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 the following week's issue

Cutting-off Machines, 3 and 4½", for prompt delivery. Send for descriptive circulars and prices. W. P. Davis, Rochester, N. Y.

"U. S." metal polish. Indianapolis. Samples free.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

6Spindle Turret Drill Presses. A.D. Quint, Hartford, Ct.

Mixing machinery. J. H. Day & Co., Cincinnati, Ohio.

Ag'ts and sub's wanted. *Scientific Machinist*, Clev'd, O.

Universal and Centrifugal Grinding Machines. Pedrick & Ayer, Philadelphia, Pa.

Will sell, or place on royalty, valuable railroad patent, No. 446,274. J. B. W., Box 210, Minneapolis, Minn.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

For pumping engines. J. S. Mundy, Newark, N. J.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wie, Syracuse, N.Y.

Crandall's patent packing for steam, water, and ammonia. See adv. next week. Crandall Packing Co., Palmyra, N. Y.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

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Perforated Metals of *all* kinds and for *all* purposes, general or *special*. Address, stating requirements, The Harrington & King Perforating Co., Chicago.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $4; Munn & Co., publishers, 361 Broadway, N. Y.

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For Sale—Patent No. 471,891, issued March 29, 1892, for brake shoe. This invention provides a brake shoe for road wagons, having a face which may be readily renewed, and is formed of a single casting. For particulars address Mark A. Penney, Perris, Cal.

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 This is for our information and not for publication.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.

INDEX OF NOTES AND QUERIES. No.

(4352) A. V. F. asks: 1. Why is cyanide of copper better than sulphate of copper for plating? A. Because an alkaline solution will not corrode the metal upon which the copper is to be deposited. An acid solution will corrode some metals, and the thin film of oxide would prevent the adhesion of the copper. 2. Why cannot sulphate of aluminum be used as well as sulphate of copper for electrotyping? A. No method has been discovered as yet for using sulphate of aluminum for electrotyping.

(4353) T. H. B. asks: Is the trolley wire insulated or not? A. It is supported by insulators but has no insulating covering.

(4354) C. F. Van D. asks: 1. What kind of glass jars must I use in making Leyden jars? I have tried common fruit jars, also flint glass jars procured at the druggists'. The fruit jars give best results, but neither give even fair results. Is it in the composition of the glass? A. Use glass which contains no lead. A great deal depends upon the composition of the glass and the thickness of the walls of the jar. They should be rather thin. 2. I have constructed a Winshurst influence electrical machine, and get splendid results. It was made according to description in SCIENTIFIC AMERICAN some years ago. When I turn the handle, I notice that there is a very peculiar odor noticeable. Is this what is called "ozone"? Is it injurious to inhale the same, or otherwise? A. The odor you describe is due to ozone. It is not especially injurious, but if inhaled continuously will produce a headache, and curiously enough it often cures a headache.

(4355) E. H. A., Dallas, Texas, asks how to construct best a "polar chamber," and what to do with the injurious heavy drops of dew collecting on the cold walls? The hot weather here is upon us, and polar chambers would be perhaps a luxury, if not a health resort. A. The best arrangement for a "polar" or cool chamber is by the use of compressed air, say to a pressure of 15 lb. per square inch, allowing the air to cool to normal temperature in coils of pipe in the outer air, and then discharge in a closed room. This will give a temperature in hot weather in your climate of about 60° with very little cost for air compression. A windmill or gas engine may be used for compressing the air. We do not advise a lower temperature than above stated, if so low. The change on going in and coming out will be too great for health. The walls should never be cold enough to collect moisture or dew.

(4356) J. A. L. asks: 1. How much coal would be required to furnish 1 horse power for ten hours, if used by a fairly economical stationary steam engine? A. 60 to 80 pounds of good coal should run your engine ten hours. 2. Have been unable to prepare sensitized silver paper that would keep according to formula prescribed in query No. 3240 without getting a milky precipitate and small granular crystals on the paper. A. We think the precipitate is a chloride of silver. There may have been too much citric acid added. Try another brand of albumen paper. Sometimes this is defective. Another formula, said to be an improvement, is as follows:

Silver nitrate	2 oz.
Citric acid	1 "
Alcohol	1½ fl. oz.
Water	16 oz.

The paper is floated two minutes in hot weather, and three minutes in cold weather. It should be carefully dried and kept in a dry place.

(4357) F. H. T. asks: 1. In washing dry plates after developing or fixing can I use salt water (sea water)? If not, why? A. No, because in drying it will leave the plate covered with chloride of sodium or salt. 2. Why does the alum solution that I use for hardening the film discolor, and does it make any change in the ultimate result? If it does not, where does the coloring matter come from? A. The coloring of the alum is due to the developer left in the plate after washing and to the gelatine. By filtering the alum each time and keeping it in a stoppered bottle it can be used repeatedly. In hot weather it is advisable to use a fresh bath of alum for each batch of plates. Cramer's chrome alum solution is considered the best.

(4358) R. E. D. asks: 1. Will you kindly inform me what the tonnage of American vessels is at present, and what it was before the war? Is the American merchant marine increasing under the present administration? When the war vessels now being built are finished, will the United States navy be able to repel a naval invasion by any foreign country, and protect our ports from bombardment? Is farming by irrigation being employed to any extent in the Western and Pacific States and Territories? A. The largest tonnage built in any one year was in 1855—533,000 tons. Since then it has varied in different years from 100,000 to 250,000. The total tonnage of the United States is about 4,000,000 tons and has steadily increased. We think the United States is amply able to repel any attack from a single nation. An invasion is out of the question. Irrigation is largely on the increase in the Western States, and will eventually become the means of farming thrift over millions of acres of our arid lands.

(4359) C. L. K. asks: 1. What is the black incrustation which forms on the zinc plate of a gravity battery. Does it increase the internal resistance? My zincs are made from scrap sheet zinc. When it is dissolved in nitric acid, and ammonium hydrate is added, a bluish precipitate falls. How can copper form there when the zinc does not come in contact with any copper sulphate? A. The black incrustation referred to is metallic copper in a finely divided state. Probably a little copper sulphate is mingled with the zinc sulphate. 2. Why is the incrustation harder to remove when the battery (36 cells) is working through 2,000 ohms than when 1 cell is working through 10 ohms? Merely jarring the zinc will remove it in the latter case, while it takes hard and continued scraping to get it off in the former. A. In the case of 36 cells, probably owing to the greater resistance of the circuit, a greater amount of copper was deposited upon the zinc. 3. Does an abundance of precipitated copper on the copper plate increase the internal resistance? A. It has the opposite effect. 4. Will zinc sulphate crystallize over the edges of the jars before the solution is saturated? A. It is always liable to do so. 5. Why are not the coils of a sounder made of German silver wire instead of copper. Its price per ohm is much less than copper, and the coils could be placed much nearer the magnets? A. It is a mistaken idea to suppose that resistance alone adds any efficiency to a magnet. It is a question of ampere turns. If the ampere turns can be secured in a magnet without any resistance, so much the better. The use of German silver for magnets would be something like drawing steam through a coil of small pipe when a large straight pipe could be used for the same purpose.

(4360) W. H. P. asks: 1. What are the data and process for computation of the motive power to be obtained from the flow of an artesian well? A. The water power of an artesian flowing well may be obtained by measuring the quantity of water delivered at the highest available point in cubic feet per minute. Multiply by 62½ pounds to a cubic foot and by the height of available flow in feet from the ground and divide the product by 33,000 pounds for the gross horse power. Of this you can utilize from 60 to 80 per cent for power by water wheels or turbines. 2. Is there a method of connecting and firmly uniting pieces of vulcanized rubber; car spring rubber for example? A. For firmly cementing rubber springs together use rubber cement prepared for vulcanizing and heat in a vulcanizing oven. Composite cements will not stand the elastic strain on car springs. No perfect way of uniting vulcanized rubber is known.

(4361) A. F. H. wishes to know how old faded photographs can be restored. A. The print is removed from the mount by soaking in warm water. Then it is immersed in a weak solution of bichloride of mercury and warm water, 10 grains of the bichloride to 4 ounces of water. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 451, for full directions.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

May 10, 1892.

AND EACH BEARING THAT DATE.

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

Acid pan and making the same, sulphuric, R. Kuch 474,527
Advertising machine, C. P. Oldham 474,504
Advertising wagon, W. S. Carter 474,366
Aerated liquids, receptacle for, J. D. Iler 474,387
Aerating liquids, apparatus for, C. A. & J. Schneible 474,414
Aerating liquids, art of and apparatus for, J. & C. A. Schneible 474,413
Alarm. See Fire alarm. Heat alarm. Low water alarm.
Alloy, E. W. Cooke 474,443
Atomizer, Laubensdorfer & Lipp 474,605
Atomizer nozzle, Hugershoff & Lipp 474,526
Auger, post hole, C. Justesen 474,664
Axle bearing, D. Wigger 474,709
Axle lubricator, J. C. Cropper 474,652
Bark cutting machine, tan, A. F. Jones 474,745
Barrel, J. P. Cowden 474,723
Barrel heading machine, F. Emmert 474,596
Batteries, exciting fluid for galvanic, C. Lutcke, Jr. 474,454
Bearing, dust proof swivel shaft, T. A. Edison 474,593
Bed, folding, J. E. Yeager 474,587
Bedstead, invalid, C. W. Pratt 474,690
Belaying pin, J. W. Collins 474,722
Bending machinery, E. L. Booher 474,358
Bicycle, T. E. McKenna 474,400
Bicycle, A. Sequeira 474,764
Bicycle, T. J. Thompson 474,784
Bicycle brake. A. Perkins 474,759
Bicycle driving mechanism, D. J. Hoopes 474,740
Bicycle support, M. L. Schoch 474,415
Billiard and pool table adjuster and leveler, Little & Bogardus 474,750
Bit. See Bridle bit.
Board. See Electrical switchboard.
Boiler. See Steam boiler. Water tube boiler.
Boiler cleaner, J. Q. Cook 474,369
Bolt lock, G. Coulon 474,444
Bone cutter, hand, C. H. Farrington 474,728
Bookbinding, H. H. Roche 474,483
Bookbinding, etc., web for, J. A. Wagler 474,509
Bookcase, revolving, F. H. Haley 474,556
Boot or shoe, R. Bruzon 474,574
Boot stretcher, W. L. Faire 474,376
Bottle stopper, E. L. Lloyd 474,642
Bottle washing machine, J. Masson 474,397
Bottle washing machine, J. F. Wittemann 474,510
Box. See Music box. Musical box. Paper box.
Box making machine, R. L. Coons 474,545
Brace. See Rail brace.
Bracket. See Scaffold bracket.
Brake. See Bicycle brake.
Brake beam, R. T. Markee 474,669
Bread, apparatus for baking altar, P. H. Horan 474,601
Bridge gate, A. J. Smith 474,420
Bridge or platform, float, H. B. Seaman 474,487
Bridle appliance for subduing horses, G. R. Hollingsworth 474,739
Bridle bit, A. H. Conn 474,368
Brush, bottle washing, J. Babis 474,625
Buckle, suspender, J. Fritz 474,599
Building, M. Schmid 474,647
Button, C. Erlanger 474,445
Calendar, C. N. Hoyt 474,602
Calendar and desk article, combined, J. T. Hawkins 474,449
Calendar and key ring, perpetual, A. B. Dwigans 474,725
Camera. See Solar camera.
Can. See Sheet metal can.
Can heading machine, C. W. Sleeper 474,584
Can spout, H. Stiles 474,507
Candle holder, J. F. Young 474,768
Car brake mechanism, J. & H. R. Howard 474,451
Car brakes, power transmitting device for, W. B. Turner 474,615
Car coupling, L. Barnes 474,466
Car coupling, D. Donahue 474,373
Car coupling, R. H. Dowling 474,772
Car coupling, S. J. Freeman 474,730
Car coupling, J. W. Gardner 474,553
Car coupling, Preston & Wirsig 474,691
Car coupling, M. W. Trexler 474,703
Car, dumping freight, R. M. Johnson 474,744
Car heating apparatus, G. A. Prescott 474,404
Car heating apparatus, railway, J. Q. C. Searle 474,417
Car, railway, J. Hammond 474,736
Car, railway, C. M. Hollingsworth 474,660
Car seat, J. Krehbiel 474,666
Car vestibule connection, Kittredge & Kirby, Jr. 474,796
Car wheel, L. B. Smyser 474,421
Carriage, convertible child's, E. Lotinka 474,641
Cart, coal, C. Elbee 474,374
Cartridge priming pin, J. Orcutt 474,607
Case. See Book case. Cigar case. Packing case. Ribbon case.
Cash indicator and register, T. J. Hume 474,558
Cash recorder, Metcalfe & Ziegler 474,672
Cash register, J. A. Treat 474,614
Cash register, indicator, and recorder, C. F. Brown 474,791
Caster, M. A. Cutter 474,576
Catamenial sack, H. F. Ferguson 474,378
Centrifugal machine, H. W. Lafferty 474,389
Chain link or tip, ornamental, E. B. Bullock 474,792
Chair seat spring support, J. A. Staples 474,536
Chamber vessel, E. Wenigmann 474,617
Chart, interchanging word or number, W. M. Gilmore 474,732
Check hook, C. A. Squire 474,612
Chimney top, G. W. & J. M. Powers 474,689
Cigar case, M. J. Strain 474,613
Cigar cutter, J. H. Bowen 474,626
Cigar perforator, D. Castro 474,793
Clamp. See Moulder's flask clamp. Plumber's clamp.
Clamp, W. H. E. Brande 474,719
Clasp, M. Epple 474,521
Clasp, E. J. Steele 474,537
Cleaner. See Boiler cleaner.
Clevis, R. L. Kirby 474,747
Clevis, plow, J. M. Norris 474,681
Clock chime, G. L. Cummings 474,371
Clover hulling machine blast board, J. N. Kallor 474,604
Clutch, J. Walker 474,429
Coffee, roasting, C. Salomon 474,531
Collar fastener, horse, E. E. Armstrong 474,712
Collar pad, horse, J. F. Glidden 474,524
Combing machine, fiber, Barnett & Black 474,513
Commutator brush, Hirsch & Meminger 474,600
Composing bar, adjustable angular and circular, A. H. Arnold 474,649
Compound engine, J. F. Murphy 474,643
Conductor, expanding, F. H. Moore 474,563
Conveyer, J. H. L. Tuck 474,786
Cooking apparatus, steam, R. C. Andersen 474,620
Cooking utensil, R. C. Andersen 474,619
Cooking vessel, R. C. Andersen 474,622
Cork extracting device, S. D. Webb 474,788
Cork extractor, L. C. Mumford 474,480
Corn for domestic use, machine for preparing green, P. S. Rich 474,762
Cotton gin condenser, D. A. Sailor 474,799
Cotton press, J. Price 474,482
Coupling. See Car coupling. Thill coupling.
Cover fastener, slip, T. Hertwig 474,525
Cuffholder, W. C. Shaw 474,648
Cultivator, J. W. Fawkes, Sr. 474,377
Cultivator, orchard, J. Schauman 474,763
Cup. See Umbrella drip cup.
Cutter. See Bone cutter. Meat cutter. Weed cutter.
Dash, vehicle, W. L. Hawes 474,634
Decorative films, device for applying, W. H. Coe 474,629
Dehorning implement, E. M. Samsel 474,696
Disinfecting device, S. H. Forbes 474,597
Door guard, G. W. Glazier 474,633
Draught equalizer, S. W. Woods 474,493
Drier. See Grain drier.
Drum, heating, Held & Gruenhagen 474,656
Dust collector, G. Walter 474,490, 474,491
Earthenware, etc., apparatus for moulding, J. Crossley 474,496
Eaves trough, A. C. & J. L. Byers 474,412
Educational appliance, J. H. Eickershoff *et al* 474,773
Electric conductor connection, C. W. Tobey 474,584
Electric conduit, A. Bruner 474,468
Electric machine, Wagner & Schwedtmann 474,787
Electric machine or motor, dynamo, J. D. F. Andrews 474,624
Electric machine or motor, dynamo, C. D. Jenney 474,388
Electric motors, circuit controller for, W. S. Andrews 474,623
Electric snap switch, G. K. Hutchins 474,473
Electric switch, Willing & Violet 474,541
Electrical heater, W. Mitchell 474,797
Electrical indicator, J. W. Gibboney 474,523
Electrical switchboard, L. A. Fehr 474,632
Electrically heated vessel, W. Mitchell 474,398
Elevating bags, barrels, etc., apparatus for, J. B. Deffler 474,653
Elevator, C. Ross 474,609
Elevator, C. Whittier 474,431
End gate, carriage, S. R. Bailey 474,353
Engine. See Steam engine. Traction engine.
Engine, J. Harris 474,557
Engines, steam loop connection for, W. Burnham 474,438
Engines, steam loop connection for steam, W. Burnham 474,437
Exercising apparatus, line fastener for, T. Peterson 474,760
Explosives, apparatus for the manufacture of, H. S. Maxim 474,561
Explosives, manufacture of, F. Roller 474,529
Extractor. See Cork extractor. Nail extractor.
Fan, bed, W. H. Wrigley 474,710
Farm gate, G. Van Horn 474,426
Faucet, measuring, R. A. Parish 474,583
Faucet, registering, Peirce & King 474,564
Fence, G. Merritt 474,455
Fence machine, J. Chaplin 474,794
Fence, stock, P. M. Sparks 474,464
Fertilizer distributer, G. D. Haworth 474,635
Fertilizers, making, T. M. Smith 474,419
Fiber machine, L. Bacallado y Sanchez 474,714
File, bill and letter, J. W. Henson 474,776
File holder, W. Lumley 474,478
File, check and bill, Lomb & Jewell 474,501
Finger ring, H. Huestis 474,638
Fire alarm, automatic, M. Martin 474,670
Floor layer, H. G. Epps 474,654
Flour, mechanism for testing and recording the properties of, J. Hogarth 474,636
Fly trap, C. Becher 474,514
Fork. See Weft fork.
Fuel bricks, machine for forming, J. P. Schmidt 474,412
Funnel, measuring, F. E. Butts 474,575
Funnel, packer's, J. H. J. Haines 474,382
Funnel, valved, T. Miller 474,674
Furnace. See Ore roasting furnace.
Gauge. See Track gauge.
Gauge knife, A. B. Schofield 474,532
Garment supporter, S. B. Ferris 474,379
Gas burner, self-closing, W. M. Roberts 474,695
Gas mixer, Stephens & Holmes 474,781
Gas pump, L. Allen 474,512
Gas regulator, M. O'Gorman 474,481
Gate. See Bridge gate. End gate. Farm gate. Irrigating head gate. Swinging gate.
Generator. See Steam generator.
Glass, etc., machine for decorating, M. Suess 474,701
Glass rolling machine, S. Sadler 474,484
Glove fastener, C. H. Reed 474,409
Gluing machine, W. E. Brock 474,572
Gold from sulphide ores, extracting, T. A. Edison 474,591
Governor, engine, R. J. McIlhenny 474,678
Governor, steam radiator, W. Burnham 474,441
Grain drier or moistener, J. C. Weller 474,568
Grate, A. A. Shepardson 474,462
Grate and mantel, portable, F. L. Hart 474,655
Grate fire guard, J. J. Mitchell 474,562
Gravel screen, F. J. Hoyt 474,662
Guard. See Door guard. Grate fire guard.
Guitar bridge, T. Wolfram 474,432
Harrow, J. S. Rayl 474,692
Harrow tooth, spring, A. V. Ryder 474,461
Harvester, corn, E. B. Bowen 474,359
Harvester, corn, W. M. Platt 474,761
Harvester, grain, J. F. Steward 474,700
Harvesters and binders, grain conveyer for, G. Schubert 474,416
Hat sweat band, H. E. Ward 474,540
Hay loader, T. C. Lippitt 474,476
Hay press, T. J. Finch 474,498
Hay stacker, D. M. Stephens 474,422
Head and shoulder rest, L. L. Pletcher 474,688
Heat alarm, electric, J. Meyer 474,673
Heater. See Electrical heater.
Heating, etc., apparatus for, Rivnac & Vojacek 474,694
Heel randing machine, F. F. Raymond, 2d 474,408
Heeling machine, F. F. Raymond, 2d 474,407
Hoisting and conveying machine, A. E. Brown 474,494
Holder. See Candle holder. Cuff holder. File holder. Paper holder. Penholder. Photographic plate holder. Rein holder. Wire screen cloth holder.
Hook. See Check hook. Rope hook.
Horseshoe, J. P. Gilbert 474,554
Horseshoe, N. Lundwall 474,751
Hub band, G. Monteith 474,754
Ice cream freezer, T. S. Lewis 474,475
Index or directory, A. H. Martin 474,479
Indicator. See Cash indicator. Electrical indicator. Watch regulator indicator. Wind vane indicator.
Injector, R. G. Brooke 474,361
Insulating coupling, A. Anderson 474,569
Iron. See Sad iron.
Irrigating head gate, J. Ettien 474,549
Jar sealing device, I. P. Nelson 474,756
Joint. See Rail joint.
Knife. See Gauge knife.
Knitting machine, W. H. & G. D. Mayo 474,671
Labeling machine, F. Mueller 474,677
Labeling machine, can, R. L. & H. F. Wight 474,618
Ladder, extension truck, C. Canciani 474,628
Lamp, socket, electric, Kurz & Amundson 474,667
Latch, gate, W. Brown 474,362
Leather dressing composition, J. E. Swain 474,702
Letter press, pneumatic, Page & Buchanan 474,401
Lifter. See Transom lifter.
Lightning arrester, M. Dickerson 474,469
Liquors, apparatus for cooling and aerating malt, H. E. Deckebach 474,630
Lock. See Bolt lock. Nut lock.
Lock, C. A. Berry 474,790
Lock, C. E. Candee 474,519
Lock, W. H. Taylor 474,783
Loom positive shuttle motion, E. H. Graham 474,555
Low water alarm, Delaney & Hills 474,631
Lubricator. See Axle lubricator.
Mask for firemen, etc., J. M. Jacobs 474,500
Meat cutter, R. C. Ellrich 474,595
Meat pickling apparatus, J. Fey 474,446
Meat, preserving, J. Mariosa 474,581
Metal plates, machine for shaping and flanging, A. C. A. Holzapfel 474,661
Middlings purifier, Baker & Verity 474,354
Milk jar and closing device therefor, H. P. Barnhart 474,436
Mixer. See Gas mixer.
Moulder's flask clamp, W. W. Archibald 474,352
Mower, K. S. Nygaard 474,798
Mowing machine pitman connection, G. H. Spaulding 474,767
Music box, F. H. Cortheil 474,370
Music leaf turner, T. F. Petit 474,458
Musical box, S. Cuendet 474,520
Nail extractor, R. C. Ellrich 474,594
Nail puller, F. G. Stark 474,698
Nether garment, T. Field 474,550
Nitro cellulose, making, H. Maxim 474,778
Non-conducting casing for heaters, flues, pipes, etc., T. W. Jenkins 474,639
Nut lock, N. P. Garrett 474,380
Nuts, ratchet washer for bolt, W. A. Galbraith 474,731
Oil, paint, G. W. Banker 474,434
Ore conveying apparatus, T. A. Edison 474,592
Ore roasting furnace, H. F. Brown 474,573
Oven screen or mat, J. E. Bruso 474,364
Packing case, S. Mueller *et al* 474,755
Pad. See Collar pad.
Paint, C. H. Reaney 474,693
Paper box, knockdown, E. M. Scott 474,610
Paper holder, M. F. Berry 474,516
Paper holder and cutter, roll, J. Frankel 474,598
Paper holder and severing machine, roll, Ford & Jacobs 474,551
Pavilion, rotary, C. M. Hollingsworth 474,659
Pencil sharpener, J. Siegel 474,418
Penholder, C. T. McClintock 474,644
Photographic plate holder, J. H. Ballman 474,571
Pier, O. Haerem 474,734
Pipes, bell and spigot joint for cement-lined, E. H. Phipps 474,779
Pipes, rods, etc., collar for, G. W. Aldrich 474,511
Planter, E. J. Updike 474,425
Planter and fertilizer distributer, seed, J. Laude 474,748
Planter, corn, G. W. Brown 474,363
Planter, corn, L. P. Graham 474,448
Planter, hand corn, J. W. Champion 474,721
Plow, J. A. Cole 474,651
Plow beam, H. H. Sater 474,485