

(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. C₂ calcite—lime carbonate. A₂ chlorite schist. B₂ contains sand, clay, mica, iron, oxide, and peaty matter. D₂, orthoclase. F₂, quartz. H₂, 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 undeveloped orthoclase.—C. L.—No. 1, trap rock. Nos. 2 and 3, gneiss and mica schist—the dark mica is biotite. No. 4, principally orthoclase.

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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 Midallings 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.
[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

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