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.

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 This is for our information and not for publication.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.

(2976) A. C. asks: 1. Is an iron casting containing from 40 to 60 per cent of steel (or *vice versa*) of any commercial value as scrap? A. Yes. 2. Is it possible to decarbonize foundry irons by the Bessemer or any other process? If not, why? A. Yes; but they may not be well adapted for it, as not being pure enough, etc. 3. Why will steel scrap produce slag in a cupola and not in a covered crucible? A. In the cupola it is mixed with the ashes of the coal, which have to be slagged off, and it also needs slag to protect it from oxidation. In a covered crucible there is no impurity to be disposed of, and the steel is protected from oxidation. 4. In the manufacture of steel car wheels are the wheels cast from new steel, made in a converter? A. Casting direct from a converter has had very little success hitherto, on account of blowholes in the metal. 5. Is not the presence of blowholes in steel castings due more to the lack of pressure on the castings rather than to impurities in the metal? A. Blowholes are due to the low degree of fluidity of melted steel, and only to a limited extent to impurities. 6. What work is there on the manufacture of steel castings that you could recommend as being thoroughly up to the times? A. We highly recommend our SUPPLEMENT, No. 692, as well as many others to be found indexed in our new catalogue of SUPPLEMENTS. Also Howe's "Metallurgy of Steel," $10 by mail.

(2977) J. N. H. asks: 1. In what ratio is the time in which no current is passing to the time in which a current is passing in an alternating current? A. The time when no current is passing is almost zero. As the current rises and falls, and changing in direction rises again, the zero phase is indefinitely short in duration. The full discussion is quite complicated. 2. How can the lines of force about a certain magnet be calculated? A. By determining the adhesion of an armature, or by determining the E. M. F. produced by cutting the lines with a coil of given size, or by producing the lines and determining the E. M. F. produced in a coil of known size. 3. What is meant by the "torque" of an armature? A. The turning moment or couple, the product of the pull upon the armature by its effective radius tending to produce rotation. 4. What is a "cushion tire" on a bicycle? A. A hollow tire, giving greater extent of cushioning than the ordinary solid rubber tire.

(2978) C. H. asks: 1. What kind of battery would be most satisfactory and economical to run a motor to furnish ¼ horse power? A. Probably a Bunsen battery is the best for your purpose. You will find it a troublesome and expensive power. 2. How many cells would be required A. Enough to give 373 watts through zero external resistance, say 24 one quart cells. 3. How long would they furnish the required current at one charging? A. With ordinary use they will work for 50 or 60 hours with one full charge and an additional renewal of the bichromate solution. 4. What makes the bones of canned salmon so soft and brittle? A. The canning process, and action of the ingredients.

(2979) N. E. C. asks: What is the difference between air pressure at sea level and one, two, three, four and five thousand feet elevation respectively? And, what the difference in the volume of air at sea level and the above elevations? A. Taking the height at sea level as 30 inches, at 5,000 feet it is 24·773: at 10,000 feet, 20·459; at 15,000 feet, 16·896: at 3 miles, 16·361; at 6 miles, 8·923; at 9 miles, 4·866; at 15 miles, 1·448. As a rough approximation, allow one inch to one thousand feet. The volume of the air is in inverse ratio to the height of the barometer.

(2980) A. F. asks (1) if there is anything he can put on boots and shoes to make them waterproof? A. Beef tallow 4 ounces, resin 1 ounce, beeswax 1 ounce, melt together and add an equal quantity of neat's foot oil. Rub in while warming the shoe at a fire. 2. How can I take spots out of clothes, black worsted. It is a lightish spot, and I think it is grease. A. Use benzine, applying in a ring around the spot and finally to the spot itself. 3. How can I make cloth waterproof? A. Melt in paraffin wax with a hot iron. 4. I have a scar on my chin; how can I take it off? A. It is probably impossible to remove completely; consult a physician.

(2981) H. A. S. asks what the boiling point is for oils of spruce (*Abies nigra*) and tamarack (*Larix Americana*). A. The specific gravity of these oils varies from 0·850 to 0·880; they boil from 300° to 320° Fah., are very slightly soluble in water, sparingly in alcohol, readily in ether.

(2982) M. F. asks how to transfer lithographs to glass. A. Varnish the glass with dammar varnish or Canada balsam. When dry, soak the picture in water for some hours. When the glass is nearly dry, smoothly press the wet picture upon it, being careful to exclude all air bubbles. When all is dry, rub off the paper with the wet finger, dry, and revarnish.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 14, 1891.

AND EACH BEARING THAT DATE.

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

Adjustable bracket, Nacke & Brinkmann ... 450,250
Alarm. See Burglar alarm. Fire alarm.
Animal trap, Murphy & Lennon ... 450,471
Animal trap, F. Warner ... 450,545
Annunciator, heat, A. Reinemann ... 450,425
Arm, artificial, T. Sparham ... 450,476
Armature, L. C. Atwood ... 450,552
Automatic lubricator, C. A. Pierce ... 450,421
Axle, car, L. Hall, Jr ... 450,230
Axle lubricator, C. W. Brewer ... 450,135
Axle nut, vehicle, J. Hansen ... 450,311
Baby jumper, R. Billeaux ... 450,394
Badge, campaign, H. Phillips ... 450,524
Baling press, W. H. Howard ... 450,585
Baling press, J. M. Sanders ... 450,301
Banjo, C. A. Woodhull ... 450,442
Bar. See Car draw bar.
Barrel hooping machine, W. H. Potter ... 450,190
Barrel washing machine, M. Gottfried ... 450,149
Bather's appliance, F. W. Ostrom ... 450,318
Batteries, porous cell for galvanic, W. Burnley ... 450,354
Battery. See Galvanic battery.
Bedstead, wardrobe, N. G. Augier ... 450,600
Bell, W. A. Luttgen ... 450,169
Bell and indicator, electric call, W. Cox ... 450,558
Bell, door, Allen & Goulden ... 450,347
Bin. See Coal or grain bin.
Blacking case, J. M. Wheeler ... 450,440
Blind pulley, Venetian, J. G. Wilson ... 450,392
Blind, window, G. W. Morstatt ... 450,316
Board. See Ironing board.
Bobbin or spool, J. L. Cheney ... 450,218
Boiler cleaning compound, E. J. Hoffman ... 450,232
Bolting machine, O. Esche ... 450,310
Book and tally sheet, poll, H. M. Geiger ... 450,582
Books, etc., apparatus for marbleizing or ornamenting, Zichtl & Brecht ... 450,307
Boring and mortising implement, C. Reed ... 450,338
Bottle stopper, W. P. Bonwick ... 450,479
Box. See Cock box. Folding box. Letter box. Paper box. Signal box. Stuffing box.
Bracket. See Adjustable bracket.
Brake. See Car brake. Locomotive driver brake.
Brick or tile machine, J. C. Titus ... 450,201
Bridge wall, tubular, J. R. Walsh ... 450,268
Brush, blacking, R. L. Stevens ... 450,500
Buckets, soap dish and brush holder for scrub, C. A. Inglis ... 450,462
Buckle, D. L. Smith ... 450,442
Bung wrench, J. Smith ... 450,381
Burglar alarm, C. R. Canterbury ... 450,282
Butter extractor, centrifugal, A. Wahlin ... 450,391
Butter, manufacturing, G. H. Hamrick ... 450,459
Butter tub, G. Smith ... 450,261
Button, F. E. Williams ... 450,273
Button, loop, G. Heuser ... 450,510
Cabinet for holding time cards, etc., U. M. White ... 450,271
Cabinet, office, J. W. See ... 450,196
Cable covering machine, J. D. Bishop ... 450,131
Cable covering press, C. H. Matchett ... 450,175
Cake turner, R. W. Stephens ... 450,536
Camera, Blair & Crowell ... 450,214
Can capping machine, J. C. Winters ... 450,276
Can filling apparatus, Many & Harrison ... 450,467
Candle holder, M. V. Woncher ... 450,277
Cane and table, combined, O. N. Kuhl ... 450,603
Car brake, automatic, A. J. Rosentreter ... 450,300
Car, cattle, F. E. Canda ... 450,504
Car coupling, J. F. Angerstein ... 450,348
Car coupling, T. E. Askew ... 450,129
Car coupling, R. Chandler ... 450,217
Car coupling, C. E. C. Edey ... 450,578
Car coupling, J. Green ... 450,356
Car coupling, J. E. Kauffelt ... 450,238
Car coupling, Murphy & McCarthy ... 450,180
Car coupling, Thomas & Littlejohn ... 450,537
Car coupling, J. Simms ... 450,539
Car door, freight or grain, G. C. Dougherty ... 450,559
Car door, grain, C. A. Schroyer ... 450,430
Car draw bar, J. M. Maxwell ... 450,247
Car, electric motor, F. A. Pocock ... 450,189
Car, stock, G. D. Burton ... 450,138
Car, vestibule, H. Tanner ... 450,343
Cars, fender or safety attachment for electric or other, D. Hines ... 450,460
Cars, safety gate for street, F. C. Cash ... 450,556
Cars, switch device for street, J. Young ... 450,549
Carriage, child's folding, F. Bornemann ... 450,362
Cartridge filler, D. T. Llewellyn ... 450,465
Cartridge, paper shell, J. Gardner ... 450,454
Case. See Blacking case. Cigar case. Clock case. Shipping case.
Cash drawer and recorder, P. Westphal ... 450,439
Cash register, H. Cook ... 450,365
Cash register and indicator, H. Cook ... 450,364
Cash register and indicater, Manko & Paine ... 450,416
Cattle guard, C. O. Davidson ... 450,450
Ceiling, metallic, J. R. Wilson ... 450,274
Chamfers, producing, J. L. Dalot ... 450,507
Chart holder, C. H. Congdon ... 450,284
Chimney thimble, C. F. Green ... 450,355
Cigar case, A. H. Hieatzman ... 450,312
Circuit closer, W. C. Johnston, Jr ... 450,292
Clamp. See Jeweler's clamp.
Clasp. See Shoe clasp.
Cleaner. See Grain cleaner.
Clock case, H. S. Prentiss ... 450,528, 450,530
Coal or grain bin, W. Walker ... 450,267
Cock box, stop, E. P. H. Capron ... 450,140
Coffee or tea pot, F. D. Wheelwright ... 450,208
Collar fastener, horse, J. Thielen ... 450,389
Comb. See Curry comb. Toilet comb.
Combination lock, S. K. Weymouth ... 450,207
Composition of matter, W. W. Dunnett ... 450,560
Compound engine, A. J. Pitkin ... 450,374
Copying press, L. Ehrlich ... 450,563
Corn crib and granary, portable, C. I. Cook *et al* ... 450,506
Corn crib, portable, Cook & Britton ... 450,505
Corn popper, H. B. Yaryan ... 450,279
Corner strap, M. E. McMaster ... 450,472
Cotton gins, roll box for, Fraser & Stewart ... 450,229
Cotton scraper and chopper, combined, C. C. Chappel ... 450,480
Coupling. See Car coupling. Hose coupling. Radiator coupling. Thill coupling. Vehicle reach coupling.
Crushing and pulverizing machine, W. H. Howland ... 450,488
Cultivator and thinner, cotton, L. Studer ... 450,303
Cultivator, garden, C. S. Norcross ... 450,523
Cultivator, harrow, and seeder, C. C. Hair ... 450,150
Curry comb, J. Du Shane ... 450,562
Curve scriber, W. Gardner ... 450,455
Cut out, multiple fuse, A. W. Jones ... 450,159
Cutter. See Metal cutter.
Deodorizing compound, F. Lintz ... 450,370
Desk, adjustable folding, J. H. Fry ... 450,580
Door check, H. A. J. Rieckert ... 450,496
Door hanger, C. W. Bullard ... 450,352
Door spring, Harvey & Root ... 450,486
Dress skirt gauge, C. H. Trott ... 450,265
Drill. See Grain drill. Seed drill.
Dry kiln for malting, J. Kam ... 450,237
Dumb waiter, T. Coldwell ... 450,283
Dust collector, C. W. Cooper ... 450,327
Dust collector, O. M. Morse ... 450,372
Dust collector, D. A. Ward ... 450,269
Egg poacher, J. P. Eustis ... 450,564
Electric cable holder, J. W. Marsh ... 450,589
Electric lighting, making filaments for, S. F. Van Choate ... 450,304
Electric machine, dynamo, W. F. Collins ... 450,219
Electric motor, pulsating current, C. J. Van Depoele ... 450,544
Electric motors, automatic switch for, F. E. Whipple ... 450,441
Electric signal R. H. Gruschow ... 450,458
Electric switch, Adam & Knapik ... 450,551
Electric wire connection, E. J. Gatley ... 450,581
Electric wire support, Lieb & Lavens ... 450,587
Electrical distribution system of, C. J. Van Depoele ... 450,541
Electro magnetic reciprocating engine, C. J. Van Depoele ... 450,543
Electro-therapeutic apparatus, regulator for, J. H. Davis ... 450,577
Elevator, C. R. Pratt ... 450,252
Engine. See Compound engine. Electro magnetic reciprocating engine. Gas engine.
Engine operating mechanism, steam, S. H. Pitkin ... 450,526
Engines, machine for boring the cylinders of steam, G. H. Corliss ... 450,401
Engines, machine for finishing side flanges of cylinders of steam G. H. Corliss ... 450,399
Engines, machine for finishing the ends of cylinders of steam G. H. Corliss ... 450,398
Engines, treating the cylinders of steam, G. H. Corliss ... 450,397
Eraser, ink, W. H. Robinson ... 450,378
Exercising apparatus, neck, T. Peterson ... 450,188
Explosives, apparatus for making dope for, J. C. Schrader ... 450,591
Extractor. See Butter extractor.
Fan, rotary, R. Godeffroy ... 450,148
Fare registering apparatus, Depeker & Erhardt ... 450,602
Faucet, registering beer, J. A. Durnbaugh ... 450,561
Feed regulator and register W. C. Newman ... 450,298
Feed water purifier, H. Warden ... 450,437
Fence post, C. H. Gersch ... 450,355
Fence weaving machine, H. Haynes ... 450,573
Fertilizer distributer, Cook & Patric ... 450,308
Fertilizer distributer, J. R. McCord ... 450,598
Fertilizer, phosphatic, J. Reese ... 450,254, 450,255, 450,531
Filter, Davis & Riddell ... 450,223
Filter, H. Warden ... 450,204
Filter, water, Davis & Riddell ... 450,222
Filters, recarbonizer for, W. W. Whiddit ... 450,209
Fire alarm and telephone system, S. W. Ludlow ... 450,245, 450,406
Fire extinguisher, automatic, Kreitz & Rosenbusch ... 450,161
Fire extinguishing system, automatic, Knowles, Jr., & Young ... 450,413
Fire protector, W. F. Bean *et al* ... 450,595
Fire sprinkler, automatic, J. F. Byers ... 450,574
Fish harvester, R. Yoakum ... 450,306
Fish hook, J. M. Munn ... 450,317
Fish preserve dam, S. McElroy ... 450,490
Float, C. Frattini ... 450,408
Flower stand, folding, C. A. Gibford ... 450,146
Flushing tanks, siphon for, H. P. Cope ... 450,557
Folding box, S. L. Saunders ... 450,194
Fumigating compound, Morris & Chenevert ... 450,522
Furnace grate, Z. F. Bryant ... 450,351
Gauge. See Dress skirt gauge.
Galvanic battery, W. A. Crowdus ... 450,285
Game apparatus, E. S. Boynton ... 450,395
Gas engine, J. Fielding ... 450,406
Gate. See Railway gate. Swinging gate. Wire gate.
Gate, A. W. Graham ... 450,569
Gearing, frictional, G. W. Soule ... 450,302
Generator. See Steam generator.
Glove, catcher's, E. H. Decker ... 450,366
Governor for steam engines, shaft, C. B. Mohn ... 450,249
Governor, steam engine, J. Harrold ... 450,151
Grain binder, A. E. Woodhouse ... 450,346
Grain cleaner, F. M. Shaw ... 450,198
Grain drill, A. L. & D. L. Baughman ... 450,478
Grain meter, C. S. Beggs ... 450,213
Grate, W. E. Kelly ... 450,315
Grindstone attachment, M. Raymond ... 450,191
Grooving machine attachment, G. A. Kennedy ... 450,463
Guard. See Cattle guard. Snow guard.
Gun barrels, fastening device for, G. W. Cilley ... 450,448
Gun sight, W. L. Marble ... 450,469
Gun sight, adjustable, W. L. Marble ... 450,468
Gun tool, C. & E. Tomlinson ... 450,328
Gymnastic line ball, T. Peterson ... 450,185
Hame attachment, W. B. Abrams ... 450,550
Hanger. See Door hanger.
Harness, J. H. Bradshaw ... 450,134
Harvester attachment, J. K. Beehler ... 450,443
Harvester, corn, A. A. Lundy ... 450,371
Harvester, cotton, J. A. House ... 450,584
Harvester, stalk fodder, H. F. Longworth ... 450,244
Harvesters, tension device for self-binding, M. S. Brown ... 450,555
Hat blocking machine, W. H. Pittilla ... 450,422
Hat fastener, W. H. Thompson ... 450,538
Hitching device, F. Sweetland ... 450,382
Hoisting machine, J. L. Dean ... 450,143
Holder. See Candle holder. Chart holder. Electric cable holder. Paper holder. Tool and work holder. Umbrella holder.
Hook. See Fish hook.
Hook, H. H. McLean ... 450,181
Hops, apparatus for extracting, J. Schneider ... 450,534
Horses, foot rasp for, G. Tompkins ... 450,436
Horseshoe machine, J. E. Bucklin ... 450, 97
Horseshoe making machine, Z. V. Purdy ... 450,375
Hose coupling, L. Ott ... 450,3
Hose nozzle and coupling, reversible, A. B. Foans ... 450,452
Hot air register attachment, J. Segal ... 450,322
Hub and axle, vehicle, I. M. Warner ... 450,438
Ice creeper, R. A. Camp ... 450,503
Ice freezing machine, C. C. Smith ... 450,199
Injector, J. Trix ... 450,202
Inkstand, fountain, C. W. Rohrkaste ... 450,497
Insulation of armatures for dynamo-electric machines, R. Eickemeyer ... 450,366
Insulator, Lieb & Lavens ... 450,294
Insulator, electric wire, D. A. Bertolette ... 450,384
Iron, stone, etc., composition for treating, G. B. Smith ... 450,388
Ironing board, J. F. White ... 450,210
Jeweler's clamp, E. N. Parker ... 450,474
Jeweler's stock, G. E. A. Knight ... 450,412
Key, H. E. Russell, Jr ... 450,340
Key fastener, J. Ford ... 450,407
Kettle and steamer, sectional odorless, C. S. Dunham ... 460,328
Kettle cover, O. E. Harmon ... 450,231
Kiln. See Dry kiln.
Knife sharpener, C. K. Bradford ... 450,215
Knitting machine, circular, J. H. Hinchliffe ... 450,291
Lamp, F. S. Dellenbaugh ... 450,508
Lamp extinguisher, A. G. Hoyde ... 450,410
Lamp lighting mechanism, W. D. Boremus ... 450,483
Land roller, N. J. Johnson ... 450,514
Lantern, tubular, L. F. Bette ... 450,444
Latch, J. W. Hansen ... 450,290
Latch, H. E Russell, Jr ... 450,339
Latch stop, Burgess & Volght ... 450,353
Latch stop, T. Lyons ... 450,331
Lathes, drip pan for metal turning, C. M. Conradson ... 450,481
Leggin, E. Christensen ... 450,326
Letter box, A. T. Sinclaire ... 450,379
Letter box, house door, E. S. Dunavan ... 450,226
Level, spirit, H. Green ... 450,457
Lifter. See Plate or pie lifter.
Lighting apparatus, J. T. Scholte ... 450,429
Limb, artificial, F. W. Neubert ... 450,297
Liquids, clarifying, C. Liesenberg ... 450,243
Lock. See Combination lock. Nut lock. Time lock.
Lock, P. Crady ... 450,220
Lock, H. E. Russell, Jr ... 450,341
Locomotive driver brake, W. L. Austin ... 450,212
Locomotives, traction device for, S. Runser ... 450,582
Loom shuttle, H. P. Briggs ... 450,554
Lubricator. See Automatic lubricator. Axle lubricator. Pulley lubricator.
Lubricator, G. C. Pyle ... 450,424
Mail pouch, P. Crosson ... 450,309
Mask, face, B. F. Lamb ... 450,515
Match making machine, C. J. Donnelly ... 450,405
Measuring electric currents, instrument for, H. H. Cunynghame *et al* ... 450,221
Measuring vessel, C. W. Proctor ... 450,494
Measuring vessel, liquid, D. E. Wolff ... 450,383
Metal bending machine, R. Lavery ... 450,241
Metal cutter and punch, W. Smith ... 450,599
Metal flanging machine, R. Lavery ... 450,240
Metal plates, table for conveying and cooling, H. Aiken ... 450,360
Metal rods or bars, making rolled, Large & Thomas ... 450,340
Metal scouring machine, E. O. Goss ... 450,456
Meter. See Grain meter.
Meter, W. T. Fox ... 450,567
Mill. See Ore mill.
Motor. See Electric motor.
Mowing and reaping machine, E. Webster ... 450,546
Mower, lawn, C. A. Frayer ... 450,568
Mowing machines, cutting mechanism for, W. F. Shuey ... 450,499
Musical instrument, mechanical, E. Schilling ... 450,257
Necktie fastener, J. Metz ... 450,248
Nippers, cutting, Marsh & Fisher ... 450,174
Nut lock, J. C. Richardson ... 450,377
Odometer, Reinhold & Slayton ... 450,380
Opera glasses, J. Green ... 450,409
Ore concentrator, Young & Parson ... 450,280
Ore mill, C. S. Jones ... 450,236
Ozone water, preparing, J. C. Dittrich ... 450,404
Packing, balanced slide valve, W. S. Rogers ... 450,209
Packing, metallic piston, N. Pfaum ... 450,493
Pail and lunch basket, combined dinner, W. Poyner ... 450,527
Pail making machine, H. J. Medbery ... 450,590
Paper box covering machine, M. F. Wilson ... 450,275
Paper box, re-enforced, S. T. Achor ... 450,211
Paper cutting machine, guillotine, L. U. Gill ... 450,147
Paper holder and cutter, roll, A. Loft ... 450,168
Paper, letter, A. R. Baker ... 450,130
Pen, drawing, C. T. Finlayson ... 450,227
Pen, fountain, L. A. Shattuck ... 450,197
Pencil sharpener, I. E. Tallman ... 450,433
Pendulum bob, supplemental, H. S. Prentiss ... 450,529
Phosphate, ammoniated, J. Reese ... 450,253
Photograph negatives, device for lifting, C. H. Buchwalter ... 450,447
Photographic cabinet, C. Quartley ... 450,475
Piano action, A. H. Hastings ... 450,572
Pipe. See Sewer pipe. Sheet metal pipe.
Plaster casts, making, L. Enricht ... 450,287, 450,288
Plater or pie lifter, D. H. Sweeney ... 450,477
Plates, machine for cutting holes in, F. Schoff ... 450,428
Plow, G. W. Baker ... 450,281
Plow and potato digger, combined, W. E. Anderson ... 450,128
Poke, animal, J. F. Phillips ... 450,525
Pole, peg, T. Peterson ... 450,187
Police baton, C. Schwend ... 450,258
Post. See Fence post.
Pot. See Coffee or tea pot.
Potters' pins, machine for cutting, J. H. Mountford ... 450,179
Press. See Baling press. Cable covering press. Copying press. Printing press.
Printing cylinders, pantograph machine for tracing designs upon, J. Hope, Jr ... 450,155
Printing press, J. M. Jones ... 450,368
Printing press, chromatic, J. C. Kellberg ... 450,369
Propeller, Marsh & Truss ... 450,417
Protector. See Fire protector.
Pruning implement, A. L. Schollhorn ... 450,342
Pulley lubricator, loose, H. L. Miller ... 450,519
Pump, G. A. Smith ... 450,535
Pump, E. Zickwolff ... 450,393
Pump, centrifugal force, Nicholas & Turner ... 450,491
Pump, double-acting suction and force, A. J. Hopkins ... 450,461
Pump, surf power, H. E. Thomas ... 450,434
Pumps, apparatus for cooling and lubricating the working parts of, C. G. Mayer ... 450,517
Pumps, valve for air, J. Herrold ... 450,162
Punch, paper A. B. Dick ... 450,224
Rack. See Safety rack.
Radiator coupling, Kittredge & Hogan ... 450,160
Radiator support, M. W. Baily ... 450,325
Rail and its fastening, girder, W. C. Wood ... 450,594
Rail connection with supplemental wire, C. A. Robinson ... 450,193
Railway, electric, R. M. Hunter ... 450,586
Railway gate, O. W. Johnson ... 450,235
Railway motor system, reciprocating electric, C. J. Van Depoele ... 450,542
Railway switch and signal, connected, M. Wuerpel ... 450,548
Railway switch appliance, J. J. Hill ... 450,329
Railway tie, E. Dietrich ... 450,145
Railway tie, metallic, I. L. Blakeslee ... 450,132
Railway tie, metallic, H. D. Dasher ... 450,601
Railway tie, metallic, E. Saunders ... 450,498
Railway trolley, electric, A. S. Hickley ... 450,153
Railway wire support, electric, C. A. Lieb ... 450,164
Railways, electric switch for electric, F. Mansfield ... 450,172, 450,173
Rat trap, T. Merrell ... 450,176
Refrigerating valve and regulator, Cox & Brockington ... 450,575
Register. See Cash register.
Regulator. See Feed regulator.
Rheotome, G. E. Pragnell ... 450,319
Roller. See Land roller.
Rule, telescopic, J. A. Cook ... 450,141
Safety rack, McIlhenny & Davison ... 450,419
Sand moulding machine, T. Mistelski ... 450,521
Sandpapering and friezing machine, combined, L. E. Paine ... 450,337
Sash fastener, J. Wander ... 450,344
Savings bank, pocket, F. H. Brown ... 450,216
Sawsmithing machine, N. W. Mortorff ... 450,176
Scaffold support, adjustable, J. J. Hammer ... 450,570
Screen. See Window screen.
Screw beading machine, Southard & Smith ... 450,262
Seed drill, N. J. Johnson ... 450,513
Sewer pipe making machine, T. C. Hargrave ... 450,583
Sewing machine, A. S. Dinsmore ... 450,225
Shafts, vehicles, H. H. Lockwood ... 450,167
Sheaf gatherer, O. P. & M. T. Brinker ... 450,136
Sheet metal pipe, Davidson & Flender ... 450,142
Shelving, J. Gottfried ... 450,289
Ship, D. Bruce, Jr ... 450,350
Shipping case, E. M. Thompson ... 450,435
Shoe, F. D. Smith ... 450,200
Shoe clasp, J. J. Unbehend ... 450,596
Shoe fastening, G. S. Webber ... 450,205
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Leather, White Brothers &Co..... 19,327
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