

(2949) G. P. asks: Can you please tell me how to mend hole in rubber foot ball? A. See answer to query No. 2903. To resist the pressure, the patch should be inside. Success is doubtful.

(2950) G. H. R. asks: 1. Will you please give the chemical reactions in the development and fixing of a dry plate with pyro developer? A. The developer reduces to a metallic state the bromide of silver in the film which has been acted upon by light. The fixing bath dissolves out the bromide of silver unacted upon either by light or the developer. 2. What will remove pyro stains from the fingers? A. A solution of citric acid—20 grains to one ounce of water will remove the stains. 3. What is process of manufacture of celluloid? A. 100 parts camphor are mixed with 42 to 50 parts pyroxylene (nitro-cellulose) and pressed or rolled hot. Another method dissolves 50 parts nitro-cellulose in 100 parts alcohol with 25 parts camphor and evaporates to the consistency of jelly. By exposure to the air in thin plates it hardens.

(2951) W. L. R. asks: 1. What preparation or solution can I use to make a pair of buckskin moccasins waterproof? A. Use grease or leather stuffing. It will change the nature of your buckskin. 2. I put a Cramer plate in a solution of alum and water to take out the frills. The frills came out, but on drying the plate, it left the alum on it. I washed it in running water for hours, but it would not come off. What will take it off without injury to the plate? A. The particles of alum may be rubbed off with a tuft of wet absorbent cotton. If they are firmly fixed in the film, there is no easy way to remove. Possibly by soaking the negative in a weak solution of water and sulfuric acid, the deposit may be dissolved out. 3. A recipe for making magnesium cartridges to be operated by a fuse like the Scoville magnesium cartridges? A. An effective magnesium compound is made by mixing equal parts of nitrate of barium and magnesium powder. Put it in a paper case and connect with a slow powder fuse, which can be had from manufacturers of powder.

(2952) S. H. H., Jr., says: I wish to make a small camera for taking photographs four inches high, three wide and about two deep. Would you please tell me the size and kind of lens to use in making a camera of the above size? A. You need to use a two inch equivalent focus, Morrison or Gray wide angle lens. The diameter of the lens would be about half an inch. 2. How can I secure a light background in taking photographs? A. A common plain blanket hung up behind the object will give you a light background, or use very large sheets of manila paper.

(2953) A. C. S. asks: How can tallow be softened or refined so that it may be used as a lubricant for the working parts of a microscope? The opticians use the material, which is admirably adapted to the purpose, but I have been unable to learn how it is treated, but after treatment the tallow is almost as soft as lard. A. Tallow can be softened by mixture with oleic acid or with some neutral oil such as sweet almond oil. Treatment with borax and water hot is good as a refining process.

(2954) P. C. asks: 1. How can I find the weight of a casting of common gray iron? I have the full size pattern of soft pine at hand. A. Multiply weight of pattern by 14. 2. In an electro-motor of any given size, what increases the efficiency—more winding on the field magnets or more divisions on the armature? A. It is good practice to use plenty of divisions on the armature. Its winding must be based on the difference of potential between its terminals and the desired power. 3. Are not all electro-motors series wound? A. No. They are often shunt and compound wound. 4. How would lengthening or shortening armatures (of motors) of the same number of coils and same diameter of core affect the efficiency of the motor? A. No direct effect can be predicated. In a general sense the armature core should be of rather large diameter. 5. In four field magnets faced and bolted together would the lines of magnetic force be perfect, so as to give twice the pull on the armature that one pair of magnets would give? A. A single large electro-magnet is far more advantageous than a combination of small ones.

(2955) J. J. asks for a filling, black and other colors, such as is used for brass signs, something that will harden and stand exposure to sun and weather, also the cleaning of the brass with acids and by rubbing. A. Melt together in a clean iron pot two parts each of best asphaltum and gutta percha, stir well together, then add one part of powdered gum shellac. It should be used hot. It may be mixed with small, vermillion or other pigment if desired.

(2956) L. M.—If you use well insulated wire and wind carefully, you may omit the shellac varnish altogether, or you may soak the coil in very thin varnish after it is completed, allowing it several days in which to dry.

(2957) W. W. D. asks if double or single cotton-covered wire is used to wind 8 light dynamo, also if the two rods down side are of brass or copper. A. Double-covered wire is preferable wherever it can be used. The rods are of copper.

(2958) A. B. T. asks what will stick the amber mouth piece of a pipe together; it is broken about  $\frac{1}{6}$  inch from the end. I have tried many kinds of glue, but cannot stick it; the heat or moisture of the mouth seems to soften the glue. A. Moisten with linseed oil and press together after heating. Too much heat will ruin the amber, and too little will not cause adhesion.

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## INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

March 31, 1891.

## AND EACH BEARING THAT DATE.

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

Addressing machine, C. E. Hadley.....	449,820	Dust collector, A. Hunter.....	449,633	Measurements of time, space or quantity, apparatus for recording, H. Abbott.....	449,192
Dye, black, J. Schmid.....	449,622	Dynamo regulator, B. H. Fisher.....	449,245	Meat cutter, S. T. Jull.....	449,585
Eaven-trouly machine, W. A. Colsten.....	449,107	Egg beater, A. White.....	449,187	Meat cutter, rocking, J. Tritz.....	449,451
Egg carrier, T. E. Perkins.....	449,186	Electric battery, thermo, J. N. Webb.....	449,186	Mechanical movement, J. Z. Roraback.....	449,334
Electric circuits, fuse for, F. W. Maxstadt.....	449,289	Electric circuit, fuse for, F. W. Maxstadt.....	449,289	Metal can, Reiset & Waaber.....	449,186
Electric contact, O. J. Dep.....	449,302	Electric contact protector, R. Varley, Jr.....	449,302	Metallic bond of and apparatus for reducing, W. Wakely.....	449,145
Electric currents, regulating apparatus for, W. Lahmeyer.....	449,248	Electric currents, regulating apparatus for, W. Lahmeyer.....	449,248	Meter, See Pison meter.	
Electric fixtures, hanger board for, G. B. Lean.....	449,266	Electric fixtures, hanger board for, G. B. Lean.....	449,266	Metrotonic, A. G. Pinfold.....	449,635
Electric light shade, J. W. Easton.....	449,407	Electric light shade, J. W. Easton.....	449,407	Mill, See Feed mill. Grinding mill, Rolling mill.....	
Electric lighting system, G. Gibbs.....	449,474	Electric switch, H. T. Clark.....	449,282	Mill and power mechanism, E. C. Griffin.....	449,118
Electric switch, W. H. Clark.....	449,188	Electric switch box, J. H. Dean.....	449,382	Mixing apparatus, R. Smith.....	449,250
Electric wires, binding post for, H. P. Ball.....	449,307	Electric wires, binding post for, H. P. Ball.....	449,307	Monkey wrench, V. J. McDonnell.....	449,129
Electric wires, covering, T. W. Norman.....	449,168	Electric wires, elastic metallic pole for, C. A. Lieb.....	449,125	Motor, See Spring motor.	
Electric wires, elastic metallic pole for, C. A. Lieb.....	449,125	Electric-magnetic device, M. G. Crane.....	449,706	Mucilage holder and spreader, J. H. Porter.....	449,234
Elevator, See Coal or grain elevator. Package elevator. Portable elevator. Water elevator.....		Elevator operating system, electric, W. Baxter, Jr.....	449,611	Muffler, steam, C. E. Healy.....	449,120
Engine, See Gas engine. Multiple expansion engine.....		Engines, converting device for steam, F. W. Leffel.....	449,162	Musical instrument, H. Dunsmuir.....	449,284
Engines, device for maintaining the gum on, E. E. Kingsley.....	449,490	Engines, device for maintaining the gum on, E. E. Kingsley.....	449,490	Musical instruments, keyboard playing attachment for, J. P. Becker.....	449,396
Felt shaver, B. Marley.....	449,163	Felt shaver, B. Marley.....	449,163	Needle points machine for polishing, W. H. Dayton.....	449,313
Balloon, B. E. Budgen.....	449,240	Felt shaver, B. Marley.....	449,163	Newspaper cover, J. Davis.....	449,210
Baloon from caving, device for preventing, D. H. Solomon.....	449,385	Felt shaver, B. Marley.....	449,163	Nut lock, F. M. Diffany.....	449,211
Bar, See Cutter bar.		Felt shaver, B. Marley.....	449,163	Oil, tanner's, W. B. Davis.....	449,437
Battery. See Electric battery. Galvanic battery.....		Felt shaver, B. Marley.....	449,163	Opera glass holder, J. U. Gerow.....	449,531
Bellows fold coupling, E. L. Perry.....	449,687	Felt shaver, B. Marley.....	449,163	Ordnance breech-loading, H. Schneider.....	449,335
Belt, electric, D. P. Andrus.....	449,455	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Organs, F. Roosevelt.....	449,177
Belt gearing, T. H. McCrary.....	449,186	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Organ, domestic, J. Watson.....	449,590
Belt shaver, E. Marley.....	449,163	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Organs, H. S. Varley.....	449,442
Bicycle, G. C. Wickes.....	449,131	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Overhose, M. S. Varley.....	449,433
Bicycle, J. B. Evans.....	449,531	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Package elevator, R. Van Heukel.....	
Bicycles, oil can holder for, L. H. Bannister.....	449,491	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Package making and filling machine, H. E. Smyser.....	449,275
Blacking, shoe, G. P. Tipton.....	449,239	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pad, See Harness pad. Hoof pad. Truss pad.....	
Blasting, submarine, T. Puskas.....	449,272	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Paging machine, S. K. White.....	449,304
Boat, See Separable boat.		Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Paper cutting machine, C. R. Ely.....	449,525
Boiler, See Sectional boiler. Steam boiler. Tubular boiler.....		Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Paper holder and cutter, roll, W. G. Haas.....	449,158
Boilers, machine for calking seams and joints of steam, G. J. & C. H. Hoskins.....	449,286	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Paper holder and cutter, roll, E. E. Staninger.....	449,501
Bookbinders machine, Smith & Arnold.....	449,535	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pens, fountain, H. T. Reed.....	449,295
Boot or shoe stay, W. A. Neely.....	449,167	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pencil sharpener, slate, E. R. Lovett.....	449,625
Boot soles, etc., machine for channeling and trimming, J. B. Hadaway.....	449,247	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Photograph erasing attachment, P. T. Dodge.....	449,349
Bottle, metal cased, Z. T. Hall.....	449,118	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Piano action, S. R. Perry.....	449,283
Bottle, nursing, C. B. Balston.....	449,275	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Piano action, upright, G. M. Guild.....	449,583
Bottle scraper, mucilage, M. C. Rosnecht.....	449,285	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Piano tuning apparatus, A. Feldlin.....	449,409
Bicycle, J. B. Evans.....	449,531	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Picture or mirror frame hanger, D. G. Rulon.....	449,496
Bicycles, oil can holder for, L. H. Bannister.....	449,491	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pill machine, J. A. McFerran.....	449,124
Blacking, shoe, G. P. Tipton.....	449,239	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipe coupling, F. J. McGuire.....	449,238
Blimpie, C. B. Dalton.....	449,275	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipe coupling, H. B. Nichols.....	449,666
Boomerang, M. C. Rosnecht.....	449,131	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipe forming machine, J. Hartley.....	449,112
Boomerang machine, M. C. Rosnecht.....	449,131	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipe tester, close, and clean-out, W. P. O'Brien.....	449,161
Boomerang machine, M. C. Rosnecht.....	449,131	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipes, self-adjusting frost protector for ventiat.....	
Boomerang machine, M. C. Rosnecht.....	449,131	Felt shaver, device for maintaining the gum on, E. E. Kingsley.....	449,490	Pipes, T. C. Boyd.....	
Box, See Electric switch box. Letter box. Sig-.....		Fence, See Fence post.		Piston meter, J. B. Negus.....	449,199
Box, See Manufacture of hooped, H. H. Higham.....	449,413	Fence, See Fence post.		Planters, dropper guide for corn, A. P. Aldridge.....	449,100
Bracelet, C. Bachem.....	449,103	Fence, See Fence post.		Platform. See Carr platform.	
Bracket, C. Porter.....	449,134	Fence, See Fence post.		Pliers, T. F. Vandegrift.....	449,250
Brake. See Car brake.		Fence, See Fence post.		Plow, J. A. McIver.....	449,565
Braiding, machine, B. W. Valentin.....	449,503	Fence, See Fence post.		Plow, G. W. Phinney.....	449,331
Bridle bit attachment, A. Lobdell.....	449,176	Fence, See Fence post.		Plow, gang, J. & W. Pacerson.....	449,329
Bridle bits, making, Van Ness & Lewis.....	449,163	Fence, See Fence post.		Plow, river channel, D. H. Solomon.....	449,354
Broom, J. M. Meador.....	449,550	Fence, See Fence post.		Plows, weed attachment for, W. D. Crowell.....	449,465
Broom, stable or street, A. T. Mowll.....	449,440	Fence, See Farm gate.		Plunger press, rebounding, T. J. Strait.....	449,601
Broom, stable or street, C. F. Murray.....	449,455	Fence, See Farm gate.		Pocket knife, W. Schmachtenberg.....	449,99
Broom, stable or street, G. W. Baker.....	449,621	Fence, See Farm gate.		Polishing cone, A. T. Good.....	449,217
Brown, cleaning and polishing, H. A. Webster.....	449,1				

[APRIL 11, 1891.]

Stamp puller, W. Smith.....	449,396
Stamp puller spool, Cunningham & Funk.....	449,307
Sulky, J. W. Kelley.....	449,542
Supporter. See Garment supporter.....	449,141
Suspenders, W. J. Stewart.....	449,141
Switch. See Electric switch.....	449,240
Switch tongue adjuster, I. Mowder.....	449,240
Swivel, H. E. Kelsey.....	449,324
String electro-therapeutic, E. Bartsch.....	449,442
Swing set, self-inflating, Paterson.....	449,270
Telegaph transmitter, H. G. Robbins.....	449,174
Telephone, W. Humans.....	449,254
Telephone circuit and apparatus, J. J. Carte.....	449,106
Telephone sound transmitter, A. E. Schatz.....	449,180
Thermometer graduating machine, J. D. Hall.....	449,442
Thermometer printing machine, J. D. Hall.....	449,444
Thermometer tube filling apparatus, J. D. Hall.....	449,443
Thill coupling, F. N. Kelsey.....	449,367
Thill coupling, Rose & Thompson.....	449,235
Thrashing cylinder, C. Frantz.....	449,438
Thrashing machines, straw stacking attachment for, A. P. Miller.....	449,556
Tile building, J. Pajean.....	449,133
Tire, roofing, E. Bennett.....	449,391
Tire for vehicle wheels, C. Challiner.....	449,251
Tire for vehicles, rubber, A. Straus.....	449,502
Tire for wheels, rubber, Jeffries & Grant.....	449,650
Tire tightener, A. M. Reeves.....	449,234
Tobacco stick, T. H. Ellington.....	449,465
Toasting strips and booking machine, J. R. Williams.....	449,394
Tool box, S. P. Graham.....	449,245
Toy sounding, D. W. Watrous.....	449,146
Transom lifter, A. L. Peacock.....	449,426
Transportation, method of, W. C. Andrews.....	449,102
Trap. See Insect trap.....	449,426
Traps, inserting springs in, E. S. Hotchkiss.....	449,534
Trees, machine for budding, W. M. Rowell.....	449,591
Trimmer. See Band trimmer.....	449,465
Trough. See Water trough.....	449,465
Truck, electric motor, F. O. Blackwell.....	449,197
Truck for railway cars, Pfingst & Bemis.....	449,182
Truck for suspended cars, R. C. Forsyth.....	449,318
Truss pad, J. Garcia.....	449,473
Tubular boiler, down draught, D. V. O'Brien.....	449,481
Type to type bars, tool for clamping, H. Abbott.....	449,190
Typewriting machine, Clinton & McNamara.....	449,616
Typewriting machine, B. T. Mulligan.....	449,562
Typewriting machine, A. B. Reid.....	449,296
Typewriting machine, H. H. Unz.....	449,460
Typewriting machines, platen for, H. Abbott.....	449,481
Umbrella rack or stand, C. R. Risdon.....	449,463
Unloading apparatus, R. S. Kirkpatrick.....	449,448
Unscrew, hand, for household, S. Welch.....	449,147
Valve, ball cock, T. R. Keworth, Jr.....	449,351
Valve, center seal and by-pass, W. Crighton.....	449,351
Valve, cut-off, H. King.....	449,123
Valve for compound engines, starting, W. B. Yeo.....	449,457
Valve for expansion pipes, safety, Bryant & Crow.....	449,348
Valve for tanks, float, Beckman & Lubener.....	449,424
Valve, rotary, F. Schneider.....	449,181
Valve, steam engine, J. E. Waterous.....	449,504
Vat and churn, J. Hansen.....	449,321
Vehicle, convertible, G. H. & G. H. Mutton, Jr.....	449,365
Vehicle running gear, E. O. Pease.....	449,427
Vehicle seats, jointed iron for, G. H. & G. H. Mutton, Jr.....	449,419
Vehicle wheel, J. N. Clouse.....	449,205
Velocipede, J. Edelstein.....	449,111
Velocipede, T. B. Jeffery.....	449,220
Velocipede, J. O. Ratibun.....	449,383
Velocipede, A. W. Schieding.....	449,498
Vulcanizer, J. Fergus.....	449,470
Wagon beds, run iron for, G. A. Nelson.....	449,425
Wagon dumping, J. W. Dunham et al.....	449,212
Wash basin, L. P. & N. Stout.....	449,263
Watch boy fastener, E. Kline.....	449,465
Watch case, traveler, J. A. Lauten.....	449,370
Watchmaker's pliers, E. E. Coble.....	449,310
Water closet, portable, A. J. Niles.....	449,426
Water elevator, J. Faggoa.....	449,252
Water heating device, R. P. White.....	449,509
Water trough, B. Koeppe.....	449,481
Waterways, apparatus for scouring, E. G. Holden.....	449,479
Weather strip for freight car doors, W. R. Betham.....	449,399
Web fabrics, machine for guiding the edges of, L. Hollingsworth.....	449,623
Weighing machine, automatic, H. E. Smyser.....	449,276
Weighing mechanism, grain, S. E. Brown.....	449,402
Welding machines, burr preventer for electric, E. Thomson.....	449,357
Well sinking, expansion drill for, A. Cameron.....	449,613
Wells, groove cutting machine for oil or gas, J. L. Addison.....	449,459
Wheel. See Vehicle wheel. Wind wheel.....	449,426
Wheel scotching device, cart, E. Murgatroyd.....	449,269
Whimmetre, J. M. Blondell.....	449,647
Wind wheel, F. Miller.....	449,399
Wind wheel, M. G. Robbins.....	449,539
Winker attachment, M. Sansoucy.....	449,497
Wire, making seamless plated, F. F. Peck.....	449,428
Wire, manufacturing seamless gold plated, C. R. Smith.....	449,183
Wire, manufacturing seamless hollow, C. R. Smith.....	449,382
Wrapping paper, C. Y. Knight.....	449,124
Wrench. See Monkey wrench. Pipe wrench. Ratchet wrench.....	449,410
Wrench, H. Hammond.....	449,410
Wrench, G. L. McCauley.....	449,575
Wringing roller, C. A. Kohl.....	449,545

## TRADE MARKS.

Cigars, J. Alvarez & Co.....	19,262
Cigars, S. Azciano y Meana.....	19,263
Cigars, V. Bustillo & Brother.....	19,264, 19,267 to 19,272
Cigars, J. S. Murias & Co.....	19,265
Cigars, J. Villamil & Co.....	19,266
Coal, cannel, Macfarlane & Morde.....	19,239
Detergent composition resembling soap, Hyde Carpet Cleaner and Moth Exterminating Co.....	19,259
Hair restorative, J. T. Fay.....	19,242
Hose supporters, G. Frost & Co.....	19,235
Linen, P. M. Murray.....	19,233
Meat, C. Oskamp.....	19,234
Paint, black, H. S. Fassett & Co.....	19,243
Pills, E. Krauth.....	19,243
Porcelain ornaments and toilet and table ware, Haviland & Co.....	19,257, 19,258
Remedy for blood and liver diseases, D. G. Potts.....	19,260
Remedy for rheumatism, neuralgia, and like diseases, J. D. Groves.....	19,231
Rice, prepared, Crystal Rice Milling Company.....	19,241
Seed card, French, Richards & Co.....	19,242
Seeds, herbs, plants, trees, and shrubbery, J. L. Childs.....	19,246
Shawls, woolen, F. T. Bauch.....	19,255
Shears and scissors, a table, pocket, and shaving cutter, A. J. Jordan.....	19,237
Soap, toilet, Ostrom & Lincoln.....	19,244
Soaps and lotions, toilet, E. Rimmer.....	19,244
Sprinklers, automatic, R. Wood.....	19,252
Stoves, heating and cooking, F. A. Klaine.....	19,238
The plates, Copper Miners Tinplate Company.....	19,246
Tin plates, Pontypool Iron and Tinplate Company.....	19,250, 19,251
Tin plates and terne plates, Copper Miners' Tinplate Company.....	19,245
Tin plates and terne plates, Pontypool Iron and Tinplate Company.....	19,248, 19,249
Tin plates, terne plates, and tin taggers, Old Castle Iron and Tinplate Company.....	19,247
Topical remedy, A. I. Babendreier.....	19,253
Wines and alcoholic liquors, H. S. Woodbury.....	19,261

## DESIGNS.

Badge, C. F. Irons.....	20,645
Basket, fruit, J. A. Doty.....	20,641
Belt, apparel, J. Bigelow.....	20,640
Bottle, J. L. Dawes.....	20,656
Dental cabinet, T. J. Collins.....	20,643
Embroidery, P. Kleeberg.....	20,652
Furnace, Kernal, Jr., & Landers.....	20,618
Handle to rknives, etc., R. A. Hathaway.....	20,647
Hole punch, spoon, fork, etc., R. L. Leding.....	20,649
Handle to spoons, forks, etc., W. B. Durkin.....	20,649
Jump-had, A. Lovett.....	20,644
Neckscarf, ornamentation of, S. Finkelstein.....	20,642
Paper, etc., wrapping, H. W. Burtch.....	20,654
Spoon, E. C. Baumgras.....	20,655
Spoon, etc., E. Harris.....	20,657
Spoon, etc., R. Leding.....	20,650
Spoon or fork handle, H. B. Swart.....	20,653
Toy bank, R. Fribbie.....	20,646

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