

but only the current induced by the diaphragm, is a positive, then a negative, current sent in the same direction, or a positive in one direction, then a negative in the other direction, for each motion of the diaphragm? A. A positive current passes in one direction, then a negative in the opposite direction.

(19) R. S. asks: What is the difference between a German "loth" and an American ounce, or between a German and an American pound? A. The German "loth" is equivalent to 1/2 ounce, apothecaries' weight. The German pound contains 5,522.96 grains, apothecaries' weight. The American pound (apothecaries') contains 5,760 grains, apothecaries' weight.

(20) R. A. S. asks: 1. Will you please tell me how high water will run in a siphon? A. About as high as it can be drawn with a pump, 26 or 28 feet. 2. What is the composition of which crucibles are made? A. See p. 267, vol. 39, of SCIENTIFIC AMERICAN.

(21) "Tinsmith" asks: 1. What is the difference between "coke tin plate" and "charcoal tin plate"? A. The terms "coke" and "charcoal" refer to the quality of iron from which the tin is made. 2. Can bright tin plate be made in this country? A. Yes.

(22) W. P. H. asks: 1. What kind of metal will demagnetize a horseshoe magnet? A. We know of none. 2. Which will run the heavier a heavy wagon with thick heavy wooden spindles or same wagon with thin iron spindles? A. The one with the wooden axle.

(23) G. T. asks: 1. Which is best, a 6 inch bi-convex or bi-concave, to view pictures in a box? A. The bi-convex. 2. What would be the best distance for focus? A. 10 or 12 inches. 3. Will not this lens do for a camera obscura, with mirror? A. Yes.

(24) C. F. asks: 1. Would the galvanometer be deflected by a coil of wire that surrounds a strong bar magnet? A. Yes, if the bar were inserted or removed. 2. What is the change occasioned in the magnetic field in the telephone by the vibration of the diaphragm? A. The magnet is temporarily weakened by the approach of the diaphragm. 3. What are the best works on magnetism? A. "Fundamental Magnetism" by Harris.

(25) S. Z. asks: 1. How can be determined the augmenting power of any microscope? A. It is found by dividing the minimum distance of distinct vision with the naked eye by the focal length of the lens or combination of lenses. For example, taking 10 inches as the average distance for the minimum of distinct vision, a lens of 2 inches focal length magnifies five diameters, one of 1/2 inch 20 diameters, and so on. 2. Can you tell me in what consists the greater value which the short horn cattle have over the common ones? A. Their bones are smaller, they fatten easier, are better milkers, and it might be said that they are generally better.

(26) A. F. H.—A new and useful combination is patentable though its elements are old, if the result of the combination is the product of the co-operative action of its elements, and not a mere aggregation of several results, each the separate product of one of the elements or groups of elements. It is immaterial whether the co-operative parts act simultaneously or successively.

(27) A. asks: Would it be any advantage for a locomotive to have a glass gauge. Provided there were plenty of gauge cocks in proper places, would it assist an engineer to prevent his crown sheet from being burnt? A. We think a glass gauge a good check upon deceptive indications of gauge cocks.

(28) C. K. asks what kind of a book to get to study cam motion, leverage, and mill gearing. A. Box on "Mill Gearing," and Fairbarin on "Mills and Mill Work."

(29) E. S. writes: I have tried to melt brass in a crucible in a common hard coal stove, but it would not melt, and not having a forge, I intend to make a small furnace to melt about 1 to 2 lbs. of brass. It is to be 5 inches inside diameter and 12 inches high, and is to be shaped like a cupola for melting iron. I intend to use coke for fuel, and would like to have your opinion of it. A blast furnace of this kind is not adapted to melting brass; an ordinary coal stove will answer every purpose, if the draught is good. It may be that you did not allow the brass sufficient time to melt.

(30) E. N. asks: Where shall I place a weight on a safety valve lever in order that the steam blow off at 80 lbs. pressure per square inch in the boiler? Diameter of valve is 2 1/4 inches, and weighs 2 lbs.; the lever is 3 1/2 inches from fulcrum to valve stem, and weighs 6 lbs. The weight is 7 3/4 lbs. Please also give me the rule by which to figure the same. A. See p. 267 (29), current vol. of SCIENTIFIC AMERICAN.

(31) A. P. F. asks: Will a safety valve work well with a steel coil wire spring on top of valve exposed to heat of steam as soon as valve rises? We have one in that shape on steam fire engine, and when the steam raises the valve it will blow down the pressure 40 or 50 lbs., unless screwed down to get more tension on the spring; and if screwed down when hot from steam blowing off, will not rise until the pressure runs up 40 or 50 lbs. A. Your valve is not a safety valve, but a danger valve. You should get rid of it at once, and put in its place a properly constructed safety valve.

(32) J. H. asks: 1. In what number and volume of the SCIENTIFIC AMERICAN is the diagram of Haeckel's theory of evolution? A. See vol. 34, p. 167. 2. In Knight's Mechanical Dictionary, page 90, an ammonia engine is described requiring only one quarter the fuel to gain the same pressure of steam. Could I use ammonia instead of water, with a coil of pipe, for a steam carriage, as described in SCIENTIFIC AMERICAN, No 8, February 22d, page 116? A. Many attempts have been made to use ammoniacal gas instead of steam for motive power, but so far unsuccessfully. It is almost impossible to prevent the escape of the gas in a working machine. This is a source of danger and is injurious to the men. Its economy in practical working has not been demonstrated. It would not suit your purpose, as you must have a condensing apparatus to recover the ammonia in a liquid state.

(33) J. W. F. asks the number of gallons a still will hold, 6 feet in diameter, 25 feet long, filled to a depth of 54 inches. Still is set horizontal. A. 4,254 standard gallons nearly.

(34) J. R. F.—You will find an excellent article on the use of petroleum in steam boilers in SCIENTIFIC AMERICAN SUPPLEMENT, No. 82.

(35) C. K. asks what end of a telephone coil to attach to zinc pole of battery, in order to have the current increase the magnetism, when telephone and sounder of a Morse instrument are used on same circuit. A. If the diaphragm end of the magnet is north, the wire from the zinc pole of the battery should go around the magnet in a left handed direction. If it be south, the wire from the zinc pole should go around the magnet in a right handed direction.

(36) F. A. M. asks: 1. Has either the Bell or Gray telephone been operated over the Atlantic cable? A. No. 2. What obstacles, if any, would there be to the success of such an experiment? A. The slowness with which the electrical impulses follow each other preclude telephonic communication.

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

G. P. H.—It is a deposit of carbonate of lime, containing a small amount of phosphoric acid. By proper treatment it might make a good lime. The industrial uses of lime are many. Its great affinity for carbonic acid fits especially for the preparation of the caustic alkalis. Slaked lime is employed in the preparation of ammonia from sal-ammoniac and of hypochlorite of calcium (bleaching powder). Lime is used in the purification of illuminating gas from carbonic acid, etc.; in the refining of sugar; in the manufacture of soda; in tanning, to remove the hair and prepare the hide; in bleaching; in the manufacture of stearine candles; the making of mortar etc.—C. H. R.—It is not properly a clay, but a loam, a mixture of clay and sand. It forms with water a slight plastic mass, and is not very refractory. We see no reason why the loam, as represented by this sample, should not make good bricks and articles of coarse pottery if properly burned.—F. L. R. B.—It is clay, containing a large percentage of silice. It is not indicative of the presence of any of the noble metals.—H. M. C.—They are not samples of meteoric iron, but of magnetite. Some of the samples react very much like ilmenite (titaniferous iron).

COMMUNICATIONS RECEIVED.

Gary's Perpetual Motion and Neutral Line. We have at hand a few communications on the above, among them a column from Mr. Gary. The editor is, however, obliged to decline as useless the further discussion of the matter.

- On the Gary Motor. By P. J. D.
On the Gary Motor. By J. A. P.
On Heat. By E. C. F.
On a Small Steam Boat. By B. J. McD.
On Dreams. By R. K. T.

[OFFICIAL.]

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending April 15, 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.

Advertising device, F. J. Bailey... 214,275
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Coats, N. Malmar, Brooklyn, N. Y.
Corset fastener, G. C. Judson, Newton, Mass.
Fireplaces, H. Clayton, Lexington, Ky.
Fruit drier, A. J. Reynolds et al., Chicago, Ill.
Knitting machinery, J. Nelson, Rockford, Ill.
Machine guns, F. E. Schultze, New York city.
Musical instruments, M. J. Matthews, Boston, Mass.
Petroleum, refining, W. Ryder et al., Philadelphia, Pa.
Piston rod packing, L. Katzenstein, New York city.
Printing films, B. Day, West Hoboken, N. J.
Steam boiler, draught regulator for, A. C. Harrison, Philadelphia, Pa.
Tobacco curing, C. Hornbostel, New York city.