

In the other. It is not correct, therefore, to say that the discharge is always in the same direction when referring to any one rod. Points receive and give off charges more readily than surfaces do. It is in consequence of this fact that round surfaces are used with the electrical machine, and points with lightning rods, the object being an accumulation of electricity in one case and its dissipation in the other.

(26) J. W. S. asks: How can I render pasteboard unflammable? A. Soak your pasteboard in a solution of tungstate of soda, and dry in the sun.

(27) E. C. A. asks: 1. Have there ever been any experiments made to ascertain the relative size of the atoms of various substances? Respecting the constitution, shape, size, and absolute weight of elementary atoms, chemists know nothing; but they have proved that the atoms of hydrogen are lighter than those of any other element, and they have discovered how many times heavier each elementary atom is than an atom of hydrogen. Thus, we know how many times heavier an atom of carbon is than an atom of hydrogen; and the so-called atomic weight of carbon is a statement of its atomic ratio. 2. Do all atoms weigh the same, or do they vary in different substances? For example, does one atom of aluminum weigh the same as one atom of platinum? A. They vary; hydrogen being 1, aluminum is 27.48, and platinum 197.88.

What do the best authorities decide is the cause of gravitation? A. It is an inherent property of every particle of matter in the universe to attract every other particle, with a force directly proportioned to the mass of the attracting particle, and inversely to the square of the distance between them. A satisfactory hypothesis has never been offered in explanation of the cause of this universal attractability of matter.

(28) B. asks: Can earth and calcareous sand, containing from 10 to 30 per cent of sulphur, be separated by any other method than the Sicilian kiln or calcareum? If so, where can I find the process? A. Consult Wagner's "Chemical Technology," pp. 194 to 199. See also p. 296, vol. 31 of the SCIENTIFIC AMERICAN.

(29) S. L. L. says: I have been trying to obtain oxygen gas from water by means of sulphuric acid and chloride of lime. I knew that the sulphuric acid would unite with the lime, setting free the chlorine, which, uniting with the hydrogen of the water, would, I thought, permit the oxygen to pass through a capillary tube, and be shown by the application of flame. I saw the gas rise in the tube; but it would not affect the flame when a match was applied. What was the reason? A. Your reaction simply gives you sulphate of lime and chlorine water. Under the existing circumstances, the chlorine does not attack the hydrogen.

(30) C. L. asks: What is oxphosphate of iron? A. There is no such substance. What is the process of condensing milk? A. See p. 343, vol. 30.

(31) C. P. W. says: 1. What is the green substance that is formed when unbrowned coffee is put into the white of an egg? A. It is a compound resembling tannate of gelatin. 2. In Youmans' "Chemistry," it is stated that tea arrests transformation; in a work entitled "Foods," it is stated that tea hastens transformation. Which is correct? A. The best series of experiments on this point are by Julius Lehmann, who found that the use of tea and coffee as articles of diet appeared to exercise an important influence in retarding the waste of the tissues of the body.

(32) T. F. H. says: I have a set of silver articles with black wooden handles which have turned brown in color by being buried in a damp bank vault. What can I use to stain the handles black and restore the polish? The wood is very hard, I presume ebony. A. Dip the handles in a boiling solution of weak caustic alkali, to dissolve all the grease; dry, and apply a solution of nitrate of silver. It will be necessary, often, to apply two or more coats of the nitrate of silver.

(33) J. E. asks: Is there any perceptible shrinkage in gas in consequence of the gasometer pit leaking and being renewed with water? In other words, does fresh water require to be saturated to a certain degree with gas before the gas holder will rise, a portion of gas being absorbed every time more water is added? A. There will be a slight absorption of the gas by the water. The two principal ingredients of coal gas are hydrogen and marsh gas, and 1 cubic inch of water absorbs 0.0015 cubic inch of hydrogen, and 0.035 cubic inch of marsh gas. There will be no stoppage in the rising of the gas holder on account of this slight absorption.

(34) A. S. asks: What will remove mud spots from heavy black silk? A. The safest plan is to wash carefully with good soap.

(35) C. A. F. asks: 1. Is cow or horse manure better for lettuce, beets, cucumbers, etc., and why? A. The latter, as it is more highly nitrogenized. 2. In what kind of soil should musk melons be raised? A. A rich sandy soil.

I recently purchased a fine specimen of calamine, purporting to come from Arizona. Does that territory contain that mineral? A. If so, it must be in a new locality as yet unknown to mineralogists in the East.

(36) C. L. asks: What are the methods of obtaining the silicious and aluminous ethers? I believe they were discovered some few years ago (6 or 7) by Mr. Theophile Zschweski. A. Dibasic silicate of ethyl (2C₂H₅O, SiO₂)₂ is formed by adding alcohol gradually to chloride of silicon. A powerful reaction occurs: hydrochloric acid is evolved in abundance, and a colorless liquid is obtained, which, when submitted to distillation, at first evolves hydrochloric acid; but the boiling

point rises rapidly until it reaches 330° Fah., at which temperature pure dibasic silicate of ethyl distils over. It is a limpid liquid, of a pleasant ethereal odor, and a hot taste resembling that of pepper. It is combustible, and burns with a flame of dazzling whiteness, depositing pulverulent silica. The composition of this body is remarkable, 4 volumes of vapor being produced from the compound, C₁₆ H₂₀ Si₂O₈: favoring the hypothesis of the tetraatomic character of silicon, with an atomic weight of Si=28. This ether is not miscible with water, but is decomposed by it, with the separation of gelatinous hydrate of silica. Silicic ether (C₂ H₅ O, SiO₂) is a second ether, containing only half the quantity of oxide of ethyl that is present in the foregoing compound. It may be procured by acting upon alcohol of specific gravity 0.833 with chloride of silicon, and distilling. The dibasic silicate is formed at the same time, and the first portions of the distillate consist entirely of this compound; but by degrees the boiling point becomes higher, and when it reaches 600° Fah. the pure monosilicate passes over. The dibasic silicate of ethyl, in fact, transformed into the monobasic silicate by the action of the water present in the dilute alcohol, occasioning the decomposition of the dibasic silicate into the monosilicate, while alcohol is set free. If more water be added, a viscous compound is obtained, which, according to Ebelman, contains a third ether, with twice as much silicic acid as the foregoing one. Aluminic ether or aluminum ethyl, Dr. Cossa states, can be prepared by causing aluminum to act upon stannic ethyl. For further particulars of processes, consult Wurtz' Dictionnaire de Chemie, vol. 1, p. 1352.

(37) J. E. L. says: I have an article of pearl ash containing 14 per cent of phosphate of potash. What will be the most economical process for separating it from the carbonate? I desire to get a perfectly pure carbonate, and to utilize the phosphate. A. It cannot be done cheaply. It would be necessary to convert one of these soluble bodies into an insoluble, and then reconvert it into the original condition.

(38) H. R. P. asks: What effect does chocolate have on the system? A. Chocolate, when properly prepared, is considered by physicians as a very wholesome and nutritious substance.

(39) J. H. M. asks: Can ammonia be distilled or obtained from common sea weed? A. Ammonia can be obtained by distillation, in closed vessels, of organic matters containing nitrogen. A large amount is obtained from the refuse product of the distillation of coal for the manufacture of gas. Among the products are water and a considerable quantity of carbonate and hydrosulphate of ammonia; the ammoniacal salts become dissolved in the water, and constitute the ammoniacal liquor of the gas works: this liquor is saturated with sulphuric or hydrochloric acid, and thus the sulphate or muriate of ammonia of commerce is procured.

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

G. W. H.—No. 1 is impure limestone. No. 2 is argillaceous shale colored by red oxide of iron (the blue portions by carbonate of copper in traces). In some pieces the amount of iron is considerable. No. 3 is the same but with less iron.—J. M. H.—You had better consult the druggist from whom you obtained the pills.—J. R.—No. 1 is sulphide of lead with silice. It has been fused previously. Of No. 2 the part insoluble in acid is silice: the remainder is composed principally of iron with some alumina. No. 3 is quartz and sulphide of iron. No. 4 did not arrive. No. 5 is sulphide of iron partly altered to oxide.—B. F.—No. 1 is chlorite rock. No. 2 is quartz rock. No. 3 is steatite rock with quartz vein. No. 4 is talcose schist. No. 5 is talcose schist with talc. No. 6 is quartz with chlorite and decomposed micaceous schist. No. 7 is quartz rock. No. 8 did not arrive. No. 9 is a jaspery quartz. No. 10 is quartz rock with traces of iron and manganese. Although some of these specimens have the appearance of gold bearing rocks, the fact could be ascertained only by assay on a considerable quantity of ore.—G. P. L. R.—No. 1 is decomposed granite. No. 2 is white porcelain clay.—A. W. D.—It is hornblende, containing silica, alumina, lime, magnesia, and iron, but is not of value.—J. B.—It is milk quartz and is not valuable.—A. J. G.—Gold is not present.—G. H. C.—It is pyrites.—P. H. L. and J. I.—It is iron pyrites, of little value.—C. R. T.—It owes its peculiar character to a large percentage of red oxide of iron.—A. T. H.—It is a variety of granite rock, and may be used in building.

COMMUNICATIONS RECEIVED.

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

- On Cotton Mathematics. By H. V. M.
On a Power Manual. By A. S. R.
On Astronomical Calculations. By S. D. S.
On Heating Churches. By J. I. S.
On Wagon Wheels. By P. K. W., and by G. A. G. Jr.
On the Keely Motor. By F. W. Jr.
On Electric Force. By F. S. P.
Also inquiries and answers from the following:
J. B. N.—J. B.—E. L. E.—W. R. H.—G. E.—I. E. S.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given. Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket,

as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells the best washing machine? Whose is the best cross-cut saw? Why do not makers of magic lanterns advertise in the SCIENTIFIC AMERICAN? Is there a really fireproof and burglar-proof iron safe? What does a Rhumkorff coil, capable of giving a 12-inch spark, cost?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week ending September 7, 1875.

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

Table listing inventions and their patent numbers, including items like Air engine, Alarm, Amalgamator, Auger, Barrel bung, Barrels, Battery, Bell, Billiard table, Billiard table cushion, Blasting, Boats, Boiler, Boiler plates, Boiler, steam, Boiler water tube, Bolt and rivet machine, Book, copy, Boot, Bottle stopper, Boxes, machine for trimming, Burial case, Burner, vapor, C, Butter mold, Butter worker, Can opener, Car coupling, Car coupling, G. M. Brill, Car platform, Car replacer, Car starter, Car street, Car trucks, Carburer, Carriage, child's, Carriage case for blasting, Cattle stall, Check rower, Chuck, planing, Churn, J. F. Coe, Churn washer, Bright & De Guire, Churn washer, G. W. Eichholtz, Cistern cut-off, T. B. Harrison, Clasp, dress supporter, E. A. Bliss, Cloth-scouring machine, C. Franke, Coats, apparatus for shaping, C. Franke, Cock, stop, C. Franke, Cock, stop, C. F. Murock, Coffee, glazing roasted, Bell & Conrad, Coffin screw, W. M. Smith, Compass, mariner's, G. Iles, Cooker, feed, Fisher & Wickiser, Cork for stoppers, preparing, C. H. Frash, Corn dropper, check row, J. W. Fawkes, Corn-shelling implement, J. M. Wilson, Cotton sweep, M. Call, Cultivator, M. McNitt, Dental plates, M. Lamb (r), Derrick, B. Freeman, Desk, reading and writing, E. W. Stiles, Die stock, V. J. Reece, Door check, W. Vanderveer, Drill, ratchet, H. C. English, Easel, parlor, E. G. Chormann, Eaves trough hanger, J. P. Abbott, Egg stand and boiler, Woods & Sherwood (r), Eggs, batter of, W. O. Stoddard, Elevators, automatic brake for, H. Pearce, Engine, direct acting, J. R. Padack, Engine, rotary, L. Adams, Engine, steam, H. Davey, Engraving machine, R. W. Johnson, Eraser, india rubber, R. Lockwood, Fence post, G. W. Hatch, File, Carr & Wilcox, Filter, submerged, J. W. Lefferts, Fire kindler, D. Frankforter, Fire place grate, J. Bowen, Fire plug, J. A. Stacey, Fruit dryer, Lowman and Creps, Fruit jar, F. H. Cowl, Furnace, J. M. Dimpfel, Furnace, H. M. Smith, Furnace, locomotive boiler, W. F. Grassler, Furnace, feeding air to, W. J. O'Neal, Gas, making heating, J. M. Ayer, Gas light globe, T. Trudeau, Gas main dip pipe, P. Munzinger, Gas regulator, J. Adams, Gas stove, J. J. West (r), Gate, Redmond and Rhodes, Gems, setting, H. G. Mackinney, Glass monument, A. Pfeiffer, Glazier's diamonds, P. Sinsz, Grain-cleaning machine, G. E. Throop (r), Grate bar, E. N. Schmitz, Grindstones, forming artificial, G. Hart, Gunpowder, manufacture of, H. Courteille, Harness saddle, J. F. Knox, Harrow, J. B. Greene, Harvester, A. J. Cook, Harvester, J. S. Fowler, Hat and cap, Isidor and Hein, Hat-pressing machine, M. A. Cuming, Hat-stretching machine, R. Eickemeyer, Hats, stiffening, R. Eickemeyer, Heading buildings, C. Franke, Hinge, A. H. Ishant,

Table listing inventions and their patent numbers, including items like Hinge, Hook, snap, H. C. Goodrich, Horse power, O. Storle (r), Ice cutting machine, J. Schater, Ironing apparatus, H. E. Smith, Keys, machine for making split, W. H. Fox, Knit goods, etc., uniting, H. A. Blanchard, Knitting stockings, etc., Polle and Keisker, Lamps, funnel for filling, H. H. V. Lilley, Land roller, E. H. Adams, Lantern, pocket, J. Stevens, Lightning rod, W. H. Spang, Link, W. A. Ingalls, Locomotive boiler furnace, W. F. Grassler, Locomotives, reversing gear for, J. Ord, Loom for weaving matting, S. Kuh, Loom shuttle binder, J. H. Moore, Loom stop motion, B. F. Arnold, Looms, take up pawl for, S. S. Walker, Marking pot, W. H. Rodden, Masts for boats, hinged, Davenport and Porter, Metallic vessel, E. T. Covell, Mill, grinding, G. Sclisor, Mirror, toilet, H. Palmieri, Miter, level, and plumb, combined, J. Murray, Muff, head, I. B. Kleiwert, Music leaf turner, F. G. Johnson, Nail cutting machine, W. Wickersham, Napkin holder, C. Rowland, Neck tie, A. P. Damon, Nozzles, joint for hydraulic, J. J. Crawford, Nut lock, J. G. Perry, Oar lock, G. H. Hurd, Organ reed boards, A. W. Wilcox (r), Ovals, machine for cutting, J. E. Howard et al., Pantaloons former, C. Franke, Paper bag holder, G. H. Cleveland, Paper collar and cuff machine, E. Wilker, Paper making cylinder, S. Sellers, Pavement, Abbott and Cranford, Peat machine, C. H. Williams, Penholder, D. M. Somers, Photographs, coloring, W. W. Williams, Pianoforte, G. C. Manner, Pianing chuck, G. V. Seaver, Planter, corn, E. E. Matthews, Planter, cotton, J. B. Onan, Plow, side hill, R. I. Knapp, Plow, sulky, E. W. Russell, Portfolio stand, D. J. Steen, Power regulator, spring, G. Collier, Propeller for vessels, F. Jacob, Propelling machine, J. J. Flack, Propelling mechanism, L. W. McKenney, Pump, force, F. W. Clarke, Pump valve, T. Maguire, Pumps, strainer for, L. Blass, Purifier, flour and middlings, A. M. Comstock, Railroad rail joint, S. H. Witmer, Railroad switch, C. C. Coats, Railway, elevated, W. Harrison, Railway signal, detonating, F. Hickman, Rake, horse hay, Downing & Van Campen, Rake, horse hay, J. Hollingsworth, Rattan, treating, C. Newman, Refrigerator, H. H. Barnes, Refrigerator, H. G. Gleyre, Register, hot air, E. A. Tuttle, Rein holder, Porter, Hawes, & Page, Respirator and inhaler, J. Carrick, Roller & barrow, A. P. Allen, Sad iron heater, G. W. Cottingham, Salt, deposits from tubes in, W. C. Halliday, Sash pulley, J. Smith, Saw mill head block, Dilger & Dunn, Sawing machine, Pesse & Whitacre, Scaffold, L. W. Swafford, Seal metallic, F. C. Hamilton, Separator, grain, L. C. Royer, Sewers and sinks, emptying, R. Boeklen, Sewers, manhole cover for, D. H. Fernald, Sewing cabinet, A. Testevin, Sewing machine, W. G. Beckwith, Sewing machine, W. L. Fish, Sewing machine plaiter, W. Walker (r), Sheet metal, corrugating, W. B. & O. P. Scaife, Shoe pegs, making, F. D. Ballou, Shoemakers' cutter wheel, etc., J. W. Carver, Soldering machine, L. P. Merriam, Sole channeling machine, L. Goddard, Sofa, T. Ramsden, Spinning ring, W. Jenckes (r), Spoke socket, A. Clist, Spoke tenoning machine, C. W. Latham, Square, W. H. Walker, Stove, gas, J. J. West (r), Stove heating, M. C. C. Church, Stove, heating, Raymond & Campbell, Stove heating, T. White, Stove polishing machine, P. H. Walsh, Table, ironing, Hughes and Lockard, Table slide, extension, Maxwell & Peaster, Tar from seaweed, obtaining, W. H. Rudwick, Thill coupling, F. Chapman, Ticket case, I. White, Ticket reel, A. Stephenson, Tile, illuminating, T. Hyatt (r), Trap, fly, R. Nutting, Trap, hog, W. Deatherage, Tunneling machine, B. Dowd, Umbrella tip cup, F. S. Brown, Undergarment, S. T. Converse, Valve, balanced, G. Mossop, Wagon,umping, P. & J. Heilman, Jr., Wagon seat, S. B. Conover, Wagon spring, M. Feigel, Washing machine, D. Warnock, Watch regulator, R. S. Mershon, Wells, shutting off water from, J. P. Gordon, Wheat steamer and equalizer, Sims & Hosick, Whip socket, H. Fowler, Windmill, S. M. Abbott, Window screen, J. E. Chase,

DESIGNS PATENTED.

- 8,594 and 8,595.—CARPETS.—T. Barclay, Lowell, Mass.
8,596.—PLATED BAND.—R. Christesen, W. Meriden, Conn.
8,597.—COFFEE MILLS.—J. Girard, New Britain, Conn.
8,598.—CARPETS.—H. F. Goetz, Boston, Mass.
8,599 to 8,603.—CARPETS.—E. Guiraud, New York city.
8,604.—MATCH SAFES.—T. B. Harkins, Bristol, Pa.
8,605.—GAS LITER.—C. Herter, New York city.
8,606.—CARPETS.—J. E. Hill et al., Philadelphia, Pa.
8,607.—CARPETS.—A. Lilley, Lowell, Mass.
8,608 and 8,609.—CARPETS.—D. McNeil, Lowell, Mass.
8,610 to 8,635.—CARPETS.—J. M. Christie, Kidderminster, England.
8,636.—FABRICS.—E. C. Clark, Rockville, Conn.
8,637 to 8,642.—CARPETS.—C. W. Swapp, Lowell, Mass.
8,643.—SHAWLS.—H. Berg, Philadelphia, Pa.