T. B. W. asks: If a steam boat runs eight miles in an hour, from point to point (in still water), what distance would she run with the help of a fourmile current? Answer: The speed of the vessel would be increased by the speed of the current, if the resistance of the air is neglected.

J. S H. P. asks: 1. How is carbolic soap made? What proportion of the (pure) acid is used? 2. In midwinter, when the thermometer in the room stands at 80° or 85°, though clad in thick under and outer garments, we call it only comfortably warm. But in summer at the same temperature, though clad in the thinnest possible garments, we loll in the shade and call it intolerably hot. Why is this? Answers: 1. Carbolic acid soap is made by adding from 5 to 20 per cent of carbolic acid, according to the use to which it is to be applied. 2. We do not always feel the same degree of temperature, for example, 85° Fah., to be invariably oppressive or hot. This is owing to the fact that the atmosphere at this temperature sometimes contains more moisture than at others. The drier the warm or hot atmosphere, the less the heat is felt, owing to the rapid evaporation of perspiration from the surface of the body. During a cold clear winter's day the air contains much less moisture than in summer, so that, although we may be in a room artificially heated to 80° Fah. or above, it may not feel uncomfortable, the insensible perspiration rapidly passing off and cooling the body.

C. W. E. asks: How can I make an electromagnet to be operated by an earth battery? Answer: You can make an earth battery by sinking two large plates of copper and zinc in moist earth, and connecting them by conducting insulated wires attached to each. Such a battery was constructed by Bain in 1841. You can make an electro-magnet by winding stout copper wire, covered with silk, around a piece of soft iron bent in the form of a horse shoe, care being taken that the coils are wound in the same direction around each bobbin, either from or towards the axis of the magnet. The more numerous the coils, and the greater the power of the electric current, the stronger the magnet.

W. S. B. asks: How can I anneal gold after it has been cast? Answer: We think you can do it by heating the gold, and allowing it to cool slowly.

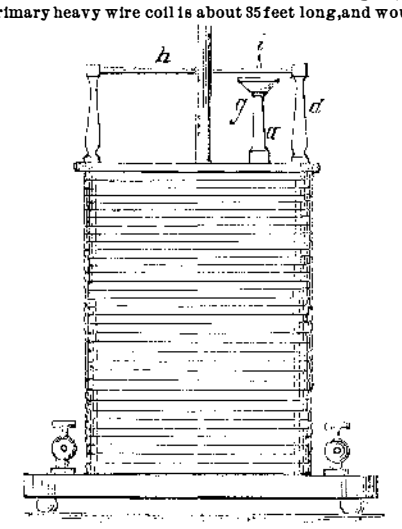
C. R. asks: 1. What is the best and most economical constant battery? 2. I have heard of a thermo-electric battery. Is there one of practical utility? Answers: 1. Daniell's battery is recommended for constant action. It is not expensive, and no gases escape from it. It consists of a cylinder of copper, in which is placed a cylindrical vessel made of unglazed biscuit ware, or porous earthenware. Into this porous vessel a rod of amalgamated zinc is placed. The copper vessel is filled with a saturated solution of sulphate of copper with a little sulphuric acid. The porous cell is filled with dilute sulphuric acid, and on a perforated shelf, fixed to the upper part of the copper cylinder, are placed crystals of sulphate of copper (blue vitriol) to keep up the strength of the solution. 2. Thermo-electric batteries have been made of considerable power, but we know of none that have ever come into practical use.

D. H. M. asks: How can I separate iron from copper and brass? Answer: If you heat the metals in a crucible, the brass will be melted first, and can be poured off.

S. asks: 1. How is aniline made from coal tar? What apparatus is necessary? 2. How are bronze powders made? 3. How are the various colors produced from aniline? 4. Can you give me a good recipe for Worcestershire sauce? Answers: 1 and 3. The basic portion of coal tar or coal tar naphtha, that is, the least volatile products of the distillation of these substances, is strongly agitated with hydrochloric acid in excess. This is done on the large scale in vessels lined with lead. The clear portion of the liquid is then decanted and evaporated until acid fumes appear. It is again filtered and neutralized with potash or milk of lime and distilled. The portion that passes over at 360° Fah. is crude aniline. By the action of bichromate of potash on sulphate of aniline, rich shades of purple and violet are produced. 2. To make a bronze powder, mix peroxide of tin and sulphur, of each 2 parts, sal ammoniac 1 part. Expose to a low red heat in an earthenware retort until sulphurous fumes cease to be given off. 4. The following recipe gives a fine sauce: Port wine and mushroom ketchup, of each 1 quart; walnut pickle 1 pint; soy ½ pint; pounded anchovies ½ lb.; fresh lemon peel, minced shallots and scraped horseradish of each 2 ozs.; allspice and black pepper (bruised) of each 1 oz.; cayenne pepper and bruised celery seed of each ½ oz. (or curry powder ½ oz.); digest for 14 days, strain and bottle.

W. W. B. says: In making gas from petroleum, there are several difficulties of which the most serious is the deposit of carbon in the shape of dry powder in the retorts, and other troubles between the retort and the gas holder. Petroleum is the finest gas-making material we have, taking into consideration its price; it will yield from 6,000 to 8,000 feet per barrel, and the supply seems to be inexhaustible. It is a question of great importance to the oil producer to get a steady market for his oil, and to the people to get a cheap and good light. Both of these objects would be attained by a practical solution of this question: Can gas of good quality, and cheap, be manufactured from crude petroleum on a large scale? I say that it can, and it can be done by any mechanical arrangement to inject air and petroleum in graduated quantities into the retorts; and I also say that it will convert all the petroleum into gas of high illuminating quality and leave no carbon in any shape, either in retort or pipes. I have proposed the question to many gas men, but nobody seems to know anything about it, except that petroleum is a difficult thing to handle in gas making. I write to you to ask: 1. Will not the injection of air and petroleum into the retort convert all the petroleum into gas? 2. Would there be any deposit of carbon on the retorts or pipes? 3. Would it be a permanent gas or a mechanical mixture? 4. Would there be danger of explosion from injecting a graduated quantity of air into the retort? Answer: Petroleum being a mixture of various hydrocarbons, that is, various chemical combinations of hydrogen and carbon that are for the most part liquid at ordinary temperatures, it is obvious that it cannot be changed into a permanent gas without decomposition, or a new interchange of its elements, forming new chemical compounds. It is found that, when petroleum is submitted to a high temperature without access of oxygen, decomposition takes place, a quantity of uncombined carbon being deposited. It is evident, then, that the permanent gas formed is a hydrocarbon with a less proportion of carbon than the liquid petroleum. To convert all the petroleum submitted to heat into a gaseous body, something must be supplied that will combine with the extra carbon and form either another illuminating compound or one that can be removed by subsequent purification. When petroleum burns in the air, its elements combine with oxygen, forming carbonic acid gas and vapor of water. The injection of air or oxygen into the decomposing retorts would therefore defeat the object in view that of making a permanent illuminating gas. It would simply cause a combustion of the petroleum more rapid than that which takes place in the open air, besides the risk of explosion. It would be far more philosophical to inject hydrogen with the petroleum into the retort, or to decompose the petroleum in an atmosphere of hydrogen. This hydrogen could be readily formed by decomposing superheated steam by means of red hot anthracite coal. Indeed, superheated steam alone in contact with the decomposing petroleum might yield a portion of its oxygen to the extra carbon, thus obviating its deposition on the retort, forming carbonic acid gas which could be removed by water. If free hydrogen were liberated, it would increase the heating properties of the flame. We simply mean here to indicate the philosophical method of experiment, bearing in mind the constitution and affinities of chemical bodies. Nothing but practical trial in this way can solve the problem of the utilization of petroleum in the manufacture of illuminating gas.

J. M. asks: How can I make an induction coil to use with two large Grove's cups? With this arrangement, can I make an electric light? Answer: You can make an induction coil as follows: In the figure, the primary heavy wire coil is about 35 feet long, and wound



round a glass tube. Outside of this is wound the secondary fine wire coil of about 1,400 feet. Battery contact is broken and renewed by the rotation of a soft iron bar, *h*, which, mounted between two brass pillars, is placed immediately over the axis of the coil, in which is placed a bundle of soft iron wire. The current of the battery passes through the pillar *d* and the axis carrying the iron bar, and contact is broken and renewed by the point *i* dipping as *h* revolves into and out of mercury in the brass cup *g*, on the pillar *a*, through which the circuit is completed. The binding screws in front connect with the ends of the coarse interior coil, and for connection with the battery. Two screws behind connect with the ends of the fine wire coil, from which the secondary current is derived, and from which shocks may be taken, water decomposed, etc. You cannot make the electric light with this arrangement. That requires that the fine wire coil should be wound round a soft iron horseshoe magnet, which is made to revolve rapidly in front of a permanent or temporary electromagnet.

J. K. asks: Is there in existence a means or contrivance to start, and keep in motion for one minute only, a machine which uses 5 horse power? The power which runs the machine is unable to set it in motion, and cannot even assist in it. What may I employ to start the machine? Answer: We hardly get your idea; but as the question is stated, it would seem possible to apply some other power, say that of a steam engine, to start the machine.

A. L. B. says: In your answer to I. E. E., the method by which the Lexington Avenue Synagogue is lighted by electricity is incorrectly stated. The burners in the Synagogue are not lighted by the galvanic current heating a platinum wire, but by induced electricity, produced by a new frictional apparatus and condenser, contained in one small case. The electricity, generated by turning a crank, is stored up in the condenser, which, when a sufficient quantity and intensity is arrived at (depending upon the number of burners to be lighted), is discharged, producing a spark at each burner—the circuit being there broken—and ignites the gas which has been turned on immediately before the discharge.

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

J. E. H.—Siliceous earth, apparently infusorial. Infusorial earth is used as a polishing material, under the name of electro-silicon.

J. R. E.—Blue clay, a silicate of alumina.

P. S.—Hypersthene (or Labrador hornblende) with iron.

W. W. B.—Galena (sulphide of lead).

T. F. H.—Galena (sulphide of lead).

J. W. C.—Micaceous iron ore.

COMMUNICATIONS RECEIVED.

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

On Crucibles. By L. T. C.
On Silicon Steel. By C. W. H.
On Heat. By H. C. F.
On Perfect Combustion. By C. R.
On a White Blackbird. By J. S. B.
On Using Heat Twice. J. A. H. E.
On Transit on the Canals. By R. D. R.
On the Art of Inventing. By K.
On Lunar Acceleration. By J. H.

Also enquiries from the following:

C. K. C.—P. W.—W. H.—W. H. S.—E. J.—E. H. K.—S. E. J.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL.]

Index of Inventions

FOR WHICH

Letters Patent of the United States

WERE GRANTED FOR THE WEEK ENDING

October 14, 1873,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

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APPLICATIONS FOR EXTENSIONS.

Applications have been duly filed, and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:

26,860.—MAKING TINWARE.—S. J. Olmsted. Dec. 31.
26,952.—LAMP.—G. Neilson. Jan. 7.
30,467.—SINGEING PIGS.—A. Denny *et al.* Jan. 14.

EXTENSIONS GRANTED.

25,796.—JACQUARD MACHINE.—A. Babbett.
25,797.—HARVESTER.—E. Ball.
25,807.—HEM FOLDER.—L. Clark.
25,814.—SLEEPING CAR.—J. Danner.
25,843.—CULTIVATOR.—T. McQuiston.
25,862.—WEEDING HOE.—J. M. Adams.
25,867.—COVERING SADDLE TREES.—J. Maclure.

DISCLAIMER.

25,796.—JACQUARD MACHINE.—A. Babbett.

DESIGNS PATENTED.

6,956.—DOOR KNOB.—J. O. Hollis, Boston, Mass.
6,957.—RUBBER BOOT.—L. L. Hyatt, New Brunswick, N. J
6,958.—STOVE.—J. Martino, Philadelphia, Pa.
6,959.—PICTURE FRAME, ETC.—J. Nonnenbacher, N. Y. city
6,960.—STATUE.—J. Rogers, New York city.
6,961.—KITE.—S. M. Simonds, Philadelphia, Pa.

TRADE MARKS REGISTERED.

1,488.—BLACKING.—L. Amson & Co., New York city.
1,489.—BLACKING OR GREASE.—L. Amson & Co., N. Y. city.
1,490.—BARRELS OF WHISKY.—Derby *et al.*, St. Louis, Mo.
1,491.—CORSET SPRINGS.—F. L. Egbert, New York city.
1,492.—SHIRTS.—Kohn & Co., Philadelphia, Pa.
1,493.—BRUSHES.—J. M. C. Martin, New York city.
1,494.—CLOTHES WRINGERS.—Queen City Wringer Co. Cincinnati, O.
1,495.—BAKING POWDER.—Royal Baking Powder Co. New York city.
1,496.—STOVES.—J. Spear & Co., Philadelphia, Pa.
1,497.—GRINDING MILLS.—Straub & Co., Cincinnati, O.
1,498.—RUBBER BOOTS.—Candee & Co., New Haven, Ct.
1,499.—QUICKSILVER FLASKS.—Quicksilver Mining Co., New Almaden, Cal.
1,500.—WINDOW POLISH.—H. M. Wade, Philadelphia, Pa.
1,501.—MEDICINE.—J. L. Graham, Pittsburgh, Pa.
1,502.—LUBRICATING OIL.—Leonard *et al.*, New York city.

SCHEDULE OF PATENT FEES:

On each Caveat	$10
On each Trade-Mark	$25
On filing each application for a Patent (17 years)	$15
On issuing each original Patent	$20
On appeal to Examiners-in-Chief	$10
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On an application for Design (3½ years)	$10
On an application for Design (7 years)	$15
On an application for Design (14 years)	$30