

What and why is it? A. The paper breaks what may be termed the magnetic circuit. 8. How can wood be seasoned? A. By drying. 9. Why do they use an induction coil in the telephone instead of a direct current? I should think it would be unprofitable on account of the resistance. A. To avoid the necessity for heavy lines for conductors.

(2226) A. T. O. writes: 1. I have a solid flame gas furnace. Is it a good thing to use in heating tool steel for forging and tempering? A. Yes, if the temperature is high enough. 2. What is the caustic potash and iron battery of which I have heard favorable mention lately? A. Negative element iron, positive element zinc, depolarizer oxide of copper, resting on the iron plate, exciting liquid caustic soda, or caustic potash in solution, E. M. F. 07 to 09 volt. Resistance very low, current very constant. 3. A ton of water falling 10 feet will do 20,000 foot pounds of work. Now, I maintain that if it be allowed to do its work by falling through that distance, it is immaterial whether it does it through the medium of an overshot or a turbine wheel, provided friction be left out of account, and, in the case of the overshot, that none of the water be discharged from the buckets until it reaches the lower level. Am I right? A. It is immaterial. On the whole perhaps the overshot type of wheel has given the highest efficiency, though turbines have in some instances given about as good results. A loss of from 10 to 30 per cent is to be anticipated.

(2227) L. H. asks: How many gallons of water can be evaporated with a ton of coal? Does salt water evaporate as fast as fresh, under similar conditions, and if not, explain difference? What is the best known process for evaporating water for making salt where coal is used as a fuel, and where can I get information as to the cost of same? A. The evaporation power of a ton of bituminous coal is equal to about 3,000 gallons of water in open pans, with economical firing. As saturated brine boils at 227° Fah., instead of 212° for fresh water, the evaporation effect of a ton of coal will be somewhat less for making salt. By the regenerative process of utilizing the heat of the vapor of evaporation for heating and concentrating the incoming brine, it is claimed that a much greater evaporation effect is produced per pound of coal, a possibility of nearly 15 pounds of water per pound of coal. By addressing the Secretaries of State of New York and Michigan you may obtain the reports on the salt industry of these States.

(2228) W. D. M. asks: 1. What is the E. M. F. of Fuller's battery? A. About 2 volts. 2. How long will 10 or 12 Fullers run, using them about four to six hours a day? A. It depends on the amount of work done. Probably 4 or 5 days. 3. How many 2 quart Bunsen battery cells will it take to run the simple electric motor, and how many days will they run the motor at six hours a day? A. It will take 12 cells, connected 6 in parallel and 2 in series. 4. Will wrought iron do to wind the field magnet on? A. Yes. 5. Can I use wrought iron for the core of the armature? A. It is not as good as the wire. 6. Can I use insulated iron wire No. 19 to wind the core of the armature? A. Yes. 7. What number of wire should be used for the winding of armature and field magnet? A. No. 18. 8. How many revolutions will it make a minute? A. About 2,500. 9. What fraction of a horse power is it? A. One-eighth to one-tenth.

(2229) J. B. P. asks: Why does a tree grow round and not square or any other shape? A. There is nothing in nature on the square, except the forms of some crystalline minerals. A circle is the shortest way around, and as trees grow from a common center, a circle becomes a natural sequence in their outward form.

(2230) E. H. asks: Is there any agent known which will restore the ductility of sheet iron, which has been annealed, otherwise than rolling? A. Rolling or hammering is the only way of hardening zinc. Its toughness cannot be restored except by rolling at the proper temperature.

(2231) O. P. asks for a rule to find the horse power to hoist a given load from a coal shaft in a given time. Say 2,500 pounds 400 feet in one minute. A. Multiply the load in pounds by the height in feet per minute and divide the product by 33,000. Thus: 2500x400=1,000,000=30 horse power, to which must be added the friction of engine and hoisting gear.

(2232) G. W. T. asks: What is the difference in amount of yearly evaporation between one acre of grass land, one acre of plowed land, and one acre of water? A. The difference between the amount of evaporation on water, plowed land, and grass is very uncertain, depending upon the supply of water in the soil, a dry soil evaporating much less than a wet soil under plowed ground. On the average, evaporation on water is greatest, amounting to about 0.08 of a pound per square foot per hour at a temperature of 50° in a light breeze. Plowed ground less, and grass more or less, according to condition of soil beneath. The river basins of the northeastern part of the United States and Western Europe evaporate about one-half the total rainfall, while the great basins of the Amazon and the Mississippi evaporate four-fifths of the total rainfall. The entire Nile basin evaporates about 96 per cent of the total rainfall. The evaporation from the whole land surface of the world gives an average of about 75 per cent of the total rainfall upon the land.

(2233) W. E. F.—The bird is the Bohemian waxwing (Ampelis garrulus L.) Habitat North America, U. S. "Casually in winter, but sometimes appearing in immense roving flocks south, sometimes to 35°" (Cones); also "Northernly hemisphere, northerly, wandering south in vast troops at irregular periods. In America, south, regularly in winter to the northern tier of States, in the Rocky Mountains much further, casually to about 35°. Rare on the Pacific coast except in Alaska. Breeds in high latitudes, but down to the United States border in the Rocky Mountains nests in trees or bushes in the crotch of a bough or saddle on a lumb" (Cones). Eggs larger than those of the cedar waxwing. Your other queries will be answered later.

(2234) C. H. V. asks: What will make linen paper soft and limber, other than by immersion in weak sulphuric acid bath? A. Boiling water tends to produce the desired effect; caustic alkali in solution or a strong solution of chloride of zinc may be tried. It is not easy to suggest anything that will effect the purpose without injury to the fiber.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted May 6, 1890, AND EACH BEARING THAT DATE.

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

Table listing inventions with names and dates. Includes: Adjustable table, R. S. Carr; Alarm lock, P. Francis; Amalgamator, E. D. Roth; Ammonia engine, aqua, J. H. Campbell; Ammonia engines, apparatus for securing the absorption of exhaust ammonia gas from, C. H. Campbell; Anchor attachment, H. L. Meule; Anti-friction wheel, C. G. Deming; Awning, T. W. & B. T. Wood; Ax, wood chopping, O. King; Axle journal box, car, W. O. Dunbar; Axle, self-lubricating, T. J. Weaver; Axle, vehicle, L. M. Daddridge; Baby walker, A. Resenthal; Bag, See Traveling bag; Ball seater and capper, combined, J. W. Carver; Band cutter and feeder, M. Ryman; Bandtie, J. R. McLaren, Jr.; Barber's appliance, A. C. Osborne; Barrel machine, H. J. Gilbert; Barrel making machine, C. W. O. Erichsen; Barrels, making, H. J. Gilbert; Basins, sewer gas excluder for wash, F. B. Herbert; Bath, See Electroplating bath; Bathing apparatus, Swank & Cesner; Batteries, device for unloading, recharging, and recharging electric car, J. C. Chamberlain; Bed bottom and brace, adjustable, P. G. Gesford, Jr.; Beds, automatic leg for folding, F. Bennett; Belt, electro-galvanic, A. Dew; Belt shifting and brake apparatus, combined, J. Thomson; Belts, girths, etc., tool for tightening, J. Eagan; Bench, See Work bench; Binder, temporary, D. Moynahan; Blacksmith's tongs, J. T. Spencer; Block, See Fuse block; Beard, See Bulletin board. Multiple switch board; Boiler, See Steam boiler; Bolt heading device, E. Hubner; Bolt trimming machine, F. Mutimer; Bolting reel, R. A. Stubbs; Bolt and manifold blaster, combined account, F. R. Miller; Bookbinding machine, A. Malm; Bookbinder's and printer's dry pressing, sheet tying, smashing, and tableting machine, J. W. Jones; Book cutting machine, E. Girtanner; Boring machine, C. H. Irwin et al.; Bottle corking machine, E. Ermold; Box, See Cigar or tobacco box. Letter box. Brace. See Rail brace; Bracket, See Fence bracket. Shelf bracket; Brake, See Car brake. Wagon brake; Brake hose, electric connector for, Wamsley & McIntosh; Bridge, penton, S. N. Stewart; Broiler and baker, combined, G. Milner; Brush, fountain, W. H. Heinz; Bulletin board, baseball, Grozier & Anderson; Burial casket, B. H. Bennett; Burial casket, J. D. Ripson; Burner, See Gas burner; Burner, T. Wall; Button, S. C. Howard; Button fastener, F. A. Smith, Jr.; Buttonhole cutter, E. J. Toof; Cabinet for duplicating apparatus or slabs, M. A. Levy; Cable grip carrier sleeve, J. Stephenson; Camera back piece, J. F. Hein; Can, Clark & Folsom; Can capping machine, S. Lake; Car brake, railway, Headley & Bemis; Car coupling, Bacon & Sellers; Car coupling, I. Bradford; Car coupling, M. M. Green; Car coupling, E. Scott; Car coupling, Westbrook & Cook; Car door, T. G. Ruffhead; Car door brackets, catch for, F. E. Canda; Car door fastener, H. E. Heke; Car, dumping, Chevalier & Buette; Car seat, street, H. W. Libbey; Car, stock, G. D. Burton; Car, stock, J. H. Kimball; Car wheel, balanced, P. H. Griffin; Carburetor, J. J. Cooper; Carburetor, W. H. Shannon; Carburetor, J. S. Tibbets; Card cutting machine, M. Meriam; Carriage spring, W. T. Foster; Carrier, See Cash carrier. Trace carrier; Cart, read, C. L. Barrett; Carts, spring back for road, J. H. Hough; Cartridge indenter, W. S. Tobie; Cash carrier, A. A. Callie; Cash register and indicator, H. T. Jones; Catches, making garment or fabric holding, G. H. Phelps

Table listing inventions with names and dates. Includes: Cement, establishing units of measure in, pounding Portland, Trump & Peck; Cement tubes, machine for making, D. Zissler; Centrifugal liquid separator, H. F. Beiming; Chair, desk, and table, combined, O. Fritz; Chair, seat, reversible, J. B. Popenhagen; Chill for car wheels, P. Connolly; Chlorine, obtaining, R. Dörmer; Chopper, See Cotton chopper; Churn, J. M. Curtice; Churn, J. H. Rebok et al.; Churn, P. A. Schuch; Churn closure, H. Brekaw; Cigar or tobacco box, S. E. Warren; Cigarette, F. S. Kinney; Clamp, See Furniture clamp. Hose clamp; Clamp, W. Carrell; Cleaner, See Flue cleaner. Window cleaner; Clip, See Spring clip; Clod fender, S. B. Davis; Clock winding mechanism, A. Bannatyne; Clock winding mechanism, automatic, O. Urban; Cloth, etc., steam box for dampening, D. Gessner; Clothes rack, ironing table, and clothes drier, combined, J. S. Cole; Clutch, Moore & White; Clutch, friction, J. D. Ehrmann; Clutch, friction, A. W. Jones; Coal and other minerals, separating and cleansing, Lührig & Cuninghame; Coal chute, R. A. McCauley; Coal screen, Simpson & Stockett; Coal separator, W. H. Sexton; Coffin, S. & C. A. Bledget; Coke ovens, portable bottom for, Evans & Adams; Colters to plow beams, device for attaching, G. Moore; Combustion, means for assuring perfect, J. Livingston; Commutator for electric motors, A. A. Ingraham; Condenser, automatic, L. Schutte; Cork puller, automatic, E. B. Middlekauff; Corn shocker, H. Levarn; Corset fastening, T. J. Brough; Cosmetic, J. B. Strong; Cotton chopper, scraper, and cultivator, D. D. Ellis; Coupling, See Car coupling. Hose coupling. Pipe coupling; Crane, S. Fetter; Crusher, See Ore crusher; Cuff holder, A. Goulding; Cultivator, C. Albersen; Cultivator, F. C. Field; Cultivator, spring teeth, J. H. Fountain; Cultivator, steam, C. R. Sack; Cup, See Oil cup; Cut-off for rain water spouts, S. T. Suddick; Cutter, See Band cutter. Buttonhole cutter. Vegetable cutter; Damper regulator, C. G. Jewett; Damper regulator, T. J. Kieley; Dental elevator, D. Siddall; Dental matrix, W. H. Marshall; Dental plugger, electric, W. E. Gibbs; Ditching machine, grader, and loader, combined, W. H. Sanford; Dock, dry, O. Von Nerta; Door, fireproof, J. W. Rapp; Door guard, trap, J. Kearney; Door lock, J. F. Thompson; Door opener, A. Hotaling; Draught attachment, plow, G. Richter; Drawer and sales recorder, cash, D. J. Johnston; Drawer equalizer, J. H. Knaus; Drawer, furniture, J. H. Knaus; Dredge, W. S. Fickett; Dress form, J. R. Hepert; Drier, E. R. Shaw; Dynamo regulator, W. H. Elkins; Earrings, ear wire for, E. A. Lehmann; Electric conductor support and protector, E. M. Boynton; Electric conductors, introducing compositions into, D. Brooks, Jr.; Electric current regulator, E. P. Warner; Electric lines, apparatus for testing, B. E. Waters; Electric loop switch, C. E. Scribner; Electric machine, dynamo, D. B. Brace; Electric machine, magneto, C. E. Scribner; Electric machines, iron core for dynamo, M. De-prez; Electric meter alternating current, G. Westinghouse, Jr.; Electric meter, L. Duncan; Electric switch, O. S. Platt; Electric switch, Platt & Orford; Electrical collecting device, G. Forbes; Electrical conduit, G. Sprague; Electroplating bath for copper, W. B. Hollingshead; Elevator, See Dental elevator; Elevator, T. P. Ford; Engine, See Ammonia engine. Steam engine. Steam or other engine. Vapor and ammonia engine; Engine reversing lever, steam, C. Phillips; Envelope fastener, reversible, O. A. De Long; Eyejetting machine, F. W. Merrick; Fabric, See Roofing fabric; Fan, J. M. Curtice; Fan, ventilating, Smith & Caldwell; Faucet, G. C. Sawyer; Feed rack, J. X. Mills; Feed water heater, F. L. McGahan; Fence bracket, Kramer & Gee; Fence, straight portable, J. W. Viges; Fender, See Clod fender; Fibrous materials, transmitter for, G. Beekman; Filtering apparatus, W. M. Jewell; Fire extinguisher, automatic, J. Hill; Fishing rod, E. W. Edwards; Flood or water gate, C. M. Hunt; Flower or plant holder, M. H. Christie; Flower pot machine, C. McDonagh; Flue cleaner, boiler, J. C. Bauer; Fodder fork, C. L. Rudiger; Forging machine, link, P. Byrne; Forgings by electricity, method of and apparatus for making rolled, G. D. Burton; Forgings, machine for making rolled, Simonds & Grant; Fork, See Fodder fork; Frame, See Vault light frame; Fruit gatherer, H. D. Reeves; Furnace, See Hydrocarbon furnace; Furnace grate bar, boiler, J. Livingstone; Furniture clamp, J. Benedict; Fuse block, ceiling, E. E. Erickson; Gauge, J. A. Campbell; Game or puzzle, W. E. Geff; Gangway and ship's ladder, passenger, C. Thomson

Table listing inventions with names and dates. Includes: Gas burner, E. F. Trent; Gas burner, natural, C. H. Carpenter; Gas jets, attachment for increasing the illuminating power of, V. E. Cohen; Gases from coke ovens, apparatus for utilizing waste, C. C. Wylie; Gate, See Flood or water gate. Railway gate. Railway crossing gate. Swinging gate; Gate, W. A. Scott; Gate hanger, Peak & Casaday; Gear wheel, C. H. Morgan; Generator, See Steam generator; Glove adjuster, M. E. Towse; Gramophone, W. Suis; Grinding machine, A. B. Landis; Grinding pearl, ivory, etc., machine for, J. H. Lawles; Guard, See Door guard; Gun barrel, spring air, C. J. Hamilton; Gun, machine, J. L. Murphy; Gun, quick firing, Holmstrom & Nordenfeldt; Hame fastening, J. E. Bull; Hammock stand, portable curtained, A. J. Weston; Handle, See Tool handle; Hanger, See Gate hanger; Harrow, H. H. Frazier; Harrow, W. S. McCord; Harrow, W. T. Sterling; Harvester, corn, G. F. S. Zimmermann; Harvester, cotton, G. Beekman; Harvester, grain, R. H. Sheldon, Jr.; Hat forming and pressing machine, T. J. Pearson; Haversack, W. F. Arnold; Head and back rest, C. Gurney; Heater, See Feed water heater; Heel building machine, J. E. Brown; Heel plate, F. H. Richards; Holder, See Cuff holder. Flower or plant holder. Match box holder. Paper holder. Plate holder. Sponge holder. Stub holder. Tool holder; Hominny flakes or corn flakes, manufacturing, J. A. Currie; Hood, M. Frey; Hook or shackle, R. M. Ruck; Horses' hoofs, tool for trimming, A. M. Roberts; Horseshoe, J. Murphy; Hose clamp, D. F. Teomey; Hose coupling, C. Eckhard; Hose reel attachment, J. H. Luther; Hydrocarbon furnace, Rogers & Wharry; Indicator, See Steam engine indicator; Inhaler, R. Macdonald; Inhaler and respirator, J. O. Woods; Inhaling apparatus, R. Macdonald; Inkstand, G. A. Fifield; Insect trap for furniture, P. J. & W. Baumüller; Insulating compound, heat, N. C. Fowler; Insulator, J. F. Buzby; Iron, See Sad iron; Ironing machine, J. J. Daley; Ironing machine, R. H. Dunsbury; Jack, See Wagon jack; Jigging sieve, hydraulic, O. Bilharz; Joint, See Railway joint. Railway rail joint; Klin, See Tile or brick klin; Knitting machine latch needle, O. Treat; Knitting mechanism, circular, Davidson & Dixon; Knob attachment, I. J. Gray; Lamp, W. W. Willits; Lamp, Argand, C. S. Upton; Lamp attachment, arc, A. P. Seymour; Lamp key socket or switch, incandescent electric, Holmes & Gale; Land roller and pulverizer, J. W. Eardly; Lantern, W. J. Quinn; Lathe, W. F. Barnes; Lathe, coil pipe turning and boring, J. T. Bright; Lathes, tool carriage for, W. F. Barnes; Lawn edge trimmer, H. H. Dille; Lead and base bullion from slags, mattes, and speiss, apparatus for separating, W. B. Devoreux; Leather cutting tool, H. Comstock; Leather scouring machine, F. Menk; Letter box, S. A. Darrach; Liquid agitator, C. J. Hauck, Jr.; Lock, See Alarm lock. Door lock. Mortise lock. Nut lock. Safe or vault lock; Lock trimming, G. R. Johnson; Locks, combination finder for, M. Jackson; Locking attachment, electric, H. J. Meyers; Loom, H. B. Morris; Loom take-up mechanism, J. Riddiough; Marble, polishing, Fowler & Ott; Match box holder, E. C. Bachert; Measuring device, distance, H. Emken; Meat casings, machine for reversing, E. Cheriére; Mechanical movement, W. K. Bell; Mechanical movement, W. E. Brock; Mechanical movement, J. Thomson; Medicine spoon, C. Danielewsky; Metal rods, rolls for reducing and straightening, W. Allerdice; Meter, See Electric meter. Water meter; Mill, See Rolling mill. Sawmill; Minnow trap, J. S. Cochenour; Mould board, J. O. Moses; Mortise lock, O. R. Cooke; Motion, apparatus for transmitting and converting, E. Wright; Motion, mechanism for transmitting relative, Smith & Caldwell; Motor, See Electric motor; Mower, H. Lindstrom; Mower attachment, center cut, G. W. Sturm; Multiple switch board apparatus, J. J. Carty; Multiple switch board, divided, J. J. Carty; Multiple switch board test circuit, C. E. Scribner; Multiple switch board testing apparatus, C. E. Scribner; Music boxes, feed mechanism for, E. Malke; Nail, See Picture nail; Nut lock, J. A. Bryan; Nut lock, W. McQuiston; Oil cup, J. S. Hall; Oil, extracting, W. T. Forbes; Ordinance, gas check for, H. Schneider; Orc crusher, E. D. Roth; Ores, jigger for treating, O. Bilharz; Ores, percussion frame with revolving belt for the treatment of, O. Bilharz; Organ, reed, F. Pritchard; Organs, pneumatic action for, V. Willis; Packing, piston rod, F. A. Carlson; Padlock, registering, R. G. Ward; Paint, hydrocarbon device for burning off, J. P. Hayes; Paper bag machines, delivery mechanism for, J. Arkell; Paper fixture, toilet, J. T. & W. J. Donovan

