

## TO INVENTORS.

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## 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.

Packers of Canned Goods please address Norton Brothers, Chicago, Ill., for particulars regarding Norton's Improved Can, illustrated in this number. They will supply Cans complete, Tops only, or Dies, with License, to those who make their own cans.

Steam Tug Machinery, Engines, Boilers, Sugar Machinery. Atlantic Steam Engine Works, Brooklyn, N.Y.

Jarvis Patent Boiler Setting, same principle as the Siemens process for making steel; burns screenings and all kinds of waste fuel, without blower. A. F. Upton, Agent, 43 Congress St., Boston, Mass.

H. W. Johns' Asbestos Liquid White Paint has been adopted for interior and exterior wood, iron, and stone work on the U. S. Capitol, at Washington, D.C.

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.

Valves and Hydrants, warranted to give perfect satisfaction. Chapman Valve Manuf. Co., Boston, Mass.

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"Vick's Floral Guide" contains a colored plate, 500 illustrations, 100 pages, descriptions of the best flowers and vegetables, and how to grow them; all for 5 cents; in English or German. Add. James Vick, Rochester, N.Y. Carbon Pencils for Electric Light. 1 College Pl., N. Y.

For Sale cheap.—A Stave Saw, nearly new; cylinder 43 1/4 x 24 feet. Dodge, Churchill & Co., Monroe, Wis.

Magneto-Telephone Call Boxes, \$5. Indiana Electric Works, 34 E Washington St., Indianapolis, Ind. Stamp for circular.

Deoxidized Bronze. Patent for machine and engine journals. Philadelphia Smelting Co., Phila., Pa.

Kimball's Catarrh Cigarettes, an instantaneous relief and a pleasant smoke. They contain no tobacco.

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Bunnell's New Nickel Solution; rapid in action; white and perfect deposit on all metals; works on zinc, iron, solder, etc., without coppering; easily managed; and low price. Guaranteed to infringe no patent. Bunnell, 112 Liberty St., New York.

Corliss Engines. Watts, Campbell & Co., Newark, N.J.

For Power and Economy, Alcott's Turbine, Mt. Holly, N.J. Catalogues and Circulars of our latest Scientific Publications, mail free. E. & F. N. Spon, 446 Broome St., N.Y.

Case Hardening Preparation. Box 73, Willimantic, Ct.

H. Prentiss & Company, 14 Dey St., N. Y., Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list.

Needle Pointed Iron, Brass, and Steel Wire for all purposes. W. Crabb, Newark, N. J.

Belcher & Bagnall, 25 Murray St., N. Y., have the most economical Steam Engines, Boilers, Pumps, in market; also improved wood and iron working machinery.

Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.

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

Bolt Forging Machine & Power Hammers a specialty. Send for circulars. Forsaith & Co., Manchester, N. H.

For Sale Cheap.—Second-hand 8 foot Boring and Turning Mill, Lathes, Planers, Drills, Bolt Cutters, etc. Circulars. D. Frisbie & Co., New Haven, Conn.

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

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Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N.J. 1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.

Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N. Y., (Evening Post Building, room 22.)

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements, etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

Brush Electric Light.—20 lights from one machine. Latest & best light. Telegraph Supply Co., Cleveland, O.

The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are to be sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

Alcott's Turbine received the Centennial Medal.

Solid Emery Vulcanite Wheels—The Solid Original 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 38 Park Row, N. Y.

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign circulation.

Pure Turkey Emery in 10, 60, and 250 lb. packages; all numbers; any quantity; lowest rates. Greene, Tweed & Co., New York.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St. Wm. Sellers & Co.

Bevins & Co.'s Hydraulic Elevator. Great power, simplicity, safety, economy, durability. 94 Liberty St. N. Y.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N. H.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon & Co., 470 Grand St., N. Y.

Pulverizing Mills for all hard substances and grinding purposes. Walker Bros. & Co., 23d & Wood St., Phila., Pa.

The Lambertville Iron Works, Lambertville, N. J., build superior Engines and Boilers at bottom prices.

Inventors' Models. John Ruthven, Cincinnati, O.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bentel, Margedant & Co., Hamilton, Ohio, at lowest prices.

Steel Castings true to pattern, of superior strength and durability. Gearing of all kinds. Hydraulic cylinders, crank shafts, cross heads, connecting rods, and machinery castings of every description. For price list and circular, address Chester Steel Castings Company, Evelina St., Philadelphia, Pa.

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

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in Scientific American of this week.

Diamond Self-clamp Paper Cutter and Bookbinders' Machinery. Howard Iron Works, Buffalo, N. Y.

Best Power Punching Presses in the world. Highest Centennial Award. A. H. Merriman, W. Meriden, Conn.

Fine Taps and Dies for Jewelers, Dentists, and Machinists, in cases. Pratt & Whitney Co., Hartford, Conn.

Oak Tanned Leather Belting, Rubber Belting, Cotton Belting, and Polishing Belts. Greene, Tweed & Co., 18 Park Place, N. Y.

Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65,000 lbs. to sq. in. Circulars free. Pittsburg Steel Casting Company, Pittsburg, Pa.

## Notes &amp; Queries

(1) G. N. S. asks for the process of tinning malleable iron. The castings are small and easily handled. A. The articles are cleaned by pickling them for a few minutes in a bath composed of 6 lbs. of water and 8 lbs. of sulphuric acid, and scouring them with sand. They are then heated to the melting point of tin and sprinkled with rosin powder, or dipped in melted rosin, and then in molten tin covered with tallow, brushed with a piece of hemp, and rubbed dry with sawdust or bran. If small, they are simply placed, after heating, in a shallow vessel with some melted tin, and brushed about with a piece of hemp sprinkled with dry sal ammoniac.

(2) G. J. S. asks how aniline black may be dissolved without the use of acids or glycerin, and how the color may be made permanent. I wish to use it for ink. A. There is an aniline black in the market quite soluble in hot water; it is called soluble nigrosine.

(3) J. E. F. asks how to make a freely flowing black ink for sketching, etc. A. Triturate soluble nigrosine with a small quantity of boiling water, and strain the hot solution. When cold, the ink afforded is ready for use.

(4) G. McM. asks how to color billiard balls. A. Red.—Soak the pieces for a few minutes in weak nitric acid, and then in a strong decoction of cochineal in ammonia water. Black.—Use nitrate of silver dissolved in water, and expose the pieces to strong sunlight. Or steep for several days in a decoction of 2 lbs. logwood, 1 lb. galls, and then for a few hours in acetate of iron (iron liquor). Green.—Steep in a solution of verdigris, to which a little nitric acid has been added, or in a solution of distilled verdigris in acetic acid. Sal ammoniac is sometimes added to this solution. Do not use metallic vessels. Purple.—Steep in a weak aqueous solution of terchloride of gold, or boil for some time in a strong aqueous solution of logwood extract, and then add 4 ounces of alum to the gallon of solution, and continue boiling until the ivory is sufficiently colored. Yellow.—Steep for 24 hours in solution of lead acetate, and after drying in solution of potassium bichromate. Or steep the pieces in a saturated solution of orpiment (sulphide of arsenic) in strong ammonia, and dry. The depth of color depends upon the degree of concentration of the solution. Blue.—Stain them green and then immerse in hot solution of pearl ash. Or boil in logwood decoction and then in aqueous solution of copper sulphate. Or steep them in weak solution of sulphate of indigo, to which a little tartaric acid has been added. The coal tar colors, though brilliant, are apt to fade.

(5) C. E. N. asks how to make, and how to put on a good polish for black walnut tables used for

hot and cold water in a bar room. A. Use a cloth cushion moistened with clear solution of 1 part shellac in about 10 parts of alcohol, applying a few drops of linseed oil to the cushion occasionally during the operation of polishing.

(6) E. D. S. asks: Is there anything that is applicable to window glass that will keep frost from accumulating on it, in cold weather? A. Glycerin is sometimes used.

(7) H. M. A. asks if freezing injures cider for drinking or for vinegar. A. No.

(8) C. L. H. asks: Can you kindly tell me in your paper some effective, cheap alarm for a bell telephone? I am unable to use an electro-magnetic bell for reasons. A. Such an alarm as you require is described in SCIENTIFIC AMERICAN SUPPLEMENT No. 161.

(9) H. M. N. asks: 1. What causes such a variety of colors to appear on oily water? A. It is due to the phenomenon called by physicists interference of light, caused by the varying thicknesses of the film of oil. A fine illustration of this may be observed in the soap bubble. 2. Why is tallow for steam engine cylinders preferable to any other lubricator? A. Pure tallow has less tendency to decomposition than oil under similar conditions. A pure hydrocarbon is, however, preferred by many, especially in high pressure engines.

(10) U.S.A. writes: 1. In your SUPPLEMENT No. 149, you describe how to make a simple electric light, and how to make the batteries. In battery, Fig. 4, should the small hole which is in the bottom of all flower pots be closed? A. Yes. 2. Should I put the same solution which is used in the pipe bowl, in Fig. 3, in the flower pot? A. Yes.

(11) Keho asks: Would a ten pound cannon ball sink to the bottom, if thrown in the deepest part of the ocean? A. Yes.

(12) L. E. L. asks (1) for an explanation of the principle of the gyroscope. A. See SCIENTIFIC AMERICAN, vol. 38, p. 335. 2. How can I make a cheap telephone? A. SCIENTIFIC AMERICAN SUPPLEMENT No. 142, contains full instructions for making telephones.

(13) C. M. D. asks how a Maynooth battery is made and charged. What liquid in the porous cup, and what in the iron one? A. It consists of a water tight cast iron cell, containing a porous cell, within which is a plate of zinc. The iron cell is charged with a mixture of equal parts of nitric and sulphuric acids, and the porous cell with sulphuric acid 2 parts, nitric acid 1 part, water 18 parts.

(14) M. asks: Is there any cure for a cracked plantation bell without recasting it? A. Drill a hole at the end of the crack, and saw through the crack to the hole. If the bell is too hard to admit of this treatment, we know of no cure.

(15) "Reader" writes: I have a hard rubber comb, it acts on paper and hair the same that a magnet does on a steel needle, why is it? A. Hard rubber, sulphur, wax, glass, and other substances, when rubbed with silk, flannel, or fur, become electrified and acquire the property of attracting light bodies.

(16) A. H. V. asks if Brazilian pebble spectacles are injurious to the eyes. A. They are generally considered better than glass.

(17) Otto writes: It is asserted that the whole mass of water in the Hudson (down to the very bottom) would flow north during the flood tide. Is it possible? A. We do not think the entire mass of water flows back with the tide. For a considerable distance this may be the case, but there is a neutral point beyond which the downward flow of the river is simply retarded.

(18) C. N. A. writes: I desire to construct an induction coil according to the method given in SUPPLEMENT No. 160, and would like to ask if it would not be possible to use coarser wire than No. 36 for secondary coil, without destroying the effect—say No. 30 or 32? A. No. 30 or 32 will not do as well as No. 36.

(19) L. H. asks: 1. In making India ink pictures with a brush how are the shades made smooth and merged evenly into the white of the card board on which they are painted so that they will look like a photograph? A. The first requisite is the proper quality of paper. The tints should be carefully washed, one over the other, beginning with the lightest. 2. Is there a cheaper way than the electric pen to get several copies of written manuscript? A. Manifold paper is not expensive and answers a good purpose.

(20) A. H. writes: I have occasion to work in pearl, and I find a great deal of trouble in doing so, especially in turning it, it being so extremely hard. Will you give me some particulars in working it? A. There are two kinds of shells used in the manufacture of small articles; the porcelaneous and the nacreous. The former are extremely hard, and can be worked only with the apparatus employed by the lapidary. The latter are more generally used, and may be sawn, filed, and turned, with some facility. The pieces should be roughed out on a common grindstone. After turning, they should be smoothed with pumice stone and water, and polished with rotten stone wet with sulphuric acid slightly diluted.

(21) G. J. B. asks: Is it possible for the ground under fifteen feet of water in the ocean to freeze? An old captain in this place says he has known it to be frozen off Fire Island in 15 feet of water. A. Not in water freely open to the sea. In confined coves it might possibly happen in the latitude of Fire Island, but even that is doubtful.

(22) G. W. M. writes: My friend holds that not one half of the leading astronomers believe the moon to be a lifeless planet without air or water, and I hold that fully four fifths of the astronomers believe it to be dead. Your opinion is desired. A. The moon is considered as lifeless by most astronomers.

(23) E. H. G. asks: Would a sheet of copper placed between two zinc plates, in place of the platinum sheet used in the "Kiddler battery," produce a current of electricity? A. It would afford a fair current for a short time.

(24) P. F.: Kienmayer's amalgam for electrical machines is prepared as follows: one part of zinc and one part of tin are melted together and removed from the fire, and two parts of mercury stirred in. The mass is transferred to a wooden box containing some chalk, and then well shaken. The amalgam before it is quite cold is powdered in an iron mortar and preserved in a stoppered glass vessel. For use a little lard is spread over the cushion, and some of the powdered amalgam sprinkled over it and the surface smoothed by a ball of leather.

(25) W. C. M. asks for the names of the latest and best receipt books and chemistries on dyeing, as he is in the dyeing and scouring business for ladies' and gentlemen's goods. A. The SCIENTIFIC AMERICAN SUPPLEMENT contains the latest information on the subject of dyes. See Nos. 53, 55, 68, 74, 75, 76. Napier's "System of Chemistry applied to Dyeing." Gibson's "American Dyer." O'Neil's "Dictionary of Dyeing, etc." Smith's "Dyer's Instructor."

(26) J. L. asks: 1. Will the armatures of a number of telegraph instruments all make the same movement when the circuit is broken? A. Yes. 2. Would all move the same distance if the circuit should be closed before the armature of one had reached its full distance from the magnet? A. Yes, as we understand you. 3. Will the telephone work on a line in connection with a battery, or must the battery be cut out? A. A battery does not interfere with the working of the telephone when the circuit is continuous. 4. What is there to prevent the use of the telephone instead of the Morse telegraph? A. It has in many instances replaced the telegraph.

(27) C. W. asks: 1. What kind of carbon is used in the porous cup of a Leclanche battery, and is it powdered, granulated, or in lump? A. Use carbon from gas retorts. It should be coarsely powdered. 2. In what proportion is it mixed with the peroxide of manganese? A. We have seen batteries filled with the carbon alone that seemed to work quite as well as those containing the peroxide of manganese. The proportions of the two should be about equal. 3. Should the porous cup be packed full or only partly full? A. The porous cup should be filled. 4. Will a pencil of zinc such as is generally used give as strong a current as a piece of zinc placed around the cup as in the carbon battery? A. Yes.

(28) W. S. R. asks: How can I polish a piece of marble? A. Smooth it with sand and water applied with a marble rubber, then rub it with pumice stone, and finally with a paste of putty powder, using a felt rubber.

(29) B. E. B. asks how the gilt work on gas fixtures is produced. A. In some cases it is simply brass, spun, burnished, or polished, and lacquered; in other cases it is produced by the application of bronze powders.

(30) J. McCa. writes: Wishing to construct a dynamo-electric machine, after the plans given in SUPPLEMENT No. 161, I ask: 1. Does this machine, whether magnet is excited by battery or not, require an induction coil to be used, to produce an electric light? A. No induction coil is required. 2. Would common Western Union local battery answer instead of Bunsen cells; if so, how many? A. 16 or 12. 3. A light of what candle power will this machine produce? A. We do not know the photometric value of the light, but we think it would equal 4 or 6 gas jets. 4. Will increasing width, height, and wire on both magnet and armature increase the power of this machine in proportion? A. Yes.

(31) "Canuck" writes: I have made a pair of Bell telephones according to directions as given in Popular Science Monthly. Used a steel bar one quarter inch diameter and five inches long for core, and wound for one half inch on bar silk covered No. 60 copper wire until the diameter of bar and wire was about three quarters inch or seven eighths inch. Took the thinnest ferrotype plates for diaphragms and have used a Daniell battery varying in strength from one to twelve cells, still it fails to transmit sound. A. Use three eighths inch magnets, and No. 36 wire. No battery is required. See SCIENTIFIC AMERICAN SUPPLEMENT No. 142, for directions for making telephones.

(32) C. H. K. asks how many pounds pressure (steam) per square inch a boiler made of No. 14 standard gauge, charcoal iron, will stand with safety. Size of boiler 12 by 24 inches. Single riveted seams. A. Safe working pressure, 40 to 50 pounds.

(33) W. W. asks: What is the largest sized steam boiler that can be practically heated by crude petroleum? A. So far as we know, the limit is the same as obtained when coal is used as fuel.

(34) H. T. asks what is used to black the inner surface of tubes of fine optical instruments. It must be easily applied. A. Coat the surfaces with good gold size, and, while still adhesive, dust over it quickly lamp black, or, what is better, ivory black reduced by grinding to an impalpable powder.

(35) A. B. D. asks in which position can a bell be heard the farthest, on an open prairie, close to the ground, or on a tower two hundred feet high. A. On the tower.

(36) F. A. T. asks how to put a polish on fine walnut furniture. A. Mix with two parts of good alcoholic shellac varnish, 1 part of boiled linseed oil, shake well, and apply with a pad formed of woolen cloth. Rub the furniture briskly with a little of the mixture until the polish appears.

(37) T. J. B. asks: Should the slides of an engine be set a trifle lower at the end towards the crank to hold the weight (of piston) off the lower surface of the cylinder on a horizontal engine or not? A. They should be level.

(38) S. wants to know how much steam power would run a fan to furnish an ordinary blast for a cupola with a melting capacity of not more than 300 lbs. of iron. Fan the old style. A. It probably would not require more than half a horse power, at most.

(39) N. G. asks what photographers use to polish or glaze photographs. A. Heated burnishing rolls.



(40) G. E. asks how to melt old rubber belting and scraps of rubber, such as hose and doormats, over again and make it elastic so that it can be used in making the moulds for plaster casts. A. Old rubber cannot be melted as you suggest—it suffers partial decomposition in heating and does not again assume its original properties. Such moulds can be made from the gum rubber, as described on pp. 35 and 105, vol. 38, SCIENTIFIC AMERICAN, but they are too costly.

(41) H. N. D. asks how to make steel run sharp when poured in moulds. A. It is only necessary to use a suitable quality of steel to insure this result.

(42) G. D. H. asks for the method of manufacturing oakum. A. By picking old hempen rope into fibers.

(43) C. A. H. asks: Is there any work published giving a history of the success reached in attempts at utilizing anthracite coal dust or culm for the purposes of fuel, or which explains the peculiarities of coal dust and the impediments in the way of its utilization? A. There is some valuable information on this subject in Bourne's "Steam, Gas, and Air Engines."

(44) W. H. C. asks for a simple method of electroplating. What shall I use to remove the fatty particles entirely from the work? A. For silver plating the bath consists of potassium-silver cyanide, prepared by precipitating solution of silver nitrate with potassium cyanide, and redissolving the washed precipitate in excess of potassium cyanide solution—potassium cyanide, 12 oz.; water, 1 gallon; silver cyanide, about 1 troy oz. Filter and use in a porcelain or glazed vessel. For the whitening bath dissolve 1 lb. potassium cyanide in 1 gallon of water, add one-quarter oz. troy of silver cyanide, and filter the solution. The baths are provided with silver feeding plates for anodes proportioned in size to the surface of the work to be plated. These are connected with the positive pole of the battery. The cleaned articles are connected by a copper wire with the zinc pole of the battery, dipped for a minute or two in the whitening bath, and when uniformly coated with a white film of silver transferred to the plating bath, under similar conditions. 3 or 4 Smee cells with plates 10x4 inches will generally suffice for the plating bath, and 4 or 5 similar cells for the whitening bath; 20 to 30 minutes in the plating bath is usually sufficient to plate the work properly. Articles of copper, brass, or German silver, to be plated should first be cleaned by boiling them for a few minutes in strong potash water to free them from traces of oil or grease, and, after rinsing, in dilute nitric acid to remove any oxide, and again thoroughly rinsed. It must not be touched by the hand after cleaning. Just before putting the work into the bath, dip it momentarily in strong nitric, or a mixture of equal parts nitric and sulphuric acids and rinse quickly. After this treatment it is sometimes dipped for a moment in dilute aqueous mercurous nitrate solution, and rinsed again. This has the effect of coating the clean metal with a film of mercury, which secures a perfect adhesion of the deposited silver. For nickel plating see article on p. 209, vol. 38.

(45) J. S. L. asks: Of what material are the printer's inking rollers made? A. Usually of glue and molasses, glue and glycerin, or glue, glycerin and oil. Those of glue and glycerin are prepared as follows: Glue is melted in water by the aid of a salt water bath into a very thick paste, to which undiluted glycerin is added in quantity by weight the same as that of the dry glue. The mixture is then thoroughly stirred and further heated to evaporate the excess of water. It is cast over a mandrel in iron or copper mould well oiled, and allowed to cool slowly and thoroughly before being removed.

(46) W. B. K. asks: Can you tell me about the sized boiler and fly wheel for a cylinder 1 inch bore and 2½ inches stroke? A. Boiler 15 inches diameter, 30 inches high. Fly wheel, 6 to 8 inches in diameter.

(47) M. J. W.—See Schuman's "Manual of Heating and Ventilation."

(48) J. E. P.—A gravity battery should be used on a closed circuit, and it must not be moved about.

(49) E. asks: How can I become a mechanical draughtsman? A. Study lessons in mechanical drawing contained in the SCIENTIFIC AMERICAN SUPPLEMENT.

(50) F. J. H. writes: I wish to cast a cannon having brass and copper. I would like to have a receipt for a good composition, for I wish the gun to look nice and be strong. A. For a large gun, copper, 90; tin, 10. For a small gun, copper, 93; tin, 7.

(51) A. G. R. asks: Is there any invention for conveniently unloading hay in bars by removing the whole load at once from the wagon to the mow? A. Yes, but there is room for improvement.

(52) J. J. J. asks: 1. Can you refer me to a good book on draughting? A. See Prof. MacCord's drawing lessons in SCIENTIFIC AMERICAN SUPPLEMENT. 2. Where can I get good draughting tools? A. Consult our advertising columns. 3. How can I make a cheap invisible ink? A. See SCIENTIFIC AMERICAN SUPPLEMENT No. 157.

(53) A. C. B. asks: What power is cheapest and most convenient for a small shop requiring 4 or 6 horse power? A. A portable or stationary steam engine.

(54) T. B. asks: What is allowed for shrinkage of iron in bridge building? A. An allowance of one-eighth inch in 1,500 feet for each change in temperature of 1° Fah. is ample.

(55) F. W. Peirce asks if there is not a point in the periphery of a wagon wheel that stops for an instant as it comes into contact with the ground. A. Yes.

(56) M. A. R.—For full description of induction coil, see SCIENTIFIC AMERICAN SUPPLEMENT No. 160.

(57) G. I. T. asks: Would you recommend the use of galvanized iron tea kettles? A. No.

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

Carl.—It is arsenopyrite or mispickel, containing a little cobalt and a trace of nickel. It contains about 45 per cent of arsenic.—F. M. M.—It is an excellent quality of bituminous coal, suitable for gas making. C<sub>2</sub> calcite—lime carbonate. A<sub>2</sub> chlorite schist. B<sub>2</sub> contains sand, clay, mica, iron, oxide, and peaty matter. D<sub>2</sub>, orthoclase. F<sub>2</sub>, quartz. H<sub>2</sub>, anhydrite.—J. S. G.—Thermica (biotite) has little commercial value. Those varieties containing a high per cent of potash are sometimes utilized for fertilizing purposes. G. F. M.—It is kaolin, containing about 10 per cent of quartz sand. If properly washed it may be utilized for the manufacture of pottery, porcelain goods, etc. Fine English kaolin brings in New York from \$15 to \$17 per ton (barreled). A. A. G.—It is ferropyrroite or crystallized bisulphide of iron (iron 46.7, sulphur 53.3) associated with quartz. When free from arsenic it is sometimes used as a source of sulphur in the manufacture of sulphuric acid and of sulphurous acid for bleaching. The mineral is commonly called fool's gold. See p. 7, vol. 36. J. D. S.—The large piece is fibrous talc. The smaller fragment is a clay containing undecomposed orthoclase.—C. L.—No. 1, trap rock. Nos. 2 and 3, gneiss and mica schist—the dark mica is biotite. No. 4, principally orthoclase.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

#### COMMUNICATIONS RECEIVED.

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

Heating and Pounding of Crank Pin Journals. By J. R.  
On the Gyroscope. By N. D.  
On Mine Water in Fish Streams. By C. Smith.  
A Biography. By W. B. C.  
On Middelings Purifier Controversy. By R. J. A.  
On Shorthand. By H. H.  
On the Sun's Rays. By B. B.  
On What Congress Ought to Do. By G. H. K.

#### OFFICIAL.

**INDEX OF INVENTIONS**  
FOR WHICH  
Letters Patent of the United States were  
Granted in the Week Ending  
January 14, 1879,  
AND EACH BEARING THAT DATE.  
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