recommended for a support in the first fusion of the assay. It is often quite difficult to procure good coals for the purpose, especially when on a prospecting trip. Is there not some kind of material from which small capsules can be made for the purpose, which can be used an indefinite number of times, and which would be equally as good as charcoal? A. We know of no support that will serve as a good substitute for the coal. A small bone ash cupel will answer in some cases.

(22) R. G. asks: 1. What is the weight of a foot of water in pipes from one-sixteenth of an inch to one inch in diameter? A. The weight of one cubic foot of fresh water is 62½ lb. and from this you can estimate the weight of water of any diameter and length of pipe. 2. What is smallest water meter under a 20 foot head that it would be possible to drive a sewing machine with at the usual rate of speed? A. You should apply to a maker of turbine wheels. The size depends upon the construction of the wheel and the manner in which the water is applied.

(23) A. W. C. writes: I have a coil of half inch steam pipe (iron) to be used for a boiler which opened in two places in the weld in coiling. Can you tell me how to repair it? A. Either braze up the opening in the pipe, or close it up as close as possible with a hammer and bolt a sleeve around it, with cement for a joint.

(24) L. K. S. asks: When were ships first copper bottomed? A. Fincham's history states that it was in the year 1553 that metal sheathing was first applied.

(25) C. D. W. asks in what cities on this continent other than horse power is used on street railways, also what power is used in cities you may name, whether steam, electrical, or compressed air? A. Compressed air engines have been tried in this city, but we believe they are not now in practical operation. At New Orleans, steam produced from highly heated water tarried in tanks or fireless boilers is used. In San Francisco cars are drawn by endless ropes drawn by stationary engines, and we understand that Cincinnati is about to apply the same principle. In Philadelphia and in Brooklyn on many of the streets of the outskirts cars are drawn by steam locomotives of peculiar construction.

(26) E. H. A. asks: What is the weight of a blow given on a pile from a hammer weighing 1,700 lb. and falling 24 feet? A. 29·8 tons.

(27) "Cameo" asks whether a cameo is any kind of stone, cut in relief, or whether it is necessarily a precious stone. A. "A precious stone carved in relief."—Webster. "A precious stone or shell having an imitative design engraved upon it in bass relief, or figures raised above the surface."—Worcester.

(28) C. G. A. writes: I am about to construct some wooden trays with perforated bottoms, to hold fish eggs. They are to be placed in a tall pile, one over the other in the air, and be supplied with water in small quantity, which shall dip down through the whole series. I want a varnish or other preparation which shall be proof against the action of the water, and shall protect the wood from it and also prevent the wood exuding any hurtful juices. Is there any better mode than to varnish well with asphaltum? A. Give several flowing coats of good asphaltum varnish thinned with oil of tupentine somewhat and let them dry thoroughly before wetting.

(29) W. H. P. asks: 1. Can the electric light and other phenomena produced by a current from a Gramme machine be produced by the current of one or more induction coils? A. No. 2. If not, why not? A. Because the secondary current is of necessity intermittent and of very high tension. The machine referred to produces a quantity current which is requisite for the electric light.

(30) B. R. D. asks (1) how to proceed in the manufacture of aluminum. A. Alum is dissolved in hot water, a certain proportion of carbonate of soda is added, and the whole evaporated to dryness. In the manufacture of aluminum alloys this preparation is simply added to the metals—copper, tin, zinc, nickel, etc., fused in a covered crucible, and vigorously stirred in while the heat is continued, with care to exclude the air as much as possible. For gold colored aluminum bronze: 2 lb. copper is melted, and to it is added 1 lb. of the soda alum mixture and 6 oz. oxide of zinc. Cover, stir, and heat for about 15 minutes. 2. A foreign journal says: "1 oz. of charcoal, 3 oz. of salt, and 1 lb. of the oxide of aluminum put in a covered crucible and kept in the fire from 15 to 25 minutes at about 700° Fah." I wanted some to-day for an experiment, and failed. I inclose a sample of what I got. A. Too large a quantity of charcoal powder or too small a quantity of aluminum oxide (calcined) was used in your experiment. Reduce the materials to a powder that will all pass through a 90-mesh sieve, first having dried all thoroughly. Mix thoroughly, cover well in the crucible, and give a better heat. 3. Have I the right to make for an experiment? A. Yes. 4. What is the lifting power of the magnets in the best electric machines per horse power? A. Probably 200 lb. There is no fixed limit.

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

S. H. H.—Chrome iron ore, worth ass aying.—A. F. B.—Nickeliferous pyrites—of some value.—T. P. C.—1. Lead sulphide (galena), argentiferous, in quartz and limestone. 2. Galena in limestone. 3. Pectolite—a lime potash soda silicate with a little galena. 4. Magnetic iron oxide—magnetite or loadstone. 5. Traprock. 6. Clay. 7. Quartzite.—F. B. M.—Sandstone—no value.—T. S. B.—Ferruginous sandstone—contains nothing of value.—G. M. W. and G. M. D.—An impure ocher. If ground and calcined would make a cheap pigment.—W. K.—1. Quartz carrying a small quantity of argentiferous sulphurets. 2. Gold quartz. 3. Quartz, gypsum, and iron sulphuret. 4. Micaceous and garnetiferous quartz. It carries a small quantity of copper and iron sulphurets, and some of it may be argentiferous. 5. Quartz, fluorite, and zinc oxide.

## NEW BOOKS AND PUBLICATIONS.

AYER'S ALMANAC FOR 1881. IN ENGLISH, GERMAN, DUTCH, NORWEGIAN, SWEDISH, FRENCH, SPANISH, PORTUGUESE, AND BOHEMIAN. Published by Dr. J. C. Ayer & Co. Lowell, Mass.

We are in receipt of a neatly bound set of the various editions of Ayer's Almanac, as above, containing not only specimens of the languages above named, but also some pages of Turkish, Armenian, Greek, Bulgarian, and Chinese. The collection before us is a literary curiosity, and a remarkable example of enterprise and liberality. The annual edition is from ten to eleven millions, for free circulation.

SEWING MACHINERY. By J. W. Urquhart. London: Crosby, Lockwood & Co.

Gives a brief history of the principal sewing machine inventions, with details of construction and directions for adjusting the leading machines of the several types.

THE STATELY HOMES OF ENGLAND. By Llewellynn Jewitt and S. C. Hall. Two series in one volume. 8vo, pp. 399 and 360. New York: R. Worthington.

Thirty-one of the more notable of the historic castles, halls, and other "stately homes" of England are here pleasantly described and pictured by means of three hundred and eighty engravings on wood. The text is uncommonly good for a work of this class. The homes portrayed are rich in historic interest, many being ancient and all the seats of history-making families. The sketches were originally prepared for the pages of the *Art Journal*, but have since been considerably enlarged.

TOMLINSON'S HANDY BOOK FOR THE OFFICE AND HOME. Chicago: John H. Tomlinson. 8vo, paper.

The author has compiled from various sources a considerable amount of information and practical advice touching business affairs, social conduct, and so on.

MODERN ARCHITECTURAL DESIGNS AND DETAILS. New York: Bicknell & Comstock. Price $3.

Embraces plates 17–24. Low priced Queen Anne cottages, summer houses, and sea shore houses, with elevations, framing plans, exterior and interior details, and window sash.

[OFFICIAL.]

# INDEX OF INVENTIONS

FOR WHICH

**Letters Patent of the United States were Granted in the Week Ending**

**January 11, 1881,**

**AND EACH BEARING THAT DATE.**

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, 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. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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