simons, Paper collars, etc., cutting, C. H. Denison, Paper cutter and perforator, W. Daniels, Paper, safety, J. W. Caslear, Paper vessel, E. Waters (r), Pasteboard, making, B. F. Field, Pier, cast iron, J. F. Hume, Pillow case frame, T. F. Walter, Pin, taper, E. H. Gaylor, Pipes from frost, protecting, A. N. Rankin, Plane, bench, L. T. Davis, Planter, corn, S. Wright, Planter, hand, D. W. Hughes, Planter, seed, F. O. Wenell, Plow, sulky, R. R. Fenner, Press, baling, D. O'Connor, Press, combination cotton, J. F. Taylor, Press, hydraulic adjustable, M. Stannard, Printing machine, block, F. Walton, Printing, preparing plates for, A. F. Eckhardt, Printing press, C. B. Cottrell, Printing press, W. F. Wyman, Pruning implement, W. Carr, Pump, H. Tyler, Pump, chain, W. Wehres, Pump, rotary, O. H. Whitney, Radiators, valve for steam, W. C. Baker, Railway rail joint fastening, P. F. & E. A. King, Railway switch, C. P. Deyoe, Rattan measuring machine, N. H. Richardson, Reflectors, C. M. Murch, Register, heating and ventilating, J. B. Oldershaw, Sawmill head block, G. M. Peitan, Shaft coupling, D. L. Newcomb, Shaft tip, S. H. Raymond, Sheave, P. Kavanagh, Shoe nails, metallic strip for, G. McKay, Show case, R. H. Harrison, Snutter, fireproof, Pierce & Smith, Shutter worker, J. D. Hughson, Sifter, ash, W. Baumann, Sign and order slate, combined, J. S. Gold, Soap, transparent, advertising, S. Struuz (r), Solder, apparatus for melting, J. P. Hays.