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

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Thill Support, picture on page 356, for sale on reasonable terms.

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Wanted to manufacture. new machinery of real merit. John M. Kramer & Bro. Machine Works, Maria Stein, O.

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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.

Competent persons who desire agencies for a new popular book, of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office. 361 Broadway, New York.

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 This is for our information and not for publication.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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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.

(5531) C. D. A. desires to know what chemicals and what proportion of each are used in a preparation called chemical ink eraser. A. Take chloride of lime 1 pound, thoroughly pulverized, and 4 quarts soft water. The above must be thoroughly shaken when first put together. It is required to stand twenty-four hours, to dissolve the chloride of lime; then strain through a cotton cloth, after which add a teaspoonful of acetic acid (No. 8 commercial) to every ounce of the chloride of lime water. The eraser is used by reversing the penholder in the hand, dipping the end of the penholder in the fluid, and applying it, without rubbing, to the word, figure, or blot required to be erased. When the ink has disappeared, absorb the fluid with a blotter.

(5532) M. S. Y. asks: 1. Is that end of the magnetic needle which points toward the north pole of the earth the north pole of the needle? A. It is generally so termed, but the earth's N. magnetism is the opposite of that of the N. end of the needle, otherwise there would be repulsion instead of attraction. 2. What is the object in having the zinc in the gravity battery shaped like a crowfoot? Would not a square or circular plate give as great E. M. F.? A. The E. M. F. has nothing to do with shape. The crowfoot shape facilitates cleaning. 3. Is the gravity battery suitable for an open circuit? How many cells would be required to ring a small door bell? A. No. Three cells are ample as long as in condition. 4. I have a bichromate four-cell battery, which gives a powerful current for about an hour, then stops action. After cleaning elements and amalgamating zincs it works as well as before. What is the matter, and is there any way of preventing the sediment accumulating on the elements? A. Your battery should not accumulate such a sediment. Perhaps your solution is wrongly made. The battery probably becomes exhausted. This is of course inevitable. Larger jars will, by holding more solution, give the battery more durability. 5. How to clean rust from nickel plating? A. Use electro-silicon or putz pomade. You will wear the nickel, but that is unavoidable.

(5533) S. C. H. writes: 1. Can you tell me the easiest and best way to patch rubber, as the inner tube of pneumatic bicycle tires? Have some trouble to make ordinary "tire tape" adhere to the tube, and rubber dissolved in benzine, while it forms a film, does not unite with the tube fabric. A. Rub the inner tube with emery cloth or sandpaper at the place to be patched. Put on some *good* rubber solution. Prepare your patch in like manner with rubber solution. It is well after the solution is dry, in fifteen minutes or more, to repeat the application, not using the emery cloth, however. Then, after the solution has dried completely, put the patch on and rub it well down. Dust on some talc, or chalk it well, before replacing. For an emergency use one application only. The great point is to have the surface dry before putting on the patch. Use only the best rubber cement or solution. Do not try to make it yourself. It is well also to apply benzine before putting on the solution. 2. Is there any good work on the care, filing, and scientifically practical use of saws? A. We can supply, by mail, Worssam's "Mechanical Saws," $2.50; Holley's "Saw Filing," 75 cents; Grimshaw's "Saw Filing," $1; Oldham's "Why Band Saws Break," $1. 3. Can I arrange an electric call bell to operate in connection with and over same wire with an acoustic telephone wire, all out of doors and about 300 feet long? A. If you see that the wire is properly insulated at the points of support, you can use it as described.

(5534) R. C. B. asks: Will you be kind enough to let me know if any railroad train or engine has ever covered ninety miles in one hour? I don't mean run at the rate of ninety miles an hour, but has gone from one given point to another which were ninety miles apart in one hour. A. We think there is no record of any train time nearly as great as you state for a distance of ninety miles.

(5535) G. D. C., Conn., says: I mail you a twig cut from a tulip tree in my yard. In the early part of the season the tree was infested with green lice and later by this—whatever it is. Will you kindly give me the name of the insect and a remedy for it. The tree is quite a large one and I do not like to lose it. Some of the branches are now devoid of leaves and seem to be dying. Reply by Professor Riley.—The tulip twig sent has upon it a number of common tulip scale insects, *Lecanium tulipiferæ*, Cook. This insect, like others of its class, is protected by a scale, a resinous excrescence over the surface of the body, which in this species is brown and very convex above, and has on the underside a cotton-like secretion common to all members of the genus, which serves to inclose and protect the eggs. In general form this scale is not unlike a turtle in appearance when mature. The numerous small yellow eggs are deposited beneath the scale, and, after hatching, escape and disperse to all parts of the tree, fixing themselves and ultimately developing protecting scales of their own, beneath which they extract the juices of the plant by means of a long proboscis. An interesting fact in connection with this scale insect is the secretion by it of a quantity of sweet liquid, the "honey dew" of the Aphides, which, in the case of scale insects, is rarely produced in very great quantity. With this species, however, it is so abundant that they are frequented by honey bees in large numbers and a great deal of inferior honey is stored up wherever this insect is abundant. This honey, like the honey produced from Aphides, in addition to its very inferior quality, is objectionable in that it candies almost immediately after being stored up by the bees in their cells. The remedy for this scale insect consists in the use of kerosene emulsion at the time of the hatching of the young, as hitherto recommended for similar cases in these columns. It is doubtful whether the trees will die, however, even without treatment, as the parasites of the coccid prevent its continuance in destructive numbers.

(5536) T. H. C. says: There is a method of making a light glow light by means of phosphorus and sweet oil, sufficient to make out the hands of a watch at night. A. Phosphureted oil is the best means of exhibiting the luminous properties of phosphorus. A small piece of dry phosphorus, about the size of a pea, is placed in a test tube with a little pure olive oil. The test tube is held in the water bath until the oil becomes heated and the phosphorus liquefies. It is then shaken until the oil will take up no more phosphorus, and after allowing the oil to become clear, it is poured off into a small glass vial provided with a glass stopper. Only a small quantity of this oil in the bottom of the vial is necessary. When it is shaken about so as to coat the sides of the vessel, and the stopper is removed so as to let the air get in, the oil-coated sides of the glass become at once luminous, and continue so as long as the stopper remains out. Characters written on paper with oil thus prepared (freshly) appear in the dark very brightly. Phosphureted ether is prepared by digesting phosphorus in ether for some days in a tightly stoppered bottle. A piece of sugar dipped into this ethereal solution and then thrown into water makes the surface of the latter appear quite luminous in the dark. Young experimenters must remember that phosphorus is very dangerous to handle when out of water, and often inflames spontaneously when exposed dry in the air. 2. Also the formula for soldering fluid, made of muriatic acid and zinc with muriate of ammonia? A. This liquid, which causes no rust on iron or steel, is prepared by cutting zinc into small pieces, dissolving in hydrochloric acid until the acid ceases to bubble. Add about ¼ part of the solution of ammonia, which neutralizes the acid. Dilute the whole quantity of liquid with an equal quantity of water. The information given above is from the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(5537) S. J. S. asks: 1. In either a gentle breeze or a violent storm, where is the power that propels the air—in front or in the rear? A. The gentle breeze is the natural drift of the air, either toward a region of low pressure or it may belong to the general circulation of the atmosphere due to equatorial heat lifting the air to flow off toward the poles. In the first case the cause of motion is in front, while in the second case it is in the rear of the course of the wind. Storm winds are largely local, sometimes blowing toward a center of heat rarefaction, which carries the central portion upward and draws the surface air toward the center. 2. What gives to a cyclone its whirling motion, and where is the power that propels it—in front or in the rear? A. Storms of a whirling character, as some of the great storms originating in equatorial regions and tornadoes, are generally started by an upward central flow due to excessive heat, which draws the air violently toward a central region and sets the wind into a whirl—the direction of the whirl being controlled by the resultant of the motion of the earth's surface in its revolution and the direction of the antitrade current in the upper atmosphere. The propelling power that moves the cyclone along its path is probably behind it and in the great body of the antitrade wind. The power that produces the whirl is probably central and in front. 3. What causes clouds to move in any given direction? Is the power that moves them in front of them or behind them? A. The clouds' movement is with the wind in which they are suspended, and they have the same cause of motion as the wind. See a most interesting work on physical geography by Houston, $1.25 by mail.

(5538) F. J. M. asks: 1. What is the best way to nickel plate zinc? A. For the nickel bath for zinc: To 6 gallons water add 2 pounds double sulphate of nickel and ammonium, 7 ounces sulphate of ammonium, dissolve by boiling. Cool and test for acid with blue litmus paper; if found, neutralize with hydrochlorate of ammonia. 2. What is the best way to silver plate steel knives? A. For the silver bath for cutlery, for 1 gallon water dissolve 5¼ ounces nitrate of silver; add gradually in solution, 8 ounces cyanide of potassium. 3. Will you give me the best method for tin plating or tin dipping for knives and forks? What I mean is dipping in molten tin and have them come out smooth, or if anything can be put in the tin to make it come out smooth. Also will you give me a formula for a good copper plating solution, also a brass solution. A. For the tinning process, dip the clean articles in a hot solution of muriate of tin, dry quickly, and dip in the melted tin bath. All the various processes and receipts for nickel, silver, and tin plating, as also for copper and brass plating by the electric and dipping methods, are detailed in the "Scientific American Cyclopedia of Receipts," $5 by mail.

(5539) J. R. R. asks (1) how the proportions of large induction coils are calculated. A. The general rule for induction coils is to make the ratio of turns of secondary and primary proportional to the increase of voltage desired. To increase from the voltage, in the primary to one thousand times as great voltage, one thousand times as many turns are given the secondary as are in the primary. This rule is, however, far from perfect. 2. Must the secondary wire be silk wound? A. No. Bare wire is often used, wound carefully, so that successive layers will not touch. 3. What is the capacity of condensers to be used for them? A. Do not calculate, but follow proportions of some successful coil. See our SUPPLEMENT, Nos. 160, 569, 229, 166, also SCIENTIFIC AMERICAN, No. 14, vol. 66, for coils and apparatus connected therewith. The whole subject is usually treated rather empirically.

(5540) W. J. L. asks: 1. Can a motor be run by gravity battery? If so, how many cells would it take to run motor described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641? A. A gravity battery is not suited for the purpose, on account of its high resistance; try plunge battery described in SUPPLEMENT No. 792. 2. Does increasing length of wire in armature coils increase or decrease voltage of a dynamo, and to what extent? A. It increases it if the field is kept excited to the same extent as before. Yet it is possible that increase of length of armature wire may reduce the current so as to interfere with the excitement of the field and so cut down the lines of force sufficiently to reduce the voltage.

(5541) J. G. Von H. writes: 1. It is said that there are only two kinds of electricity—static and dynamic. Is the induced electricity from an induction coil static? If not, what is the difference between static and induced electricity? A. There is really only one kind. Static electricity is used to express electricity at rest; dynamic electricity to express electricity in motion, or re-establishing equilibrium of potential. In the popular conception very high tension phenomena are generally referred to static electricity. 2. What is the most injurious to mankind, 500 volts ½ ampere, or 500 volts 10 amperes? A. The discharge last named is practically an impossibility. High and rapidly changing voltage is the most injurious type.

(5542) F. J. S. says: I have a double steeple compound condensing engine, two high pressure cylinders, 3 inches diameter, two low pressure cylinders, 6 inches diameter, by 4 inches stroke. With 100 pounds steam, what size and pitch of propeller should I have? A. The double compound engine at the pressure stated will run a propeller wheel 36 inches diameter, 48 inch pitch.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 21, 1893,

AND EACH BEARING THAT DATE.

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

Air compressor, hydraulic, J. Gustafson 509,220
Air deflecting device, B. F. Taylor 509,337
Alarm. See Fire or burglar alarm.
Ampere meter or voltmeter, C. Wilkens 509,342
Apparel, bar or tack for slitted portions of articles of, A. E. Burk 509,190
Atmospheric heater, E. A. Edwards 509,023
Baling press, P. Nelsen 508,966
Barrel indicator, register, and recorder, N. Horn 509,033
Battery. See Storage battery.
Bearing, anti-friction, C. H. Cook 509,199
Bearing, roller, F. Van Benthuysen 508,003
Bearing, roller, Purdon & Walters 509,048
Bearing, swinging, J. Roger 508,981
Bed, folding, M. L. Barr 509,907
Bed, spring, D. Leonard 509,040
Bedstead, cabinet, J. C. Andresen 509,148
Beer pipes, apparatus for cleaning, O'Connor & Reisky 509,235
Bell, electric, W. J. Schweiger 509,050
Belt fastener, C. D. Fuller 508,931
Belt fastener, D. Pasztor 508,970
Bending press, hydraulic, B. H. Tweddell *et al* 509,265
Bicycle lock, J. W. Leonard 509,175
Bicycle mud guard, D. S. Hitchcock 509,652
Bicycle or tricycle, U. Faussereau 509,122
Bin. See Flour bin.
Blower, concentrating, F. P. Smith 509,142
Blower, suction, T. Marsden 509,321
Boiler. See Steam boiler.
Boiler scales, removing, J. Draper 509,209
Bolt threader, L. Kirchenbauer 509,039
Books, etc., adjustable back for, E. Schafer 508,988
Books, machine for securing backing strips to and folding, A. L. Garver 509,215
Boot or shoe, J. W. Packard 509,241
Box. See Letter box. Match box. Salt box.
Brake. See Carriage brake. Wagon brake.
Brake beam, P. B. Harrison 508,940
Brake for cycles or other carriages having rubber-tired wheels, A. C. Roper 509,183
Brick kiln, C. Moellenhoff 508,960
Brick machine, E. Fernholtz 509,302
Bridge and tail piece, W. P. Owen 509,240
Bridge, winter, E. Fontaine 508,929
Bridle bits, die or mould for covering, G. Brockington 509,293
Brush, Olsen & Miller 509,237
Burner. See Hydrocarbon burner.
Butter extractor, centrifugal, E. G. N. Salenius 509,185
Buzz, E. R. McCall 509,044
Calendar, C. N. Hoyt 509,166
Calipers for measuring distances, C. W. Preston 509,096
Can cap, G. J. Record 509,088
Capstan and apparatus for plowing, A. L. Grinnell 509,028
Car, T. E. Pope 509,325
Car brake slack adjuster, F. J. Cole 509,018
Car, cattle, F. E. Canda 509,192
Car coupling, C. C. Davison 509,299
Car coupling, G. W. Dickey 509,208
Car coupling, J. H. O. Kemp 509,038
Car coupling, J. Reinicke 508,976
Car coupling, W. F. Richards 509,100
Car coupling, B. K. Richardson 509,248
Car coupling, Schroeder & Lindholm 509,104
Car coupling, J. C. Souleyret 509,144
Car coupling, W. C. Watson 509,108
Car, dumping, W. A. Thacher 508,998
Car, push, C. Roberts 509,182
Car, railway, M. W. Edgar 509,300
Car safety device, railway, C. L. Pullman 509,096
Car wheel, Hymas & Brockley 509,084
Cars, skid shoe for railway, L. Peetz 508,971
Carbureting apparatus, gas, R. S. Lawrence 509,174
Carriage, Currier & Ellis 508,919
Carriage brake, child's, F. O. Boes 509,288
Carving machine, O. Lademann 508,951
Case. See Shipping case.
Cash register, T. Carroll 509,071
Chair. See Convertible chair. Opera chair.
Chair bottom, spring, Judson & Edmond 509,225
Chute, Lloyd & Reiersen 509,041
Cider mill, L. Middleton 509,958
Cigar holder, E. L. Gaylord 508,933
Cigar lighter, electric, Jenne & Willey 509,085
Clamp joint, F. Higbie 509,222
Clamping mechanism, F. Johnson 509,129
Clock escapement, torsional, E. Klahn 509,315
Cloth finishing machine, A. Brown 509,286
Cloth singeing device, R. M. Hunter 508,944
Clothes drier, J. J. Bisel 509,349
Clothes drier, J. Schmitz 509,989
Coating non-metallic articles with metal, Ash & Gill 509,280
Convertible chair, J. H. Woodman 509,257
Conveyer, D. J. Sheldrick 509,261
Corset waist, I. M. Rew 509,327
Cotton press, W. T. Bessonette 508,909
Counter seat, G. A. Moss 508,961
Coupling. See Car coupling. Hose coupling. Thill coupling.
Crane, supporting, F. A. Kirby 509,227
Cultivator, French & Einfeldt 509,027
Cultivator, beet root, W. Miskovsky 508,959
Cultivator, combination, T. J. Bottoms 508,912
Cultivator, garden, L. M. Stegner 509,995
Cultivator, wheel, E. Einfeldt 509,024
Current controlling device, W. H. Morgan 509,322
Curtain fixture, C. E. Goodrich 509,078, 509,161
Curtain fixture for bay windows, Ortt & Shearer 509,238
Cutter. See Milling cutter.
Cutter head, H. Ernsberger 509,301
Cycle change gear, E. L. Rosenfeld 509,329
Cyclometer, J. S. Hilliard 508,941
Damper, T. Davidson 509,019
Damper regulator, thermostatic, I. F. & F. C. Beers 509,348
Dental heater, T. G. Lewis 509,176
Desk support, F. W. Tobey 509,000
Desk, wall, J. C. Richardson 509,101
Digging machine, Bendinck & Renner 509,286
Dipper handle socket, G. W. Knapp 509,173
Distilling and rectifying apparatus, Burkhardt & Schule 508,913
Door check, S. E. Foreman *et al* 509,305
Door, electrically controlled, F. Callahan 509,116
Door fastener, F. W. Tobey 509,999
Door hanger, R. W. Lundy 509,131
Door hangers, adjustable track for, R. W. Lundy 509,132
Door lock, sliding, I. C. Com 508,917
Door lock, sliding, E. E. Fasching 509,025
Door lock, sliding, Lewis & Weenink 509,130
Door lock, sliding, C. L. Mueller 509,089
Door mat, S. Armstrong 509,013
Dough dividing machine, A. Rudloff 508,984
Drier. See Clothes drier. Garbage or rubbish drier.
Electric meter, J. Perry 509,095
Elevators, regulating switch for electric, H. A. Allen 509,279
Engine. See Gas engine. Wind engine.
Engraving machine, Hirsch & Thiede 508,942
Fabric. See Pile fabric.
Fan, E. Ross 509,249
Fan or blower, rotating, F. P. Smith 509,143
Felly attachment, wheel, E. I. Fisk 508,927
Felly, wheel, W. W. Stall 509,259, 509,261
Fence and means for securing tension thereon, wire, P. Mast 508,957
Fence, wire, D. Rogers 509,102
Fences, apparatus for taking up the slack of wire, D. W. Housley 509,034
Fencing strand and making same, wire, A. B. Woodard 509,343
Fiber cleaning machine, W. A. Keene 509,314
Fibers, process of and apparatus for treating textile, E. Maertens 509,351
Filling indicator, N. Johnson 509,170
Filter, C. H. & I. H. Jewell 509,126
Fire alarm telegraph repeater, T. F. Gaynor 509,216
Fire alarm telegraphs, non-interference signal box mechanism for, T. F. Gaynor 509,219
Fire and burglar alarm, R. L. Levin 508,954
Fire escape, A. R. Shannon 509,106
Flour bin and sifter, combined, A. Wolff 509,276
Flue stop, J. A. Hadley 509,307
Folding stand, etc., G. W. Voeltzkow 509,005
Fork, W. Schrader 509,103
Front rod for double slips, A. H. Johnson 509,128
Fruit gatherer, M. Alexander 508,905
Fruit gatherer, W. P. Wadsworth 509,007
Fuel for lighting or heating, apparatus for using liquid, H. Galopin 509,076
Fume arrester, F. Swiontkowsky 509,336
Furnace. See Glass annealing furnace. Glory-hole furnace. Vitrification furnace. Welding furnace.
Furnace fire bar, A. Kulbrock 509,950
Furniture, knockdown, H. E. Clement 509,198
Gauge. See Micrometer gauge.
Game apparatus, W. W. Lapham 509,316
Game apparatus, R. Oberwimmer 509,179
Game apparatus, coin-controlled, E. H. Davis 509,922
Garbage or rubbish drier, J. Mann 509,177
Garden implement, Hanneken & May 509,308
Garment supporter, F. W. Taylor 509,338
Gas engine, C. Sintz 509,255
Gas liquefying apparatus, F. B. Deane 509,205
Gate, L. W. Youngs 509,346
Glass annealing furnace, George & Shortle 508,934
Glass articles, apparatus for attaching stems and feet to, L. Schaub 509,250
Glass blower tre fue, J. Casner 509,195
Glassware threading device, L. Friedrich 509,214
Glory-hole furnace, C. D. Trimble 509,146
Gold from ores containing it, apparatus for the separation of, W. D. Bobm 509,289
Grain binder, E. G. Watrous 509,008
Gun and electrical devices therefor, magazine, J. L. McCullough 509,091
Gun, recoil-operated quick-firing, C. Holmstrom 509,313
Gun wad, shot, A. E. Veon 509,273
Handle. See Saw handle.
Harness, J. H. Rhoads 509,247
Harness line ring, M. C. Flack 509,026
Harp, G. B. Durkee 508,922
Harvester, corn, N. W. Hartman 509,162
Harvester, corn, W. K. Liggett 509,229, 509,230
Harvester, self-binding, Deering & Steward 509,020
Harvesting and thrashing machine, combined, J. L. Heald 509,082
Hat blocking machine, W. Beckerle 509,284
Hat retaining device, A. B. Olson 509,092
Heat regulating device for stoves or furnaces, L. H. Fisher 509,153
Heat regulating device for stoves or other heaters, L. H. Fisher 509,152
Heater. See Atmospheric heater. Dental heater.
Heating and ventilating apparatus and system, F. P. Smith 509,332
Hedge trimming machine, G. W. & C. E. Goss 508,936
Hinge, lock, G. F. Pottle 509,047
Hoe, grubbing, J. C. Thompson 509,264
Hook. See Snap hook.
Hook and eye, Bates & Collins 509,347

Horse detacher, F. Zipperling 509,112
Horse detaching device, C. M. Welch 509,010
Hose coupling, air brake, S. M. Beery 509,114
Hose nozzle support, G. R. Unkefer 509,187
Hub attaching device for vehicle axles, H. Wecker 509,009
Husking machine for rice, etc., J. Winter 509,011
Hydrocarbon burner, V. C. Dillmann 508,923
Incubator, A. N. Jewett 509,035
Indicator. See Barrel indicator. Filling indicator.
Jars, flexible sealing joint for fruit, G. B. Howell 509,223
Joint. See Clamp joint. Limb joint.
Journal and boxing and bearing therefor, I. Metzger 509,178
Kiln. See Brick kiln.
Kitchen cabinet, J. P. Gage 508,932
Knife. See Pocket knife.
Knife, R. J. Christy 508,916
Knitting machine, circular, McMichael & Wildman 508,965
Knitting machine stop motion, H. S. Becker 509,283
Knitting machine striping attachment, circular, J. A. Parr 509,243
Knob and spindle lock, R. F. Carty 509,194
Labels, etc., apparatus for pasting or gumming, E. H. Friedlander 509,213
Lamp, M. M. Deem 509,206
Lamp casing, electric arc, P. Federmann 508,926
Lamp, central draught, J. F. Place 509,324
Lamp, electric arc, H. P. Ball 509,014
Lamp, electric arc, R. M. Hunter 509,167, 509,168
Lamp, electric arc, B. B. Ward 509,188
Lamp socket, electric, W. C. Bryant 509,297
Lamps, automatic thermal cut-out for incandescent electric, E. H. Johnson 509,036
Lantern for vessels, etc., signaling, E. H. L. Petersen 508,972
Latch, H. C. Piester 508,973
Lathe taper attachment, J. Flather 509,212
Lead, making white, E. Waller 509,057
Lead, manufacture of white, Waller & Hinman 509,059
Letter box, G. E. Siebler 509,254
Limb joint, artificial, L. S. Gardner 509,157
Linoleum, apparatus for the manufacture of, D. N. Melvin 509,088
Linoleum or other floor cloths, machine for the manufacture of, J. S. Farmer *et al.* 508,925
Liquids, slot machine for delivering, J. H. Davis 509,119
Lock. See Bicycle lock. Door lock. Permutation lock. Seal lock.
Lock and latch, O. J. Brugman 509,016
Locomotive, electric, J. C. Henry 509,311
Loom shuttle, G. C. Voigt 509,339
Lumber, compound, C. E. Parks 509,180
Lung tester, C. W. Delaney 509,207
Mandrel, expansible, H. T. Giles 509,159, 509,160
Mantel shelf and clothes rack, combined, C. W. Parks 509,242
Mat. See Door mat.
Match box, P. Seiler 509,051
Match safe, pocket, G. Rich 508,977
Mattress, invalid, H. F. Harding 509,081
Mattresses, ventilating button for, Young & Scruggs 509,345
Measure, compositor's pay, Drake & Heffron 509,073
Measure, tailor's, C. Gunkel 509,080
Measuring device for canisters, V. J. Long, Jr 509,320
Measuring vessel, A. F. Dubois 509,210
Meat tenderer, R. B. Lavigne 508,953
Meat tenderer, J. T. Oakes 509,323
Meat ventilating pin, H. J. Reiss 509,099
Merry-go-round, J. S. Sprague 508,994
Messages, apparatus for receiving written, C. Rogers 509,140
Meter. See Electric meter.
Micrometer gauge, J. P. Lavigne 508,952
Middlings purifier, H. H. Ring 508,979
Mill. See Cider mill.
Milling cutter, J. Thomson 509,145
Millstone dress, J. H. Brown 509,294
Moistener, envelope or stamp, H. A. Fry 509,156
Moistener, envelope or stamp, G. R. Shebbeard [illegible]
Mould sander, C. H. Horton 509,038
Moulder's flask hinge, J. Rost [illegible]
Moulding machine, C. Seymour 509,331
Mop wringer, A. M. Burnham 509,070
Motor, Maxfield & Snyder 509,043
Motor, D. D. Shaw 509,052
Mowing machine, G. Beekman 509,285
Mowing machine, J. W. Latimer 509,317
Musical instrument, F. Mann *et al.* 509,232
Musical instruments, machine for swaging wire for, F. Ramacciotti 508,974
Nut lock, Ortt & Shearer 509,239
Oiler, C. J. Hauck, Jr 509,309
Opera chair, G. A. Clapp 509,196
Orange sorting machine, P. L. Billingsley 508,911
Ores, concentrating, Waller & Sniffin 509,058
Ozone, liberating, N. Helmer 509,163
Pan. See Vacuum pan.
Paper machines, steam regulator for, R. Smith 508,993
Paving, machine, R. J. Carson 509,117
Pen, drawing, H. P. Norton 509,137
Permutation lock, G. Vogt 509,006
Piano, upright, H. Ziegler 509,111
Pianos, string frame for upright, H. Ziegler 509,110
Pianos, stringing, C. S. Weber 509,274
Pick, Williams & Edwards 509,147
Pile fabric, woven, J. Raab 509,138
Pipe hanger, J. H. Cain 508,914
Pipethread protector, M. Blakey 509,115
Pipe wrench, L. Dahlstrom 508,920
Piperazine, making, W. Majert 509,087
Planing machine channel cutting tool, W. C. Rolston 508,982
Planing machine for blower pistons, E. D. Johnston 509,086
Planter, corn, D. M. Forsyth 509,087
Plates for the purpose of utility and ornament, preparing, H. Goodwin 509,124
Plotter, F. C. Stowell 509,335
Plow, F. Bartels [illegible]
Plow, sulky, G. R. Shelhamer 508,992
Pneumatic ventilator, W. R. Macdonald 509,231
Pocket knife, J. C. Larson 509,228
Press. See Baling press. Bending press. Cotton press.
Pressure brake mechanism, fluid, C. Schlared 509,330
Printing machine, web, L. C. Crowell 508,918
Printing press gripper, F. X. Muller 509,090
Propeller, M. Davies 509,204
Propelling mechanism, boat, J. R. Mahoney 509,133
Pulverizer or harrow, M. Bruner 509,068
Pump, hydraulic air compressing or exhausting, O. Dalisch 508,921
Pump valve, gas, W. F. Garrison 509,158
Punch, ticket bell, J. M. Black 509,237
Punching or perforating apparatus, multiple, A. Meyer 509,134
Purse, safety, W. M. Ward 509,341
Rail fastener, guard, G. L. Cummins 509,203
Railway conduit, electric, G. T. Woods 509,065
Railway devices, actuating mechanism for, E. Fontaine 508,928
Railway, electric, J. H. Dale 509,072
Railway, electric, J. H. Vail 509,002
Railway electric signal, automatic, Karr & Bradrick 508,946
Railway signals, electro-mechanical slot mechanism for, T. H. Patenall 509,093
Railway supply system, electric, J. C. Henry 509,312
Railway switch, D. M. Church (r) 11,390
Railway train order and signaling device, L. T. Crabtree 509,201
Reaping machine, L. Jankowski 508,945
Refrigerating or freezing machine regulator, Sterne & Murray 509,263
Refrigerator, T. A. Baggett 509,281
Register. See Cash register.
Regulating mechanism, A. Kleinstiver 508,947
Regulator. See Damper regulator.
Relief plates, making, J. F. Earhart 509,120
Renting machine, coin-controlled, G. Richmond 509,181
Restaurant service, W. A. Butterfield 509,191
Ring. See Harness line ring. Terret ring.
Roasting coffee, etc., apparatus for, D. P. F. Cardozo 509,298
Rowlock, C. Norman 508,969
Safe, provision, J. H. Stephens 509,262
Salicylate of tolyldimethylpyrazolon, H. Thoms 509,055
Salt box, J. A. McGlinchy 509,135
Salt, process of and apparatus for making, D. P. F. Cardozo 508,915
Sash fastener, J. A. Forbes 509,304
Sash holder, C. E. Lucas 509,042
Saw, frame, N. S. Snell 509,256
Saw handle, reversible, J. R. & W. R. Randolph 508,975
Sawmill dogging mechanism, A. Harrold 509,029
Saws, safety guard for rip, G. A. Shields 509,253
Scaffolds, contrivance for fastening, A. Kuhn 508,949
Scraper, wheeled, Ackerman & Hasselquist 509,278
Screw wrench, W. Dicks 509,151
Seal lock, F. F. Getze 509,077
Seat. See Counter seat.
Sewer, J. P. Nesdall *et al.* 508,967
Sewing machine attachment, Wells & Sparks 509,062
Shears, C. Hamann 509,125
Sheet metal package, G. G. McMurtry 509,136
Shipping case, I. Unger 509,001
Shoe, C. A. Riedig 508,978
Shoe, turned, H. H. Budd 509,149
Signal. See Railway electric signal.
Signal apparatus, block, Johnson & Patenall 509,127
Signal device, electric, T. F. Gaynor 509,218
Signal or other circuits, electrical apparatus for controlling, H. A. Parrish 509,244
Signal receiver, electric, W. H. Kirnan 509,171
Sled propeller, H. Roeber 508,980
Snap, harness, H. J. Bickle 508,910
Snap hook, E. Covert 509,200
Snow plow, O. Spiegel 508,333
Soap, manufacturing, J. Schicht 509,049
Sowing machine, seed, O. B. Ruppe 508,986
Spoons, forks, knives, etc., manufacturing, G. W. Peck 509,094
Spring. See Vehicle spring.
Square, S. H. Bretz 509,292
Stalk cutting machine, W. & J. Allingham 508,906
Stamp and signal device, combined electric time, T. F. Gaynor 509,217
Stamps, etc., apparatus for collecting and arranging postage, H. A. Krotzsch 508,948
Stamping in colors, E. A. W. Wolter 509,109
Stanchion, cattle, H. Heitman 509,031
Stand. See Washstand.
Staves, machine for finishing twisted, D. F. Miller 509,233
Steam boiler, H. A. Laughlin 509,318
Steam trap, H. Creamer 509,202
Stereotype or electrotype plates, base for, H. Fietsch, Jr 509,075
Still, druggist's, C. R. R. Beck 509,282
Stirrup, Riker & Green 509,139
Stoker, mechanical, F. O. Ruppert 508,985
Storage battery, E. P. Usher 509,266 to 509,272
Store service track curve, S. W. Barr 509,015
Stove, furnace, or range grate, C. F. Hutchinson 509,224
Stove, heating, A. Muller 508,962
Stove, oil, A. R. Welch 509,189
Stove or range name plate attachment, G. G. Wolfe 509,064
Stoves, etc., oven door for, J. E. Yeager 509,012
Street sweeper, E. C. Fisher 509,303
Suppositories, machine for making, C. W. Fox 509,154
Surgical instrument, A. C. Kellogg 509,226
Surgical needle holder, J. L. Hanchett 508,939
Suspender end, S. Froeblich 509,306
Sweets, apparatus for manufacturing, P. Lindemann 508,955
Switch. See Railway switch.
Switch operating mechanism, Walker & Marshall 509,340
Table. See Wall table.
Tap, collapsible, A. G. Anderson 509,113
Telegraph, signal, C. V. Boughton 509,290
Telegraphy, J. P. Wooten 509,066
Telephone exchange apparatus, C. E. Scribner 509,186
Telephone speaking attachment, W. & G. Weber 509,061
Terret ring, O. Van Cole 509,004
Thermostat, Tunnard & Keays 509,056
Thill coupling, F. J. Buff 509,017
Thill coupling, A. E. Hotchkiss 509,165
Tile, illuminating, H. Haustein 509,030
Tire, bicycle, F. W. Huestis 508,943
Tire, flexible wheel, E. H. Seddon 508,991
Tire, pneumatic, C. Carey 509,193
Tire, pneumatic, L. Holt 509,164
Tire, pneumatic, S. H. Stubbs 509,996
Tire, pneumatic, W. A. Warren 509,107
Tires, inflating tube for pneumatic, J. B. Rathbun 509,097
Tongue support, W. H. Watts, Jr 509,060
Toy, dancing, N. Christianson 509,150
Track sanding apparatus, Murry & Walker 509,234
Traction wheel, Hawes & McNair 509,221
Trap. See Steam trap.
Trolley mechanism, J. T. Fuller 509,123
Trolley wire hanger, G. H. Ricke 509,328
Trowel, mason's, A. Roncaglia 509,352
Truck, car, Mansfield & Baker 508,956
Truck, band, H. O. Thomas 509,054
Trunk, traveling, W. C. Clark 509,197
Typewriting machine, C. J. Bond 509,067
Typewriting machine attachment, E. W. Eaton 509,121
Vacuum pan, E. Passburg 509,045
Valve, F. Fichter 509,211
Valve, automatic, G. W. Young 509,344
Valve, automatic three-way, W. Craig 509,118
Valve, balanced slide, C. R. McGahey 508,964
Valve closing device, Kleppe & Neubaus 509,172
Valve, piston, S. O. Jones 509,037
Valve, steam-actuated engine, H. Breitenstein 509,291
Valve, throttle, J. E. Stannard 509,334
Vehicle spring, G. C. Burch 509,069
Velocipede, S. A. Grant 509,079
Ventilation of closed rooms, etc., apparatus for the, H. G. Siegert 509,141
Ventilator. See Pneumatic ventilator.
Vessel, collapsible or knockdown, G. P. Frothingham 509,155
Vise, jewel setter's, S. Heberling 509,310
Vitrification furnace, P. K. Sommer 509,257
Wagon brake, automatic, Weenberg & Lindstrom 509,063
Wagon, dump, M. L. Senderling 509,105
Wagon, dumping, W. U. Bosch 509,350
Wagon, dumping, J. Sabold 509,184
Wagon dumping device, C. H. Peardon 509,245
Wall, fireproof, H. M. Newington 508,968
Wall table, E. H. Hamilton 508,938
Washboard, H. G. Olds 509,236
Washstand, H. B. Brown 509,295
Water closet, S. W. Lewis 509,319
Weather indicating device, H. I. Ireland 509,169
Welding furnace, S. H. Percy 509,046
Whalebone stays, machine for scraping the ends of, M. Sachs 508,987
Wheel. See Car wheel. Traction wheel.
Wheel rim, C. S. Dikeman 509,021
Wheel rim, W. W. Stall 509,258
Wheel rim, vehicle, W. W. Stall 509,260
Whips, stalk splitting machine for, D. D. Griffin 508,937
Wind engine, M. Schou 508,990
Windlass self-register, ship's, S. S. Gerry 508,935
Windmill governor, O. A. Farley 509,074
Window, J. Ehrcke 508,924
Wire attaching device, C. H. Taylor 508,997
Wire splicing tool, J. B. Murdock 508,963
Work holder, L. E. Whiton 509,275
Wrench. See Pipe wrench. Screw wrench.
Wrench, A. Shepard 509,252
Wringer. See Mop wringer.
Yoke, neck, Pedersen & Melin 509,246

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Underwear, Rothwell Hosiery Company 23,831
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