

glycerine (in the form of dynamite or otherwise) would require a force greater than to split a rock, and the rock yields. Gunpowder yields but 1.3 as much gas on exploding, and the complete combustion of its grains requires an appreciable amount of time. Nitroglycerine explodes all but instantaneously.

(25) W. B. asks: 1. Have Zamboni's dry piles ever been made of silver and zinc, and why do they not frequently make them so? A. We do not know that Zamboni's dry piles have ever been made of zinc and silver plates. Probably the reason why they are not made in this way is because an unnecessary amount of metal would be used; the silvered or tinned paper is found sufficient. 2. How long will they give an electrical current? A. They will give a feeble current which may last for years. 3. Can I do plating with Zamboni dry piles? A. No, the current is too slight. 4. Why must the gravity battery copper wire be inclosed in rubber or gutta percha? A. To prevent a short circuit.

(26) R. W. D. writes: I use the water pipes running through our house for a ground wire on a local telegraph wire. 1. Is there any danger of lightning doing any damage to the house? If so, what danger is there? A. If the wire connected with your water pipes is of sufficient size we think there is no danger; however, we advise the use of a lightning arrest. 2. How often should Callaud batteries working a telegraph wire on a closed circuit and never cut out, be cleaned? A. The Callaud battery, if properly cared for, will not need cleaning until the zinc is exhausted.

(27) R. W. R. asks for a recipe for making a good cheap mucilage. A. Add British gum (dextrine) to a quantity of hot water until a sirupy liquid is obtained; then add a few drops of clove oil and cool for use. See also receipt on p. 347 (7), current volume.

(28) A. L. asks if there is anything that will stop (superfluous) hair from growing? A. See p. 75 (26), 91 (1), volume 39 of SCIENTIFIC AMERICAN.

(29) J. B. R. writes: I wish for a recipe for making water pens, the kind to dip in water in order to write. A. Moisten one of the soluble aniline blues or violets with thin gum water to form a paste, which will harden sufficiently on drying.

(30) E. E. G. asks: 1. Have paper wheels for cars ever been tried without a tire of iron or steel? A. No. 2. Are paper wheels now in use? A. Yes. 3. If so, where? A. On many railroads, including the Metropolitan Elevated in this city. 4. Have they iron tires? A. Yes, iron or steel. 5. How are the wheels fastened to the axle? A. By iron hubs or centers.

(31) R. H. & C. M. A.—We are offered an engine which has a cylinder 10 inches bore, 20 inch stroke, which we are recommended to use with 75 lb. steam as shown on gauge on boiler, and to make 150 revolutions per minute. By your rule for calculating horse power, this would seem to give us 89 1/4 horse power, which seems to us to be overrated. A. If the average pressure on the piston be 75 lb., your result is correct; but a deduction of say 15 per cent should be made for friction.

(32) R. D. B. asks: What length, thickness, and kind of charcoal ought to be used to produce an electric light on the plan as mentioned in SCIENTIFIC AMERICAN SUPPLEMENT, No. 162, page 2577, Fig. 29, equal to the light of two (4 foot) gas burners; and also how many batteries (Grenet style with carbon plates 4x9 inches) it would take to run said light? A. You will find the small pencils of carbon made expressly for electric lights, much better than charcoal. The pencil should be about 3/4 inch in diameter and 1/2 to 3/4 inch long. Eight cells of the size given should afford a fine light, but with the Grenet battery the light will be temporary.

(33) W. A. P. asks: 1. What is it that carriage makers use for setting the boxes in the hub with some kind of cement? A. The boxes are usually secured by wedges. We do not know of a cement that would answer the purpose. 2. What means will I use to get a fine finish on a buggy bed before varnishing: is it best to grind paint that I get in tin can, before using? A. After applying the several coats of paint, including the priming, the rough coat—which is rubbed down—and the final coats giving the color, apply a coat of good rubbing varnish, and when it becomes thoroughly dry, smooth and polish it first with finely pulverized pumicestone and water, and second with rottenstone and water. Finally apply a flowing coat of fine copal varnish.

(34) H. E. P. asks: Do dead centers ever occur in vertical, direct acting engines, or, in fact, any kind of a single engine, whether vertical or horizontal, with fly wheel or direct acting? A. The term dead center applies to all reciprocating engines; it is that exact point from which the direction of movement of the piston is changed, or that point where the pressure exerted upon the piston has no effect upon the rotating motion of the crank and shaft. The set of valves, point of cut off, or any other of the details of the arrangement of the engine, have nothing to do with it.

(35) T. G. asks (1) what the so-called fire kings use toruban their skin to protect them from being burnt with the red hot iron they use in their performances. A. Water alone is commonly used, we believe. 2. What is the composition of aqua vitæ or water of life? A. Aqua vitæ—brandy, spirit, alcohol.

(36) C. W. asks: 1. What size and how much wire will I need in each spool to make an electrical gyroscope, as illustrated in SCIENTIFIC AMERICAN, No. 22, volume 38, and what length and thickness of core? A. The dimensions of the gyroscope referred to are as follows: Diameter of wheel, 2 1/2 inches; rim, 5-16 inch square; diameter of magnet cores, 1/2 inch; length of magnet cores, 1 inch; between centers of magnet cores, 1 1/2 inch; width of armature, 1/2 inch; thickness of armature, 1/8 inch; magnets wound with 6 layers No. 20 silk covered wire. 2. How much battery is necessary to work the same? A. 4 Bunsen cells in good order will run it, but 6 cells would be better. 3. Will ordinary zinc and copper cell do, of one quart capacity? A. Yes, but it will require from 12 to 15 of them. 4. Can I use a pair of Bell telephones for microphone experiments, by substituting a soft iron core in place of magnets? A. Yes. 5. How much battery will I need to work a line say of less than 300 yards in length? A. 2 or 3 Fuller cells.

(37) D. C. W. asks how to clean grave-stones without acid. A. Use stiff wire brushes of different sizes, and plenty of water.

(38) J. H. asks what are the uses of mica, and what is its value. A. Clear sheet mica is chiefly used for lights in the doors of stoves and furnaces, for lanterns, lamp chimneys, and transparencies, and in the manufacture of various toys, etc. Put up in pound packages it sells for from 40 cents to \$2.75 per pound, according to size and quality of the sheets. Unrimmed sheets are generally unmerchantable. It has been used successfully for roofing purposes.

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

J. J. K.—1. Gypsum—sulphate of lime—used for manufacturing plaster of Paris and as a fertilizer. 2. The fragments are probably of meteoric origin.

COMMUNICATIONS RECEIVED.

- On Patent System. By J. W.
On the Hypothesis. By T. F.
On Smoking Coffee for Consumption. By T. H. K.
On Yellow Fever Manual and Squaring the Circle. By A. J. M. T. O. C.
On the License System. By J. H.
On Ventilation. By C. J. B.
A Mechanic's Theory of the Solar System. By W. W.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

May 27, 1879,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Table listing inventions and their patent numbers, including Amalgamator, Auger, Bag fastener, Bale tie, Baling press, Basin, Basin cleaner, Bed, spring, C. T. Segar, Bedstead, wardrobe, E. E. Everitt, Billiard cue rest, T. Watson, Boot, C. H. Colburn, Boot and shoe heel plate, S. C. Sweet, Boot and shoe toe stretcher, W. Nagle, Bottle cage, Williams & Greenwood, Bottle cork fastener, T. H. Shahan, Bracelet, self-adjusting, W. A. L. Miller, Braid package clasp, D. & D. L. Goff (r), Bran packer, J. E. Belt, Brick, etc., burner, J. & C. J. Foster, Brick burning kiln, E. G. Kemper, Brick machine, T. B. Craycroft, Buckle, Welden & Royce, Buckle, trace, A. McMullen, Butter and egg package, S. McHenry, Butter case, refrigerating, E. Slocum, Butter mould, W. S. Alexander, Butter package, W. W. Rodgers, Button and stud, C. G. Bloomer, Button card, J. Thornton, Calendar support, Pruyn & Hyatt, Candle, electric, J. B. Fuller, Carding machine cleaner, P. Hauser, Carpet fabric, W. Wallace, Carriage, child's, J. W. T. Huke, Caster, S. Vanstone, Casting hubs, mould for, V. Price, Casting ornamental figures, composition for, A. Kiesele, Chain, driving, G. Vickers, Chair leg tenoner, F. F. Parker, Chair seat and back, Heywood & Watkins, Churn, W. L. Allegree, Churn, M. R. Wheelchel, Churn dasher, S. K. Warren, Cider mill, Marsh & Brandt, Cigar package, M. W. Prager, Clay grinder and mixer, J. M. Kennedy, Clocks, making wires and arbors of lock work for striking, F. A. Lane, Cocks, operating stop, P. Connolly, Coin assorter, A. S. Tyler, Coin package, W. V. Brigham, Copying press, W. L. Inlay, Cotton and hay press, J. K. Hawkins, Crochet needle, W. Ross, Cultivator, O. A. Crain, Cultivator, W. Jones, Curtain fixture, C. Cretors, Dental hand piece, H. D. Justi, Desk, A. De Bary, Desulphurizer, A. M. Phelps, Diamonds, mounting, L. Taverdon, Dish washer, L. Warren, Distilling petroleum, process and apparatus for, J. L. Kirk, Distiller, wood, A. Knobloch, Door check, J. P. Ellacott, Door sheave, rolling, J. H. Townsend, Doubling and winding machine, T. Unsworth, Easel, F. S. Frost, Eave trough, C. W. Haucke, Egg packing box, I. Karel, Electric lighter, Cointepas & Rouchel, Electrical switch wires to binding posts, attaching, J. E. Hamilton, Electroplater, H. & H. W. Lovejoy et al (r), Envelope, A. Christey, Envelope or double postal card, L. H. Rogers, Fan, automatic, F. Roekenbach, Farm gate, W. Claypool, Farm gate, automatic, L. Ferguson, Farm gate support, S. G. Holyoke, Faucet joint, N. Spofford, Fence, J. W. Legore, Fence wires, machine for barbing, E. P. Peacock, Fencing, barb for wire, J. S. Crowell, Filter, E. W. Kidney, Firearm, G. W. Cilley, Fire escape, E. M. Ball, Flywheel, G. H. Corliss

Table listing inventions and their patent numbers, including Fruit drier, McDowell & Ewell, Furnace for reducing oxide ores, C. M. Dupuy, Galvanic battery solution, C. A. Ehrenberg, Carbage cremating furnace, W. J. Morris, Gas, apparatus for the production of illuminating, C. Marchand, Gas works, jet exhauster for, J. S. Connelly, Gate, J. A. Knickerbocker, Glass jar mould, J. N. Bodine, Glassware finisher, H. S. McKee, Glove, A. Harris, Grain conductor, J. F. Lenox, Grain drill fertilizer attachment, C. P. Bechtelle, Grain drill fertilizing attachment, D. F. Hull, Grain transferer, J. T. Hough, Gridiron, J. M. Adams, Guard finger, J. O. Brown, Hame fastener, H. N. Beam, Harrow, S. F. Reynolds, Harrow, sulky, G. W. Riley, Harvester rake, C. Lidren (r), Hats, ventilating, Waddell & Sample, Hay rack, C. Graham, Hayrake, horse, W. S. Archer, Hay rake, horse, W. C. Kingsnorth, Hay ricker and stacker, B. F. Jones, Hides, machine for ascertaining the area and weight of, D. T. Winter, Hoe, J. Gilmer, Holdback, vehicle, R. T. Barton, Hop pole puller, B. G. Chapman, Horse clothing, J. C. Simpson, Horse detacher, J. Carr, Horse detacher, R. H. Oakes, Horse detacher, W. H. Petree, Horseshoe, Moebs & Landschneider, Horseshoe nail forger, L. S. Parre, Hose coupling, car, F. Woodbridge, Hub, vehicle wheel, J. I. Healey, Hydraulic elevator, H. Snowden, Hydro-pneumatic engine, C. Fisher, Incense coal, compound for, E. W. J. Lindesmith, Injector, Fulton & Proeger, Injector and ejector, J. H. Irwin, Instrument case and dental engine, combined, B. M. Wilkerson, Invalid chair, adjustable, F. Bohnert, Knitting machines, knocking over bit for, W. D. Ormsby, Labels, pictures, etc., machine for varnishing, gumming, and sizing, J. T. Turner, Ladder hook, adjustable, D. P. Foster, Ladder, platform, A. J. Andrews, Lamp, E. Blackman, Lämp, E. M. Löwden (r), Lamp attachment, L. W. Peck, Lamp bracket, H. R. Mills, Lamp chimney, C. L. & C. Bartholomew, Lamp chimney, globe, J. H. White, Lamp, electric, W. Gilman, Lamp shade, P. K. Guild, Lasting machine, Copeland & Woodward, Lathe, grinding, C. Fest, Lawn sprinkler and hose reel, E. L. Abbott, Levees, constructing, M. C. Lawton, Lifting handle, W. H. Hart, Line holder, J. J. W. Wilson, Load binder, Holler & McDaniel, Mail bag dropper, Brauchler & Sindorf, Mashing grain, apparatus for, J. A. Eberhardt, Mash tub, G. Young, Measure and funnel, G. W. Shaw, Mechanical movement, T. W. Eaton, Mechanical movement, C. Tyson, Metal bar reducer, G. J. Capewell, Metal shearing machine, C. A. & L. K. Williams, Microscope, W. H. Bulloch, Milk cooler, Ford & Butler, Milk pan, C. C. Fairlamb, Milk setter, F. G. Butler (r), Moth proof fur case, C. M. Parker, Motion converter, R. P. Bowdoin, Mowing and reaping machine, G. O. S. Conway, Musical instrument, mechanical, E. P. Needham, Nut lock, G. W. Rhines, Nut lock, J. D. Van Benthuyzen, Oil, etc., can for, J. D. Pierce, Oils for illumination, heavy hydrocarbon, R. S. Merrill (r), Ore pulverizer, I. M. Phelps, Ore pulverizer and separator, A. Goodhart, Ore roaster, revolving, D. W. Brunton, Organs, pedal attachment for reed, G. B. Kelly, Orrery, A. Mang, Oven, domestic, J. Watson, Pails, removable cover or front for, Mayo & Atkinson, Paper box cover machine, M. F. Wilson, Paper machines, automatic feed for, J. T. F. MacDonnell, Paper pulp from wood, making, W. E. Farrell, Paper vessel, W. C. Ritchie, Pen, fountain, L. W. Fairchild, Pen, fountain, G. Wells, Pianoforte action, G. O. V. Roedern, Picture, A. F. Craig, Pitman connection and crank pin, D. H. Cooper, Plaiting machine, J. H. Brown, Planter, corn, W. W. Goodwin, Planter, corn, Taylor & Rice, Plaster and pad, R. M. Kennedy, Plow, E. O. Beach, Plow, sulky, T. E. Jefferson, Plows or harrows, farm truck or draught attachment for, M. Harris, Polisher, tumbling, J. W. Hyatt, Porcelain, box and cover for firing decorated, E. M. Ford, Post driver, W. A. Newton, Printing, autographic, W. T. Howard, Printing machine sheet deliverer, S. D. Tucker, G. R. Carey, Propulsion of vessels, pneumatic, R. H. Tucker, Puddling furnace, I. Beanland, Pulp, making wood, C. B. Carter, Pump, C. G. Grove, Pump plunger, G. H. Corliss, Pump, submerged, J. M. May, Pump valve, G. H. Corliss, Pumping engine, steam, G. H. Corliss, Pumping engine, G. H. Corliss, Punch, leather cutting, B. Bohonon, Quartz crusher, I. M. Phelps, Radiator, steam, J. T. Kelly, Rail joint, E. P. Hyatt, Railway switch, S. B. Nickum, Railway track, portable, M. Pesant, Refrigerator, J. P. Ast, Ribbon clasp or clip, C. C. G. Hubert, Rivet, tubular, B. L. D'Aubigne, Roll for forming metal articles, G. J. Capewell

Table listing inventions and their patent numbers, including Roller and pulverizer, G. Meding, Roofing, metallic, L. Struble, Rotary engine, R. Campbell, Sad iron, Williams & Warren, Sad iron and gutting roller, C. J. Kramer, Saddle tree, gig, J. B. Gathright, Sauce, making solidified, J. A. Liebert, Sash fastener, F. R. Glascock, Sawing box stuff, machine for, J. Du Bois, Sawing machine, drag, J. K. Alters, Scale beam, J. R. Linen, Sewer gas stopper, C. Y. Wemple, Sewer pipe, F. McMackin, Sewing machine, J. A. True, Shade supporter, S. H. Miller, Shafting coupler, W. T. McMasters, Sheet metal can seam, E. Norton, Shingle bolts, mill for sawing, J. Du Bois, Ship's hull, R. H. Tucker, Shirt front or dickey, G. C. Henning, Shoe clasp, King & Hammond, Shoes, button hole for, W. F. Hill, Sickle, etc., holder, H. E. Fuller, Sink valve, Crossman & Somes, Skate, roller, L. B. Jackson, Jr., Skid, W. H. Douty, Sled, R. T. Ogden, Sled propeller, R. Steel, Smoke and dust excluder, J. E. Driesbach, Snow plow, J. M. Baldwin, Spinning machine spindle, D. Kelley, Spooling guide, C. Sullivan, Spools, thread fastening on, W. E. Barrows, Stall for vessels, cattle, B. Albee, Stamp, cancelling and dating, W. J. Blackwell, Stamp mill cam, J. Scott, Steam boiler, tubular, G. H. Corliss, Steam engine beam, G. H. Corliss, Steam engine, compound, G. H. Corliss, Steam engine cylinder, G. H. Corliss, Steam generator, M. J. O'Rielly, Steamer and drier, grain, L. Hartson, Stencils, producing autographic, S. S. Nickerson, Stirrup, saddle, P. A. De La Nux, Stool, D. B. Reynolds, Stove, cooking, J. B. Long, Stove, heating, J. P. Clark, Stove, heating, M. Helbling, Stoves, long center and reservoir cover for, S. R. Burton et al., Straw cutter, J. Dick, Jr., Sublimating apparatus, I. M. Phelps, Surf boat, R. H. Tucker, Surveying instrument, I. Humphrey, Swive holder, W. L. Pitts, Tag fastener, F. Morris, Tapping pipe fittings, machine for, D. Ackerman, Teaching arithmetic, device for, S. P. Halleck, Teeth, artificial, J. W. Holt, Telephone switch, H. L. Roosevelt, Tether, Fox & Cottrell, Thill coupling, H. F. Gaines, Thill coupling, R. W. Hawes, Thrust block, J. S. Wilson, Tile moulding for holding tiles, C. A. Wellington, Time lock, T. Shaw, Toy pistol, J. M. Keep, Tumbling rod knuckle, C. Q. Hayes, Umbrella frame, J. Miniere, Valve gear, steam engine, G. H. Corliss, Valve, steam engine exhaust, G. H. Corliss, Vapor burner, Z. Davis, Vehicle dashboard, B. J. Warden, Vehicle spring, Spalding & Wiede, Velocipede, J. E. Browne, Veneer sander and smoother, W. Gardner, Vent, automatic air, J. P. Gruber, Ventilator, G. R. Buffham, Ventilator, L. J. Wing, Wagon, beer, J. G. Unsoeld, Wagon, buck board, R. A. Morse, Wash board, F. Freleigh, Weather strip, I. Bennett, Weather strip, H. L. Hye, Wind engine, J. W. Kelsey, Windmill, J. Desjardins, Wire drawing, lubricating material for use in, A. B. Brown, Yoke coupling for vehicles, neck, S. Brown

TRADE MARKS.

Table listing trade marks and their associated numbers, including Capsuled medicine, S. Limousin, Cigars, cigarettes, smoking and chewing tobacco, Goodwin & Co., Cigars, cigarettes, smoking and chewing tobacco, and snuff, H. Welsh, Cigars, cigarettes, and smoking tobacco, Straiton & Storm, Dyspepsia cure, J. C. D. Curtiss, Fertilizing compositions or compounds, The Chesapeake Guano Company, Flour, Rolston, Hall & Co., Flour, Thomas & Co., Kerosene oil, R. W. Forbes, Lard, W. J. Wilcox & Co., Laundry soap, Allison Brothers, Liniment, F. F. Brailard, Lotions for the skin and hair, A. A. Heaton, Petroleum for illuminating and lubricating purposes, Mather Brothers, Pills for cure of chills and fever, W. W. Brownfield, Preparation of corn starch, A. Erkenbrecher, Smoking tobacco, J. R. Day & Bro., Starch for laundry use, A. Erkenbrecher, Skirt braid, S. B. & M. Fleisher, Troches or lozenges, Hall & Hodgman, Wax or mining candles, W. T. Coleman & Co., Wood barrels, kegs, well buckets, and pails, J. F. Vogt & Bro.

DESIGNS.

Table listing designs and their associated numbers, including Billiard table, H. W. Collender, Carpet, W. McCallum, Combined rose and escutcheon, G. S. Barkentin, Dish handle, S. Stevens, Door knob, G. S. Barkentin, Gimp, J. H. Thorp, Handles of spoons and forks, W. C. Beattie, Ornamental chain, W. T. Chamberlain, Rubber mats, G. Woffenden, Stands for sad irons, etc., L. & W. H. Berger

English Patents Issued to Americans.

From May 30 to June 3, inclusive.

Table listing English patents issued to Americans, including Filtering machine, G. C. W. Belcher, St. Louis, Mo., Gas burner attachment, W. V. Bachelard, N. Y. city, Grain binders, F. Randall, Mich., Tramway cars, J. Stephenson, New York city