

## RECENTLY PATENTED INVENTIONS.

## Electrical.

**DYNAMO ELECTRIC MACHINE.**—Charles P. Scheuritzel and John L. Hess, Brooklyn, N. Y. According to this invention, the armature is formed of coils of equal length made separately and applied to the armature to overlap each other and form a regular series around the armature core, there being a novel arrangement of commutator brushes, whereby the current may be given from the coils singly in succession or from two or more coils in parallel, and the generator and motor being operated upon an open or closed circuit plan.

## Mechanical.

**CAN MAKING MACHINE.**—Mathias Jensen, Astoria, Oregon. This invention covers improvements on formerly patented machinery for similar purposes by the same inventor, to increase capacity and insure certainty in capping and crimping cans after they are filled, without spilling the contents, the invention covering various novel features and combinations of parts.

**HORSESHOE HAMMER.**—George T. Peters, Butte City, Montana. The face of this hammer has two sides extending at an obtuse angle and both having a roughened surface, the apex of the face being flattened and left blank, making a hammer specially adapted for quickly and conveniently sharpening calks and toes for horseshoes, and fitted for use from either side of the anvil.

**TOOL FOR POINTING MASONRY.**—Jesse A. Blanchard, Duluth, Minn. This tool has two opposed plates loosely connected, between one edge of which the wedge-shaped member of a handle is adapted to enter, a heart being inserted at the opposite edge, making a tool especially adapted for masons' and bricklayers' use, and which may be employed to face the mortar between the courses as desired.

**BOOK-LETTERING MACHINE.**—George H. Reynolds, New York City. Mounted on the frame is a vertically reciprocating head block, with a central slot and front and rear guide ribs, pallet-carrying loops engaging the ribs, and other novel features, forming a machine designed to facilitate book finishers' work.

## Agricultural.

**SEED DROPPER.**—Albert J. Helvern and William B. Schwalm, Walton, Ind. Combined with the seed drop bar, lever, and actuating mechanism, is an endless chain belt, an adjustable weight connected with the lever, friction rollers carried by the belt engaging the weight, making an attachment for planters with which is connected a marking device to effectually check the rows.

**SAFETY CLEVIS.**—James F. Forrest, Poynette, Wis. This device has two members, of which one is pivotally connected by an ordinary clevis with the end of the plow beam, and the other to the whiffletree to which the team is hitched, forming a simple and durable device by which the team will be detached from the plow when the latter strikes a rock, root, or other obstruction.

## Miscellaneous.

**CLOTHES LINE PROP.**—William B. Adams, Greenfield, Ohio. This is an extensible prop stick for the support of stretched and filled clothes lines, whereby the line may be held at the desired elevation, while the stick may be closed together to reduce its height, affording a light and compact device.

**VENT BOX.**—Walter E. Warner, Brooklyn, N. Y. This box has ventilating surfaces, a bottom outlet, an aperture in one side surrounded by a coupling, and means for attaching the body to a support, being designed for use in connection with the plumbing system of buildings, the boxes discharging any foreign matter entering and providing at all times for a perfect circulation of air.

**BEDSTEAD ATTACHMENT.**—James B. Hill and William D. Gohn, Zilwaukee, Mich. This is an outrigger device consisting of a mattress frame having at one end a hook adapted to drop over and grasp the top edge of the bed rail, with a hinge connection at the other end to permit the mattress frame to be swung around and folded behind the head board, the device being designed to take the place of a cradle or crib for accommodating a baby at the side of the bed.

**CAMERA STOP.**—Lyman G. Bigelow, Chattanooga, Tenn. By this invention the stop or diaphragm for a photographic camera is made with a central opening surrounded by an annular network, or a translucent or transparent film, tinted or lined or stippled, to cut off only a portion of the marginal rays, the light passing freely through the center, the design being to soften the image while retaining its clearness of definition.

**PALATE PLATES.**—Ludwig Pritzius, Ludwigshafen-on-the-Rhine, Germany. This invention relates to the making of caoutchouc plates for artificial teeth, and provides an apparatus by means of which the plates may be accurately moulded and rendered hard and dense, the apparatus being free from danger of explosion during the manufacture.

**DIE FOR MAKING JEWELRY.**—Henry B. Veit, New York City. A longitudinally channeled steel stock is provided, adapted to receive a series of independently engraved or embossed dies, to form different combinations, clamping plates and screw bolts being secured to the ends of the die stock to hold the dies in place, the composite die being as efficient as a solid die, and accomplishing a saving of expense in a factory manufacturing jewelry.

**CANNON PINION FOR WATCHES.**—Frank P. Allen, Fort Gaines, Ga. This invention provides means for adjusting the cannon pinion to the arbor of the center wheel with a constant frictional contact, a concave spring being interposed between a shoulder on the arbor and the inner end of the cannon

pinion, while a concentric countersunk screw holds down the pinion on the arbor and compresses the screw.

**SEWING MACHINE.**—Clarence Harman, Omaha, Neb. This invention covers improvements in the shuttle-carrying mechanism, the stop motion, and the feed mechanism and regulator, designed to make a simple, strong and inexpensive machine which will be as efficient in operation as more complicated machines.

**FIRE ESCAPE.**—George W. Bowman, Red Cliff, Col. This escape is made in the form of an easy chair, so constructed that in its descent a guy tape or rope will be so wound as to return the chair from the ground to the elevation it had descended from, a simple form of brake being provided whereby the occupant of the chair may regulate the rapidity of its descent.

**SASH BALANCE.**—William Cashner, Pleasant Hill, Mo. By this invention the upper and lower sashes are supported by suspension cords secured to pulleys actuated by springs contained in them, the pulleys being on a shaft journaled in bearings in uprights to turn in either direction, and both the springs being called into play by the lowering of either sash.

**BELL CORD ATTACHMENT.**—George A. La Fever, Selkirk, N. Y. In connection with a clamping device for holding the cord is held a knife or chisel and operating mechanism to cut the cord, the device being designed for attachment to railway cars, to cut the bell cord when the cars separate accidentally.

**SPRING HINGE.**—Herman A. J. Rieckert, New York City. The hinge casing has one closed end in which is a helical spring against which rests a sliding ring having a cam-shaped opposite face and means to prevent its rotation, a pivot or pintle entering the open end of the casing and having the face of its inner extremity shaped to correspond with the cam face of the ring, the hinge being adapted to support heavy doors and render them self-closing.

**BOLT.**—Frank W. Wallace, Utica, Miss. This invention relates to double bolts arranged at the top and bottom for half doors which meet in the middle, divided window shutters, etc., and provides for simultaneously operating or drawing such bolts, instead of pulling on a hanging chain for the upper bolt and drawing the lower one by hand, etc.

**LAWN SPRINKLER.**—Robert Franken, Pomona, Cal. This is a sprinkler in which the force of the water automatically revolves the discharge pipe to distribute a fine spray of water around, the stand pipe having an air chamber thereon, and a joint sleeve extending throughout the length of the guide tube, with other novel features, whereby the head joint is made water-tight, and any leakage is avoided.

**POULTRY DRINKING FOUNTAIN.**—Glenn C. Burrell and Edwin H. Roblee, Canisteo, N. Y. This fountain has a reservoir and trough fitted in a heater receptacle, whereby the water supplied is heated while in both the reservoir and trough, and the water will be kept in a clean and wholesome condition and furnished in sufficient quantities for the poultry.

**COMBINED BED AND LOUNGE.**—Henry Burgess, Chicago, Ill. Combined with the frame is a folding back adapted to be let down into the frame into a horizontal position to complete the bed, the article having the ordinary appearance of a lounge, and being capable of use as a lounge and as a receptacle for bed clothing.

**HAT OR BONNET BOX.**—Andrew C. Mack, Portland, Oregon. This box is made of triangular shape in cross section, of card board or other suitable material, and preferably foldable, the construction being specially designed for the packing of millinery, hats or bonnets for shipment, so that the hat will be held stationary and the trimming cannot be crushed.

**WAIST AND SKIRT.**—Camille Caen, New York City. This is a combination garment so made that all the under garments may be attached to a single waist, to which the skirts and other underwear are so connected that their weight is sustained mainly by the hips, leaving the waist and adjacent parts of the body untrammelled.

**SHIRT AND SUSPENDERS.**—Herman Peiter, Norwalk, Conn. According to this invention, two endless bands are secured to the shoulder portions of the shirt around the armholes, on the interior, and pendant suspender pieces are extended through slits in the shirt to the rights of the endless bands, there being adjustable button straps on the suspender pieces.

**PAINT.**—John H. Baker, Chicago, Ill. This paint is composed of linseed oil, white lead, water, plaster of Paris, a drier, and other ingredients, in specified proportions, designed to make a paint that will be thoroughly water and weather proof, and will not crack, blister, or become sticky with exposure to the sun or weather, while also being a non-conductor and not affected by frost.

**NOTE.**—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

## NEW BOOKS AND PUBLICATIONS.

**THE CHEMISTRY OF IRON AND STEEL MAKING AND OF THEIR PRACTICAL USES.** By W. Mattieu Williams, F.C.S., F.R.A.S. London: Chatto & Windus. 1890. Pp. ix, 420. Price, \$3.00.

The well known author of this book, having been formerly chemist in the works of Sir John Brown & Co., of Sheffield, may be considered as speaking *ex cathedra* in treating of iron and steel. The subject is one of never-ceasing interest to the modern scientific reader, and Mr. Williams' distribution of material exhibits peculiarly good judgment. Starting with the ores of iron, their reduction and dissociation, the blast furnace, puddling, manipulation, and physico-chemical changes of iron and steel are treated. Impurities and their effect, the Bessemer process, and a theory of steel are suggestive titles. Under fluxing, the author gives

his theory of soldering, to which, however, full adherence can hardly be given. It is exceedingly doubtful if resin used as a flux in soldering reduces the oxide of tin, as the heat is so low. This is the theory proposed by the author. In treating of sal-ammoniac as a flux he curiously omits the analogous effect produced at ordinary temperatures on mercury by an aqueous solution of mercuric chloride. Any one who has worked with the blowpipe will also be inclined to doubt his theory of the volatilization of borax carrying with it a dissolved oxide in the brazing process.

**THE CENTURY DICTIONARY.** Vol. 4. M to P, inclusive. Pp. 1323, 1,500 illustrations. The Century Company, New York.

The fourth volume of this monument of American scholarship does as much as its predecessors to establish the character of the book. It is really of dual character. It is in the first place a dictionary. As an instance of this the editors cite the word *put*, which is treated etymologically and lexicographically in seven columns, including 17 definitions and 149 special phrases. But to keep abreast of the times a quantity of special words, trade and scientific terms, had to be given. These in many cases are illustrated with cuts in the text. From these the work acquires an encyclopedic cast. Thus its possessor will have at once a dictionary of about 225,000 words and an encyclopedia. Our space, it is evident, is quite insufficient for a review of this really magnificent work. We trust in the future to notice the successive volumes, of which two are yet to come.

## SCIENTIFIC AMERICAN BUILDING EDITION.

JANUARY NUMBER.—(No. 63.)

## TABLE OF CONTENTS.

1. Handsome colored plate of an elegant residence on Riverside Avenue, New York City. Cost \$60,000 complete. Floor plans, two perspective elevations, etc. Mr. Frank Freeman, New York, architect.
2. Plate in colors showing an attractive cottage at Maplewood, Chicago. Estimated cost \$3,000. Perspective view and two floor plans.
3. A cottage at Rutherford, N. J., erected at a cost of \$6,000 complete. Perspective elevation, floor plans, etc.
4. An elegant residence at Chestnut Hill, Pa., recently erected for Mr. Alfred C. Rex. Cost \$30,000 complete. Floor plans, perspective elevation, etc.
5. Sketch and floor plans of a residence at Stockton, Cal. Estimated cost \$10,000.
6. Cottage at Englewood, Chicago. Perspective view and floor plans. Cost \$4,200.
7. Residence on Powelton Avenue, Philadelphia, Pa. Cost \$30,000 complete. Architect Thos. P. Lonsdale, Philadelphia. Floor plans, perspective elevation, etc.
8. A cottage at Jackson Park, Chicago. Estimated cost \$4,000. Floor plans, perspective elevation, etc.
9. Cottage on Munroe Avenue, Chicago. Two floor plans and perspective view. Cost \$900.
10. Residence at Wayne, Pa., from plans prepared by W. L. Price, architect, Philadelphia. Cost \$7,000 complete. Floor plans, perspective view, etc.
11. An attractive country church of moderate size recently erected at Glen Ridge, N. J. Estimated cost about \$15,000. Perspective view and floor plan.
12. Cottage at Lakeview, Chicago. Floor plans and perspective view. Cost \$3,000.
13. A stable combining both beauty and convenience, erected for Mr. A. C. Rex, at Chestnut Hill, Pa. Cost \$1,800. Plans and perspective.
14. A cottage at Auston, Chicago, Ill. Cost \$4,300. Two floor plans and photographic view.
15. Sketches of park entrance lodges.
16. Engraving of the Woman's Temperance Temple, Chicago, Ill., as it will appear when finished. Estimated cost of the Temple \$1,100,000.
17. View of Whitworth Memorial Hospital.
18. Miscellaneous contents: The marble industry.—Lighting streets of London.—Mahogany ties and marble bridges.—Staining floors.—The Peruvian temple of Pachacamac.—How to catch contracts.—Black birch.—Some of the merits.—Improve your property.—The Scientific American a help to builders.—An improved article for plastering, tiling, and cement work, illustrated.—The Sinclair double rocker, illustrated.—An improved veneer press, illustrated.—Our last year's volume.—The Albany Venetian blinds, illustrated.—A convenience for hospitals, families, etc., illustrated.—The education of customers.—The Buffalo hot blast heating system, illustrated.—The "Willer" sliding blinds, illustrated.—Mueller's water pressure regulator.—Artistic wall decorations.

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## Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

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Wanted—Position as assistant to superintendent of manufacturing concern in or near New York, by young engineer (24) experienced as draughtsman on mechanical, architectural and topographical work, also accustomed to use of field instruments, transit, level, etc. Several years' experience in factory. Can give reference. Address "Engineer," 35 Wall St., N. Y., 8th floor, room 25.

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

## Notes &amp; Queries

## 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. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(2672) Optician writes: 1. It happens quite often in my business that I receive rubber eye-glass frames as well as zylonite eye-glass frames, broken, for repair. I do not know of any method by which such broken frames could be successfully rejoined without the use of wires, etc., and you would greatly oblige me by explaining to me the method required to accomplish it. A. You cannot satisfactorily mend these articles. A special cement is sold for zylonite, but there is little chance of your securing a good joint without riveting. 2. I would also like to know if there is a fluid or chemical compound that will make old steel frames for eye-glasses blue again, or if there is any way to blue any steel frame outside of the heating process. A. After polishing, lacquer with shellac and alcohol colored with aniline or Prussian blue. 3. How to polish or rather repolish the brass parts of a telescope or microscope if they are shop work, so as to look like new again, possessing that goldish, fine appearance? A. For polishing use putz pomade, followed by the finest rouge. The lacquered parts must be coated while warm. The smallest trace of oil will injure the work. 4. How is the gold finish put on opera glasses? A. By electroplating. 5. How can I figure out the power of a telescope, microscope, or field glass? A. As a practical test for small telescopes, etc., look at a brick wall with one eye looking through the glass and the other looking directly at the wall. Count the divisions between the bricks as seen through the glass corresponding to a single brick as seen directly. This gives the magnifying power. For a microscope the following is a practical rule: A stage micrometer is placed in the field, and the instrument is focused on it; with a camera lucida a convenient number of divisions of the micrometer is drawn upon a piece of paper. The divisions are measured and their relation to the true size of the scale gives the magnifying power in diameters. A camera lucida can be improvised from a cover glass fixed at an angle of 45 degrees to the eye piece by a lump of bees-wax.

(2673) W. G. M. asks: 1. What is the cheapest known freezing mixture and how is it used? A. 1 part salt and 2 parts ice, or 1 part nitrate of ammonia and 2 parts water. The latter can be used and then the salt can be recovered by evaporation. 2. What is the least expensive to liquefy sulphurous acid, after it has been converted into a gas? A. Pressure. 3. About what will be the cost per year of operating an electric light plant of eight incandescent lights, the lights to burn about ten hours per day, and not considering the cost of power? A. Four lamps will represent 80 lamp hours per day or 29,800 lamp hours per year, representing

about \$25 consumption of lamps alone. Attendance, oil and general maintenance cannot possibly be estimated without full knowledge of the case. It would require a comparatively small portion of a man's time. 4. Where is the Herreschoff marine coil boiler made? A. The Herreschoff Manufacturing Company, Bristol, R. I.

(2674) G. C. W. asks (1) for formula for arsenic complexion wafers. A. Arsenic should only be taken internally under advice of a physician. 2. Recommend books for the beginner at pattern making. A. We recommend "The Pattern Maker's Assistant," by Joshua Rose, price \$2.50, which we can supply. 3. Give number of SCIENTIFIC AMERICAN or SCIENTIFIC AMERICAN SUPPLEMENT that gave directions for laying out and making a photographic camera bellows out of paper. A. We refer you to SUPPLEMENT, No. 625.

(2675) W. E. D. writes: On examination of a burned-out Edison incandescent electric lamp (16 candle power), I noticed around the inside of the neck of the globe a very thin deposition of what appears by reflected light to be copper. But on looking through it as it is translucent, the substance is of a beautiful chlorine green. Will you please tell me whether it is copper or not? Why does it appear green by transmitted light? What probably caused the deposit on the inside of the vacuum globe? I have observed but two or three instances of such a thing, and am much puzzled at the phenomenon. The deposit always takes place in a burned-out globe. A. The phenomenon you describe has often been observed. It is due to the deposition of an exceedingly thin film of metallic copper, which, like gold, is green by transmitted light. The green is complementary to the red color shown by reflected light.

(2676) J. H. B. asks how large copper pipes are brazed and bent, say 4 inches to 6 inches diameter, and whether flanges to be attached to such pipes by brazing require a special mixture or will any ordinary brass answer? A. The seams are filed off so as to come accurately together. They may be lapped or butted. In the latter case the metal may be cut into teeth, so as to constitute a species of dovetailing. Spelter, an alloy of zinc and copper, is used in powder or in sheet as the brazing material. As flux, borax which has been heated to expel almost all the combined water and has then been powdered, is used. The borax and spelter are placed on the line of the joint, and heat from a blow pipe, blast lamp, hearth, or oven is applied. As the borax melts it runs into the joint by capillary action and is followed soon after by the melting spelter. The pipe must be held absolutely stationary as regards the joint, and as needed, more borax or spelter may be supplied during the process. More will be learned from seeing it done than from any description. The bending is done by rolls and by hammering. Special brass is sold for the brazing. The same answers for joints and flanges.

(2677) R. A. asks: How many feet of illuminating gas will a gallon of 88° gasoline make in a carburetor where the air is passed through the gasoline in small jets under pressure? Are there any works published in which full data is given, about gas made from hydrocarbon oils? A. Reliable data on the above matters are wanting. The custom is not to meter the gas thus made, and hence the difficulty of getting accurate data. As regards true gas made from naphtha, it is treated of in works on gas making. It is used as an addition to water gas, in quantities produced by from 3 to 6 gallons of naphtha per thousand cubic feet of finished gas.

(2678) W. C. Van N. writes: On page 400, of vol. lviii., there was a description of a new style of pad for hektographic work. In trying to use it I made a failure. At least the work was not satisfactory to me. Can you tell me whether it has proved a success? There is a machine for sale called the "express duplicator," which it is claimed duplicates without the trouble of washing the pad. Is it simply the pad described in your paper? If properly managed, will the pad described by you do the work claimed by the duplicator? A. The pad, if properly prepared, should work. It is supposed to require no washing off, the blotting paper absorbing the ink. We can only suggest a new trial. Be careful to use the best quality of blotting paper. It corresponds substantially in its alleged working with the "duplicator" you mention.

(2679) G. W. L. asks: How long must two cylinders of tin or galvanized iron, 1 foot in diameter, be to support 200 pounds on the water and not sink over 6 inches? They are to be used in connection with a water cycle and air tight. A. Much depends upon the weight of the iron that you make the shells of, in the computation of the floatation. If made of very light iron and with proper lines for speed, the cylinders should be not less than 12 feet long; 14 feet would give better results. They would not sink 6 inches if of proper lightness.

(2680) W. R. asks how to make a bright green ink from verdigris (copper acetate). A. You can approach to what you want by mixing verdigris with a solution of shellac in borax water. It will be very imperfect as an ink.

(2681) F. H. V. asks: 1. Can you inform me through your paper what is used in painting blackboards? I have painted one, but it does not seem to take the chalk very easy. A. Mix lampblack and ground pumice with shellac varnish. See queries No. 2453 and 2454, for more elaborate formulas. 2. Is there any kind of cement with which to fasten leather to iron? A. Make strong glue, while hot mix with it tannic acid and apply at once while hot. Bind firmly until dry.

(2682) G. C. asks for the best process to soften a cow's horn, so as to straighten it? A. Immerse in boiling water.

(2683) S. B. B. asks the best methods for testing old gold for its purity. Also the best tests for silver. A. An assay or analysis is the only good method. Gold should dissolve in a mixture of one part nitric with three parts hydrochloric acid. A residue indicates silver. If sulphuric acid is added to the solution, a precipitate indicates lead. One quick

method is to determine its specific gravity. Silver may be dissolved in nitric acid. It should, with excess of ammonia, give a colorless, clear solution. Sulphuric acid may be used to test for lead.

(2684) G. S. writes: A man has a field whose sides are to each other as 5 to 6; if one foot be added to each side, it will contain 304 square feet. What are the lengths of the sides? A. Calling the length in feet of one side x, and of the other side y, we have the proportion:

x : y :: 5 : 6 or x = 5/6 y (1)

From the conditions of the problem we have

(x+1) x (y+1) = 304 (2)

substituting (5/6 y + 1) x (y+1) = 304

reducing y^2 + 2/3 y = 363 2/3 solving y = 18 feet x = 15 "

The problem cannot easily be solved by pure arithmetic.

(2685) J. S. writes: How should I connect coil with cells, in a pocket battery? Battery is a physician's battery with three cells, current breaker and induction coil. A. If the connections are broken, you will probably find their remains under the case in grooves, possibly covered with a thin board or with pasteboard. Connect your battery thereto, one end to each connection.

(2686) H. W. R. writes: I have two jars of acid deadened with zinc; one jar I used sheet zinc, the other I used zinc out of galvanizing pot; the one with sheet zinc I can use, the other I cannot use; when the iron is put through the latter, the tin will not stick, but it will when put through the acid with the sheet zinc. Can you tell me the cause of this? A. A good soldering fluid must be pure. It should contain only chloride of zinc and sal ammoniac. The zinc from the galvanizing pot has become contaminated with iron and other impurities, and hence gives an impure soldering fluid.

(2687) C. A. C. asks for a preparation for cleaning kiln gloves to take the blackness off. A. Use bread crumb or India rubber sponge. They may also be rubbed off with benzine, which, however, gives them an unpleasant odor. See query No. 2670.

(2688) E. C. W. asks: 1. What is the effect of glycerine added to tobacco? A. It keeps it soft. 2. What will keep cut tobacco moist in packages? A. Glycerine. 3. What will keep it from getting musty? A. Add no glycerine, but keep it dry. 4. Is opium ever used in tobacco, and what is a safe proportion? A. Yes; but we would discontinue any such use of it.

(2689) A. T. asks: Can you suggest a convenient method by which one could index the Notes and Queries, one of most valuable features of the paper, for future reference? A. We do not know of a better way to index Notes and Queries than by using an index book with the edge cut to show the letters at a glance. Enter the subject by the letter that begins the word that represents the principal point in the Notes and Queries. Follow on the same line with the date and number between vertical ruling. A card catalogue is more thorough but less compact.

(2690) P. J. L. asks: 1. If an electric motor were used to run a dynamo, would the dynamo develop more electricity than the battery that would be necessary to work the motor? If so, about what proportion? A. No; there will be a loss of probably 40 to 60 per cent. 2. About how many candle power in a common gas jet? A. Twelve to twenty-five, according to size, material, and state of jet and quality of gas.

(2691) E. P. A. asks the meaning of the term "A curve of versed sines." I know what a versed sine is, and have a table of such sines, but am puzzled to understand how they can form a curve. A. On a horizontal line lay off equal distances representing lengths of specific arcs of a circle of given radius. On each division erect a perpendicular equal to the versed sine of the arc of that radius and length. The curve connecting the tops of such lines will be the curve desired. The formula reads y = ver. sin. x. A constant may be introduced, making the formula read y = a ver. sin. x.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 30, 1890,

AND EACH BEARING THAT DATE.

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

Alloy, I. H. Johannes. 443,943
Altair bread or wafers, apparatus for cutting, P. H. Horan. 443,766
Alum cake, making, H. W. Shepard. 443,685
Animal trap, Mellon & Best. 443,970
Annunciator, electrical, Lathie & Jeavons. 443,874
Arm rest, G. B. Steinbauer. 443,839
Art panels, etc., constructing, E. A. Galindo. 443,651
Axle bearing, self-oiling, J. S. Patten. 443,974
Axle nut, carriage, A. Folsom. 443,828
Baby walker, M. Hoyer. 443,853
Balance escapement, S. Riefler. 443,891
Bale cover, cotton, W. Orr. 443,619, 443,620
Band cutter, A. & M. Stanzel. 443,575

Banjo, A. C. Fairbanks. 443,510
Barrel washing machine, U. & H. E. Eberhardt. 437,511
Basket cover fastener, J. F. Donley. 443,710
Bath. See Electrical and vapor face bath.
Battery. See Galvanic battery. Secondary battery.
Beams, to walls and truss and girder beam, Schling, G. C. Whitlock. 443,657
Bedclothes fastener, A. E. Birdsall. 443,742
Bed pan, B. A. Dugot. 443,538
Bevel, G. M. Redway. 443,531
Bicycle, F. H. Bolte. 443,815
Bicycle, W. A. Fleming. 443,338
Bicycle, F. E. Hunt. 443,721
Binder, temporary, Blackburn & Brimm. 443,551
Binder, temporary, C. B. Clark. 443,507
Binder, temporary, T. Faifer. 443,935
Blacking case, C. F. Demme. 443,825
Board. See Wash board.
Boiler. See Steam boiler.
Boiler incrustation, apparatus for preventing steam, J. Langstaffe. 443,595
Bookbinding, R. A. W. Winzenburg. 443,588
Bookcase and student's table, W. J. Mecoy. 443,713
Book, coupon account, D. F. Parker. 443,973
Book rack, A. Pant. 443,926
Book, receipt and record, H. Loewenbach. 443,550
Book stand, J. W. & C. T. Knipp. 443,906
Books, machine for securing hangers to the corners of, J. W. Collier. 443,499
Boot or shoe sole cutting machine, C. A. Gilman. 443,515
Boring machine, F. L. Bryant. 443,699
Boring machines, foot attachment for, A. Wavra. 443,701
Bottle disk, A. L. Bernardin. 443,981
Bottle stopper, M. J. McHugh. 443,371
Bottles, tool for forming the necks of, W. Painter. 443,728
Box. See Fire box. Match box.
Bread preserver and protector, J. A. Parker. 443,637
Bridge, N. W. McGinn. 443,714
Bridle bits, T-head mouthpiece for, G. Meyer. 443,533
Brush, window cleaning, M. S. W. Martinot. 443,908
Buckle, P. L. Garlepp. 443,511
Burner. See Gas burner. Gas burner. Hydrocarbon burner. Petroleum burner.
Button fastener, J. C. F. Dick. 443,669
Calendar, O. C. Blackmer. 443,994
Camera apparatus, slide, and extension bed, H. C. Boddy. 443,610
Cane shredding apparatus, H. A. Hughes. 443,522
Cane, etc., shredding apparatus for, H. A. Hughes. 443,523
Car brake, H. G. Bird. 443,965
Car brake mechanism, R. Sheldon. 443,871
Car, C. H. B. Smith. 443,870
Car coupling, C. N. Alderman. 443,841
Car coupling, G. H. Duke. 443,958
Car coupling, Harvey & Kane. 443,916
Car coupling, J. E. Kline. 443,587
Car coupling, C. W. Manchester. 443,937
Car coupling, R. B. Chery. 443,870
Car coupling, G. W. Moon. 443,582
Car coupling, J. Rawles. 443,867
Car coupling, E. B. Reid. 443,540
Car coupling, S. Robertson. 443,921
Car coupling, D. Roche. 443,714
Car door, Crumbaugh & Prater. 443,956
Car heater, H. B. Keiper. 443,770
Car heating apparatus, J. Emerson. 443,935
Car safety device, street, A. E. Appleyard. 443,738
Car wheel dressing machine, B. J. Abbott. 443,928
Car wheel, W. W. Walker. 443,882
Cars on inclined railways, driving mechanism for, C. W. Hunt. 443,768
Cars, pipe coupling for railway, J. Emerson. 443,934
Cars, steam and air pipe coupling for railway, J. Emerson. 443,936
Carrier. See Trace carrier. Wire carrier.
Cart, road, L. Burg. 443,592
Carving machine, Smith & Post. 443,802
Case. See Blacking case. Book case.
Cash carrier apparatus, J. Davis. 443,903
Cash register and indicator, J. T. Crowley. 443,892
Casting machine, stereotype, H. G. Lange. 443,662
Casting machine, stereotype, Strong & Lange. 443,656
Cellar doors, device for raising and lowering, C. E. Golden. 443,962
Chain, drive, O. P. Harford. 443,793
Chain, C. H. B. Smith. 443,870
Chair, Gate & Herrick. 443,913
Chocolate, preparing, Tobias & Fischer. 443,979
Chopping knife, M. Ludwig. 443,600
Chuck, dredge, J. H. Turner. 443,305
Chuck, drill, N. E. Austin. 443,400
Chuck, for lathe, J. H. Woodcock. 443,720
Churn motor, C. W. Lillie. 443,682
Clear cutting machine, F. W. Hoffmann. 443,676
Cinders, apparatus for transporting and dumping, J. M. Hartman. 443,574
Clamp. See Flooring clamp.
Claw, J. D. C. K. 443,550
Cloth pressing machine, G. W. Voelker. 443,700
Clothing drier, J. W. Reed. 443,920
Clothes line prop, S. Keeling. 443,618
Clothes pin, W. Richards. 443,622
Clutch, electro-magnetic, C. E. Kells, Jr. 443,772
Clutch, for W. J. Woodcock. 443,720
Coal piling and removing machinery, J. M. Dodge. 443,605
Coffin fastener, C. A. Conklin. 443,822
Conductors in conduits, apparatus for laying, T. J. Cope. 443,824
Cooler. See Milk cooler.
Cork, machine for reducing, J. E. Gaylord. 443,757
Copper mat to copper, converting, J. E. Gaylord. 443,758
Cot, J. R. Lariew. 443,712
Coupling. See Car coupling. Shaft coupling. Thill coupling.
Cranks, for B. Carnan. 443,931
Crushing and grinding mill, S. Benson. 443,929
Cuff, J. F. Fellows. 443,696
Cultivator, E. R. Conklin. 443,703
Cultivator, F. R. Glascock. 443,914
Cultivator, J. W. Kraus. 443,919
Curtain holder, J. S. Ireland. 443,949
Curtain, E. P. Braren. 443,981
Curtain pole ring, H. J. Gilbert. 443,514
Cut-off and filtering joint, A. Anderson. 443,800
Cutter. See Band cutter. Food cutter. Meat cutter.
Cutting irregular shapes, machine for, F. H. Hiermann. 443,535
Cylinder coupling joint, T. W. Moran. 443,746
Damper regulator, electric, J. O'Meara. 443,716
Dental grindstone wetter and wiper, E. C. Goeldner. 443,572
Dental instrument, E. Gash. 443,611
Dental plugger, L. West. 443,631
Dental tool, G. H. Pelree. 443,705
Dental vulcanizer, F. W. Seabury. 443,649
Dies, manufacture of, J. A. House. 443,767
Digger, S. Smith. 443,922
Dish, for R. N. Ross. 443,538
Door, E. E. Richardson. 443,541
Door check and spring, pneumatic, F. J. Wood. 443,702
Door hanger, L. Terry. 443,638
Door lock, sliding, G. A. Colton. 443,849
Dough sheeting machine, continuous, J. H. Mitchell. 443,822
Drawing knife, E. Snyder. 443,874
Drier. See Clothes drier.
Drill. See Rock or earth drill. Well drill.
Dynamo stations, safety device for, C. E. Ongley. 443,727
Electric conductors, apparatus for laying, T. J. Cope. 443,824
Electric motor, C. P. Pines. 443,642
Electric motor, C. J. Van Depele. 443,880
Electric protective and signaling system, C. E. Ongley. 443,799
Electric stop mechanism, magneto, W. H. Kilbom. 443,646
Electric torch, J. J. Wood. 443,653
Electrical and vapor face bath, N. Lyke. 443,580
Electrical conductors, apparatus for automatically grounding or cutting out of circuit exposed, F. W. Jones. 443,527
Electrical conductors with lead, machine for covering, F. H. Stilling. 443,541
Embroidering machine, Buss & Saurer. 443,820
Engine. See Wind engine.
Envelope, E. A. Dubey. 443,611
Eraser, rubber, A. S. Fitch. 443,613
Eraser, rubber, W. Friend. 443,615 to 443,617
Exercising machine, S. Riefler. 443,614
Exercising machine, J. R. Hamilton. 443,631
Exhibiting goods, means for, A. Pratel. 443,644
Farm gate, S. S. Aispach. 443,843
Fatty products, recovering, M. L. Griffin et al. 443,840
Faucets, pall holder for, H. Kellner. 443,771
Feed water regulator for steam boilers, automatic, F. T. Kent. 443,577
Fence pickets, machine for pointing, J. M. Vance. 443,806
Fence post, O. F. A. Faulkner. 443,848
Fences, tension governor for wire, B. O. Haugh. 443,555
Fence, for weaving wire and picket, Bigelow & Prosser. 443,892
Fencing, standard for wire, M. Amos. 443,622
Fertilizer distributor, C. W. Nicholson. 443,664
Fertilizer from tank water, making, H. T. Varyan. 443,559
Fibrous plants, disintegrating, H. L. Doby. 443,904
Fire extinguisher, S. C. Friend. 443,614
Fire, C. E. Ongley. 443,724
Firearms, safety lock for, A. Von Derschau. 443,747