

Business and Personal.

The charges for insertion under this head is One Dollar a line for each insertion; about eight words to a line.

Order pattern letters & figures from the largest variety. H. W. Knight & Son, Seneca Falls, N.Y.

Best drying machines. S. E. Worrell, Hannibal, Mo.

Bankrupt Machinery Sales. Am. Tool Wks., Clev., O.

Chain Belting & Grain Dryers, F. H. C. Mey, Buffalo, N. Y.

Portable and Stationary Cylinder Boring machines, Pedrick & Ayer, Philadelphia, Pa.

Wm. Jessop & Sons have a handsome display of steel in Mining building at the World's Fair.

The Improved Hydraulic Jacks, Pumps, and Tube Expanders. R. Dodgeon, 24 Columbia St., New York.

Hydraulic Wheel Presses a specialty. The J. T. Schaffer Mfg. Co., Rochester, N. Y.

Stow flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wle, Syracuse, N. Y.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

Split Pulleys at low prices, and of same strength and appearance as whole pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Perforated Metals of all kinds and for all purposes, general or special. Address, stating requirements, The Harrington & King Perforating Co., Chicago.

To Let—A suite of desirable offices, adjacent to the Scientific American offices, to let at moderate terms. Apply to Munn & Co., 361 Broadway, New York.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Canning machinery outfit complete, oil burners for soldering, air pumps, can wipers, can testers, labeling machines. Presses and dies. Burt Mfg. Co., Rochester, N. Y.

Competent persons who desire agencies for a new popular book, of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.



HINTS TO CORRESPONDENTS. Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

(5151) C. W. S.—The care of a gravity cell is very simple. Two things are necessary; one is to keep the zincs clean, the other is to keep the line of demarcation of the copper solution and the zinc sulphate about half way between the zinc and copper solutions of the battery.

(5152) J. J. M. says: Some time ago I saw a man who made it his business writing names and designs on glassware. I am acquainted with the process using the vapors of fluorine acid, but this man used a fluid with pen and brush.

Replies to Enquiries. The following replies relate to enquiries published in the SCIENTIFIC AMERICAN, and to the numbers therein given.

tion of the glass, lead glasses being easily acted upon and furnishing a very fine matt surface. 3. Where it is desired to have the surface of the glass not altogether matt, but shining like ice, as in the case of window glass, this may be attained in a simple manner by placing the glass plate in a perfectly horizontal position and covering it with fine groats.

(5153) J. M. says: Will you please advise a subscriber how to finish an oak front to a dwelling that is exposed to the weather, where the finish will stand any reasonable length of time and not come off, bleach out and fade? All fronts to dwellings and stores in this part of the State that I have noticed do not stand the weather.

(5154) P. McL. writes: I am about to erect two batteries of boilers, four boilers in each battery. Size of first battery 26 feet long by 38 inches diameter, two 15 inch flues in each boiler.

(5155) F. W. M. asks: Is there any need of a flux in casting brass? If there is, what is the best to use? A. No flux is used in casting brass. A little powdered charcoal is put on the surface in the crucible to prevent oxidizing.

(5156) J. J. P.—We do not think a fan blower is adapted to organ blowing, on account of the vibration of the column of air, which would affect the sounds produced by the pipes.

(5157) C. H. asks: 1. I have just made two storage batteries, 4 plates, each 4x5 inches, coated with red lead mixed with sulphuric acid and water. I want to charge them from a 50 volt, 16 candle power socket.

(5158) W. M. writes: I have constructed a pair of receivers of the Bell telephone pattern, merely as an experiment. When I tried them I found that the sounds were very low and indistinct.

(5159) B. M. C. V. asks: 1. What is the rule to know the charging time of a given accumulator? Has the number of plates anything to do with it, or the surface of the plates as represented by square inches? A. Charge your batteries until the positive plates look like wet slate nearly black; when partly discharged they become dark red, chocolate or plum color.

BORING GLASS.—In the May 6, 1893, number of the SCIENTIFIC AMERICAN, a correspondent, M., tells of a very good way to drill glass plate.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

June 20, 1893,

AND EACH BEARING THAT DATE.

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

Table listing various inventions such as Adjusting wrench, Advertisable clock, Alarm, Alum leaf, Alloys by electro deposition, Animal shears, Antisiphon and making it, Automatic wrench, Ax making die, Axes, manufacture of, Ballot box, Registering, W. S. Black, Barrel or casing, machine for setting up and winding, Basket, pitcher carrying, H. T. Blake, Bearing, shaft, A. H. Reid, Bearing, wagon roller, F. W. Nason, Bed bottom, spring, W. Schmidt, Bed chair, J. K. Wood, Bed clothes clamp, J. H. Schroeder, Bed couch, J. C. Wood, Bell, electric, W. J. Murdock, Belt, J. A. Ferguson, Belt fastener, C. D. Fuller, Bicycle frame, etc., F. H. Bolte, Bicycle lock and support combined, J. E. Davis, Binder, R. R. Vernon, Boiler, See Steam boiler, Boot tree, M. Spuhr, Bottle stopper, F. S. Towle, Bottles, device for preventing the fraudulent filling of, J. J. Dour, Box, See Cr. box, Brake, See Car brake, Brake support, J. A. Brill, Brick machines, method of and machinery for operating the pressing plungers of, J. C. Anderson, Bridge for draw, H. W. Yerrington, Brush, paint, D. W. Long, Buckle, suspender, A. E. Jones, Buckle, suspender, H. D. Shackelford, Ruckle, trace, M. Walker, Burner, See Gas burner, Hydrocarbon burner, Burner, fuel, E. B. Corne, Bush and bung, combined, Phillips & Deuriam, Camera, See Photographic camera, Can, See Preserving can, Can heading machine, M. A. Wheaton, Cane and umbrella, combined, W. B. Blake, Car brake, L. S. Cresson, Car coupling, C. A. Dunn, Car coupling, Goff & Joiner, Car coupling, R. Nash, Car coupling, J. H. Swindell, Car door, J. W. Dellinger, Car fender, J. M. Wiecek, Car fender, railway, F. G. Groshans, Car roof, non-conductor compound, F. H. Murphy, Car safety, H. F. Brow, Car safety attachment, street, L. K. Dubois, Car seat heater, railway, H. H. Forsyth, Jr., Car seats, device for turning the backs of, J. E. Groves, Car, street, J. A. Mehling (r), Car wheel, H. E. Butts, Cars, trussed trolley board for electric, H. Cochran, Carpet beater, F. L. Goodenough, Carpet cleaner, F. H. Good, Cash register, G. E. Kellar, Cash register and account checking, method of and machine for, J. T. Hicks, Caster, F. V. Frank, Chain drive, J. O. Brown, Chain links, machine for separating, F. L. White, Chain or cable grip, G. Gagnon, Chair, See Bed chair, Dental chair, Knock-down chair, Chains, J. C. Huggins, Channelling machine, French & Meyer, Chart displayer, W. S. Temple, Chopper, See Meat chopper, Churn, T. J. Meislind, Cigar punching machine, F. C. Miller, Cigar rolling machine, C. L. Gray, Clamp, See Bed clothes clamp, Hose clamp, Cleaner, See Carpet cleaner, C.I.P., See Paper clip, Clock, secondary electric, R. S. Howland, Cloth cutting machine, O. Froemert, Cloth stretching and drying machines, chain-gauging, D. R. Kinyon, Coffin signal, A. Kwatkowski, Coffins, trimming table for, S. S. Hotchkiss, Coin-controlled lock, W. S. Rogers, Coin-controlled machine, J. A. Light pipe, Collar fastener, horse, W. A. Holland, Compass, beam, H. H. Wiley, Confidential letters, apparatus for operating, R. Savage, Cooker, steam, G. Goff, Cooler, See Milk cooler, Copy holder, E. H. Carr, Copy holder, Potter & Fortney, Coupling, See Car coupling, Thrill coupling, Vehicle road coupling, Cultivator, D. F. Lawrence, Cultivator, disk, Brown & Knaub, Cultivator, disk, E. Miller, Cultivator tooth, F. B. Harvey, Curling iron holder, H. Storey, Cut-off, electric, G. F. Parson, Cutter, See Stalk or trash cutter, Cycle, carrier, J. Warrick, Dampier, G. T. Moe, Deacondensers, device for overcoming, C. A. Van Allen, Desk switch, D. A. Nash, Desk switch, J. J. Willis, Die, See Ax making die, Dies, apparatus for making, G. F. Champney, Dies, machine for making, G. F. Champney, Dies, making, G. F. Champney, Digger, See Post hole digger, Directory holder and operator, A. F. George, Disinfecting device, G. N. & F. G. Botsford, Disk sharpener, H. Casey, Display rack, D. Goldstein, Door holding device, M. W. Reeves, Door, sliding, H. J. Lohman, Drain, die, C. S. Baird, Drill, See Grain drill, Dust collector, T. & G. M. Parkinson, Egg beater, H. F. Juergens, Egg shipping case, J. H. Bowley, Electric converter, G. & A. Frankkuhs, Electric lighting system, C. L. Moray, Electric motor regulator, G. H. Whittingham, Electrical, G. W. Swartz, Electrical energy by natural force, means for storing and supplying, F. G. Corning, Elevator, N. Beckwith, Engine, traction, N. Shell, Engine, See Gas engine, Steam engine, Excavating shafts, D. N. Long, Eye former, W. E. L. Rodgers, Eyeglasses, F. G. Schmidt, Fan, rotary, J. H. Jones, Fan, rotary, T. M. Bates, Fan, rotary, J. W. Miller, Filter, A. Williams, Filtering apparatus for beer or wine, J. Horning, Finger ring, M. E. Oppenheimer, Finger tip, device for reducing distorted, F. B. Dantz, Fire escape, J. D. Nibbs, Fire escape, J. D. Nibbs, Fire escape, portable folding, W. H. Milllett,

Table listing various inventions such as Fish plate, Davis & Dick, Fishing rod, A. Caine, Fishing wrench, J. W. Kellam, Flood heater, Page & Hausheer, Flood heater, portable, combined, E. S. Hyde, Fly trap, I. J. Edge, Fumigator, Dickinson & Sasser, Fur trimmings, artificial claw for, A. & J. Jacobson, Furnace, See Hot air furnace, Furnace, E. B. Coxe, Furnace grate bar, W. H. Heaton, Garment supporter, G. E. Adams, Gas burner, Hartmann & McKee, Gas engine, C. W. Pinkney, Gate, See Bridge gate, End gate, Railway gate, Gate, N. J. Bishop, Gate, W. D. Culwell, Generator, See Steam generator, Glass, china, or earthenware, means for connecting metallic fittings to, O. E. & J. F. Green, Glove, boxing, J. Bennett, Goggles, non-aerostic, J. Kent, Governor, engine, T. D. Dyer, Governor, engine, R. H. Matber, Grain binder, M. Kane, Grain drill, Nugent & Gilbert, Grain separator, O. M. Morse, Grate, E. Fales, Grate, jacket, H. Johnson, Grave alarm, A. Lindquist, Grinding machine for metals, W. Bright, Grinding ring, A. M. Corning, Hanger, See Trolley wire hanger, Harmonica case, M. Hohnke, Harness fastening, S. H. Haas, Harrow and roller, F. B. Harvey, Harvester, head, P. F. Wells, Harvester, beet, G. A. Farrell, Harvester, corn, G. N. Cleveland, Harvester cutter, W. E. Ball, Harvester platform adjustment, M. Kane, Heater, fluid, H. Sherman, Hinge, spring, C. S. Van Wagoner, Holdback attachment, vehicle, F. O. Frasher, Hook, See Snap hook, Horsehead, C. B. Tittle, Horsehoe, A. Rechner, Hose clamp, L. S. Goldman, Hose clamp, B. Sherman, Hose strap fastener, F. B. Mackenzie, Hot air furnace, C. A. Larson, Hot air pipe, J. P. Schaffer, Hub boring machine, J. Zimmermann, Hydrocarbon burner, W. H. Clarke, Hydrocarbon burner, J. Darby, Incubator, J. B. Halpin, Index, rotating, R. N. Brooks, Indicator, See Station indicator, Kitchen cabinet, T. R. Chambers, Knife or fork scourer, S. R. & H. Hackman, Knives, fashioned webbing, method of and machine for making, J. C. Huggins, Knitting machine electric stop mechanism, F. Hammond, Knob attachment, T. P. Humphrey, Knob attachment, T. R. Wardwell, Knockdown chair, F. O'Keefe, Ladder, extension, step, P. & B. C. Foerster, Lamp, incandescent electric, E. E. Cary, Lamp, incandescent electric, W. E. Nickerson, Lamp, incandescent electric, W. E. Nickerson, Lamp, incandescent electric, W. E. Nickerson, Lamp stand, electric, J. Cathrel, Lamps, mode of and means for renewing the filaments of electric incandescent, G. A. Fred., Lathe, engine, O. E. Perrico, Lathe grinding attachment, W. R. Cannon, Level, builder, A. W. Nisbett, Lock, See Bicycle lock, Coin controlled lock, Trunk lock, Whip lock, Lock, J. Witt, Locomotive ash pan, J. Williams, Locomotive, electric, J. C. Henry, Loom shuttle, A. H. Steele, Loom shuttle, self-threading, J. A. Gendron, Looms, read supporting device for, J. W. Cheney, Match making machine, C. M. Bowman, Matches, making, C. M. Bowman, Measuring instrument, distance, J. L. Ballie, Meat chopper, C. G. Schmidt, Meat holder, F. C. Schlechert, Metal bending and twisting machine, J. C. Herman, Metal heating apparatus and process, electric bath, Burton & Angell, Metal, machine for folding and cutting sheets of, T. L. Thomas, Metals, testing rolled or forged, A. E. Hunt, Milk cooler, G. L. Knestand, Mill, See Flour mill, Rolling mill, Mitering and joining moldings, etc., table for, C. Thuermer, Moulding compound, J. Rowbotham, Money drawer, electric alarm, Walker & Bedford, Mosquito cap, pocket outdoor, E. F. A. Bushnell, Mowing or reaping machine cutting apparatus, I. Case, Musical instrument, C. Warren, Mustard pot, C. A. Pfennig, Nutlock, J. W. Cook, Nut lock for vehicle axles, N. E. Bradford, Nut lock for self-feathering oars, W. J. Gessart, Organ, bellows, means for operating, Klock & Stevens, Organs or pianos, pedal action for, Klock & Stevens, Organs, swell pedal action for pipe, E. M. Skinner, Pad, See Stair pad, Truss pad, Padlock, H. Horne, Pail, milk, C. Bennett, Paints, agitator for mixed, C. J. McLeenan, Pan, See Locomotive ash pan, Vacuum pan, Paperclip, J. M. Keep, Paper, drawing, C. Schaeffer, Paper machine, T. E. Bright, Papermaking machines, press roll stand for, A. Aldrich, Peucel, lead, B. B. Goldsmith, Phonograph, T. A. Edison, Photograph holder, D. E. Eimer, Photograph camera, H. G. Baker, Photograph plate holder, R. B. Taft, Pillow sham holder, N. W. Stearns, Pipe, See Hot air pipe, Pipe wrench, A. E. Upton, Planter and distributor, combined, J. A. Simmons, Planter, check row, A. G. Anderson, Planter, corn, R. Boyd, Planter, corn, Upp & Young, Plants, receptacle for growing, C. Hoffman, Plastering finish, E. A. Bronson, Plwers, A. L. Schollhorn, Plow, reversible, A. Finch, Plow subsoil attachment, G. Moore, Plow, sulky, U. Anderson, Plow, sulky, J. Willmann, Portfolio, C. M. Carman, Post hole digger, R. Budd, Pouncing roll, B. G. Berrien, Jr., Power transmission mechanism, J. C. Henry, Preserving can, G. P. Herndon, Pressure devices, apparatus for operating fluid, T. J. Hogan, Printer's galley, D. R. Enright, Printing press, J. R. McDonald, Printer or binder, E. R. Hagan, Pruning implement, I. L. Beakly, Pulley covering, Reitz & McNulty, Rack, See Display rack, Stock rack, Railway construction, R. W. King, Railway gate, R. C. Douglass, Railway grade crossing device, electric, J. B. Stewart, Railway system, electric, J. C. Henry, Railway trolley, electric, J. C. Henry, Railways, closed conduit for electric, J. C. Henry, Recorder, See Time recorder, Refrigerating apparatus, M. Wanner, Refrigerator attachment, beer barrel, A. B. Kokernot, Refrigerator, beer barrel, A. B. Kokernot, Refrigerator ice supporting rack, G. L. Lobnitz, Register, See Fare register, Regulator, See Electric motor regulator, Windmill regulator, Ring, See Finger ring, Grinding ring, Rocket stand, W. H. Meadowcroft, Rod, See Fishing rod, Roofing compound, A. Monroe, Rope socket, D. W. Black, Rotations, P. Peret, Ruler, slate, B. W. Ahs, Sash fastener, B. Baker, Sash fastener, J. N. Enwer, Saw set, G. W. Ziddy, Saw setting device, C. M. Kardell, Saw tooth, cutters, Kendall & Cassidy, Sawtooth port saw, B. S. B. Scale, automatic electric weighing, C. F. Wood, Scale, weighing, J. J. Hickey,