

to leave trains of solder cooling in the form of wires. This will require a few trials to succeed well and make the wire even. 2. How to true or correct the balance of platform scales. A. Scales made by different makers require different treatment. You had better write to the makers of your scales for directions.

(573) X. T. Y. D. asks: 1. Can I assay copper ore by pulverizing, dissolving in sulphuric acid, and precipitating with iron? A. You cannot dissolve copper ore as you describe. Sometimes it is dissolved by the use of bromine or chlorate of potash with acids. The copper can be precipitated with clean pure iron wire. 2. I have some fine wood cuts; how can I varnish them so that the printing on the other side will not show? A. Size the pictures with white glue and varnish with dammar varnish.

(574) H. S. W. asks where he can obtain information in regard to building a boat called a "Barnegat sneakboat." A. The usual length of a Barnegat sneakboat is 12 feet, width 4 feet, square stern 34 inches wide, 7 inches deep. Midship depth 16 inches, low sides. Flaring canvas deck. Cockpit, 7 feet long by 19 inches wide, with wood combing. Rowlocks raised 8 inches and made to fold in when not in use. Can be clinker built, with frame, or, as often built, like a skiff, for which see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 25 and 26, "How to Build Skiffs."

(575) B. S. asks: 1. Has it not been proved theoretically and practically that to obtain the highest efficiency of an hydraulic propeller, the water must be ejected above and not below the water line? A. No. This is theoretically and practically a failure. 2. Has by practical tests any considerable success ever been attained with an ejection below the water line? A. All efforts at hydraulic propulsion have heretofore proved failures. 3. Where can I find the best records of such tests? A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 354, 415, on hydraulic propulsion.

(576) E. L. A. asks: 1. Is the eight-light dynamo described in SUPPLEMENT, No. 600, large enough to charge storage batteries sufficient to run 20 incandescent lamps? A. Yes, it will charge them at a reasonably good rate, say at 8 to 10 amperes. 2. If not, how many will it run, 16 candle power? A. The dynamo will run 8 to 10 such lamps. 3. How many storage batteries will be required? A. For fifty-volt lamps you will need twenty-five cells in series. 4. What SUPPLEMENTS describe storage batteries and how to make them? A. Nos. 688, 459, 600, 625, 626, and many others.

(577) W. A. R. asks: Is the bottom of a kettle of boiling water hotter or colder than the water when boiling, the kettle remaining on the fire? A. It is hotter than the boiling water.

(578) J. E. A. writes: 1. Has there ever been a locomotive driven by electricity generated with a galvanic battery? A. Many years ago experiments were tried by Dr. Page in this direction, but the expense of driving such motors proved too great. 2. If so, what battery was used? A. We presume a copper zinc couple excited by sulphuric acid was used. 3. What galvanic battery will give the best results in driving an electric motor, where cost is no consideration? A. A large Bunsen battery is about the best.

(579) C. F. J. writes: Can you advise me how to treat a steel woven-wire mattress so that it will withstand the action of dampness and not rust when used in a small yacht? The cloth-covered mattress placed on it will sometimes be perceptibly damp to the touch. A. We can only suggest painting or varnishing. These will tend to preserve it, but will not be very effectual.

(580) J. S. Van D. writes: 1. There is a small glass globe (about 2 in. in diameter) exhibited in show windows, containing a revolving fan made with diamond shape wings covered with tin foil or silver leaf, suspended vertically in globe. It may be a vacuum, and motion caused by light or heat; tell me cause of motion, and how they are constructed. A. See our SUPPLEMENT, Nos. 13, 26, 37, 69, etc., for description, etc., of radiometer. The motions of the molecules of highly rarefied air in the globe cause it to rotate. 2. Will city illuminating gas under pressure blown upon lime without the aid of oxygen produce intense heat enough to make the Drummond light, to be used for magic lantern purposes? A. No; you must use oxygen gas. 3. Would the gas produce more heat on lime by having the tube through which the gas passed highly heated previous to its being burned at the nozzle or jet? A. Yes; but hardly intense enough to produce a good light.

(581) H. C. W. writes: I have a few ordinary lime crystals, and I wish for curiosity to color them blue or pink or some other colors. I read some time ago that the Germans have some method. Can you furnish me with the information? A. We doubt if you will succeed in coloring your crystals. Try aniline colors dissolved in water, in which you may boil the crystals.

(582) C. J. L. asks: What causes the musical sound produced on the tumblers partly filled with liquid and rubbed on the rim with the finger? Is there any preparation placed on the finger? A. The friction of the finger makes the glass vibrate and produce sound. The finger should be wet, or resin may be applied to it.

(583) A. S. E. asks: 1. In a frictional electric machine plate, will shellac decrease the amount of electricity generated? A. No; but if applied to the glass plate, it would soon rub off. If then the partially stripped glass plate is used, an interference of positive and negative electricity may ensue, so as to cut down the amount produced. 2. What is the formula for making the chromates of Fe, Zn, Cu, etc.? A. Treat the hydrated oxides of the metals with aqueous solutions of chromic acid in cases where the desired chromates are soluble; where insoluble, mix the soluble salts of the metals with potassium chromate, both in aqueous solution. 3. Is there any SUPPLEMENT of the SCIENTIFIC AMERICAN containing directions, etc., for making frictional machines? A. No. 4. If, in an electrical machine, two plates are made to revolve in different directions on either side of a fixed plate, does the electri-

city generated amount to more than when the plates revolve the same way? Also, effect of middle plate turning in opposition to other two? A. It is a matter of experiment. You do not clearly state the conditions. 5. Can a chemist practice assaying in his own name, without being a graduate of any licensed college, or having a diploma? A. Yes.

(584) J. M. W. asks if there is any known article that will clean the hands of printers of either ink or colors, without injury to the skin? A. Caustic soda or kerosene oil may be used for printer's ink. The former must be dilute or it will affect the skin unpleasantly. Other inks yield to oxalic acid, javelle water, etc.

(585) G. H. F. asks for a simple rule for reducing Fahrenheit scale to Centigrade. A. Subtract 32°, expressing degrees below 0° F. as minus quantities; multiply the result by 5/9; the result will be the equivalent in Centigrade degrees.

(586) I. M. G. asks if powder, such as is used in revolver cartridges, becomes dead with age? Does any kind of powder die? I have a loaded revolver that has not been shot off for about fifteen years; would it be dangerous? A. Powder does not become dead with age. It may deteriorate by dampness. It would probably be risky to fire off your revolver, on account of deterioration of metal, rusting and clogging of the barrel, etc.; the nipples, if it is not a cartridge-loaded weapon, are probably so filled with rust, etc., that they would have to be cleaned out before discharging the piece.

(587) J. C. A. writes: 1. Can petroleum be exploded in its own volume in a strong closed vessel without a supply of air? A. Petroleum is not explosive. If placed in a vessel with a sufficient quantity of air for its combustion, it might by heating be made to give some sort of an explosion. 2. Would the pressure be increased much by introducing a certain quantity of air, and if so, how much air is requisite to do so, and how much would the pressure be increased? A. In general terms it should first be made into gas. Even then it would be hard to explode when mixed with air, because a large proportion of air, 25 to 50 volumes, would be required, which involves the introduction of a large quantity of inert nitrogen. Quite a high pressure is developed instantaneously by these explosions, possibly as high as 100 lb. to the square inch. 3. Would the oil, or the oil and air, if kept in a strong and tight vessel, retain its pressure any length of time, or would it gradually die out? A. Pressure could be maintained for any length of time in a tight vessel.

(588) A. R. H. asks: 1. What is the best temperature to run paraffine wax at? A. 150° to 200° F. 2. What is it made from? A. Coal, shales, ozocerite, etc. 3. How to stop its shrinking or becoming hollow when it cools? A. Let it cool slowly and add more melted paraffine to supply the deficiency.

(589) C. R. C. writes: Will you please give me a receipt to color white pastebord the color of leather, or something that will not lose its color in damp weather? A. Soak in solution of copperas and then in ammonia.

(590) E. N. S. asks: 1. Would solenoids of iron wire wound about the projecting ends of the core of an electro-magnet give good results as pole pieces? A. Not very good, from want of solidity and imperfect contact. 2. Would amalgamating the zincs of a gravity or other form of blue vitriol battery interfere with the working of the battery? If not, why are they not usually amalgamated? A. No. It is unnecessary, and hence is not done, as it would involve useless labor and expense. Your barometer would not work as you describe. Study hydrostatics, and you will see where the fallacy occurs.

(591) W. A. S.—The mineral sent is magneticon ore. Try it with a magnet, and you will find the powder adhere.

(592) O. T. asks whether common fertilizing bone dust is burned into charcoal, or is it used without burning? A. No; it is used as ground. 2. Is it injurious to vegetables, especially potatoes? A. No; it is beneficial. 3. What is the cause of so many green and bitter potatoes? A. Climatic and other conditions are, we presume, responsible.

(593) S. H. B. writes: 1. I am making a machine in which two rollers work in a liquid not quite as thin as water, but just as wet. Wooden rollers split, metal ones are too heavy. Can you give me instructions how to make them, to be waterproof, and that I can cast to shape desired, or can turn up and drill in lathe? I would like something with as low specific gravity as can be. A. We would suggest celluloid, ivory, or glass as material for your rollers. 2. I have seen in the SCIENTIFIC AMERICAN and several other valuable mechanical journals "Way to Cover Solder Marks on Brass Work;" have tried several of these wrinkles, but they will not "wrink." The sulphate of copper trick is a total failure. It makes the work black wherever there is any solder. Can you give me anything on that line of solder? A. The sulphate of copper "trick," as you term it, should have some effect, if the black deposit is polished off with a burnisher. You may cover the spots in a rather inefficient way by giving them a coating of orange shellac in alcohol.

Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

March 19, 1889,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions with names and patent numbers. Includes items like Air ship, Anchor, Arm support, Axle lubricator, Bag, Bagasse furnace, Barrels, scuttle for, Bars, machine for changing the angle of the flanges of Z and angle, W. E. Highfield, Basins and baths, secret supply, waste, and overflow for, W. H. Newell, Basket or carrier, I. J. W. Adams, Bath, See Portable bath, Bearing, anti-friction, T. R. Ferrall, Bed, folding, L. C. Butterfield, Bed, spring, F. M. Jeffery, Bedsteads, crib attachment for, V. Fitz, Beehive, F. M. Clement, Belt fastener, W. G. Avery, Belts, hinge joint for electric, N. Warrell, Belting, G. F. Page, Belting, machine, G. F. Page, Bicycle, T. O'Brien, Billiard table rail and cushion, C. G. Brockway, Bin, See Flour bin, Binder, temporary, J. F. Brown, Blower, electric blast, H. H. Blades, Bluing package, T. F. Conklin, Board, See Ironing board, Boats in series, launching, C. W. Delon, Boiler, See Wash boiler, Boiler, J. H. Cunningham, Boiler, J. T. Smith, Bolster spring for wagons, E. Cliff, Bolt heading machine, E. Burdall, Jr., Bolting reel, W. E. Gorton, Bomb, signal, R. H. Earle, Book, account, E. G. Stevens, Book carriage and protector, L. C. Leith, Book cover, F. F. Brailleur, Book mark, H. L. Mehrer, Books, cutting attachment for check, H. R. Wilson, Boot tree, A. M. Moore, Boots and shoes, manufacture of, G. H. Clark, Bottle wiring machine, Schrader & Sturm, Bottles, spreader and stopper for, E. Pomeroy, Box, See Fare box. Journal box. Mail box. Paper box, Brake, See Car brake. Vehicle brake. Wagon brake, Brake shoe, S. Hatt, Brick machine, R. F. Robison, Bridges, rails, etc., apparatus for indicating the deflexion of, O. Leuner, Buckle, S. C. Tucker, Buildings, construction of, J. E. Rankin, Burial case, J. H. Walker, Burner, See Gas burner. Hydrocarbon burner. Oil burner, Burnishing machine, G. B. Kelley, Cables, electric alarm signal for, Woodring & Gilbert, Can filling and packing apparatus, S. L. Gregg, Cans, mechanical lid shutter for, B. Wesselmann, Car brake, C. Mayer, Car brake, B. L. Wright, Car brake, street railway, W. B. Clark, Car platforms, die for forging the followers of extensible railway, Reilly & Bergman, Car, stock, E. U. Benedict, Cars, switching or transferring, Armit & Seabee, Carcasses, device for spreading, G. P. Schmidt, Card for buttons or studs, C. G. Bloomer, Card grinding machine, S. A. Prescott, Carriage curtain fastener, S. P. Scott, Cart spring, road, F. Drifill, Cartridge belt, T. C. Orndorff, Cartridge and other belts, fastening for, A. Mills, Cartridges and cartridge magazines, belt for holding, A. Mills, Cartridges for transportation and distribution, packing, T. C. Orndorff, Case, See Burial case. Needle or pin case. Note case, Cash recorder, J. M. Warner, Chair, See Rail chair, Chart, percentile measurement, F. Swain, Churn, P. C. Barlow, Churn, W. D. Makemson, Churn closure, J. McDermid, Cigar vending apparatus, W. C. Doubleday, Cigarettes, machine for dipping, C. H. & W. B. Whitaker, Cleaner, See Grain cleaner. Seed cleaner, Clip, See Halter bolt clip. Whiffletree clip, Clock, alarm, A. Bannatyne, Clock, repeating, E. Bannatyne, Clutch, friction, E. Boehme, Clutch, friction, H. Erdman, Coal elevator, J. Chase, Cocoon, apparatus for reeling silk from the, E. W. Serrell, Jr., Cocoons, apparatus for separating waste floss from, E. W. Serrell, Jr., Coffee, apparatus for preparing liquid, C. Wagner, Coffee mill, E. H. & C. Morgan, Coffee pot, E. B. Lobach, Coffin, A. Weckmiller, Coins, pad for convenience in handling and picking up, A. E. L. Slazenger, Collar, horse, W. Cosbie, Composing stick, Ludington & Leland, Concentrator, F. Sletcher, Condenser, ejector, N. W. Wheeler, Cot, folding, C. T. Segar, Cotton, machine for opening, cleaning, and ginning seed, J. R. Montague, Coupling, See Pipe coupling. Thill coupling, Cover fastener for vessels, J. H. Cassidy, Cultivator, J. G. Gaither, Cultivator, E. J. Landes, Cultivator, A. Lewis, Curtain attachment, J. Emmert, Curtain holder, Nolley & Wyatt, Cutter, See Meat cutter. Root cutter, Die, See Screw cutting die, Dish, covered, G. Jones et al.

Table listing inventions with names and patent numbers. Includes items like Draught equalizer, Draught evener, Drawer guide, Dust collector, Dust collector, T. Watson, Earth, apparatus for raising and moving, H. A. Carson, Edger, gang, H. C. Robb, Electric conductor, A. A. Brooks, Electric light support, Schardt & Jones, Electric machine, dynamo, J. W. Balet, Electric machine, dynamo, E. Thomson, Electric motors, friction gear for, C. J. Van Depoele, Electrical distribution by secondary batteries, F. King, Elevator, See Coal elevator. Hydraulic elevator, End gate, wagon, E. A. Waltz, Engine, See Gas engine. Rotary engine. Steam engine, Equalizer four-horse, A. C. Wilson, Exercising apparatus, W. Sachs, Explosive charge, high, J. W. Graydon, Eye shade, T. H. Harrison, Fabrics, ornamenting, M. L. Hiller, Fan, power, P. Murray, Jr., Fare box, T. L. Beaman, Fence, H. W. Barber, Fence, W. W. Campbell, Fence, E. F. Shellabarger, Fiber or silver, machine for forming balls of, W. B. Lee, Fibers, machine for cleaning vegetable, T. Villamor, File, newspaper, H. A. Shearer, Filter, A. Wilbur, Filter, water, J. Grant, Filtering apparatus, Gehrke & Wohlfahrt, Fire alarm circuits, coupling and automatic circuit breaker for, J. J. Cannan, Fire escape, W. J. Smith, Fish lines, sinker for, J. E. Gage, Flour bin, F. Sanderson, Fluids and semi-fluids by means of compressed air, forcing, Johnson & Hutchinson, Flush tank, J. Lawson, Food warmers, cup for, S. Clarke, Frame, See Lantern frame, Fruit driers, rotary fan for, J. W. Cassidy, Fruit grader, V. Rattan, Furnace, See Bagasse furnace, Furnace for working zinc ores, L. Kleemann, Furnace grate, M. H. Moskovita, Furnaces, etc., rotary bottom or grate applicable to, W. J. Taylor, Fuse for ordnance shells, electrical, J. W. Graydon, Fuses, circuit closing device for electrical torpedo, J. W. Graydon, Gauge, See Siding gauge, Game apparatus, Rogers & Bartlett, Game wheel, G. Wilkening, Gas burner, W. P. Tibbens, Gas engine, S. Lawson, Gas, making, W. J. Taylor, Gas producer, W. J. Taylor, Gasogene or apparatus for making aerated beverages, L. G. & S. M. Chinnery, Gate, See End gate. Railway gate, Gate, M. W. Foster, Generator, See Steam generator, Gluten and starch, obtaining, H. Barker, Governor, steam engine, O. H. Castle, Grain binder, J. F. Seiberling, Grain binders, tension device for, J. S. Gibbs, Grain cleaner, E. Bryan, Grain sampler, B. F. Morningstar, Grater, nutmeg, C. O. Blood, Gun, revolving pneumatic, J. W. Graydon, Halter bolt clip, C. C. Schwaner, Hammock suspension device, J. D. Pritchard, Harrow, C. E. Bement, Harrow and cultivator, rolling, A. J. Adamson, Harvester reel, A. O. Carman, Harvesters, shock forming table for corn, A. N. Hadley, Hat and clothes rack, Brechbill & Ensign, Hat sweat band, W. F. Beardslee, Hay rake, horse, J. M. McClintock, Heater, See Lunch heater, Heel nailing machine, J. H. Pope, Hinge, L. V. Benet, Hinge, R. E. Nolley, Hinge, friction, E. Haines, Hitching post, B. G. Knapp, Holder, See Curtain holder. Knife blade holder. Spool holder. Tumbler holder. Twine holder. Vignette holder, Hook, See Suspender hook, Horse blanket, A. H. Kinder, Horse checking device, F. T. Aikins, Horse checking device, W. P. Smith, Hose nozzle, J. Clifford, Huller, See Pea huller, Hydraulic elevator, electrically controlled, C. Whittier, Hydrocarbon burner, F. B. Meyers, Indicator, alternate current, Thomson & Wightman, Inhaler, E. Jahr, Inhaler and respirator, C. Breuillard, Inkstand, E. Davis, Insecticide composition, T. Manahan, Internasal tube, D. H. Goodwillie, Iron into malleable iron or steel, converting crude, G. L. Robert, Ironing board, H. C. Perry, Ironing table, A. Riersen, Journal box, W. W. Worswick, Knife blade holder, S. V. Ellis, Ladder and scaffold attachment, extension, I. H. Razor, Lamp socket, incandescent electric, C. E. Egan, Lantern frame, F. D. Spear, Lantern, tubular, W. Westlake, Last, J. W. Lamphier, Leather dressing, J. J. Hayward, Level, plumb, A. B. Ewing, Lock, See Nut lock. Seal lock, Lock for trunks, etc., J. J. Sager, Locomotive for single rail railways, A. Mallet, Loom for weaving unspun plant stalks, P. De Hemptinne, Loom picker check, Davidson & Bannister, Loom stop motion, J. J. McComish, Lubricator, See Axle lubricator, Lumber rack, G. Streich, Lunch heater, T. O'Mahony, Machinist's blocking, C. E. Pollard, Mail bag fastening, J. S. Goodwin, Mail box and punch, W. Wleek, Mattresses, etc., woven wire, D. H. & J. F. Gall, Measuring wheel, rotary, R. J. Buchanan