

eight dwt. of chloride of silver? A. Not long; it depends on resistance of circuit. 5. About what part of a horse power is 25 volts and 4 amperes equal to? A. Nearly one-seventh.

(2183) Sydney asks: 1. If sirup for cordial be made with cold water, is it more likely to ferment than if it were boiled? A. Yes. 2. The best way to prepare charcoal for refining spirit, and whether any particular wood should be used. If the charcoal were merely placed in a cask of spirit, would it absorb the injurious matter and have the same effect as if it were filtered? A. Animal charcoal is most efficient. 3. The best mode for filtration of small quantities of spirits of about 30 gallons at a time. A. Use a percolator, and pack in the charcoal solidly. 4. The best publication on mode of preparation of American drinks, and price, including postage to Sydney? A. Jerry Thomas' "How to Mix Drinks, or the Bartender's Guide," 75 cents. 5. Has the aerating of wines been tried in America, and with what success, also the price of such aerating machine? A. Not to any extent with fine wines. Cider can be thus treated. 6. Best mode of preparation of raisin wine. A. We refer you to the SCIENTIFIC AMERICAN, December 8, 1888, page 356, for an article on the subject by U. S. Consul E. Johnson, Kehl, Germany.

(2184) H. C. K. asks: 1. What is the theory of the Tesla motor, and what is gained by the two independent circuits as shown in your SUPPLEMENT, No. 692? A. The two independent coils are connected in series. The whole is so proportioned that there is a constant difference of one-quarter phase between the two, owing to hysteresis or "magnetic lag." This causes the axis of north and south polarity to constantly vary, rotating always in the same direction. The armature induced itself keeps trying to "keep up," and hence rotates. 2. In SUPPLEMENT, No. 718 or 734, what is meant by the Carpenter bobbin (type 600 francs)? Is it an addition to, or is it the Ruhmkorff coil that is meant in the article "On M. H. Hertz' Experiments." A. The Ruhmkorff coil is indicated.

(2185) E. A. C. writes: I have noticed that many brass castings when taken from the sand are perfectly clean and of a uniform, almost golden color. How is this obtained? A. The golden-colored castings are made from clean metal, without iron: Copper 16 ounces, tin 1 ounce, zinc 1 ounce. The flasks should be opened quickly, in from 5 to 15 minutes after pouring, according to size of pieces, and the gate of work raised, sand rapped off, and plunged in water to check oxidation. A little practice will give proper manipulation. Should only have a quick dip, so that the heat of the castings will dry them. 2. Is there any constant battery of higher E. M. F. than the gravity battery? If so, what and how prepared? A. No practical battery. 3. Why will not the gravity battery run an induction coil? A. It can be so used.

(2186) V. R. asks: What causes the report and the recoil of a gun when a charge is fired? Are the recoil and report caused by air rushing into the barrel after the bullet has left the muzzle? Is there a vacuum formed in the barrel while the bullet is leaving it? Has the vacuum (if formed) anything to do with the report and recoil? A. The report is the vibration of the air, due to the instantaneous explosion. The recoil is the result of the sudden pressure generated within the gun pushing the gun in the opposite direction from that of the ball. There is no vacuum formed, but a large volume of gas is generated by the combustion of the powder, producing a great pressure upon gun and ball, sending them in opposite directions.

(2187) C. C. asks: Will a piece of timber ready to use in a mechanical way, ordinary dry timber, shrink endways? For instance: A piece of oak timber 6 inches by 6 inches square, 5 feet long, would the decrease in length be perceptible, and is it not an ordinary expression that timber does not shrink endways? A. Timber in drying has a very small shrinkage endwise. After it is seasoned, the permanent shrinkage becomes imperceptible, but changes in temperature, and the dry and wet seasons, may make slight variation in length. In architecture endwise shrinkage is not taken into account.

(2188) J. S. S. writes: In performing the experiment of putting an iron bar in the plane of dip and striking it a few blows with a hammer, I noticed this phenomenon, viz., both ends of the bar repelled the north and attracted the south poles of a compass. Why is this? Where were the consequent points? Must there not have been one of them missing in the chain? A. You have at least two consequent south poles in the middle portions of your bar. If you saw it in two, you may succeed in finding them.

(2189) W. B. J. asks: If the governing arrangement of an engine could be made so perfect that the least perceptible change in speed would regulate the supply of steam instantly from 0 to its full capacity, or just enough to insure an even and steady speed, could the flywheel of the engine be dispensed with? Is there a governor in use that regulates the engine in such a way that the same speed is maintained when working under a heavy or light load, provided there is steam enough to overcome the load? A. The automatic system of governing engines, as now in use, is probably as nearly perfect as the mechanical difficulties will allow. We see many difficulties in dispensing with the flywheel on a reciprocating engine, from the peculiar conditions of the application of pressure upon the piston. Uniform tangential pressure on the crank pin through its entire circle is one condition for dispensing with a flywheel.

(2190) B. H. S. asks: Can you give me a good receipt for waterproofing canvas, such as is used for canvas canoes? An elastic coating is preferable, so that the canvas may be folded. A. The best advice we can give is to have your canvas coated with India-rubber. You may waterproof it by treating with a solution of 1 part gutta percha in 10 parts turpentine mixed with 10 parts linseed oil, or with 125 parts soluble gun cotton dissolved in 425 parts ether, mixed with 375 parts castor oil and 25 parts amber or the pigment. When the canvas is not to be disturbed, painting or varnishing is the best treatment. For all cases the canvas should be perfectly dry.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 29, 1890.

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 Abrasive surfaces, tool for dressing, G. G. Cro-well; Air current governor, S. P. Smith; Alarm, See Burglar alarm. Fire alarm; Animal trap, T. M. Howell; Animal trap, B. Spitznagle; Annunciator, C. W. Stimson; Anvil and vise, combined, B. S. Davis; Auger, post hole, M. Peters; Ax, hammer, and maul, combined, C. H. Williams; Axle box, car, E. Best; Axle, self-oiling car, A. A. Weber; Axles, apparatus for the manufacture of, H. Aiken; Axles, manufacturing, H. Aiken; Bag, See Clothespin bag. Mail bag. Nose bag. Paper bag. Telescopic bag; Bag holder, O. Asselin; Bag holder and spreader, C. Bolander; Baggage check and seal, combined, W. W. Campbell; Baling press, Z. J. Anderson; Barrel setting-up machine, J. Parker; Basins, safety-plug for wash, D. F. Jones; Bath, See Shower bath; Battery, See Galvanic battery; Beam or girder, G. W. Dithridge; Beam or sill, G. W. Dithridge; Bearing, anti-friction, S. W. Ashmead; Bedstead, invalid, O. A. Howe; Beef tray and meat rack, combined, A. Redmann; Beer cooling apparatus, M. Hanford; Bell, call, B. S. Cowles; Belt fastener tool, J. Lendberg; Belt rest, W. R. Fee; Bicycle, W. S. Reed; Billiard balls, combs, etc., composition of matter for making, J. H. Patterson; Binder, H. Thomas; Bit, See Plane bit; Bit stocks, ratchet attachment for, T. C. Long; Block, See Pillow block; Blue, laundry, G. E. B. Kempton; Board of trade, E. S. Reed; Boat lowering apparatus, T. S. Hosford; Bobbin or spool, G. Pendleton, Jr.; Boiler, See Steam boiler. Vertical boiler; Boiler cleaner, automatic, G. R. Ford; Boiler flue, steam, W. Cook; Boiler furnace attachment, steam, R. Marshall; Boiler furnace, steam, W. S. Walker; Boiler heads, machine for flanging, F. L. Kollberg; Boilers, method of and apparatus for purifying water for, C. Elliot; Bolting and separating machine, P. A. Tafel; Book, check, C. C. Richardson; Book pad trimming machine, A. M. Safford; Book, pocket memorandum, A. F. Conant; Books, bound volume of, A. C. Fletcher; Boots or shoes, machine for fitting soles on to, W. Avery; Bottle making machine, G. A. Fullerton; Bottle receptacle and stopper, combined, F. Henkel; Bottle stopper, H. W. Libbey; Box, See Axle box. Miter box. Paper box; Box, M. Heinemann; Box fastener, C. E. Hams; Brace, See Shoulder brace; Brake, See Cornice machine brake. Wagon brake; Brick mould sanding machine, D. H. Close; Brick, paving, Buettner & Orlikowski; Bridle, J. Gray; Broom holder, J. R. & J. Ferguson; Brushes, etc., manufacture of backs and handles for, W. M. Welling; Brushes, water shield for window, I. Stiner; Buckle, J. Parker; Buckle guard, S. S. Sargeant; Buggy bed, metallic, W. L. Dearth; Buildings, construction of, I. D. Smead; Bulletin or indicator for trains, C. M. Bolton; Bungs, tool for crimping metal, E. C. Lewis; Burglar alarm, J. H. Bleo; Burglar alarms, circuit closing hinge for electric, W. M. Bleakley; Burial casket, H. M. Reese; Burner, See Hydrocarbon burner. Sawdust burner; Burnishing tool holder, S. Ross, Jr.; Butcher's implement, W. E. Mullins; Button, R. H. Lewis; Cable and steam track crossing, combined, W. J. Morden; Cable grip, E. R. Guerra; Cable grip, etc., C. J. P. Heim; Cable road, elevated, W. P. Walling; Cables, etc., lock and support for, F. M. Bennett; Calipers or dividers, T. Isaac; Calk for horseshoes, C. Preiss; Can, See Filtering can; Can, A. F. Ahlum; Candy, L. Kuhn; Candy, machine for making stick, F. G. Birchard; Car coupling, N. F. Campbell; Car coupling, R. J. Edwards; Car coupling, H. H. Emery; Car coupling, H. Nichols; Car coupling, P. S. N. Petersen; Car coupling, C. G. Wheeler; Car coupling, Diller & White; Car coupling and draught apparatus, M. Carter, Jr.; Car coupling unlatching device, S. H. Harrington; Car couplings, link lifter and link guide for, J. N. Scarborough; Car, electric motor, J. A. Brill; Car, electric railway, J. A. Brill;

Table listing inventions with names and patent numbers. Includes items like Car heater, railway, J. F. McElroy; Car motor, J. S. Connelly; Car platform gate, H. W. Rion; Car, sleeping, C. L. Arnold; Car, stock, J. M. Burton; Car ventilator, W. E. Andrew; Cars, means for switching or guiding railway, A. E. Appleyard; Cars, shotproof structure for, E. McLane; Cars, switch attachment for street railway, A. E. Appleyard; Carbonized sheet for manifolding, I. H. Rogers; Carbons, apparatus for manufacturing electric light, H. A. Tremaine; Card cloth, tool for use in clothing cylinders and conical bodies with, J. L. Weatherhead; Card grinding apparatus, W. H. Rankin; Carpet fastener, stair, W. G. Collins; Carrier, See Egg carrier; Cart, watering, P. B. Donahoo; Chair, See Railway rail chair. Reclining chair. Rocking and reclining chair. Theater chair; Chair rest, rocking, E. Muhl; Chimney, A. Gudsorf; Churn, H. C. Anderson; Churn, Cole & Kerrihard; Churn, T. C. Sonnemann; Churns, double-acting bellows for, A. Mearns; Circuit closer, H. B. Whitaker; Clamp, E. S. Drake; Clasp, See Surgical instrument clamp; Clasp, J. R. Macmillan; Cleaner, See Boiler cleaner; Closet, See Earth closet. Folding closet; Cloth piling machine, Hazard & Crain; Clothes and dish washer, combined, M. A. Wilcox; Clothes drier, J. G. Webb; Clothes line adjuster, H. F. Metzler; Clothespin bag, Dunscomb & Heffebower; Clutch, friction, G. Leverich; Coal drilling machine, M. Hardsoeg; Coal screen, H. B. Sackett; Coat adjuster, R. Lacourse; Coating metal sheets with tin, etc., automatic machine for, Rogers & Player; Coffee polisher, J. H. Brookmire; Collar fastening, horse, F. Hora; Collar sweat pad, horse, C. Mollenhoff; Combination gauge, W. F. Jones; Commode, M. C. Scherer; Compasses, binnacle for ships, J. E. Hand; Concentrator, E. Z. Kidd; Condenser, F. M. Wheeler; Condenser for furnace fumes, R. F. Nenninger; Conveyor, H. Birkholz; Corn crib, portable, Cook & Britton; Corn husker, H. G. Baker; Corn sheller, H. A. Adams; Cornice machine brake, J. White; Cotton openers, dust trunk for, H. C. Perham; Cotton press, F. L. White; Coupling, See Car coupling. Hose coupling; Crate, D. A. Ross; Cultivator and harrow, B. F. Westmoreland; Curtain ring, M. N. Plume; Cutter, See Fodder cutter. Harvester cutter. Mowing machine cutter. Paper cutter. Rotary cutter. Thrashing machine band cutter; Cutting and conveying machine, wood, W. Merrill; Cutting and folding sheets into pamphlets, machine for, W. Scott; Damper regulator, W. B. Mason; Decorticating machine for ramie, etc., L. Landreth; Dental grinding and polishing wheel, L. M. Halsey; Dental separator, J. G. Morey; Desk furniture, V. Munger; Detonator for flaxstuffs, etc., G. D. Adams; Dish washing machine, T. A. & H. W. Pudan; Display stand, traveling, H. Westphal; Drawer for furniture, G. D. Wait; Dredging, hydraulic, J. McFarlane; Dredging machine, V. B. Pless; Drier, See Clothes drier. Fruit drier. Lumber drier; Drill, See Upright drill; Drill rods, tool for, A. Ball; Drilling machine, F. H. Richards; Drying fabrics, Stiner & Darling; Drying fabrics, machine for, Stiner & Darling; Dyeing and washing machine, pneumatic, Stiner & Darling; Dynamo and motor regulator, W. T. Peel; Dynamo regulator, J. J. Wood; Earth closet, F. E. Wolf; Earthenware building material, porous, W. Lenderoth; Earthenware, manufacturing porous, W. Lenderoth; Egg carrier, Linn & Lytle; Electric engine, R. W. Thompson; Electric heater, Drew & Francis; Electric lights, safety hook for, J. Dalton; Electric machine, dynamo, J. Wenstrom; Electric motor regulation, W. Stanley, Jr.; Electrical communication, apparatus for, J. L. Cutler; Electrical machines, brush and holder for, E. W. Rice, Jr.; Electrodes for secondary batteries, making, G. E. Heyl; Elevator and hoist, A. Gross; End gate, G. J. Carpenter; Engine, See Electric engine. Rotary engine. Rotary steam engine. Steam engine; Envelope moistener and sealer, J. Maret; Excavated or other material, apparatus for discharging or throwing, F. Nouailhac-Pioch; Expansion coil, ammonia, Skinkle & Westerland; Extractor, See Stump extractor; Eyeglasses, S. B. Oydyeke; Fare collecting apparatus, R. L. Irvine; Feathers, machine for removing down from, J. M. Pickering; Feed bag support, W. Barley; Feed trough, W. S. Barker; Feed water heater, E. R. Stilwell; Feed water heater and cleaner, W. A. Taylor; Feed water heater and filter, J. B. Churchill; Feed water purifier, live steam, E. R. Stilwell; Fence, apparatus for making woven wire, W. Delain; Fence post, Robertson & Reese, Jr.; Fence post, W. H. Thomson; Fence staples, tool for pulling, H. Raymond; Fence, wire, P. Mast; Fibers, machine for treating textile or other, J. H. Lorimer; Fibrous materials, device for preventing singles in machines for preparing, etc., T. Bentley; Fifth wheel, vehicle, J. J. Black;

Table listing inventions with names and patent numbers. Includes items like File, bill, H. Johnson; Filter, W. Connolly; Filter, P. A. Maigden; Filter, faucet, F. Bardez; Filter, water, H. J. Becker; Filtering apparatus, beer, J. W. Hyatt; Filtering apparatus, beer, P. Seibel; Filtering can and receptacle, J. V. Burke; Filtration of water for city or town supplies, system of, J. A. Crocker; Fire alarm, electric, C. H. Shaffer; Firearm, F. Von und zu Zwegern; Fire escape, R. Matthaes; Fire extinguisher, automatic, J. Madden; Fireplace, L. H. Teale; Fireplace and hollow mantel therefor, F. J. Scott; Fire set stand, W. T. Mersereau; Fishing reel support, H. J. Goggin; Flue cleaning rod, T. R. Burman; Flues, means for clearing ashes from, G. H. Sellers; Fodder cutter, W. Betz; Folding closet or wardrobe, J. J. Radcliffe; Frame, See Truck frame; Friction catch, W. Lewis; Fruit drier, G. W. Thurston; Fuel, artificial, E. K. Baoyerin; Fuel feeding apparatus, pneumatic, W. E. Allington; Funnel, measuring, W. H. Grissim; Furnace, See Boiler furnace. Hot air furnace. Rotary furnace; Furnace door opener, G. F. Moors; Furniture, J. A. Schenkel; Fuse, electrical, H. Tirmann; Gauge, See Combination gauge; Gaugelock, J. I. Hales; Galvanic battery, F. Gendron; Garbage receptacle, W. H. Buckley, Jr.; Garment, infant's, C. Guidotti; Gas engines, operating, J. J. Pearson; Gas lighter, time, A. J. Hauerbach; Gas manufacturing apparatus, G. Leisner; Gas retorts, apparatus for charging inclined, L. Van Vestraut; Gasoline tank, C. A. Rice; Gate, See Car platform gate. End gate. Sliding gate. Sluiceway gate; Gate, W. T. Grant; Gate, P. O. Hirsch; Generator, See Steam generator; Glass, See Magnifying glass; Glass cutting machine, Michaels & Baeder; Glass melting pot, E. Kaye; Glassware, machine for grinding, G. A. Macbeth; Gleaner, binder, and swathing machine, combined, C. N. Owen; Governor, steam engine, C. S. Dutton; Grabs, buckets, etc., apparatus for opening and closing, J. H. Morgan; Grain binder, J. F. Seiberling; Grain binder trip mechanism, J. F. Seiberling; Grain scalper, sheller, and peeling machine, C. Franzel; Ground roller, Burr & Cummins; Guard, See Buckle guard. Mustache guard. Rein guard. Window guard; Gun mechanism, breech-loading, Daudeteau & Darmancier; Gun mount, jointed, E. W. Very; Gun, recoil self-cocking, Cash & Brace; Gun sight, D. S. West; Guns at any angle, device for laying, J. Kelly; Gutter section fastener, W. H. Hawkins; Hair curler, J. B. Bray; Handle, See Saw handle; Hanger, See Picture hanger; Harness, blanket, J. Grim; Harness pad fastening, F. C. Kimball; Harrow, N. L. Beck; Harrow, D. O. Everest; Harrow, W. V. Walker; Harrow and cultivator, J. A. Metzger; Harvester, corn, G. H. Spaulding; Harvester cutter, E. H. Smith; Harvesting knife, T. & T. J. Downs; Hat pressing and finishing machine, C. Easton; Hat support, D. M. Fuller; Hay loaders to vehicles, device for attaching, W. A. Barber; Hearing, device for assisting the, R. M. Mathes; Heater, See Car heater. Electric heater. Feed water heater. Vault heater; Heating apparatus for omnibuses, carriages, etc., F. V. Crouch; Heating by gas or liquid fuel, apparatus for, L. W. Leeds; Heddle machine, B. Saener; Heddles, apparatus for making mails for, E. Absous; Hinge, spring, H. W. Libbey; Hitching post, E. S. Reed; Hoe, wheel, S. Fuller; Hoisting and conveying machines, tub or bucket for, A. E. Brown; Holder, See Bag holder. Broom holder. Burnishing tool holder. Sash holder. Twine holder; Hoof expander, S. W. Mackey; Hook, See Snap hook; Hook, R. M. Johnson; Hop picker, Peterson & Clark; Horse clipping machine, E. A. Cochran; Horse cover, J. Dessauer; Horse detacher, J. Stoneham; Horseshoe machine, C. L. Haight; Horseshoe nails and nail blanks, manufacture of, E. Kempster; Hose coupling, L. J. Rice; Hose coupling, brake, E. A. Leland; Hose nozzle, D. H. Rice; Hot air furnace, J. H. Nevins; Hub, wheel, H. Huddleston; Hydrant, J. F. Lingemann; Hydraulic cylinder lubricator, J. H. Brookmire; Hydrocarbon burner, C. M. Collins; Ice boxes, door or window for, D. Althen; Ice tongs, C. B. McDonough, Sr.; Induction coil, A. M. Frankenberg; Ingots, electrolytic apparatus for forming copper, M. G. Farmer; Insect trap, J. Smith; Iron, See Sad iron. Vehicle iron; Irritants, apparatus for applying, W. L. Tucker; Jaw trap, G. A. Bachmann; Joint, See Pipe joint. Railway joint; Journal box keys, manufacture of, C. T. Schoen; Key, See Telegraph key; Kilt, See Tie kilt; Kitchen utensils, cover for, J. W. & J. E. Murray; Knife, See Harvesting knife. Pocket knife; Knitting machine, circular, Brinton & Denney; Knitting machine yarn guide, Brinton & Denney;