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Curtis Pressure Regulator and Steam Trap. See p. 364.

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Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 28.

Quint's patent automatic steam engine governor. Correspondence solicited from manufacturers of throttle governor engines. Leonard & McCoy, 113 Liberty Street, New York.

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Notes & 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 This is for our information, and not for publication.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.

(1) Slip of Car Wheels.—Allow me to make the following remark as to your explanation in regard to the locomotive running over a curve, as question solved in your issue of 17th Dec. I claim that in every case the inner wheels will slip, for this reason: For instance, the locomotive is running over a short curve or long curve at their general speed, as whatever it may be, of course its tendency while it met with the curve was to go in a straight line. Now, the change of its direction is due to the curve of the rails in combination with the flanges on the driving wheels (that is, on the outer ones). Thereby more friction is created on them than on the inner ones, consequently the inner wheels will slip easier. The elevation of the outer rail is supposed to partially compensate for the centrifugal force tending to throw the flanges against the outer rail, and as only the flange of the forward driving wheel impinges against the outer rail, there is no reason for concluding that the inner wheels always slip. The whole weight of the locomotive is tended to go in a straight line, as before stated. Now, by meeting with the curve its tendency is being brought in a centrifugal motion, and hence the force being sustained by the outer rails and wheels, thus decreasing the weight of the locomotive on the inner ones, and adding equally as much on the outer. Consequently the inner wheels will slip easier. This is what is claimed in No. 10, Notes and Queries, for a locomotive when drawing. When running under momentum only, the tilting of the locomotive by the elevation of the outer track and the angular position of the track tends to prevent undue friction on the flange of the forward driver. When the locomotive runs on to a curve reversed, the slip necessarily takes place on the outer rail.

(2) W. H. D. asks how to make a canvas bag to hold hydrogen or oxygen gas under pressure for magic lantern use. A. Rubber bags are used for this purpose, and you can most conveniently make

a canvas bag air-tight by coating it with a layer of rubber cement or a solution of rubber in carbon disulphide.

(3) C. E. asks: What will be the best method to clear a waste pipe where mucus is forming or has formed from waste of beer or water, or what would be best to run through it in order to clear itself? A. Use a strong hot solution of soda.

(4) J. H. A. desires a receipt to stain white pine cherry and rosewood color. A. For cherry stain, take of rain water 3 quarts, annatto 4 ounces, boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut; keep it on the fire for half an hour longer, and it is ready to bottle for use. For rosewood stain, take alcohol 1 gallon, camwood 2 ounces; set them in a warm place 24 hours, then add extract of logwood 3 ounces, aquafortis 1 ounce, and when dissolved it is ready for use.

(5) H. M. P. asks: 1. What battery, what size, and how many cells will it require to run Edison's incandescent 6 candle power lamp, resistance 6 to 7 ohms, requiring 9 to 15 volts E. F. and 1.40 amperes current? A. A series of twenty bichromate cells would give you voltage enough for your lamp. Taking a quart battery, you might allow 1/4 ohm to each cup. This would give ten ohms internal resistance and would give through a 60hm lamp a low lighting current, say 1.25 amperes. 24 square inches of zinc in a porous cup cell are allowed by some per ampere on short circuit. 2. Would this lamp be sufficient candle power to light a room 17 by 17 feet? A. The light would be quite insufficient for the room. 3. How should the batteries be connected? A. The batteries in above calculation are connected in tension. The more you use in parallel, so as to bring down the resistance, the less acid and zinc will be used. See SCIENTIFIC AMERICAN, vol. 57, No. 2, page 16, for article on this subject. 4. What would probably be cost of maintenance per hour? A. The cost per hour depends on so many factors that it cannot be given. It will cost probably one or two cents an hour in chemicals and zincs, irrespective of the trouble. 5. Is it possible to run the lamp with gravity battery? If so, how many cells? A. A gravity battery is not available for this work. 6. Will these lamps develop the power as given by manufacturers? A. The lamps can be run far over the rated power, but they wear out sooner. 7. If this lamp is too small for practical purposes, please give battery, etc., required for 16 candle power lamp. A. For a 16 candle lamp 40 cells in series would answer.

(6) F. M. W. writes: Describe the process of polishing horn. A. It must be rubbed first with fine glass paper and then with a piece of wet linen cloth dipped in powdered pumice stone. This will give a very fine surface, and the final polish may be produced by washed chalk or fine whiting applied by a piece of cloth wetted with soapsuds. Care must be taken in this, and in every instance where articles of different fineness are used, that, previous to applying a finer, every particle of the coarser material is removed, and that the rags are free from grit.

(7) J. G. M. writes: I have recently fitted my main building, 100 x 40 feet and 35 feet high, with lightning rods, having 4 points 8-feet high and having two connections to the ground. Will you kindly tell me the required size and thickness of copper plate for ground connection, whether it should be soldered to the rod or not and whether it should be put at lower end of rod, 6 feet down, or higher up? A. Use a copper plate having about 20 square feet area. Ordinary sheet copper, such as is used for roofing, or in the manufacture of culinary vessels, will answer. The lower end of the rod should extend across the plate and be soldered. The plate should be buried in earth that is always moist. Another way to make a good ground connection is to dig a trench 10 feet long in earth that is constantly moist. Put a layer of coke on the bottom of the trench; loop the rod and lay it on the coke. Cover the rod with a layer of coke and fill in the trench with earth. The trench should extend away from the building.

(8) H. W. K. asks for a cement which can be used to stick art tile to iron. A. Try a gutta percha cement, made by melting together in an iron pan 2 parts of common pitch and 1 part of gutta percha. Stir them well together until thoroughly incorporated and then pour the liquid into cold water. When cold it is black, solid and elastic; but it softens with heat, and at 100° Fah. is a thin fluid.

(9) C. A. F. desires a receipt for preparing white linen cloth so that it can be written on without blotting, at same time making it stiff and glossy and to cut without fraying. A. Varnish the cloth with Canada balsam dissolved in turpentine, to which may be added a few drops of castor oil, but do not add too much, or it will not dry. Try a little piece first with a small quantity of varnish. The kind of cloth to use is fine linen. Don't let the varnish be too thick.

(10) J. H. R. desires a receipt for a wash or any other preparation for the hair that will make it curl. A. Take borax 2 ounces, gum arabic 1 drachm, add hot water (not boiling), 1 quart; stir, and as soon as the ingredients are dissolved add 3 tablespoonfuls of strong spirits of camphor. On retiring wet the hair with the above liquid.

(11) E. H. D. desires (1) recipes for making purple, green, and black copying typewriter inks. A. Take any desired shade of aniline dye 1/4 ounce, dissolved in 15 ounces pure alcohol, and 15 ounces glycerine, then apply to the ribbon. 2. Do strong electric or calcium lights produce sensible effect on photographic preparations? A. Calcium light has little effect, but electric light has an effect which, under sufficient exposure, is as great as sunlight.

(12) H. B. asks (1) for directions for making effervescent solution of citrate of magnesia. A. Dissolve citric acid 400 grains in water 2,000 grains, add carbonate of magnesia 200 grains; stir until dissolved. Filter into a 12 ounce bottle containing sirup of citric acid 1,200 grains. Add boiled and filtered water to fill bottle, drop in bicarbonate of potash in crystals 30 grains and immediately cork. Shake until

bicarbonate of potash is dissolved. The sirup of citric acid is made from citric acid 8 parts, water 8 parts, spirit of lemon 4 parts, sirup 960 parts. 2. How much power should I get from a bichromate of potash battery with a zinc plate 3 inches long, 2 inches wide, and 4 arc light carbons 3 inches long and 1/8 inch in diameter, two on each side of zinc, and what is its resistance? A. Your battery would give about 1/2 ampere, with resistance of 4 ohms.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

January 10, 1888,

AND EACH BEARING THAT DATE.

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

Advertising frame, R. N. Searles..... 376,265
Air compressor, G. Chamberlin..... 376,141
Ammonium sulphate, apparatus for making, W. Simpkin..... 376,351
Animal trap, A. M. Cleaver..... 376,142
Animal trap, A. E. Kunderd..... 376,246
Animals from jumping fences, device for preventing, Booth & Beard..... 376,065
Annunciator, J. P. Tirrell..... 376,171
Band band, A. J. Helm..... 376,091
Band cutter, J. E. Schooley..... 376,166
Bar. See Plow bar.
Barrel head, J. Alvord..... 376,223
Barrel holder, E. C. Gillem..... 376,376
Battery zinc, J. Beattie, Jr..... 376,228
Bedstead, folding or wardrobe, F. B. Williams..... 376,127
Bedstead, wardrobe, F. B. Williams..... 376,126
Belt shifter and trainer, F. L. Palmer..... 376,389
Belting machine, J. H. Adanson..... 376,174
Bench dog, D. A. Owen..... 376,206
Bench hook, A. P. Millspaugh..... 376,331
Bevel, L. D. Gould..... 376,301
Bicycle, Fillex & Monnin..... 376,241
Bit. See Bridle bit.
Block. See Wagon brake block.
Blowers or other machines, intermittent grip for fan, J. F. Bender..... 376,361
Boiler. See Steam boiler.
Bolt, J. Potter..... 376,258
Bookmark, reference, H. H. Russell..... 376,110
Boot and shoe box fixture, mercantile, Cobb & Bowen..... 376,070
Boot or shoe, H. Emfandt..... 376,183
Boot or shoe, W. D. Kline..... 376,154
Boot, woolen, Dodge & Smith..... 376,373
Boots, manufacture of woolen, Dodge & Smith..... 376,372
Boots or shoes, manufacture of, Lion & Cutlan..... 376,411
Boots or shoes, machine for making welts for, M. L. Keith..... 376,310
Box. See Miter box.
Box for the sale of goods, C. T. Rosenthal..... 376,261
Brake. See Car brake. Safety brake. Sled brake.
Brick sanding machine, J. I. Knapp et al..... 376,316
Bridge, draw, O. G. Balston..... 376,225
Bridle bit, A. H. Hanscom..... 376,088
Brush, rubber, J. P. Hoyt..... 376,385
Brushes, handle for muclilage, C. Rowland..... 376,397
Buckle, T. C. Field..... 376,240
Buckle, C. R. Harris..... 376,198
Buckle, E. A. Smith..... 376,287
Buildings, construction and decoration of, S. D. Hatch..... 376,330
Bustle, W. F. Osborne..... 376,394
Bustle, T. P. Taylor..... 376,272
Button, cuff, F. F. Bioren..... 376,282
Buttonhole finishing machine, G. S. Hill..... 376,245
Cake or bread beater, S. F. Stowe..... 376,420
Calendar, F. W. Moulton..... 376,391
Can, F. N. Gaskell..... 376,085
Can filling apparatus, H. Hermann..... 376,195
Can filling machine, W. H. Wright..... 376,403
Can for molasses, etc., S. R. Billups..... 376,064
Car brake, L. Kupferschmid..... 376,100
Car coupling, F. C. Bailey..... 376,131
Car coupling, C. G. Crosse..... 376,237
Car coupling, J. Hendershot..... 376,244
Car coupling, E. Huber..... 376,093
Car coupling, O. Hughes..... 376,386
Car coupling, A. Keeports..... 376,309
Car coupling, S. D. Locke..... 376,387
Car coupling, T. W. McKee..... 376,412
Car coupling, B. B. Morgan..... 376,335
Car coupling, J. P. Runkel..... 376,164
Car coupling, C. M. Shupe..... 376,213
Car starter, H. P. Wayman..... 376,356
Cars by electricity, lighting, A. D. Stevens..... 376,116
Cars, track brake for, J. S. Bokenkotter..... 376,363
Cars with hot air, apparatus for heating, Casselman & McGann..... 376,138
Carburetor, F. J. Lothammer..... 376,248
Carriage body, C. A. Reade..... 376,162
Carriage, child's, T. Lanston..... 376,201
Carriage spring, J. R. Northrup..... 376,158
Carriage top, H. B. Pitner..... 376,414
Carrier. See Hay carrier.
Cartridge shells, loading apparatus for, G. G. Greenough..... 376,148
Casehardening and cementation compound, G. F. Evans..... 376,186
Cash carriers, air cushioned counterbalance for, L. G. Bostedo..... 376,286
Cash carrier apparatus, pneumatic, Pain & Webber..... 376,159
Cash indicator and register, Schickner & Rothlisberger..... 376,262
Casting apparatus, hub, F. H. Emsign..... 376,146
Chain, drive, B. A. Lezz..... 376,325
Chair. See Railway rail chair. Reclining chair.
Chair, D. Parks..... 376,256
Chair attachment, rocking, W. Seng..... 376,266
Check hook, W. R. Moore..... 376,894
Check rein attachment, G. Hosley..... 376,206
Chisel, J. R. Bailey..... 376,276
Chopper. See Cotton chopper.
Cigar fillers, mould for measuring and partially shaping, F. A. Ford..... 376,147
Cigarettes, etc., pocket box for, C. S. Alden..... 376,056
Clamp, W. D. Hawley..... 376,304
Clock striking mechanism, W. E. Counter..... 376,074
Closet. See Water closet.
Closet flushing and regulating device, siphon, P. Harvey..... 376,090
Cock, sea, F. C. Starke..... 376,270
Cock, water, J. M. Anderson..... 376,129
Cock, water, H. D. Medrick..... 376,253
Cocks, etc., automatic device for shutting water, J. W. Brook..... 376,287
Coffee pot, A. J. Lane..... 376,319
Coffin handle, G. C. Frazier..... 376,407
Coin operated lock, M. Easton..... 376,182
Color, production of a new red azo, A. Mylins..... 376,392
Combination table, Riser & Bardonner..... 376,415
Coop, chicken, G. W. Brown..... 376,230
Core machine, Mauser & Richmond..... 376,165
Corn removing knife, C. Langbein..... 376,320
Cotton chopper, J. B. Ammons..... 376,274
Cotton chopper, W. P. Clark..... 376,294
Cotton, etc., machine for opening and cleaning, D. H. Rice..... 376,346
Coupling. See Car coupling. Pipe coupling. Tug coupling.
Crate, T. W. Lankford..... 376,321
Cultivator attachment, W. Nave..... 376,336
Curtain fixture, J. Cremer..... 376,143
Cutter. See Band cutter.
Dial, indicator, L. L. Mitchell..... 376,103
Die and die holder for drawing, W. Alderdice..... 376,222
Digger. See Potato digger.
Display rack, J. M. Laudick..... 376,318
Ditching machine, tile, W. Skinner..... 376,352
Door check, W. H. Stevens..... 376,117
Draught equalizer, W. A. Perkins..... 376,386
Drawing knife, J. R. Bailey..... 376,277
Drilling machine, T. H. Ward..... 376,354
Electric circuit breaker, W. R. Cole..... 376,071
Electric conductors, pole indicator for, A. Berghausen..... 376,281
Electric lock, C. A. Tucker..... 376,121
Electric machine, dynamo, F. Jehl..... 376,707
Electric machine or motor, dynamo, E. Thomson..... 376,120
Electric machines, armature for dynamo, H. Iemp..... 376,326
Electrical circuit breaker, W. R. Cole..... 376,072
Elevator, F. L. Palmer..... 376,340
Elevator safety device, A. C. Ellithorpe..... 376,374
End gate, J. Clayton..... 376,405
Engine. See Gas engine. Steam engine.
Envelope for newspapers and other merchandise, R. W. Macgowan..... 376,249
Envelopes, machine for sealing and stamping, H. J. Moore..... 376,883
Eraser, rubber, W. Friend..... 376,081
Explosive derived from phenol, S. H. Emmens..... 376,145
Fan, power, J. A. Mason et al..... 376,327
Fan, toilet, G. R. Burdon..... 376,231
Faucet, liquid measuring, H. M. Nye..... 376,254
Feed mill, T. C. Cadwgan..... 376,232
Feeding salt to live stock, device for, W. H. Barger..... 376,360
Fence, W. Van Horn..... 376,218
Fence machine, Elliott & Reid..... 376,184
Fence, portable, P. Newby..... 376,387
Fences, clamp for wire and picket, A. Fickett..... 376,299
Fifth wheel for vehicles, W. Blume..... 376,178
File, bill, C. C. Chamberlain..... 376,140
File, bill, S. Ely..... 376,185
Filter, rotary or oscillating, J. W. Hyatt..... 376,036
Fire alarm, circuit, J. P. Barrett..... 376,133
Fire engines, heater for steam, E. Medden..... 376,330
Fire engines, speaking tube for, W. E. Cassells..... 376,067
Fire escape, G. Pritchett..... 376,160
Fire escape, folding, I. B. Stillman..... 376,216
Fire extinguisher, W. H. Durant..... 376,239
Fire extinguishing attachment for car stoves, Ross & Brooker..... 376,163
Fire proof structure, S. D. Hatch..... 376,331
Fishing reels and rods, wedge ferrule for, H. Prichard..... 376,270
Flier frame, H. F. Straw..... 376,118
Frame. See Advertising frame. Flier frame.
Furnace. See Hot air furnace.
Gauge. See Water gauge.
Garment or coat hanger, G. Pavlik..... 376,207
Garment protector, S. I. Salomon..... 376,210
Gas engine, H. K. Shanck..... 376,212
Gas pressure regulator, M. W. Kidder..... 376,313
Gate. See End gate. Swinging gate.
Generator. See Steam generator.
Grader, road, O. E. Moats..... 376,156
Grain binder, W. N. Whiteley..... 376,123
Grain cradle, F. S. Kretsinger..... 376,317
Grain separator, N. Nilson..... 376,157
Grate, H. P. Tallmadge..... 376,170
Grooving machine, A. V. Allen..... 376,057
Guard. See Yoke guard.
Guns and ordnance, making, F. J. Seymour..... 376,168
Hammer, drop, J. Sandage..... 376,111
Handle. See Coffin handle. Mason's float handle. Tool handle.
Hanger. See Garment or coat hanger.
Harrow, J. M. Childs (r)..... 10,893
Harvester, corn, A. Hollingsworth..... 376,384
Harvester, grain binding, S. V. Kennedy..... 376,199
Hay carrier, W. S. & E. J. Risley..... 376,109
Hay rake, horse, J. G. Alexander..... 376,175
Heel burnishing machine, J. H. Buself..... 376,066
Hox trap, S. Loffer..... 376,388
Holder. See Barrel holder. Pencil rubber holder.
Photographic plate holder. Stub holder.
Hook. See Bench hook. Check hook.
Horse detacher, S. A. Pugh..... 376,107
Horse tail tie, O. Hasbrouck, Jr..... 376,151
Hot air furnace, W. Morrison..... 376,390
Hub boring machine, J. Bieber..... 376,053
Hub, self-lubricating vehicle, J. V. Hawkey..... 376,172
Indicator. See Cash indicator.
Injector, W. T. Ewing..... 376,187, 376,183
Injector, S. L. Kneass..... 376,315
Inkstand, safety, L. B. Prahar..... 376,259
Iron or steel, treating, E. D. Wassell..... 376,321
Jar fastening, W. H. Clarke..... 376,569
Joint. See Rail joint. Wood joint.
Knife. See Corn removing knife. Drawing knife.
Knitting machine, circular, W. J. McDevitt..... 376,328
Ladder, step, J. T. Miller..... 376,102
Ladies, machine for making, I. Hamilton..... 376,377
Lamp, electric, L. H. Leber..... 376,323
Lasting machine, F. Chase..... 376,368
Lead traps, making, J. A. Lowe..... 376,203
Lock. See Coin operated lock. Electric lock. Nut lock. Safe lock. Seal lock. Wagon lock.
Loom, F. Kesslering..... 376,312

Loom let-off mechanism, J. P. Thompson.....	376,353	Spinning spindles, support for, W. T. Carroll.....	376,234
Lozenge machine, O. R. Chase.....	376,068	Spring, See Carriage spring. Vehicle spring.....	
Mask, baseball, G. Barnard.....	376,278	Stanchion, D. Y. Clark.....	376,089
Mason's float handle, E. M. Van Duzer.....	376,217	Stave jointing machine, A. D. Catlin.....	376,139
Mattress stuffing machine, E. N. Stephenson.....	376,389	Steak perforator, T. W. Franklin.....	376,080
Measure, milk, C. L. Christenson.....	376,293	Steam boiler, W. H. Odell.....	376,205
Measure, rotary grain, Busenbarrick & Mitchell.....	376,367	Steam boiler, sectional, Dimmick & Smith.....	376,371
Measuring distances, instrument for, A. Osborn.....	376,338	Steam boiler, sectional, R. Ponnay.....	376,257
Mechanical movement, J. F. Hanley.....	376,303	Steam engine, G. W. Stewart.....	376,271
Metal cylinders, machine for shaping wrought, F. J. Seymour.....	376,167	Steam generator, sectional, J. Kling, Jr.....	376,098
Milk receiver, B. J. Cady.....	376,291	Steaming and cooking purposes, device for, D. C. Ganter.....	376,084
Mill. See Feed mill.....		Steel, treating low, H. A. Harvey.....	376,194
Miter box, H. D. Lanfair.....	376,300	Stereotyping, matrix for, Schreiner & Schott.....	376,348
Mitering machine, J. G. Googins.....	376,192	Stocking supporter, S. B. Ferris.....	376,298
Moulding machine, wood, W. J. Smith.....	376,283	Stone dressing machine, U. Cummings.....	376,296
Nail making machine, F. F. Raymond, 2d.....	376,208	Stove drum, G. Stephenson.....	376,115
Nail tongs, A. Wood.....	376,220	Stove, heating, O. P. Daly.....	376,076
Nailing machine, Smith & Evans.....	376,114	Stovepipe grooving machine, E. G. Wilcox.....	376,173
Needle blanks, machine for swaging, W. H. Dayton.....	376,144	Stove, safety self-extinguishing car, R. M. Baché.....	376,275
Nut blanks, method of and machine for making, S. S. Babbitt.....	376,224	Strainer for water under pressure, T. Lee.....	376,324
Nut lock, H. C. Bowen.....	376,179	Stub holder, J. M. Berry, Jr.....	376,062
Nut lock, J. A. Saunders.....	376,347	Sulphite solutions, production of, A. Frank.....	376,189, 376,190
Nuts, machine for counterboring and tapping, J. Gielow.....	376,408	Supporter. See Stocking supporter.....	
Overshoe, W. Hanley.....	376,378	Surgeon's appliance, O. Schlatter et al.....	376,264
Pail, lunch, C. M. & L. N. Thayer.....	376,113	Swinging gate, O. West.....	376,358
Paper box covering machines, cut-off attachment for, H. Inman.....	376,096	Switch. See Safety switch.....	
Paving and roofing compound, A. Walrath.....	376,172	Table. See Combination table.....	
Paving, composition of matter for, H. Busse.....	376,290	Tanks, attachment for supply, W. B. Chamberlin.....	376,292
Paving, making artificial or elastic bitumen for, H. Busse.....	376,289	Tannin extracts, manufacture of, H. M. Rau.....	376,345
Pencils, compass attachment for, M. Hanower.....	376,379	Telephonic transmitter, S. E. Beedy.....	376,060
Pencil rubber holder, J. Hoffman.....	376,196	Thermoscopes, receiving, transmitting, and distributing instrument for electro-magnetic, H. J. Haiht.....	376,149
Photographic plate holder, H. Coppin.....	376,181	Tie. See Horse tail tie. Railway tie.....	
Pictures of natural scenery and life, method of and apparatus for producing animated, A. Le Prince.....	376,247	Tool, combination, J. Angus.....	376,058
Pipe coupling, J. Armstrong.....	376,130	Tool handle, W. Millsbaugh.....	376,413
Pipe coupling, G. H. Benjamin.....	376,061	Torpedo placer, railway, S. W. Doane.....	376,078
Pipe wrench, D. R. Porter.....	376,396	Trap. See Animal trap. Hog trap.....	
Piping, flexible, Wilder & Benjamin.....	376,401	Trousers stretcher, H. E. Galloway.....	376,088
Planter, check row corn, E. N. Williams.....	376,125	Truck, M. Loree.....	376,389
Planter, corn, J. W. Craig.....	376,370	Truck, car, S. Davis.....	376,077
Planter, corn, A. Winston.....	376,422	Truck hand, S. Rogers.....	376,299
Planter, seed, J. F. Guilmarin.....	376,243	Tubes, method of and means for reducing the diameter of, A. Paterson.....	376,106
Planter, seed, J. V. Harter.....	376,089	Tug coupling, hame, D. Hill.....	376,305
Planters, compensating clutch for corn, J. S. Johnson.....	376,308	Turning crosshead pins, machine for, B. J. Coates.....	376,235
Plotter and protractor, W. J. Mitchell.....	376,332	Type writer cabinet, W. Horrocks.....	376,092
Plow attachment, Null & Bussard.....	376,393	Type writing machine, A. T. Brown.....	376,180
Plow bar, adjustable, C. R. Barfield.....	376,246	Upsetting machine, Cooke & Carlough.....	376,295
Plows, sulky attachment for, N. C. Barnes.....	376,176	Valve gear, D. F. Gallagher.....	376,082
Plumbing wall paper, window shades, etc., device for, J. Panyard.....	376,341	Valve, pressure regulating, F. Markgraf.....	376,101
Polishing and varnishing machine, J. W. Hussey.....	376,198	Vehicle running gear, P. Emery.....	376,079
Polishing powder, manufacture of, V. Seib.....	376,211	Vehicle running gear, Warrington & Bulger.....	376,219
Pot. See Coffee pot.....		Vehicle spring, H. A. Myers.....	376,104
Potassium carbonate, obtaining, F. Brunjes.....	376,368	Vehicle spring, S. H. Raymond.....	376,161
Potato digger, H. D. Binkley.....	376,229	Velocipede, railway, C. L. Collier.....	376,073
Potato digger, D. Y. Hallock.....	376,086	Velocipede saddle, E. G. Latta.....	376,322
Power shears, shear blade for, J. P. Halpin.....	376,087	Ventilator, S. W. Hurlbut.....	376,094
Power, transmitting, A. Higginson.....	376,383	Vise or clamp, hand, A. H. George.....	376,191
Press, L. D. Gordon.....	376,300	Wagon brake block, C. P. Bateman.....	376,404
Press for butter and other plastic material, G. F. Johnson.....	376,097	Wagon lock, I. M. McGonigle.....	376,329
Printing machines, accumulating sheets for, L. E. Brookes.....	376,288	Wall covering, J. A. Shephard.....	376,350
Printing presses, throw-off mechanism for job, A. P. Barber.....	376,059	Washing machine, S. S. Barrie.....	376,279
Projectile, M. E. Gregg.....	376,302	Washing machine, G. F. Dunning.....	376,298
Projectile, line throwing, J. N. Fletcher.....	376,375	Water closet flushing pipe, T. Butler.....	376,137
Protector. See Garment protector.....		Water closet, T. Kennedy.....	376,311
Pulverizing machine, A. D. Searls, Sr., et al.....	376,112	Water gauge, Parker & Tupper.....	376,255
Pump, W. J. Hearn.....	376,382	Water wheel, J. N. Weeks.....	376,357
Punch, A. Burrows.....	376,136	Wheel. See Fifth wheel. Water wheel.....	
Quilting machine, shuttle driver for, A. Beck.....	376,290	Whip core, E. K. Warren.....	376,273
Rack. See Display rack.....		Winding spools, machine for, G. H. Wilkins.....	376,124
Rail joint, G. H. Williams.....	376,402	Wire, barb, C. D. Rogers.....	376,418
Railway crossing, cable, E. S. Holden.....	376,153	Wire machine, barb, C. D. Rogers.....	376,417
Railway rail chair, and tie, combined, N. M. Marks.....	376,250	Wood joint, J. Collins.....	376,236
Railway signal, A. B. Blackburn.....	376,362	Wrench. See Pipe wrench.....	
Railway tie, J. W. Smith.....	376,214	Yoke guard, neck, H. Kniphals.....	376,099
Railway track, G. C. Baker.....	376,132		
Railway trains, pipe coupling for, N. Curtis.....	376,075		
Rake. See Hay rake.....			
Rasp cutting machine, J. & G. W. Stokes.....	376,400		
Razors, machine for honing, E. Wyttenbach.....	376,221		
Reclining chair, A. E. Palmer.....	376,105		
Refrigerator, R. Schierenbeck.....	376,263		
Regulator. See Gas pressure regulator.....			
Routing machine, G. K. Birge et al.....	376,134		
Rubber, apparatus for coating fabric with, J. H. Pearce.....	376,344		
Rubber upon one or both sides, machine for coating fabric with India, J. H. Pearce.....	376,343		
Rule, folding, A. Ryan.....	376,165		
Safe lock, H. Stanyonought.....	376,215		
Safety brake, H. Brockman.....	376,365		
Safety switch, J. B. Batt.....	376,177		
Sash cord fastener, M. H. Kinsley.....	376,314		
Sash cord fastener, O. C. Seiter.....	376,349		
Sash fastener, G. H. Aylworth.....	376,359		
Sash fastener, N. McIntyre.....	376,252		
Sawmill carriages, steam feed for, J. B. St. Louis.....	376,169		
Sawswage, H. W. Williams.....	376,128		
Saws, feed for stone, N. McIntyre.....	376,251		
Screw bolts, machine for finishing heads of, C. D. Rogers.....	376,416		
Screw tap, L. Parkerton.....	376,342		
Seal lock, Ware & Benjamin.....	376,355		
Seed tester, H. A. Goetz.....	376,242		
Separator. See Grain separator.....			
Sewer, shoe, C. K. Sherburne.....	376,118		
Sewing machine, J. Bolton.....	376,285		
Sewing machine buttonhole attachment, F. Egge.....	376,297		
Sewing machine feeding attachment, S. D. Tucker.....	376,122		
Sewing machine feeding mechanism, J. Bolton.....	376,293		
Sewing machine oscillating shuttle driver, J. Bolton.....	376,284		
Sewing machine shuttle operating mechanism, J. Bolton.....	376,361		
Shaft for steamships, W. H. Brown.....	376,135		
Shears. See Sheep shears.....			
Sheep shears, D. Cameron.....	376,233		
Shingle sawing machine, S. S. Morton.....	376,204		
Shovels, spades, etc., manufacture of, J. C. Russell.....	376,388		
Signal. See Railway signal.....			
Silicates and carbonates, making alkaline, A. Kayser.....	376,409		
Silicates, making alkaline, A. Kayser.....	376,410		
Sled, bob, F. L. Beard.....	376,227		
Sled brake, J. R. Hoyt.....	376,197		
Sole laying machine, F. W. Coy.....	376,406		
Sole, lifter, etc., inner, A. F. Smith.....	376,419		
Speed changer, A. Harding.....	376,150		

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