

Business and Personal.

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Hotchkiss & Ball, West Meriden, Conn., Foundrymen and Workers of Sheet Metal. Will manufacture in royalty any Patented articles of merit.

See N. F. Burnham's Turbine Water Wheel advertisement, next week, on page 77.

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Three Second Hand Norris Locomotives, 16 tons each; 4 ft. 8 1/2 inches gauge, for sale by N. O. & C. R. R. Co., New Orleans, La.

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Price only \$3.50.—The Tom Thumb Electric Telegraph. A compact working Telegraph Apparatus, for sending messages, making magnets the electric light, giving alarms, and various other purposes. Can be put in operation by any lad. Includes battery, key, and wires. Neatly packed and sent to all parts of the world on receipt of price. F. C. Beach & Co., 246 Canal St., New York.

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For best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay, Brooklyn, N. Y.

For Solid Emery Wheels and Machinery, send to the Union Stone Co., Boston, Mass., for circular.

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For 13, 15, 16 and 18 inch Swing Engine Lathes, address Star Tool Co., Providence, R. I.



A. J. C. and B. B. L. should consult a physician.—R. F. will find a good recipe for burnishing liquid for the heels of boots and shoes on p. 347, vol. 31.—F. K. will find a recipe for cement for china on p. 348, vol. 24.—J. C. T. should consult an engineer.—A. K. will find a recipe for root beer on p. 138, vol. 31.

(1) H. J. R. asks: How do you suspend the sheet of zinc in the galvanic battery, mentioned in a recent issue? A. Suspend it upon any insulator. Wood will do.

(2) G. F. H. asks: 1. Is there any better insulator than gutta percha or glass for the key of a telegraph instrument? A. Yes. Bone or rubber. 2. Do operators ever lose the use of their arms, by electricity passing through gutta percha insulators? A. No. 3. Is there anything that will counteract the effect of electricity on the nerve? A. No.

(3) E. L. G. asks: What is the best battery for making an electric light? A. Fifty cells of Bunsen.

(4) P. Q. S. asks: 1. In the following battery, what is the least number of cells that will give a perceptible shock? It consists of a glass jar 5x4 inches, covered by a piece of wood, suspended from which are two pieces of coke 5 inches long by 2 wide; between these is a piece of zinc of the same size. The liquid is bichromate of potash, 2 parts, dissolved in 20 parts hot water and 1 part sulphuric acid. A. One hundred cells would give a slight shock. 2. Should the zinc plate be amalgamated? A. Yes. 3. How many cells would be necessary to nickel plate buttons, etc.? A. One cell. 4. Which is the positive plate? A. The zinc. 5. In a recent issue of your journal, you published a recipe for amalgamating zincs. I tried it, but it was a total failure. I could not dissolve the mercury. What is the trouble? A. You need not dissolve the mercury. Clean your zincs with muriatic acid, and the mercury will adhere.

(5) J. S. F. asks: 1. If a plate electric machine is arranged with metallic disks and points on both sides of the plate, for conducting the electricity to the prime conductor, would it conduct more of the fluid with the same friction of the plate than it would if there were disks on one side only? A. Yes. 2. If the points are a quarter of an inch apart instead of half an inch, would it catch more of the electric fluid with the same friction of the plate? A. Yes.

(6) R. S. says: I have constructed a line of telegraph to connect my store and house, distance half a mile, and have found it impossible to make any circuit by the ground. I commenced with 4 cells of Daniell's battery; then I increased to 7 cells, and carried ground wire at each end into the cellars; these I connected with a piece of gas pipe 8 feet long, driven the whole length into the ground and surrounded with a quantity of scrap metal of different kinds, yet it does not work, and I had to put up a return wire. It works splendidly with the second wire, but I wish to make it work with the single wire. Can you inform me how it can be accomplished? A. Bury two copper plates, six feet square—one at each end of the line—in earth which is always saturated with water, and solder the ends of the wire to the plates.

(7) W. S. H. asks: What should be the members of a saline battery for constant action, the solution to be similar to sea water? A. Zinc and copper.

(8) B. P. D. says: In a recent issue you say that the resistance in the pencil of charcoal develops heat, producing incandescence. Is any effect produced by this intense heat where the carbon comes in contact with the glass cylinder? Or, more to the point: Is heat generated at all in this partial vacuum, I mean of course to any considerable extent? A. Machine electricity is not sufficient in quantity for the production of light with carbon pencils.

(9) A. asks: 1. How can I make a Leclanché battery? A. See p. 73, vol. 31. 2. How many Leclanché cups are required to make an electric light? A. Seventy-five, of large size.

(10) C. S. W. asks: Am I correct in claiming that light travels faster than galvanic electricity? A. Yes, as a general statement of fact. Galvanic electricity could travel as fast as light if it had a conductor without resistance, but that is difficult to secure.

(11) M. M. asks: Has there been in this country any practical application, to the artificial lighting of buildings, of the electric system of the Russian inventor, M. Ladiguin, described on p. 373, vol. 32? A. No.

(12) R. H. S. asks: 1. What does the following mean, in relation to lenses: "1/4 inch, angular aperture 175°," and "1/4 inch, angular aperture less than 90°, without adjustment"? A. These questions relate to compound microscopic objective lenses; 1/4 inch means that the magnifying

power of the combination is equal to a single lens of 1/4 inch focus, or 2 x 8=160 linear, when it would be used alone without an eyepiece. Angular aperture 175° means that the extreme rays which can converge in the axis of the lens from the edge of any object, and reach the eye, make in that axis an angle of 175°. Four tenths of an inch means that the magnifying power is equivalent to that of a single lens of 1/4 inch focus, or 1/4 x 8=20 times linear. Angular aperture less than 90° means that the lens does not admit rays more oblique than those which make 1/2 x 90 or 45° with the axis. Without adjustment means that the lens has not the adjustment required for high power, by which the relative distance of the achromatic lenses, of which the lens is composed, can be shifted so as to adapt the lens to different thicknesses of glass crossing the object. 2. What are an immersion lens and a dry lens? An immersion lens is one of which the curves are calculated in such a way as to be only adapted to be used with a drop of water between the lens and the object. Dry lenses are the ordinary lenses.

(13) S. M. says: I have run my lightning rod into my well as a ground connection. As water is a good conductor, I supposed this would be the best possible way. Is this correct? A. Yes.

(14) W. M. Q. asks: 1. Is there a telegraph insulator in use that the wire simply passes through? A. Yes. 2. Would a glass tube passing through the cross bar be as good as the common insulator? A. No.

(15) W. O. C. asks: 1. Will a battery consisting of two 1 quart cells (copper and zinc) be of sufficient power to silver plate small articles? A. Yes. 2. How can I construct such a battery? A. See p. 26, vol. 32. 3. Can electricity be felt by taking hold of wet sponges attached to the wires? A. No. 4. What is the least number of cells required to plate small articles, coins, etc.? A. One cell. 5. How much and what kinds of wire should I use to make an induction coil two inches long with? A. Use 500 feet No. 40 and 50 feet No. 16 wire.

(16) O. C. says: 1. I have had an electromagnet made of 1/2 inch iron, U-shaped (the arms 4 inches long), wound with 850 feet No. 23 cotton-covered copper wire; with two cells of Leclanché battery it attracts the armature (1/8 of an inch from the poles) with a force of about 4 ozs. Is that as much as I ought to expect of it? A. The Leclanché battery is not well adapted for power. You would get much more power from a single cell of Bunsen than from a dozen of Leclanché. 2. How shall I connect the cells together to get the greatest attractive power of the magnet, carbon of one cell to zinc of the next, or all the carbons together and all the zincs together? A. Connect all carbons together and all zincs together.

(17) E. C. says: I have made two Morse sounders, 1/2 inch cores, 2x1 1/2 inches spools, with 500 feet No. 28 wire. How many cells Callaud battery shall I want for 600 feet No. 12 iron wire? A. Six.

(18) C. H. W. says: 1. In a recent article on electro-metallurgy, you stated that lead articles should be electro-coppered before silver would deposit. Is the solution for this purpose the same as that for electrotyping? A. Yes. 2. You also gave the proportion of ingredients for silver bath, using cyanide of silver. What would be the proportion in using nitrate of silver? A. Nitrate of silver will not answer. 3. How many Minotti cells with 2 1/2 inch disks should I use for plating in a 1/2 gallon bath? A. One.

(19) G. A. C. says: I tried to make a battery by taking a glass jar and putting sulphate of copper in the bottom, and water on top, with a piece of copper in the bottom, and a copper wire leading from it, and zinc above with copper wire leading from it also. I cannot feel any electricity going through the wires. Is the battery too weak? A. A single cell would not have force enough for you to feel the electricity.

(20) J. W. W. asks: Is there a method of creating a vacuum, however small, by means of an electric current? A. We do not know of any.

(21) E. F. M. asks: What effect will heat lightning have on a balloon if the air is hot? A. We have no positive data to guide us upon this point but should think the heat lightning would not affect the gas.

(22) S. E. P. says: In melting ore in a small crucible, can I put in anything to make silver flow freely and separate from the other matter? A. Melt your silver with a small quantity of lead in an ordinary cupel.

(23) C. W. H. says: If a piece of glass is placed between the heat of a fire and the hand, the heat will not be felt. But if you place the glass between the hand and the sun, the heat will be felt as if the glass were not there. Why is this? A. Heat radiations are classified under two heads, luminous and obscure. A plate of glass, while it freely transmits all the higher heat vibrations or luminous heat rays, wholly arrests the obscure ones. The rays from the stove are possibly all obscure, or of slower vibration, and are therefore completely arrested by the glass plate, while the sun's heat radiations are mostly of the luminous kind (the obscure rays having been sifted out in their passage through the aqueous vapor in our atmosphere), and pass with little loss through the glass.

(24) K. H. asks: How can I color the hair on a buffalo robe, so as to make it a dark brown, nearly black? A. It will be necessary to first thoroughly cleanse the hair of all dirt, etc., as it is impossible to get any satisfactory results until this has been done. For the above purpose, the following has been used with advantage: Sufficient aqua ammonia is added to a pint of water to make the whole pungent. Afterwards wash with clean water. Then use the following dye: To a saturated solution of sulphate of copper, add ammonia

until the precipitate which falls is wholly redissolved. For a moment, to be first applied, use a saturated solution of ferrocyanide of potassium.

(25) J. F. W. says: A jeweller recently had several watches in his front window, and at a flash of lightning he felt the glass in his window move. On taking down a watch, on the face of which was a small compass, and laying the watch down face upwards, he noticed the compass out of order. It would first start and turn rapidly to the right for a good many revolutions, then poise for a second, and then revolve rapidly to the left, which it continued to do for two days, when the owner took it out. Was the watch electrified by the lightning? A. You should have stated whether the working parts were in motion or not. If in motion, the phenomenon is easily explained; some of the movable steel parts of the mechanism have, from some cause or other, become magnetized (possibly from the cause mentioned), and at every change of position they alternately attract and repel the opposite poles of the compass needle.

(26) A. S. says: I have about 300 bottles of Burgundy which has turned slightly sour. Can you tell me how to cure it? A. Try the old German method of putting into the wine a small quantity of charcoal, shaking it, and, after allowing it to stand 48 hours, decanting from the sediment.

(27) H. S. F. says: 1. On my barn there is a metallic vane. The vane is higher than anything else in the vicinity, though there are plenty of trees about. The soil is very dry. Knowing that lightning rods are seldom put up properly, is the barn safer without or with them? A. If you follow the advice given on p. 145, vol. 31, on constructing and placing the rod, there will be no doubt of its efficient protection over your property. 2. Why do trees tend to protect a building from lightning? A. Tall oaks and elm trees some times offer some protection to low buildings; but in most cases this protection is rather uncertain.

(28) O. C. L. asks: How many revolutions of Robinson's cups are equivalent to one mile traveled over by the wind? A. Dr. Robinson concluded himself warranted in laying down, as a general law, that the cups on a horizontal windmill of this description move with one third the wind's velocity, except so far as they are retarded by friction.

1. What is the simplest method of determining when it is exactly noon at New York, so as to regulate time pieces? A. The methods of determining true local time by observation are several. (1) By equal altitudes of a star or opposite sides of the meridian. Observe the time when the star has equal altitudes before and after passing the meridian; the middle point between these times is the time of the star's passing the meridian. By comparing this time with the known place of the star, we may obtain the error of the clock. (2) By equal altitudes of the sun. Since the declination of the sun changes from morning to evening, the time of the sun's arriving at a given altitude is affected by this motion, and we must compute the correction to be applied to the mean of the times observed. (3) By means of the transit instrument. The instant of the sun's passing the meridian is the time of apparent noon; and hence, if we compare the sun's passage over the meridian with a chronometer, we shall obtain the deviation of the chronometer from apparent solar time. If to this we apply the equation of time with its proper sign, we shall obtain the error of the chronometer in mean time. 2. Will a sun dial serve this purpose, and if so, how can I make one? A. Sun dials are not very accurate chronometers.

How can I make a self-registering rain gage? A. A graduated bottle with a small funnel placed in its mouth is the simplest of the various pluviometers in use, and is, perhaps, as accurate as any of them. We do not know that any self-recording instruments of this kind have yet been constructed.

(29) A. L. F. B. says, in reply to S. L. G., who asks if violin tops and bottoms are sawn thin and then bent, and also if there is a block or anything of the kind inside the violin, to glue the neck to, or is the neck simply glued to the outside: I give some extracts from the "Practical School for the Violin," by U. C. Hill: "Wood for the belly or sound board should be split so as to have a full inch thickness toward the bark or outer side, and a quarter of an inch towards the heart of the tree. Sycamore, for the back, must be cut in the same manner, with this exception: It should be split, in pieces not less than 6 inches wide, and 2 inches in thickness, at the back edge. It is then sawn in two, breadthways, or sliced into two pieces. These two pieces are then glued firmly together, with the edges nearest to the bark of the tree inwards. The under side is planed flat, and the upper or outside is, in the first instance, planed down, somewhat in the form of the roof of a house, that is, higher in the center, and sloping down gradually towards the edge. The form or model is then scooped or worked out according to the taste of the artist. It should be observed that the end blocks, which are placed one at the extremity of the neck, and the other at the bottom of the instrument, immediately under the tail-piece, are never omitted even in the commonest violins. It may not be amiss to remark that, in the oldest instruments, the upper end block is not a detached piece, but, in fact, a continuation of the neck, the ribs being let in on each side; but this system is now exploded. The neck is merely glued, and not fastened on with either a nail or a screw."

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

H. J.—It is flint.—H. S.—It is a poor quality of hematite.—J. R.—Nos. 1 and 2 are mica schist. No. 3 is quartz rock, containing iron pyrites. No. 4 is

quartz rock, containing arsenopyrite.—E. N. L.—It is not plaster, as you suppose, but calcite or carbonate of lime—Ca CO₃. Several small crystals were found in the calcite, but there were not enough of them for us to determine what they were.—J. O. B.—The dark red material, No. 1, is shale. No. 2 is a limestone containing marmolite.—J. A. H.—It is hematite.—I. L.—It is the cocoon of the attacus cecropia. "The cocoon is fastened longitudinally to the side of a twig. It is, on an average, three inches long, and one inch in diameter at the widest part. Its shape is an oblong oval, pointed at the upper end. It is double, the outer coat being wrinkled, and resembling strong brown paper in color and thickness; when this tough outer coat is cut open, the inside will be seen to be lined with a quantity of loose, yellow brown, strong silk, surrounding an inner oval cocoon, composed of some kind of silk, and closely woven like that of the silkworm. The insect remains in the chrysalis form through the winter. The moth, which comes forth in the following summer, would not be able to pierce the inner cocoon, were it not for the fluid provided for the purpose of softening the threads; but it easily forces its way through the outer cocoon at the small end, which is more loosely woven than elsewhere, and the threads converge again, by their own elasticity, so as almost entirely to close the opening after the insect has escaped."—Harris.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Keely Motor. By T. P. W., and by O. On the Weight of the Earth. By J. F.

Also inquiries and answers from the following:

- A. R. L.—N. J. W.—F. C. S.—N. R. S.—K. B.—F. W. T.—N. H. N.—A. B. F.—R. L.—W. F.—G. F.—A. G.—J. W. D.—C. H. S.—P. S.—G. D.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells lenses for telescopes? Is there a good and cheap microscope for student's use to be found in the market? Who sells the best bookbinders' boards? Whose is the best gear wheel cutter?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week ending June 22, 1875, AND EACH REPEATED THAT DATE. [Those marked (r) are reissued patents.]

Table listing inventions and their patent numbers, including Alarm, burglar, J. A. Weed, Bale tie, Du Bose & Charles, Bale tie, A. Eichholz, Bale tie, J. H. Hardman, Bath too showering attachment, W. H. Rowe, Battery, galvanic, T. Chutaux, Bed bottom, spring, J. A. Reeds, Bedstead fastening, G. Suppert, Bedstead, invalid, G. Pence, Bee hive, E. Gerry, Bell pull, W. Richardson, Belt fastener, J. B. McElroy, Belt shifter, W. H. H. Sism, Belt twisting apparatus, M. P. Wilmarth, Billiard register, electrical, Russell & Sax, Blank book, I. Reynolds, Body brace, H. R. Allen, Boller plates, punching, Carroll et al., Boller, steam, M. W. Shapley, Boller, wash, J. Rieth, Boller, feed water heater, S. W. France, Book clasp, N. Harlan, Boot and shoe, Meyer & Freiburgh, Boot and shoe crimp, C. Heller, Boring apparatus, earth, O. Martin, Bottle stopper or cork, J. Schrink, Box girder, compound, A. Hay, Boxes, machine for making, J. W. Bowers, Bridge fastening, draw, C. J. Atkins, Brush, fountain, F. McDaniel, Building composition, A. T. Lyon, Burner, argand gas, E. P. Gleason, Burner, hydrocarbon, J. W. Neely, Butter tubs, fastening for, H. C. Carter, Cake cutter, J. H. Winslow, Calves from sucking, preventing, S. Tilton, Can vent and stopple, E. M. Crandal, Canal coats, construction of, W. Ball, Car coupling, C. Bowman, Car coupling, W. S. Burton, Car coupling, J. Jacobson, Car coupling, Miso & Warner, Car coupling, N. Nilson, Car coupling, J. B. Stamour, Car truck, C. W. Mansfield, Carding machine, Blamires & Marsden, Carpet cleaner, D. B. Scofield, Carriage and chair, Tenney & Hobbs, Cartridge box, M. V. B. White, Cartridge, shot, B. D. Wilson, Cat handle, C. Strong

Table listing inventions and their patent numbers, including Chair, spring, A. W. Coates, Chuck, C. H. Powers, Cigars, case for freshing, Chandler & King, Cloth steaming machine, J. Shinn, Clothes dryer, C. Hauser, Clutch for power presses, A. H. Merriman, Coffin handle, M. H. Crane, Comb cutting machine, J. W. & I. S. Hyatt, Cooler and condenser or heater, C. H. North, Cotton gin, W. Koehl, Cradle and bedstead, C. W. Chamberlain, Curtain fixture, W. H. Sparks, Dental forceps, A. Engel, Dental rubber dams, clamp for, D. Palmer, Dominoes, spotting, I. S. Hyatt et al., Door check, W. H. Willis, Door securer, L. Marks, Drill ratchet, J. M. Koeberle, Drilling mechanism, rock, A. E. Allen, Drop lights, friction slide for, J. T. Bruen, Electrical timing apparatus, R. J. Sheehy, Elevator, water, W. Walter, Embroidering machine, Michael & Bourget, Engine governor, steam, F. M. Merrill, Engine, pneumatic, P. M. Conolly, Engine, steam, H. P. Case, Engine, steam fire, W. Knaust, Engines, valve gear for steam, J. L. Hewes, Envelope, A. N. Lewis, Escutcheon, seal, E. J. Brooks, Etchings on glass, producing, E. Dallienne, Excavating apparatus, C. G. Force, Jr., Excavator, G. W. Gonca, Fan leaves, machine for cutting, P. Hufeland, Fans, manufacture of, P. Hufeland, Fare box, A. E. Hovey, Fats for rendering, cutting, P. L. McDowell, Faucet, L. Chalze, Fence, farm, L. M. Wheelock, Fence, iron, P. Haffa, Fifth wheel, J. Hodge, File blanks, bending circular, Beyer and Heusch, Files, tempering, W. T. Nicholson, Fire arm, breech loading, B. Fasoldt, Fire extinguisher, chemical, A. E. Hughes, Fishing rod, J. L. Graves, Flooring clamp, J. T. and G. J. Moss, Fruit can, S. W. McOmber, Fruit jar, Stevens and Lumley, Fuel, etc., compression of, F. J. Hamel, Furnace, W. E. Haxton, Furnaces, supplying gas to, W. Rogers, Game table, N. W. Moulton, Gas and air, etc., carburizing, L. E. Fish, Gas extinguisher, L. Boore, Gas illuminating, F. H. Eichbaum, Gate, automatic, H. Hammond, Gate, lifting, W. Lundy, Glass annealing oven, T. B. Atterbury, Governor, W. D. Marks, Grain conveyor, H. W. Caldwell, Graining wood, G. F. Mehling, Grate bar, hollow, W. L. Gregg, Grate for cooking ranges, drop, J. E. Baum, Grinding wheel, Putnam and Esty, Hame fastener, H. J. Wilson, Harrow, C. Brodrick, Harvester, H. N. Bridenthall, Jr., Harvester nger bar, V. N. Collins, Harvester reel, J. F. Black, Hay rack, J. Hall, Heelshave, N. A. Sweet, Hinge, sheet metal, S. Scott, Hog catching implement, W. R. Ames, Horseshoe, die for spurs on, Clarke and Chase, Horseshoes, machine for bending, H. Levy, Hose coupling, E. Dayton, Hydrant, G. Hillegaas, Hydrant, W. H. McMillan, Hydrant, J. G. Murdock, Hydrocarbon burner, J. W. Neely, Ice breaking attachment for vessels, J. T. Martin, Incubator, A. Corbett, Inkstand, S. Darling, Ironing apparatus, N. Hall, Knife, shoe, H. S. Cushman, Knife, tobacco, E. T. Shelton, Ladder, fire escape, D. Sanford, Ladder, step, E. G. Hildreth, Lamp, J. S. and T. B. Atterbury, Lamp and oil can, combined, W. Roberts, Lamp, street, J. Henrich, Laster, foot power, F. J. Davis, Latch for door, O. W. Stow, Leather, bronze dressing for, E. M. Fennessy, Life preserving apparatus, H. A. Duc, Jr., Limekilns, W. S. Sampson, Links, machine for forming, J. H. Helm, Liquids, preserving, J. G. L. Boettcher, Lock, bag, F. W. Mix, Locomotives, increasing traction of, J. W. Murphy, Loom harness, J. Sladdin, Mail bag catch, H. M. Dick, Measure, speed, S. F. Minton, Medical compound, J. Cooper, Meter, liquid, E. Marsland, Mill, cider, Galt and Tracy, Mill, cider, S. Maies, Mill, rolling, I. Hahn, Mill spindle, J. A. Hafner, Molding machine, J. R. Locke, Monument, J. Sharkey, Motion, device for converting, G. Turner, Musical game apparatus, E. Draper, Nut lock, O. B. Latham, Nut lock, W. F. Marthens, Nut lock, W. P. Olden, Oils, refining, A. T. Schmidt, Organ tremolo, W. D. Parker, Organ tremolo, read, R. W. Pain, Paint, compound, A. T. Lyon, Paper barrels, making, W. G. Pennypacker, Paper boards, making, B. F. Field, Paper box, L. A. Kettle, Paper clip, Pack and Vanhorn, Paper, compound for sizing, J. Hogben, Paper cutting machine, W. I. Reid, Paper machine, C. L. Crum, Paper, cutting and delivering, W. Scott, Paraffin, etc., purifying, F. X. Byerly, Photographic dark trunk, F. Robbins, Photometer, portable or hand, W. W. Goodwin, Piano tuning pin lock, G. P. Reeves, Planos, stringing, A. Moeller, Pickles, preparing, Reckhow and Stafford, Pipes for buildings, steam, C. C. Walworth, Plane, bench, L. Bailey, Planing machine, E. Benjamin, Planing machine, H. C. Holloway, Planing machine, C. R. Tompkins, Planking set for ship carpenters, E. Sloan, Plow, O. J. Glasoe, Plow, A. Griggs, Plow colter cleaner, Wallis and Case, Plow die, C. H. Thompson, Polishing wheel, H. Hard, Postage stamp holder, P. W. Hall, Press, baling, J. C. Stokes, Press, hay, cotton and wool, W. H. McBurney, Press, screw, J. H. Clapp, Presses, clutch for power, A. H. Merriman, Printing in colors, W. H. Holmes, Propeller, chain, E. R. Austin, Pulleys, machine for grinding, A. Wood, Pump, Arndt & Ayres, Railway crossing, E. J. Patterson, Rail support, C. B. Sheldon, Railway signal, electric, H. W. Spang, Railway switch, J. Walker, Railway track, R. Banolas, Ranges, drop grate for cooking, J. E. Baum, Refrigerator, Mason & Sinclair, Refrigerator building, T. Krausch, Regulator and alarm, automatic heat, S. A. Day, Road rammer, A. Q. Ross, Roofing material, D. McDaniel, Saddle, harness, A. V. Sargeant, Sash fastener, C. B. Gardner, Sash fastener, P. Meyer, Sash fastener, W. B. Swallow, Sausage machine, D. J. Howenstein, Saw jointer and gage, R. E. Poindexter, Sawing machine, Scroll, Wescott & McGregors, Scaffold, J. E. Sanders, Screw driver, I. C. Cowles, Screw heads, die for forming, F. Rhind, Sede drill, J. R. Symmes, Seeding machine, J. B. Bushnell, Sewing machine binder, G. Wissler, Shawl strap handle, L. Loeser, Sheet metal rings, making, S. R. Wilmot, Ship carpenters, planking set for, E. Sloan, Shoe knife, H. S. Cushman, Shoe nail, H. F. Whidden, Signal, electric railway, H. W. Spang, Signal operating device, F. Culham, Sled, bob, J. J. Sandgren, Smoke drum, J. Bowman, Smokestack, J. L. Mason, Soap holder, J. P. Bryan, Spark arrester, W. Stamp, Speed measure, S. F. Minton, Spike, G. N. Sanders, Spinning machines, top roll, E. Card, Spoke tenoning machine, Coleman & Myers, Stamp canceler, M. Lewis, Stone, artificial, Osborn et al., Stove, A. Hamilton, Stove, H. J. Winterlich, Stove, camp, H. L. Duncklee, Stove, coal oil, J. L. Sharp, Stove pipe elbow, J. F. Piel, Stove, reservoir cooking, R. M. Hermance, S. gar cutting machine, F. Rochow, Swing, child's, G. A. Fanjoy, Tabs, folding work, B. Fairchild, Table, ironing and kitchen, A. Aitken, Tanning hides, Baldwin & Holcombe, Telegraph and circuit, duplex, J. B. Stearns, Thill coupling, G. W. Ladd, Tobacco can, E. T. Shelton, Toy, C. A. Bailey, Toy, bell, F. Arnold, Toy, electric, W. J. Decker, Transom for doors, J. Berndt, Trap, fly, J. M. Harper, Trap, hog, J. M. Kimball, Type casting machines, J. A. T. Overend, Valve for water tanks, J. Hadfield, Valve gear, W. L. Newsham, Vehicle bodies, corner for, Acker & Robinson, Veneer cutting machine, G. W. Swan, Ventilator, sidewall, W. G. Creamer, Wagons, brake block for, Wieterhold & Oak, Wardrobe, M. B. Coburn, Warp holder, piercing, H. S. Houghton, Washing machine, M. Newton, Washing machine, cylinder, S. and A. F. Wekey, Watch key, J. C. Duerber, Watch wheels, pivoting, F. R. Bucklin, Water closets, disinfecting, G. Jennings, Water tank valve, J. Hadfield, Water wheel, J. Erikson, Water wheel, turbine, G. Arrowsmith, Water wheel turbine, J. M. Jensen, Wells, pumping, Nickerson & Streeter, Window sash, L. P. Haradon, Window screen, S. Parker, Wood preserving compound, P. Werni, Wrench, J. Norton

Table listing inventions and their patent numbers, including 4,866.—G. H. Longmore, Portland, Me., U. S. Matting roller, June 17, 1875, 4,867.—E. B. Dodge, Peterboro, N. H., U. S. Spring bed, June 17, 1875, 4,868.—G. H. Greenough, Brooklyn, N. Y., U. S. Producing artificial light, June 17, 1875, 4,869.—A. Crabtree, Bacup, England. Middlings separator, June 17, 1875, 4,870.—A. Bedford, Boston, Mass., U. S. Bell target, June 17, 1875, 4,871.—J. P. Sharp, Birmingham, England. Steel process, June 17, 1875, 4,872.—A. Cummings, New York city, U. S. Pouring lip for sheet metal measures, June 17, 1875, 4,873.—R. S. Van Zandt, Williamsburgh, N. Y., U. S. Extension step ladder, June 17, 1875, 4,874.—A. S. Walbridge, Mystic, P. Q. Horse hay rake, June 17, 1875, 4,875.—G. M. Mowbray, North Adams, Mass., U. S. Frictional electric machine, June 17, 1875, 4,876.—G. R. Prouse, Montreal, P. Q. Steam mangle, June 17, 1875, 4,877.—A. L. Davis et al., Port Crane, N. Y., U. S. Vehicle spring, June 18, 1875, 4,878.—F. Van Patten et al., Auburn, N. Y., U. S. Fifth wheel for carriage, June 18, 1875, 4,879.—S. Duck, Victoria, British Columbia. Hub and bevel mortising machine, June 18, 1875, 4,880.—F. Van Patten et al., Auburn, N. Y., U. S. Fifth wheel for carriage, June 18, 1875, 4,881.—F. H. Date, Niagara, Ont., et al. Combined gas retort, June 18, 1875, 4,882.—E. A. Beers, De Kalb Center, Ill., U. S. Gang plow, June 18, 1875, 4,883.—N. E. Smith, Richford, Vt., U. S. Milk cooler, June 18, 1875, 4,884.—H. Ragot, Pittsburgh, Pa., U. S. Glass furnace, June 18, 1875, 4,885.—C. W. Hunt, West New Brighton, N. Y., U. S. Automobile railway, June 18, 1875.

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CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, June 15 to June 18, 1875. 4,864.—D. J. Topley, Brooklyn, N. Y., U. S. Fire extinguisher, June 17, 1875. 4,865.—J. H. Morrell, New York city, U. S. Floodway for warehouses, etc. June 17, 1875.