

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 This is for our information, and not for publication.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 part.
Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(1) G. W. J. writes: I wish to build a steamboat 50 feet keel, 15 1/2 feet beam, 55 feet on deck. What power engine, and what diameter screw wheel, will it require to drive her 10 or 12 knots per hour? The water in which she will be placed—Great Salt Lake, Utah, has a buoyancy one-fourth greater than that of ocean water. Her draught will be very shallow. Salt from condenser to be utilized. A. A stern wheel is better adapted to shallow draught boats of wide beam. For a boat of your description, a screw wheel should be at least 3 feet in diameter to be efficient. An engine with cylinder 8 x 8, working up to 15 horse power, will probably suit your requirements. Keel condensers are mostly used for small boats and yachts. See descriptive illustrations of small steamers in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 108, 425, 398, 217, 179, 224, 172.

(2) C. B. P. asks how to solder sheet brass, with ordinary copper soldering iron, and what kind of flux to use. A. For soldering with a copper, use a solder made of 2 parts tin, 1 part lead, by weight; melt, mix, and pour in small bars. For flux dissolve zinc in muriatic acid until no more will dissolve, add about one-tenth its bulk of sal ammoniac, and dilute with one-quarter its bulk of water. Wet the surfaces to be soldered with this solution, using a piece of wood or copper wire for this purpose. Then, by rubbing the surfaces with the tinned point of the copper, a coating of tin will be imparted. Put both surfaces thus prepared together, and heat by applying the copper and a little solder to the outside of the seam. The copper should be well tinned on the point, which may be done by heating the copper hot enough to freely melt pure tin. Rub a piece of sal ammoniac on a brick, then rub the copper point on the brick, with tin or solder in contact with the point. The tinning of the copper point is essential for soldering.

(3) J. W. B. asks: What combustible can be manufactured and applied in a series of small drops to a belt, so it will ignite by scratching with small instrument? A. Either of the following: 1st. One-half part by weight red phosphorus, 4 chlorate of potash, 2 glue, 1 whitening, 4 finely powdered glass, 11 water. 2d. 2 parts by weight red phosphorus, 5 chlorate of potash, 3 glue, 1 1/2 red lead, 12 water. The manipulation of these mixtures is very dangerous.

(4) T. P. P. asks how blackboard slating is made. A. Use 1/2 gallon shellac varnish, 5 ounces lampblack, 3 ounces powdered iron ore or emery; if too thick, thin with alcohol. Give three coats of the composition, allowing each to dry before putting on the next; the first may be of shellac and lampblack alone.

(5) S. K. desires a receipt for mending broken marble. A. Take plaster of Paris, and soak it in a saturated solution of alum, then bake it in an oven, the same as gypsum is baked to make it plaster of Paris; after which grind the mixture to powder. It is then used as wanted, being mixed up with water like plaster and applied. It sets into a very hard composition, capable of taking a very high polish, and may be mixed with various coloring minerals to produce a cement of any color capable of imitating marble.

(6) A. A. B. desires a formula for making an ink that will conduct electricity, such as is used in telegraphy, for producing at the other end of a line a facsimile of a drawing, etc. A. A silvered or bronzed paper is used, which will conduct electricity. A non-conducting ink is used on this, not a conducting ink. Any heavy carbon ink will answer.

(7) O. S. C. asks a recipe for making a blue stencil paint which will not rub off when used on wood boxes. A. Take of shellac and borax each 2 ounces, boil in water until they are dissolved, then add 2 ounces gum arabic and withdraw from the fire. When the solution has become cold, add enough more water to make 25 ounces, and finish by mixing with Prussian blue sufficient to bring it to a suitable consistency and color.

(8) M. R.—For a French polish, dissolve 12 ounces shellac in 1 quart wood naphtha, add 1/2 pint boiled linseed oil, thoroughly mix, and rub the furniture with a small quantity on a woolen cloth.

(9) W. H. J.—See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 472 and 429, for directions for making enamel photographs.

(10) B. J. D. asks: 1. Will you please inform me of the best means to separate wire nails from the sawdust in which they are tumbled. I use hand sieves, and find it tedious, and it consumes too much time. A. Your question can hardly be considered of general interest. For separating the nails from the sawdust, we recommend a revolving tumbler set at an inclination, with the upper end solid, lower end a sieve of the proper mesh. Feed the nails and sawdust from a hopper spout at the upper end, constantly. The sawdust will work through the sieve, and the nails be discharged from the lower end clean and dry. 2. Also the next best lubricant to oils, in running the wire into the machines, as it requires so much tumbling and sawdust to clean the oil from them, and make them bright for

use? A. For a lubricant use strong soap water; pass the nails through boiling water on a wire cloth apron and over a steam coil or other hot surface, and leave out the tumbling and sawdust.

(11) J. L. H. asks: 1. Is there any cement for glassware which will stand hot water? A. Glue to which bichromate of potash has been added, and which has afterward been exposed to strong sunlight, becomes insoluble. The proportions are not very well ascertained, but about 1 part of the bichromate, dissolved in water, and added to a solution of 6 parts of solid glue, answers very well. 2. Is there anything which will take mildew out of white goods which have been washed? A. Wet the spots with a very weak solution of chloride of soda (Labarraque's solution) or of chloride of lime (bleaching fluid) or with chlorine water and wash afterward.

(12) H. J. desires the formula used by envelope manufacturers in mixing their gum. A. Gum arabic and water mixed to proper consistence.

(13) A. B. C. asks how to make some preparation for forcing the beard or hair on bald spots to grow. A. Take of cologne 2 ounces, liquid hartshorn 1 drachm, tincture of cantharides 2 drachms, oil rosemary 12 drops, lavender 12 drops. Apply daily for a considerable period of time, it being sometimes necessary to continue the application through several weeks. This will help stimulate a growth if there are any live hair roots. If such roots be dead, or there are none, there is no preparation which will make the hair grow.

(14) J. B. desires process of giving wax that has turned yellow a clear color. The only satisfactory method of bleaching wax is by exposing it to the sunlight in thin sheets. The use of chemicals is impracticable in your case, and we fear you will find it impossible to restore the doll's faces to their original tints.

(15) G. E. M. asks best way for transferring engravings, prints, photos, etc., to glass for lantern slides. A. You cannot produce a satisfactory slide by varnishing a plate and squeezing the picture on to same, then removing the surplus paper on the back. It will not clear enough. The quickest and best way is to copy the picture in a cheap camera on glass, producing a negative the right size, by the ordinary dry plate photo process. Then from the negative so obtained, by contact in a printing frame on a special lantern slide dry plate, make the positive lantern slide. Dealers in photo materials will supply the things necessary.

(16) M. F. B. asks: 1. Is the time telegraph from Washington the mean time of the 75th meridian from Greenwich, or the mean time of the meridian of the Washington Observatory? A. Time for railroads and most civil purposes is telegraphed from Washington to various stations, as New York, Cambridge, and Alleghany, and is the time for the 75th meridian from Greenwich. At these stations, time clocks are running in unison, and from them time is distributed to various points by the Western Union Telegraph. The time balls are dropped at New York, Philadelphia, Baltimore, Washington, Hampton Roads, Savannah, and New Orleans, by telegraph from the National Observatory. 2. Has the decision or recommendation of the late "Congress on the establishment of a first meridian," to begin the astronomical day with the civil day, been adopted by observatories and ephemerides generally? A. The recommendation in regard to the civil and astronomical unit has not been adopted by astronomers. It meets with some opposition, as its adoption makes a break in the continuity of record.

(17) J. F. writes: 1. If I lay down 600 feet of one inch pipe in my rooms, and fire from a coil, what will the amount of expansion of the water be? A. The expansion of water from 46° to 212° is 0.0466 of its volume. The iron pipe also expands, due to the temperature of the water. The expansion of the water in the 600 feet of inch pipe will be about 135 cubic inches. 2. What can I add to the water to keep it from freezing, in case the fire goes out? A. Add one or two pounds chloride of magnesium to the water in the coils to prevent freezing.

(18) W. H. D.—You may obtain the plain lenses for a 3 foot telescope, as described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 252, at from \$6 to \$8. If the object glass is achromatic, it will cost about \$15.

(19) W. H. C. asks: 1. Can water be said to belong to the mineral kingdom? A. It is treated as a mineral by authorities on the subject when occurring in the earth. It forms the larger proportion of the human body, and then cannot be so considered. It may be termed of intermediate nature. 2. Can the reflections of a red dress in a mirror be called red? A. Reflection is only changing the direction of a ray of light or color, and has nothing to do with its make-up. The pictures seen in a glass are spoken of as of the colors they reflect.

(20) J. F. asks process for printing from dry plates. A. See SUPPLEMENT, No. 483, page 7707, for blue prints, and SCIENTIFIC AMERICAN, August 2, 1884, page 65, for silver printing, in photographic items.

(21) F. S. H. asks: 1. In an inch and a quarter cable, such as used in cable railways, gripped in jaws 24 inches long, raising the cable 8 inches above its sheaves, in what distance each way from the grip will the cable fall to the sheaves again, supposing it to be on a tangent? A. This depends upon the distance between the sheaves. 2. What is the cost per single track per mile of a first class cable conduit for street railway? A. \$40,000 to \$75,000. 3. Supposing it practicable to operate street railways by electricity, in what would be the probable advantage in cost of operation over a well arranged cable system? A. Electric railways are not yet sufficiently established to warrant an opinion.

(22) S. G. S.—There is nothing but a scraper good for taking off old, scaly whitewash. Bronzing liquid may be a paint made with light colored varnish in which is mixed gold bronze. The varnish

may be shellac, mastic, or light furniture varnish thinned with turpentine.

(23) J. S. asks: How many feet of heating surface is calculated per horse power on a boiler at 60 pounds pressure? A. 150 square feet.

(24) J. S. P.—The influence of the sun and moon in making tidal waves of the atmosphere is no doubt true to a small extent, and was discussed by meteorologists in the early years of the century. We do not know who first suggested it. The tidal action is so complicated with and overshadowed by heat and local wave fluctuations that it is not taken into account by the meteorologists of the present day. There are mooted points now being discussed in astronomical circles that may ultimately rectify some observed irregularities in planetary motion.

(25) E. M. H. asks how to make tin plate look like brass. A. A yellow varnish can be brushed on, or, as in fancy cans, the color is printed on with a thick yellow varnish. The operation is of a similar nature to japanning.

(26) Q. A. L. asks how organ pipes are made, what solder is used, and how the soldering is done. A. Organ pipes are made of equal parts by weight of tin and lead, which melts at 370°, rolled in sheets. The solder is made of 1 1/2 parts tin, 1 part lead by weight, which melts at 334°. Solder with a copper and resin. Some care must be used and a little practice to accomplish the soldering smoothly, so as not to melt the pipe. If the solder should be found not tractable enough for your experiment, add half a part of bismuth to the solder as above.

(27) John H. asks: 1. How far is the sun from the earth? A. The distance from the sun to the earth is between 92,500,000 and 98,000,000 miles. 2. What is the circumference of the earth? A. The mean circumference of the earth is 24,898 miles. 3. What of the sun? A. The diameter of the sun is 860,000 miles; its circumference about 2,700,000 miles. 4. Also diameter of earth? A. The polar diameter of the earth is 7,898 miles; equatorial, 7,926 miles; mean diameter, 7,916 miles.

(28) D. S. S. asks: Would you inform us in settlement of an argument (as to the best method of gas saving—by closing cocks near the burner or by regulating at the meter? A. In general terms, the further from the burner the regulating is done the better. Gas should be as unobstructed as possible in its path to the point of consumption, so as to avoid eddies, which impair the illuminating power. The only objection to governing or regulating at the meter is, that it does not allow for different elevations of burners, and it does not, when cock regulating is used, allow for the burning of varying numbers of lights. The use of large burners and fewer in number is to be advocated.

(29) J. I. asks: Is it heavier on a horse to pull a load by a 100 foot rope or chain than close to it? A. If the rope or chain is free from friction on the ground, it is easier for a horse to pull a given steady load by the long hitch. Much depends upon the condition or kind of work.

(30) E. E.—The dividing engines of the surveying instrument makers will divide circles for any number of spaces. The gear cutting index has a small range only applicable to gearing. For description and illustration of gear cutting apparatus, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 50, 317.

(31) W. B. M.—For computing the horse power of a rotary engine, multiply the area of the blades or driving surfaces (as many as receive the pressure of the steam) by the mean engine pressure, and this product by the speed of the centers of area of the blades in feet per minute. Divide the last product by 33,000 for the horse power. For illustrated descriptions of rotary engines see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 11, 267, 397, 19, 149. The history of rotary engines certainly points to "dynamical misconception," or some other grave fault in the construction of most of them.

MINERALS, ETC.—Specimens have been received from the following correspondents, and have been examined, with the results stated.

W. M. H.—The metallic-looking mineral is pyrite, or sulphide of iron. The cube is hematite, or oxide of iron (a pseudomorph after pyrite possibly).

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

January 11, 1887,

AND EACH BEARING THAT DATE.

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

Acid and substitutes thereof, manufacture of salicylic, T. Kempf.....	355,875
Alarm for hoisting machinery, R. Mulholland.....	355,859
Amalgamator, centrifugal, W. White.....	355,958
Animal trap, N. C. Boynton.....	355,857
Annunciator, electric, P. Seiler.....	355,791
Automatic clasp to hang up trousers, etc., W. Peterson.....	355,711
Ax, W. J. & J. A. Dunning.....	355,080
Axles, repairing wagon, J. H. & A. T. Currie.....	355,081
Bale tie, W. P. Rylander.....	355,887
Banjo, S. S. Stewart.....	355,896
Barber's chair, J. M. Baker.....	355,854
Barber's chair, A. N. Hornung.....	355,872
Basket cover, H. Gary.....	355,925
Bed, knockdown folding, J. G. Peace.....	355,010
Bed pan, E. E. Merron.....	355,831
Bed, spring, J. Turner.....	355,808
Bed, spring, L. A. Wood.....	355,747
Bedstead and table, combined, J. P. Farrell.....	355,760
Bedstead, tray attachment for, S. B. Bartow, Jr.....	355,911
Belt fastener, L. M. Reed.....	355,341
Belt, link driving, C. A. Schieren.....	355,890
Belling, A. D. Westbrook.....	355,022
Biocycle, swing, N. Brown.....	355,029
Bit.....	See Bridle bit.
Blasting cap, J. R. France.....	355,064
Board. See Bulletin board. Plow mould board.	
Boat. See Ferry boat.	
Boat grip, T. Emerson.....	355,983
Boiler. See Steam and hot water boiler.	
Boiler explosions, safeguard against, J. E. Siebel.....	355,793
Boot, felt, H. G. Charlesworth.....	355,912
Bottling machines, pressure indicator for, J. Conner.....	355,921
Box. See Paper box. Sample or exhibition box.	
Box, A. W. Paris.....	355,609
Brake. See Car brake.	
Brake block holder, C. L. Small.....	355,951
Brick machine, J. H. Flanagan.....	355,890
Brick machine, J. E. Lesneur.....	355,876
Bridge gate, swing, C. Munsell.....	355,078
Bridle bit, C. M. Huckins.....	355,043
Buckle plate, E. C. Grant.....	355,763
Buckle rolls, machine for making and attaching, J. A. Wilson, Jr.....	355,035
Bulletin board, W. S. Evans.....	355,062
Burner. See Gas burner.	
Burning garbage, apparatus for, J. Anderson.....	355,851
Buttonhole stitching machine, J. W. Lufkin.....	355,878
Button setting machine, J. B. Miller.....	355,882
Car brake, fluid pressure, G. A. Boyden.....	356,025, 356,026, 356,057
Car coupling, Baker & Prescott.....	355,909
Car coupling, F. Betts.....	355,913
Car coupling, A. B. Cooley.....	355,864
Car coupling, A. A. Dial.....	355,979
Car coupling, J. D. Young.....	355,903
Car door fastener, freight, W. L. Benton.....	355,963
Car, hand, S. Arcus.....	355,952
Car mover, A. L. Butler.....	355,059
Car, railway, W. Robinson.....	355,720
Car starter, M. Potter.....	355,907
Car, street, H. Ames.....	355,907
Car, street, G. W. Parker.....	355,977
Car wheel, J. W. Cloud.....	355,681
Car wheels, machine for truing, Lindstrom & Miller.....	355,829
Carbonates, manufacture of oxycincholine, R. Schmitt.....	355,842
Carpet stretcher, Van Horne & Fisher.....	355,017
Carpeting, producing improved color effects in two-ply ingrain, J. L. Folsom.....	355,063
Carriage curtain fastener, A. W. Mitchell.....	355,702
Carriers, stretcher for endless, S. K. Seelye.....	355,723
Cartridge primer, W. N. Lowell.....	355,877
Cascade, artificial, F. Vorck.....	355,045
Chair. See Barber's chair. Convertible chair. Railway rail chair.	
Chair, child, G. Feldkamp.....	355,689
Chair seat, M. Pennybaker.....	355,012
Chairs, desks, and other articles of furniture, support for, G. J. J. Luther.....	355,074
Chandeliers, extension support for, A. M. Southard.....	355,845
Chimney cap, P. Melander.....	355,944
Christmas tree holder, M. Bayer.....	355,856
Cigar wrappers, machine for cutting, J. W. Cameron.....	355,918
Cigarette machine, J. A. Bonsack.....	355,968
Clasp. See Automatic clasp.	
Clasp for books, etc., B. Conlan.....	355,974
Cleaner. See Tube cleaner.	
Clevis, F. S. Dimon.....	355,980
Clip. See Paper clip.	
Clock, primary electric, V. Himmer.....	355,069
Clocks, circuit breaker for primary circuits, V. Himmer.....	355,820
Cockle and grain separator, G. F. Prescott.....	355,718
Concrete walks, laying, W. C. Hall.....	355,980
Convertible chair, O. C. Harris.....	355,819
Cooler. See Water cooler.	
Copying device, manifold, J. I. Woodfill.....	355,749
Corset, T. P. Taylor.....	355,954
Coupling. See Car coupling. Thill coupling. Vehicle reach coupling.	
Cover. See Basket cover.	
Cream from milk and churning the cream, device for separating, J. Loftus.....	355,003
Crucible furnace, H. Epping.....	355,051
Crusher. See Ore crusher.	
Cultivator, J. P. Black.....	355,915, 355,916
Cultivator attachment, T. B. Swindler.....	355,052
Cultivator beam and point, Ady & Haith.....	355,906
Cultivator, wheel, G. W. & S. Taylor.....	355,955
Cultivator, wheel, S. A. D. Thomas.....	355,899
Curb, street or other, E. L. Brown.....	355,810
Cut-off valve, J. A. Horton.....	355,993
Dampers and valves, electro magnetic regulator for, G. M. Sternberg.....	355,898, 355,894
Dead centers, device for obviating, G. Moss.....	355,705
Display rack, M. Umstadter.....	355,733
Door check, J. B. Armstrong.....	355,882
Door hanger, Miller & Kanouse.....	355,075
Door hanger, S. Shreffler, Jr.....	355,724
Door or window frame, knockdown screen, J. W. Boughton.....	355,969
Door spring, H. Lewy.....	355,001
Double pile fabric, Lister & Reixach.....	355,772
Draught regulator for stoves, etc., G. W. Lore.....	355,047
Draughting table, adjustable, J. G. Aston.....	355,023
Drag, stone, T. Shaw.....	355,792
Drawing and spinning hemp, etc., machinery for, J. Good.....	355,870
Dress weight, S. M. Moschowitz.....	355,048
Drier. See Grain drier.	
Drill. See Grain drill.	
Drilling or slotting machines, supplemental bed-plate, centering device, and work holder for, A. F. Brewer.....	355,679
Dyed fabric, naphthol, T. Holliday.....	355,935
Dyeing apparatus, W. Harley, Jr.....	355,930
Dyeing naphthol, T. Holliday.....	355,933
Dyeing textile animal fibers, T. Holliday.....	355,934
Eaves trough hanger, E. T. Kundert.....	355,046
Egg carrier, J. L. Joyce.....	355,998, 355,997
Egg carriers, machine for making, J. L. Joyce.....	355,996
Electric current indicator, J. W. Howell.....	355,041, 355,042
Electric cut-out, A. E. Paige.....	355,008
Electric machines, current collecting device for dynamo, D. Williamson.....	355,738
Electric meter, J. E. H. Gordon.....	355,871
Electric motor, J. H. Linville.....	355,771
Electric push button, F. R. Brainard.....	355,856
Electric wires, conduit for, G. D. Sutton.....	355,798
Electrical purposes, manufacturing carbons for, W. L. Voelker.....	355,020
Electrical subway, R. A. Dennison.....	355,807
Electro magnetic cut-out, F. H. Wilmarth.....	355,739
Electro magnetic motor regulator, W. L. Stevens.....	355,739
Elevator. See Pneumatic elevator.	
Engine. See Locomotive engine. Piston engine. Steam engine. Traction engine.	
Engines, wrist pin for, F. C. Chase.....	355,920
Exhibiting device, J. Modini.....	355,006
Extension table, J. Grube.....	355,817
Extension table, F. W. Nye.....	355,945
Fabric. See Double pile fabric. Dyed fabric. Pattern marked fabric.	

Feed water heater, E. Goss..... 355,989
Feeding salt to live stock, trough for, Booth & Hughes..... 355,967
Fence stays, machine for manufacturing wire, J. J. W. Connel..... 355,963
Fence, L. Moore..... 356,006
Fences, machine for making wire, E. M. Cooper..... 355,812
Ferry boat, W. Cowles..... 355,682
Fifth wheel, W. C. Switzer..... 355,799
File cutting, W. Tucker..... 356,063
Filter, J. W. Hyatt..... 355,694
Firearm, breech-loading, W. A. G. Birkin..... 355,964
Fireescape, A. J. Blew..... 355,917
Fire escape, J. Horwitz..... 355,994
Flker, speeder, J. A. V. Smith..... 355,794
Flower, artificial, W. Eggert, Jr..... 355,982
Flue regulator, J. Cant..... 355,919
Food for horses, prepared, J. B. Pinchard..... 355,837
Fruit picker, W. S. Mallard..... 355,941
Furnace. See Crucible furnace. Portable furnace.
Furnace for expanding locomotive tires, N. H. Brown..... 355,859
Furnace for fruit driers and other uses, H. S. Jory..... 356,045
Furniture wall protector, F. G. Winnek..... 355,909
Game, parlor, T. E. Parfitt..... 355,947
Gas, apparatus for treatment of natural, H. J. Hyams..... 356,071
Gas burner, A. Wasserman..... 355,805
Gas regulator, J. N. Pew..... 355,788
Gas trap cover for wash basins, N. Schwab..... 355,722
Gate. See Bridge gate. Swinging gate.
Governor, steam engine, F. M. Rites..... 355,717
Grain binders, knotting device for, W. N. Whiteley et al. (r)..... 10,797
Grain binders, tension device for, W. H. Blanchard..... 355,878
Grain drier, R. A. Burnett..... 355,861
Grain drill, J. W. Rhodes..... 355,716
Grain meter and register, F. H. Lacey..... 355,828
Grain meters, automatic cut-off for, G. Marsh..... 355,774
Grate, fire, T. C. Vesey..... 356,084
Grinding mills, hopper for, J. F. Winchell..... 355,740
Guard. See Loom shuttle guard.
Hammocks, head rest for, T. Humphrey..... 355,878
Hanger. See Door hanger. Eaves trough hanger.
Harrow, rotating sulky, E. F. Duncan..... 356,082
Harvester, Whiteley & Bayley..... 355,959
Harvesting machine, A. Stark..... 355,728
Hay and stock rack, H. Hoerman..... 355,765
Hay loader, J. W. Fogeland..... 355,991
Hay rake, horse, Alden & Kirk..... 355,674
Hay rake, horse, P. F. Fleming..... 355,691
Heater. See Feed water heater. Steam heater.
Heel rand, F. P. Arnold..... 356,056
Hinge, I. B. Kleinert..... 355,827
Hitching post, R. F. Brown..... 355,909
Hoe for chopping cotton, I. A. Thomas..... 355,801
Hog cholera remedy, T. A. Kasey..... 355,939
Hoisting and transmitting freight, coal, ores, etc., mechanism for, F. Murgatroyd..... 355,884
Holder. See Brake block holder. Christmas tree holder. Photographic plate holder. Rein holder. Sash holder.
Hoof trimmer, W. Bradbrook..... 355,756
Horn, treating, M. Kamak..... 355,998
Horse power, I. A. Jefferson..... 355,936
Horse power, M. O. Roberts..... 355,719
Horseshoe, J. Spencer..... 355,727
Hose coupling, clamp for, Schrader & Schmitt..... 356,083
Hosesupport, C. H. Favel..... 355,924
Hub, vehicle, J. Maris..... 355,698
Incubator, C. B. Eddy..... 355,684
Indicator. See Electric current indicator. Water level indicator.
Jack. See Lifting jack.
Joint. See Railway rail joint.
Kneader, dough, G. K. Knowlton..... 355,767
Knitting machine, I. W. Lamb..... 355,938
Knitting machine, circular, D. H. Hill..... 355,962
Knitting machine, circular, J. E. Place..... 356,079
Knitting stockings, J. H. Place..... 356,078
Knob attachment, H. J. P. Whipple..... 355,967
Ladder, W. & H. Cummer..... 355,683
Lamp, W. C. Baird..... 355,908
Lamp bulbs, drying incandescent electric, A. L. Reinmann..... 355,714
Lamp, incandescent electric, W. L. Voelker..... 356,019
Last, E. C. Wright..... 355,750
Lasting machine, Paine & Combs..... 355,784 to 355,880
Latch, W. B. Cantrell..... 355,680
Latch and lock, combined, A. H. Brown..... 356,027
Laying-out machine, E. A. Jerome..... 355,937
Lead, apparatus for incasing wires with, E. C. Sloan..... 355,844
Lead, machine for covering conductors with, E. C. Sloan..... 355,843
Lifter. See Transom lifter.
Lifting jack, M. G. Crane..... 355,866
Lock. See Permutation lock. Seal lock.
Lock and latch, combined, R. S. Robertson..... 356,013
Locomotive brake, G. E. Poor (r)..... 10,796
Locomotive engine, T. T. Woodruff..... 356,085
Loom for weaving double pile fabrics, C. Pearson..... 356,011
Loom for weaving terry fabrics, W. Weaver..... 355,796
Loom let-off and take-up mechanism, B. F. Meyer..... 355,882
Loom shuttle guard, J. Sullivan..... 355,797
Loom take-up mechanism, Walsh & Boothroyd..... 355,902
Loom temple, G. Harling..... 355,818
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Milling machine, nut, C. E. Roberts..... 355,718
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Motor. See Electric motor.
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Nails, making headed, F. F. Raymond, 2d..... 355,839
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Photographic burnishing machine, W. G. Entekin..... 355,922
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Picker. See Fruit picker.
Pillar step, C. E. Miller..... 355,701
Pin. See Engine wrist pin.
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Post. See Hitching post.
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Power. See Horse power.
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Railway rail joint, J. Siegel..... 355,725
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Rake. See Hay rake.
Razors, machine for honing, P. Wahl..... 355,956
Recorder. See Time recorder.
Reel. See Paper bag reel.
Register. See Telephone register.
Regulator. See Electro magnetic motor regulator. Flue regulator. Gas regulator.
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Saw, drag, Omwake & McGee..... 355,708
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Saw guide, D. J. Murray..... 355,707
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Seal lock, J. B. Armstrong..... 355,838
Seat. See Chair seat.
Separator. See Cockle and grain separator.
Sewing machine feeding mechanism, S. W. Wardwell, Jr..... 355,735
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Ships, construction of, R. M. Fryer..... 356,085
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Sleigh, S. R. Bailey..... 355,855
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Stoves, burner for petroleum cooking, V. Burkin..... 355,811
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Swinging gate, G. W. Tillson..... 355,847
Switch. See Telephone switch.
Table. See Draughting table. Extension table.
Telegraph wires, preventing noise occasioned by vibrations of, P. E. Bardonnaut..... 355,763
Telegraphy, R. G. Brown..... 355,800
Telephone, C. E. Egan..... 356,685
Telephone cabinet, C. Wittenberg..... 355,741
Telephone instruments, grounding switch for, C. G. Gould..... 356,038
Telephone, magneto, H. E. Waite..... 355,734
Telephone register, C. Wittenberg..... 355,743
Telephone switch, Hitchcock & Barnley..... 356,040
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Telephone toll collector and register, C. Wittenberg..... 355,744
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Telephone transmitter, J. P. Freeman..... 356,034
Telephone transmitter, Pratt & McPherson..... 355,838
Telephone transmitter, J. C. H. Stut..... 355,952
Telephones, alarm and register attachment for, C. Wittenberg..... 355,742
Telephones, register attachment for, C. Wittenberg..... 355,745
Textile fabrics, form for displaying, A. A. Murphy..... 355,833
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Thill coupling, Spencer & Beebe..... 355,795
Threading, cutting, and reaming, machine for, W. C. & F. E. Wells..... 355,787
Tie. See Ball tie. Railway cross tie.
Time recorder, watchman's, V. Himmer..... 356,070
Tobacco stick, J. F. Erwin..... 355,759
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Torpedoes, percussion firing device for, J. W. Graydon..... 356,067
Toy spring gun, F. W. Crandall..... 355,975
Toy target, F. W. Crandall..... 355,976
Traction engine, F. F. Landis..... 355,939
Traction engine, W. L. Leland..... 355,940
Traction engine, W. A. Shadd..... 355,891
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Transom lifter, E. Payson..... 355,949
Trap. See Animal trap.
Trimmer. See Hoof trimmer.
Trucks, apparatus for putting together and drilling locomotive and car, S. M. Vaucian..... 355,901
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Tympnum, pitch indicator for, E. Boulanger..... 355,971
Type, manufacture of, Laraway & Bridge..... 355,788
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Water meter, rotary, J. W. Hopkins..... 355,821
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Wheel. See Car wheel. Fifth wheel. Velocipede wheel. Wind wheel.
Wind wheel, Holm & Engberg..... 355,992
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Windmill, J. B. Sohn..... 355,726
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