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#### 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 This is for our information and not for publication.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.

Inquirles 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.

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(5268) W. P. M. says: I am making a watertube boiler on the porcupine plan. Is there any objection to using pipe for the porcupine as small as half an inch, where the pipes will be two feet long? A. Half inch tubes, 2 feet in length, are too small for a porcupine boiler; the circulation will be sluggish and cause the boiler to lift its water by the accumulation of steam in the small tubes, so fast as to push the water out. The fouling of small tubes is also an objection. Not less than 1 inch tubes should be used, with as large standpipe as possible; will mak the best working boiler. 2. As regarda speed, are hollow or straight water lines desirable for a steamboat? A. The concave bow and stern water lines or wave lines are the lines for speed. 3. I am using in my launch an oil-burning boller. Oil is fed to boller by steam, which is very objectionable for many things, especially noise. Can you tell me a simple way to make a vaporizer so that I can burn oil in the form of vapor instead of spray? A. There is no method of burning oil under a boller better or safer than the jet spray, either air or steam. The air jet makes the clean t fire, but the combined steam and air jet is most convenient and in general use. The steam and air jet has not been considered objectionable when properly regulated; perhaps your st am nozzle is too large and carries too little air into the fire chamber: try a smaller steam nozzle combined with an annular air nozzle for the atomizer.

(5269) N. L. T. writes: 1. In an alternating transformer what will be the relative amperage and E. M. F. of current in the secondary coil as compared to that of the primary, supposing both coils being of the same length and size of wire and both wound alik npon au iron ring or continuous core? A. The relative voltage of primary and secondary is in the ratio of the number of turns of wire in the same. The same number of turns gives the same voltage. There will be a loss in amperage in this case of about 10 per cent. 2. In what ratio does the increase of the frequency of alternations in the primary increase the E. M. F. or tension of the induced current? A. There is no connection. 8. Will a resistance in the secondary circuit have the same effect upon sistance in the secondary circuit have the same effect upon the primary current as if the same resistance were placed in the primary circuit? A. It will have what is practically the same effect by developing counter E.M.F.

4. Will you please explain in an analogous way the meaning of the expression self-induction and capacity?

A. Self-induction is electric inertis. A current requires time to be fully started and time to cease. Capacity refers to the quantity of charge retainable at a given pressure (voltage). This is analogous to storing compressed air. 5. Can you mention any substance transparent to

heat or light waves, or to both, and having some electrical conducting power and which will retain the solid form or withstand beat up to say 200° Fah.! A. There is no such substance. The general rule is that conductors of electricity are not capable of transmitting light waves.

(5270) W. H. F. says: 1. I wish to nake a compass\_12 inches long; can I use a commonhorse shoe magnet to magnetize the needle, and bow should I draw the needle on the magnet? A. Stroke it from end to end. always in the same direction, with one pole of the magnet, returning the magnet through the air. 2. want to make a helix to magnetize a % steel bar, 5 inches long; what number wire must I use and how many layers on the helix, and how many gravity batteries should be used, and how must the bar be fastened in the helix? A. No. 20 wire is a convenient size. There are no fixed dimensions. Gravity batteries are of rather high resistance. The wire may be wound directly on the bar. S. I have a zinc box in a case 12 inches deep. 1016 inches diameter, 214 inches wide, and carbon for same. What preparation can I use for a dry battery of same? A. For dry batteries we referyou to our SUPPLE-MENT. Nos. 157, 787, and 792. 4. A few days ago a consin of mine photographed a kite. In the negative are four perfect kites. A. We should like to see print from the negative. No judgment can be given without this.

(5271) N. L. M. asks how to preserve bird skins. A. Make an incision from the breastbone to the vent with a small piece of wood work the skin from the flesh. When the leg is reached, cut through the knee joint and clear the shank as far as possible, then wind a bit of cotton wool on which some arsenical soap has been pnt round the bone; do the same with the other leg. Now divide spine from root of tail, taking care not to cut too near the tail feathers, or they will comeout. Next skin the wings are far as possible and cut off. The skin will now be entirely clear of the body. The skin must now be turned inside out and the neck and skin gently pulled in opposite directions till the eyeballs are fully exposed. The whole of the back of the head may be cut off and the eves and brains taken out and their places filled with cotton wool. The whole skiu should be rabbed well with arsenical soap or plain arsenic, and the neck returned to its natural position, when, after filling the body with a little dry grass or wool, the job is done. It is very easy, and the skin of a bird la much tougher than one would suppose, though of course they vary, the night jar being very thin, while humming birds are fairly tough. All the apparatus required is a sharp knife and nair of scissors, or, for large birds, a strong pair of nippers to divide the bones. From the American Cyclopedia of Receipts, Notes and Queries."

(5272) W. L. C. writes: To settle a dispute between myself, a city editor, and a learned gentle man, I wish you would answer this: Is the Pacific Ocean along the coas from Lower California to Puget Sound rougher sea, harder to sail on, and more liable to angre waves than the eastern or Atlantic coas of the United States? Ifeo, why? Are the California, Oregon, and Washington ports harder to enter by reason of rough sea than from Maine to Florida? A. The prevailing winds along the Pacific coae of the United States are westerly or on shore winds, while the prevailing winds on the eastern coast are also westerly, or off shore winds. An on-shore prevailing wind makes a rough sea along a coast and at the entrance of harbors, especially so where there are bare at the entrance. Anoff-shore wind insures a comparatively smoothsea along a coast and easy access to harbors. The storm winds temporarily change this condition, but it is the prevailing winds that give the peculiar character o the two coasts as regards the roughness of the sea and the difficulty of navigation along the coasts and entrance to shallow harbors. The month of the Columbia with its bare is a noted example on the Pacific coast.

(5273) D. H. asks how to clean ornanental bronze door knobs and plates, light finish, also how to keep them bright. An The finish of this class of workla done by dipping in strong nitric acid or componnds of dipping acids, then washed in clean hot water and dried. The bright parts are then burnished and the articles lacquered with various colored lacquers for the required shade. Such work should never be cleaned; it destroys the lacquer coat and the recesses of the ornamentation become foul. It should be sent to a finisher of such work for renewal of the lacquered surface

(5274) A. A. P.-To smooth parchment which has become wrinkled, place the parchment face downward upon clean blotting paper. Beat up to a clear froth, with a few drops of clove oil, the whites of sevral fresh eggs, and with the fingers spread this over the back of the sheet and rub it in until the parchment becomes smooth and yielding. Then spread it ont as smooth as possible, cover with oil silk and press for a day. Thenremove the silk and cover with a linen cloth and press with a warm iron.

(5275) L. D. S. asks how to make the tin toet. A. 1. Chloride tin, 3 drm. 2. Nitric acid, 10 8. 8. Piece of zinc attached to copperwire. Put No.1 into a glass vessel with sufficient water to 8 parts fill, then add No. 2, chake well until dissolved. Now place No. 8 through a cork and insert in solution, so that no part shall touch top, bottom or side of glass vessal. Let the whole rest quietly for a short time. The tree will grow and have a very lustrons appearance.

(5276) J M H asks where the worms we see on sidewalks after a rain come from. I have heard it stated that they fall with the rain, but to my ears that explanation seems hardly plausible. Are there any well anthenticated accounts of rains of froge, etc. ? A. The worms and frogs or toads come from their holes or hiding places in the soil during rain, either driven out by the water filling their holes, or perhaps for a bath. There are no anthentic accounts of the falling of worms.

was simply accidental, as it was undoubtedly attracted to the room by light.

(5278) F. K. J. asks: How can I get the rust outof wrought iron water pipes? They are in the ground about four years, and the water runs through them about half as strong as at first. A. The pipe can-not be cleaned while in the ground; it must be taken up and the rust cleaned out with an iron rod, or lay new galvanized iron pipe, which does not rust.

(5279) R. L. S.—About 166 feet of gas can be made from a gallon of gasoline?

(5280) F. A. K. writes: Please settle a dispute by answering the following in your Notes and Queries: A holds that when a person in Australia or any other place south of the equator is looking at the sun at noon he will be facing north; or in other words, the north side of the street is the shady side at noon. B holds that sun is always south of a person at noon, no matter what part of the earth he is on. Who is right? A. A is partially right and B is wrong. To a person south of the tropic of Capricorn, or in southern Australia, the sun is always north of his zenith and casts his shadow to the sonth; and if he is north of the tropic of Cancer, the sun is always south, and casts his shadow toward the north at noon. To a person within the tropics the sun's shadow may be north or south, according to the sun's declination from his zenith.

(52 1) C. K. asks: How long will it take a storage battery current to decompose a pint of water into its gases? How many volts are required to separate it in five minutes? What is the most convenlent form of apparatus to do this work? A. To decompose water it is well to allow two volts difference of potential. An ampere for five minutes is 800 coulombs. which will decompose 0.86 grain of water. The number of cells required to decompose a pint of water must be deduced from their amperage as given by the makers of the cell. For apparatus use copper or iron electrodes and a dilute solution of caustic alkali as electrolyte.

(5282) W. H. C. says: Will you please explain the way that nails are graded, inst. what is meant by a tenpenny, a ninepenny nail, also what is the relation between the length and name of nall? A. We give the name, size, and weight of nalls as follows:

Phreepenny	25 in. le	ong	.420 per lb.
Fourpenny	1.8 "	"	270 " "
Fivepenny	1.75 "	" , <i></i>	220 '" "
Supenny	2. "	<sup>46</sup>	175 " "
Eightpenny	2.5 "	**	100 ""
Tenpenny	8	*	65 ""
Twelvepenny	3.25 "	"	. 52 ""
Twentypenny	3.5 "	"	28 " "

The lengths are standard for all kinds, but the numto a pound varies with different makers and for the different kinds, as ordinary, light, and finishing nails.

(5283) W. L. R. says: We have a horizontal tubular boiler 10 feet long, 86 inches in diameter, with 30 fines 3 inches in diameter. Also a 20 horse power engine, 9×12 cylinder, making 200 revolutions per minute. How many pounds pressure of steam are neessary to develop the full 20 horse power? A. The boller is nominally 20 horse power. Its effective horse power may be much larger with high pressure. The required boiler pressure for 20 indicated horse power of the engine will begoverned by the point of cnt-off, which if 1/2 will require 45 pounds boiler pressure. If 1/2 cut-off, 40 ponnds pressure. If 1/2 cut off, 35 pounds pressure.

(5284) R. S. asks: If there are fifty incandescent lamps connected up in series, voltage 110, amperes 6-10 for each, resistance in ohuse 168 for each lamp, will the last lamp burn as bright as the first one, and what is the cause? A. Yes: Decause each passes the same current. The current effects the heating of the

(5285) P. H. H. writes: I have two ammeters, and when I connect them together they do not register the same. Is there any way of adjusting them without having a standard instrument to go by? A. If you can secure an absolutely constant current, then you can determine its amperage by a silver ampere-meter. The method, a very simple one, la given in Ayrton's "Practical Electricity," which we can supply for \$3.50. Such a current can be used to standardize your am-

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### INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

August 8, 1893,

AND EACH BEABING THAT DATE. [See note at end of listabout copies of these Patents.]

Barrel hooping machinery, R. Welch. Barrels, etc., manufacture of metal, I Battery. See Secondary battery. Beating, vehicle wheel ball. E. A. Jon Belt, driving, S. J. Wilbur. Belt, dectric, D. P. Andrus. Belt, electric, J. H. Se Chever II. Belting, K. Kuchler. Bicycle, O. Schuledel. Bicycle strachment, T. K. S. McGriff. Bicycle brake, O. B. Burne. Bleycles changeable speed device. Bwan. Blower, rotary, E. P. Reichhelm.	
Bearing, vehicle wheel ball. E. A. Jon Belt, driving, S. J. Wilbur	602,927 502,798
Belt, electric, D. P. Andrus  Belt, electric, J. H. Se Chever Il  Belting, K. Kuchler	502,704 502,778 602,976
Bicycle, O. Schmitedel. Bicycle Strachment, T. K. S. McGrin.	502,986 503,858 502,049
Blcycle speed gearing, J. L. Abbott Blcycles, changeable speed device	for, W. B.
Blower, rotary, E. P. Reichhelm Boiler. See Steam boiler.	602,890
Boller furnace, steam, G. H. Watson. Bolt. See Stay bolt. Thill coupling t	
Bottle filling apparatus, J. Jackson Bottling machine, C. F. Mack	602,989 602,094
Blovices, changeable speed device 8 wan. Blower, rotary, E. P. Reichhelm Boller, See Steam boller. Boller furnace, eteam, G. H. Watson. Bolt. See Stay bolt. Thill coupling t Boot or shoe jack, A. F. Preston Bottle illing appartus, J. Jackson Bottling machine, C. F. Mack Boutonniere, H. W. Flahel Box. See Paper box. Telescopic boy and Packing box.	Tobacco
Bracket. Bee Deutal bracket. Brake. Bee Bleyole brake. Car bra pede braka. Brick profestor. N. Olson. Brick Iruck. J. F. Mook. Bridge gate, A. Kohler. Cambon, bleeve or collar. T. W. F. Smitchen, S. May Bridge gate, A. Kohler. Cambon, pneumate, J. Baker. Can bling machine, J. Baker. Car trake, J. W. Schoaf. Car trake, J. W. Schoaf. Car trake, J. W. Schoaf. Car coupling, J. Fischer. Car coupling, J. M. Henderson. Car coupling, J. M. Henderson. Car coupling, J. M. C. Martin. Car trader, M. F. Field. Car fender and brake, combined, F. W. Can passenger, H. W. Libbie. Car replacer, J. H. Blomshield. Car ventilating apparatus, C. Knapp. Car wentilator, J. Hankin. Car wentilator, J. Hankin. Car window ventilator, rallway, G. L. Cara. rotary tipple for dump, I. Barke. Carburetor, E. A. Smith. Carpet sweeper, C. O. Allen. Carlinga, F. Mohr. Cash reschater and indicator, J. T. Gre Centrifugal machine, Lister & Peders Chair. See Window chair. Clear pipe, Phillips & Linhard. Cruit closer, A. J. Ochring. Chruit testing apparatus, G. S. Palm. Clock, electric alarm, W. H. Deane. Clock, electric alarm, W. H. Deane. Clock, electric alarm, W. H. Deane. Clotk, elf-winding electric F. M. Sell Clothes drev. J. F. Belmidt. Cool, train, stc., pocket or bin for the T. E. Murray. Coating the luminum or alloys th	ke. Veloci-
Brick protector, N. Olson	
Bridge gate, Simon & Pletka Broom holder, C. N. Addison	502,779 502,049
Burial apparatus, I. B. May. Button, eleeve or collar. T. W. F. Smi	502,686 tten 502,834
Camera, See Photographic camera, Can filling machine, J. Baker	508,029, 508,030 502,297
Candy moulding apparatus, E. Rosen Cannon, pneumatic, J. Rapieff	berger. 502,864 502,759 509,009
Car brake, railway, T. A. Ainscough Car coupling, J. Fischer	608,027 602,711
Car coupling, J. M. Henderson	503,062, 502,068 502,765
Car coupling, W.T. Van Dorn	503,017 603,969 7 Shouldh 502,780
Car, passenger, H. W. Lipbie Car replacer, J. H. Blomshield	502,908 502,908
Car ventilating apparatus, C. Knapp. Car ventilator, J. Hankin	502,924 502,047 Thomas 502,919
Cars. rotary tipple for dump, I. Barke Carburetor, E. A. Smith.	F
Cartridge, F. Mohr. Cash register and indicator, J. T. Gre	6/3,096 ene
Centrifugal machine, Lister & Peders Chair. See Window chair. Chill, oscillatory, R. A. Ponle	en
Chimney, L. E. Clawson	
Circuit testing apparatus, F. S. Palmo Clock, electric alarm, W. H. Deane	ar503,889 502,811
Clock, self-winding electric F. M. Sol Cloth softening machine, J. W. Fries Clothes drier, J. F. Schmidt.	502,935 
Clutch, W. H. Lindsay	
Clutch, S. H. Randall. Coal, grain, etc., pocket or bin for the T. E. Murray. Coating the sluminum or alloys th	ereof. E. C. 503,097
Coin-assorting apparatus, A. R. Gunt Coin-controlled apparatus, G. F. W.	ber
Condensing apparatus, N. A. Christer Conductor support and insulator, W. Copy holder, J. M. Phillips	B. Essick 502,039 
Coating the aluminum or alloys the Broadwell.  Coin-assorting apparatus, A. R. Gunt Coin-controlled apparatus, G. F. W.: Condensing apparatus, N. A. Christer Conductor support and insulator, W. Copy holder, J. M. Phillips.  Coupling. See Car coupling. Shat this coupling.  Coupling occupants.	er 502.794
Culinary utensil, J. H. Norton	502,740 508,748
Current motor, L. C. Neal	602,881 ting, M. Von
Dolivo-Debrowolsky	
Cutter. See Rotary cutter. Dental bracket, E. R. Pettit	
Cahoon, Jr	602,976
Displaying stand, carpet, C. Haffemer Ditching machine, T. P. Coucannon. Door check, pneumatic, J. W. Wetmo	998
Door hanger, G. A. Colton Dredging machine, W. B. Pless	602,706 602,934
Drier. See Clothes drier. Dr ll. See Grain drill. Drilling machine attachment, J. J. 80	evens 603,012
Drum, heating, R. Pugo Dust collector, A. P. Gould Dve. bl ck and. Poirrier & Rosenstieb	502,489 502,863 1 502,912
Drill. See Grain Grill.  Drilling machine attachment, J. J. St Drom, heating, R. Pugh.  Dust collector, A. P. Gonid.  Dye, blc and, Poirrier & Rosenstiet Dye, blue alizarin, R. E. Schmidt.  Rarring, J. Wodika.  Eaves Grough, J. Wock.  Eaves Grough, J. Wock.	502,756 602,501
Earth boring and drilling machine, V. Eaves trough, J. Wock. Electric body wear, W. H. Pasne Electric current gene ator, alternati & Rooney Electric generator regulator, E. T. hor Electric lighting system. C. C. Chean Electric witch, J. H. McEvoy Electric witch, L. Morse Electric witch, L. Morse Electric witch, J. Morse Electrode for firing explosives, J. N. rison	502,800 502,753
at Booney	щк, эленоол 502,777 1900 502,789
Electric lighting system. C. C. the end e Electric switch, J. H. McEvoy Electric switch, L. Morse	502,702 502,983 508,975
	&H. J. Har- 502,965
Elevator. See Hydraulic elevator. elevator, Elevator gate operating device, Shav	& Lorio 602,836
Elevator gate operating device, Shave Elevator guard, O. L. Davis. Rogine. See Expansion engine. So Steam engine. Traction engine	tary engine. Wind en-
Engine operated by the explosion of	mixtures of
	pound, H. D.
Engines, driving connection for compunity  Engines, electric igniting device for Tremper	
Enginea, pressure regulator for p	oumping, E. 503,068

Tremper

Engines, pressure regulator for pumping, E. Austin
Envelope, package, M. Hess
Ersaer, blackboard, W. J. Weaver
Expansion eogine, quadruple, J. Marshall.
Expansion joint, J. Lister
Extractor. See Nall extractor. Pen extractor.
Expansion joint, J. Lister
Extractor. See Nall extractor. Pen extractor.
Expansion significant for the second seed of the seed of the second seed of the secon 光数 11,357 502,784 502,726 502,86 

gate.

Generator. See Electric current generator.

Steam generator.

126	Scientific ,
Hydraulic motor, H. Alken	Stay bolt, J. Nimn.         602.827           Steam boller, M. I. Severy         503.096           Steam engine, F. M. Davis.         502.107
Too tongs and weighing scales, combined. T.	Stay bolt, J. Ninon.         602.827           Steam boiler, M. L. Severy.         503.005           Steam engine, F. M. Davis.         502.707           Steam engine, J. W. Sar sent.         502.703           Steam generator, A. Kruesler.         502.723           Steam generator and beater combined, A. Kruesler.         502.723           Stockings, manufacture of, L. N. D. Williams.         502.941           Street sprinkler, G. Langer.         504.003           Stud hopper and delivery mechanism, C. E. Van         Norman.           Norman.         602.835
Glynn   603,042   faculator and brooder, combined, J. W. Atkinson   602,900   Incubator heater, E. P. Alexander   602,839   Indicator   See Synchronism indicator	Street sprinkler, G. Langer. 503,083 Stud hopper and delivery mechanism, C. E. Van Norman. 602,835 Sucker rod elevator, H. Knox. 502,874
Insects, apparatus for distributing solutions for destroying, J. Schreick	Norman 672.335  Norman 672.335 Suky track, H. A. & T. W. McIntosh 672.742 Suky track, H. A. & T. W. McIntosh 672.743 Suspenders, J. C. Vollman 672.743 Switch See Electric switch Tramway switch. Switchboard system, multiple, C. E. Scribner 502.771 Switchboard transfer system, C. E. Scribner 502.771
Jack. See Boot or shoe jack. Jar Protector glass fruit, M. E. Clark	Switchboards, lock switch for electric, C. E. Scrib- ner. 602,769 Switchboards, test, circuit for multiple, C. E.
Joints, mould for making plumbers', F. Tyers 502,833 Journal lubricator, car, S. Walker	Switchboards, test signal for multiple, C. E. Scribner. 502.772 Switchboards, testing apparatus for multiple, C.
Lacing studs, eyelets, etc., setting, C. E. Van Norman	E. Scribner 502,773 Switchboards, testing system for multiple, C. E. Scribner Scribner 502,773 Synchronism indicator, L. Bell 502,695 Table. See Folding table.
Lamp burner, H. E. Shaner	Switchboards, teeting system for multiple, C. B. Scribner. Synchronism indicator, L. Bell.  502.636  Table. See Folding table.  Tap, porter or beer, C. I. Snyder.  Telephone exchatge apparatus, C. E. Scribner.  502.707  Telescope box, double, J. T. Craw.  Tether or halter strap. H. T. Crepeau.  502.364  Tabil coupling. J. H. Hanson.  502.365  Thill coupling. G. H. Ferry.  502.365  Thill coupling. G. H. Ferry.  502.367  Thill coupling both. C. L. Kelley.  Thrashing machine attachment, J. C. Lundy.  502.772  Thrashing machine band cutter and feeder, D. C.  Ruth.  603.002
Lasting machine, boot or shoe, A. F. Preston 502,755 Latch, S. P. Hodgen 502,855 Latch, F. W. Tobey 502,758 Latch, coin-freed, F. E. Zschering 502,856	Thill conpling, G. H. Perry 612,999 Thill coupling bolt, C. L. Kelley. 672,972 Thrashing machine attachment, J. C. Lundy. 672,972 Thrashing machine band cutter and feeder, D. C.
Lifting machine of invalid lifter, J. Tingley 502, 103 Lime kiln. P. McLoon 502,069	Ruth.     608,002       Tie.     See Railway tie.       Tile.     502,725       Till alarm, P. Ziegler.     602,345       Till alarm, P. Ziegler.     602,345
Lithograp hie transfers, composition for forming, C.F. Habedank. 502,984 Lock. See Hasp lock. Time lock. Lock, W. E. Sparks. 502,937 Locomotives, variable exhaust nozzle for, G. H.	Threshing machine band cutter and feeder, D. C. Ruth.
Watsou         502,792           Loom for weaving chenlile strips, F. Watzlawik.         602,393           Loom picker stick check, J. Johnson         602,393           Loop fastener, H. Green         502,922           Low water alarm, N. Guyer         502,815           Lubricator.         See Axle lubricator.         Journal lubri-	Tire, wheel, H. Myers     502,741       Tob cco and packing box. C. E. Speaker     502,831       Toe weight, J. D. Keller     58,683       Tool fastening, R. Douglas     502,708
	Toy, J. Evans. 502,303 Toy, mechanical, J. W. Turner 502,833 Traction engine, B. Jackson 502,833 Train stopping device, J. B. Gross. 502,933
Lubricator, D. Stone	Trap. See Animal trap. Tricycle, A. V. Smith. 503,009 Trough. See Eaves trough. 502,872 Trough. 502,872
Middlings and nour separating machine, H. Bit- tinger	Truck, car, J. H. Graham
Monkey wench W. E. Hadger 503,889 Monkey rench, E. S. Pratt. 502,937 Motor See Current motor. Hydraulic motor. Music and matable, C. J. MacRae. 502,940 Naile rtn ct. C. H. Strant to 1.7	ture of A. S. Elmore       345,076         Tumbling barrel, J. H. Whiting       502,797         Type, M. G. Merritt       502,736         Typewriting machine, T. Cabill       502,700         Lymbells cover detachable       A. J. Robinson       607,751
Weight motor.  Music phand, adjustable, C. J. MacRac	Tumbiogbarrel, J. H. Whiting 502,797 Type, M. G. Merritt. 502,736 Typewriting machine, T. Cahili. 502,736 Typewriting machine, T. Cahili. 502,701 Umbrelia cover, detachahle, A. J. Robinson. 502,701 Valve for brake systems, triple, A. P. Massey. 503,035 Valve seats, grinding globe, W. C. Parsells. 502,878 Valve seats, grinding globe, W. C. Parsells. 502,878 Valve, them engine, E. Noche. 502,939 Valve, thortite, B. F. & G. H. Van Matre. 502,939 Vehicle gear, C. Hansen. 502,703 Vehicle running gear, W. Bonnar. 502,703 Velocipede A. L. Hahl. 502,717, 503,080 Velocipede mud guard, R. M. Woodhead. 502,802 Ven ding apparatus, coin-controlled, C. A. Howe. 502,722 Vending apparatus, coin-controlled, C. A. Howe. 502,722 Vending apparatus, coin-controlled, C. A. F. Pea-
	Valve throttle, B. F. & G. H. Van Matro       502,839         Ve bicle gear, C. Hansen       502,722         Veblele running gear, W. Bonnar       503,022         Velocipede. A. L. Hahl       502,717, 503,080
Paper bask machine, A. L. Stevens.   502,784	Velocipede brake, G. Hancock. 000,112 Velocipede mud yaurd, R. M. Woodh ead
Photographic plate holder, C. B. Withington	Vending machine, coin-controlled, H. Hoeschen. 602,317 Ventilator. See Car ventilator. Car window ventilator. Sanitary ventilator. Vincgar, apparatus for the manufacture of, R.
Pipe.       8eë Cifkar pipe.         Pipe machine.       F. M. Speed.       503,102         Plane.       L. Hardt.       502,906         Planter.       J. V. Plyler.       502,906         Planter.       J. V. Plyler.       502,906	M. Hughes. 502,339 Vise, quick-action, J. R. Denison. 502,734 Vote recording machine, J. R. McTammany 522,744 Voting booth or stall, J. W. & G. A. Shrague 502,738
Plow, J. Blunck. 522,637  Plow, H. O. Cheney 502,757  Plow draught apparatus, corn. E. B. Parker. 502,757  Plow marking a factument. G. 67. Froeman. 502,712	Voting machine, J. McTammary   02,748   Wagob, dumping, F. Bouker   068,888   Washing glasses, apparatus for, W. B. Taylor   62,266   Washing machine, Dixon & McLaughlin   86,267   Washing machine, J. Goeddek   502,266
Plow sharpening tool, E. Nelson	Washing machine, F. A. Lallemand. 542,739 Watch winding device Grasset & Meylan. 572,834 Water Closet seat, J. P. Rundle. 562,752 Weaving elastic fabrics, S. Brown. 562,558
Pager box, W. Fursyth Pedal stool, C. Zender. Pedal stool, C. Zender. Pen extractor, J. L. Kragle. Pen or pencil holder, I. H. Stathem. 602,794 Pen or pencil holder, I. H. Stathem. 602,807 Photographic camera, F. A. Hetherington. 602,807 Photographic page holder, C. B. Withington. 602,807 Photographic page holder, C. B. Withington. 602,807 Plano transposing device, L. A. Ivon. 602,798 Plano transposing device, L. A. Ivon. 602,798 Plano transposing device, L. A. Ivon. 602,798 Planet, preparing ovide of zinc, G. T. Lewis. 602,792 Plop. Bee Cikar pipe. Plop enachine. F. M. Speed. 603,102 Planter, J. V. Plyler. 604,792 Planter, J. V. Plyler. 605,792 Plow, J. Blunck. 606,793 Plow draught apparatus, corn. E. B. Parker. 607,792 Plow draught apparatus, corn. E. B. Parker. 607,792 Plow what pending took E. Nelson. 607,792 Plow what pending took E. Nelson. 607,792 Press. See Baling press. Hay press. Press. See perating mechanism, automatic locking 607,792 Projectile, L. Gathmann. 607,793 Propeller, T. O'Brien. 607,990 Propeller, T. O'Brien. 607,990 Propeller, T. O'Brien. 607,990 Pully beating and mixing engine, E. W. Barton. 607,990 Pully portable hand, Davis & Butler. 607,990 Punp, duplex steam. 607,990 Punp valve, oil well, J. O'Neil. 607,793 Radiator shelf, A. J. Bennett. 607,990 Railway conductors, subway for electric, I. L. 607,801 Railway conductors, subway for electric, I. L. 607,801 Railway conduit, electric, R. R. Zell. 607,603 Railway conduit, electric, R. R. Zell. 607,603	Vending apparatus, coin-controlled, C. A. Howe, 502,722 Vending apparatus, coin-controlled, H. Hoeschen, 502,754 Vending machine, coin-controlled, H. Hoeschen, 502,754 Vending machine, coin-controlled, H. Hoeschen, 502,754 Vending machine, coin-controlled, H. Hoeschen, 502,754 Vendinator, Sanitary ventilator. Vinegar, apparatus for the manufacture of, R. M. Hughes. Vise, quick-action, J. R. Denison. Vote recording machine, J. R. McTammany. Voting booth or stail, J. W. & G. A. Shrague. 502,745 Vagon, dumping, F. Bouker. Washing machine, J. McTammary. Washing glassee, apparatus for, W. B. Taylor. 502,963 Washing machine, J. Goeddeke. 502,963 Washing machine, J. Goeddeke. 502,963 Watch winding device Grasset & Mcylan. 502,263 Watch winding daylaratus, S. MacEachen. 502,263 Well drilling apparatus, S. MacEachen. 502,263 Winding thread on spools, machine for, D. F. Huut. 503,265 Windmill, J. Stimpson. 503,265 Windmill, J. Stimpson. 503,265
Pulley, drop press, F. Mossberg. 522,330 Pulle beating and mixing engine, E. W. Barton. 503,039 Pulverizer, land. B. S. Sexson. 503,005 Pump, duplex steam, C. M. Miller. 502,737	Hunt.   503,086   Windmill, J. Stimpson   503,785   Windmill tower, C. C. Jacobs   502,785   Window chair, F. J. Keck   502,971
Pump, hydraulic. W. Cameron. 662,390 Pump valve, oil well, J. O'Neil 662,751 Punco, portable band, Davis & Butler 503,109 Putty knife, J. M. Newton. 503,008	Window frame marker, W. Grennan
Borgmeyer	Huut. 503,096
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Rotar cutter, H. W. Winter	Rnife handle, etc., J. H. Crosby, Jr.   22,651   Lavatory leg, E. Hamusan   22,652   Medal, E. J. Habn   22,655   Paper weight, W. & L. Dorsam   22,652   Paper Weight, W. & L. Dorsam   22,652   22,65
Safe, F. Crawford. 602,855 Salicylate of para-tolyldimethylpyrazolou, H. Thoms. 503,005 Sanitary ventilator, W. L. Potter. 602,855	Spoot w J. Samused   22,679   Spoot J. Verschur   22,679   Stove, W. J. Keep   22,888   Tobacco bag, D. Ferry, Jr   22,674   Tray, F. T. Pearse   22,685
Register. See Autographic   Register. Cashregister.   Rei   n support, T. E. Clark.   602,705	Trimming, dress, J. Dreyfuss
Sawe, manufacture of, G. W. Griffin       502,886         Sawing machine, F. M. Teeguarden       502,886         Sawing the compland & Hough       502,816         Scale, cart, Coupland & Hough       502,816         Scale, portable, J. W. Storey       502,786	TRADE MARKS.  Ale and beer. G. W. Wiedenmayer
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Sewing machine, sole. J. E. Bertrand. 602,878 Sewing machine, sole. J. E. Bertrand. 602,878 Sewing machine, sole, W. O. Hildreth. 503,08 Shaft coupling, D. Rooman 603,88 Shaft tron vehicle, J. H. O. homa 672,01	Granite ware articles for bousehold use, Vienus Enamel and Stamping Company
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Ships, leak stopper for, J. E. Gowen       568,77         Shoe, F. J. King       602,97         Shovel. See Snow shovel.       502,97         Sbutter fastener, fire, A. Grosch et al.       563,64         Sieve, flour sifting       A. Sobles       562,76	Rubber goods, leather goods, and waterproof oiled fabrics, Goodyear Rubber Company, 3,455, 23,456 Stoves, cooking, heating, and gas, F. A. Klaine 23,474 Wine, vermouth, Jno. Peard Vermo th Company, 23,472
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844	Stay bolt, J. Nixon. 602,827	_
015 710	Renam hallon Mr. V. C	
028	Steam engine, F. M. Davis.         502,767           Steam engine, J. W. Sar sent.         502,763           Steam generator, A. Kruesler.         502,723	
,863	Steam generator and heater combined, A. Krues-	Ì
,042	ler stockings, manufacture of, L. N. D. Williams 502,721 Street sprinkler, G. Langer. 333,083 Stud hopper and delivery mechanism, C. E. Van Norman. 602,885	1
,900 ,899	Stud hopper and delivery mechanism, C. E. Van	1
.000	Norman 602.885 Sucker rod elevator. H. Knox 502.876 Sucker rod elevator. H. Knox 502.876 Suky track, H. A. & T. W. McIntosh 562.885 Suspenders, J. C. Vollmar. 562.782 Switch See Electric switch. Trainway switch. Switchboard system, multiple, C. E. Scribner. 502.093 Switchboard transfer system, C. E. Scribner. 502.771 Switchboards look switch for electric C. E. Scribner.	,
766	Suspenders, J. C. Vollmar	1
,826 ,951	Switchboard system, multiple, C. E. Scribner 503,099	1
1002		1
893 018	ner. 502,769 Switchboards, test circuit for multiple, C. E. Scribner 502,759 502,774	
714	Scribner 502,768, 502,774 Switchboards, test signal for multiple, C. E. 502,772 Scribner 502,772	
,694	Switchhoards, testing apparatus for multiple, C.	
894		
967 880 704	Switchboards, testing system for multiple, C. E. Scribner. Synchronism indicator, L. Bell	
007 948	Tap, porter or beer, C. I. Snyder	
926 108	Telescope box, double, J. T. Craw	
9経1	Thill coupling, J. H. Hanson 502,816	
	Thill coupling bolt, C. L. Kelley	
189 186 760	Thrashing machine band cutter and feeder, D. C. 608,002	
.[164	Tie. See Railway tie.	
105 059	Ruth	
,964	Timepiece repeating mechanism, F. Terstegen.	
937	Tire, carriage wheel, G. W. Bryan 502,839	
.79 <b>6</b> .920 .970 .962	Tire, wheel, H. Myers	
970	Toe weight, J. D. Kelier	
815	Toy J. Evans. 502,709	
,013	Traction engine, B. Jackson	
	Tramway switch, Meyer & Starkweather 502,382	
,80? ,000 ,943	Time piece repeating mechanism, 8. Persegen Tire, carriage wheel, G. W. Bryan	
HZH.	Trowel, pointing, C. M. Benson	
<b>አ</b> 696	Truck, motor car. G. W. Lacy	
.869 <b>.</b> 997	Tubes, apparatus for the electrolytic manufac- ture of A. S. Elmore 503.076	ĺ
	Tumblingbarrel, J. H. Whiting 602,797 Type, M. G. Merritt 502,736	ŀ
,9¥0 ,914	Typewriting machine, T. Cahill	
914 739 757	Tombiosbarrel, J. H. Whiting 502,794 Type, M. G. Merritt. 502,736 Typewriting machine, T. Cahill. 502,736 Umbrella cover, detachahle, A. J. Robinson. 502,751 Vaire for brake systems, triple, A. P. Massey. 503,236 Vaive seats, straining griobe. W. Dickerson. 502,237 Vaive, steam engine. E. W. Dickerson. 502,237 Vaive, steam engine. E. W. Dickerson. 502,237 Vaive, steam engine. A. Roche. 503,030 Valve, throttle, B. F. & G. H. Van Matre. 502,339 Vehicle gear, C. Hansen. 502,337 Vehicle running gear, W. Bonnar. 502,717 Velocipede. A. L. Hahl. 502,602 Velocipede brake, G. Hancock 502,717 Velocipede brake, G. Hancock 502,602 Vending apparatus. coin-controlled, C. A. Howe, 602,722 Vending apparatus. coin-controlled, A. F. Peacock. 502,754	
.015	Valve seats, grinding globe, W. C. Parsells	
1753	Val ve, throttle, B. F. & G. H. Van Matre	
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	vinegar, apparatus for the manufacture or, k.	ļ
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C)97	Washing glasses, apparatus for. W. B. Taylor	
2,761 2,712 2,747	Washing machine, J. Goeddeke	1
998	Watch winding device Grasset & Meylan. 572,884	į
3,000	Weaving elastic fabrics, S. Brown. 502,632	
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2,950 2,750	Window frame marker, W. Grennan	l
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8,101 3,024	Yoke, neck. J. R. Wade 502,783 Zither, F. Schwarzer 502,767	
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1	Tray, F. T. Pearce	
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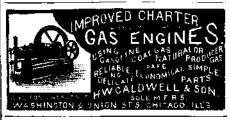
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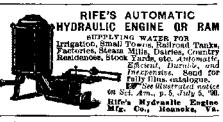
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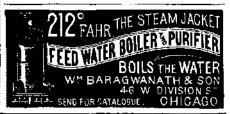
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