

bronze match box? A. Washing with plenty of clean water, accompanied with mechanical friction, is generally considered the best means of cleansing bronze articles.

(3) O. J. P. asks: Is it best to oil belts running machinery—dynamos for instance? If so, what kind of oil is best, and should it be put on inside (next pulley) or not? A. A little neatfoot oil once in a while, to keep the leather from getting too dry; use as little as possible, on both sides, and give it time to be taken up by the leather.

(4) W. D. S. asks if a diamond shaped block can be made of one piece, having eight diamond faces. A. If you intend to have the diamond shaped faces flat and all of one size, we think it cannot be done.

(5) C. P. writes: I have fixed up an old mahogany desk; after scraping I rubbed it with raw oil and shellac, which leaves it streaked and with a dull surface; what shall I use for a finishing polish? A. Mix equal parts of thick alcoholic shellac, varnish and boiled linseed oil, and shake well together before using. Rub a small quantity of this mixture vigorously over the wood until the desired polish is secured.

(6) W. H. W. says: I see in your paper of August 2, you say 6 square feet of fire surface for 2 inches by 4 inches cylinder. Now for 6 square feet fire surface how large a horizontal boiler should I have, that is, what diameter, what size tubes, what length tubes, and what thickness iron for boiler? A. For your boiler, a cylinder 12 inches diameter, 2 1/2 feet long, with 12 tubes 1 1/4 inches diameter, shell 1/8 inch thick. Heads 1/4 inch thick, tubes in lower half of heads. A miniature of the large horizontal tubular boilers.

(7) J. C. R. asks: How many foot pounds can be realized from one cubic foot of water made into steam and used through a steam siphon? A. From 3,000,000 to 4,000,000 foot pounds theoretically. You will probably not realize more than one-fifth of this in a steam siphon.

(8) C. M. W. asks about a formula for removing blackheads. A. On page 52 of the SCIENTIFIC AMERICAN for January 28, 1882, there is given very fully a description of the method used for the extraction of comedones. The articles there given are not injurious to the skin.

(9) O. S. B. asks how much pressure he would gain under the following conditions: A tight cast iron box is filled with air of 60° temperature, at a pressure of 30 pounds, and the intention is to heat it to 200° of heat. A. Air at 60° and 30 pounds pressure, and of a given volume, if heated to 200°, will increase the pressure to 38 pounds.

(10) H. W. T. asks how to construct a dumb waiter or elevator to elevate one or two hods of coal, say 50 pounds, from cellar to next story above with little exertion of strength. A. These elevators are nothing more in construction than a sort of hung platform or box partly balanced by weights, which most good carpenters understand. We recommend you to consult with some builder in your city. We cannot illustrate it in Notes and Queries.

(11) E. T. F. says: I wish to have some bells cast; how can I make my models out of wood, in order to obtain the desired weight in iron? A. If there are no core prints, the casting will weigh 16 times the weight of the pine pattern, if solid. For core prints and cores deduct 0.26 of a pound for each cubic inch from the completed weight of the whole.

(12) G. H. says: I want to make a telescope with a 3 inch object glass, 48 inch focus. What length should the body be, and would brass tubing an eighth of an inch thick be strong enough? What diameter should the focusing tube be and what length? A. Make the body of your telescope about 42 inches in length, and your focusing tube about 10 inches in length and 1 1/2 inches in diameter. A tube one-sixteenth of an inch thick would answer for the body.

(13) A. A. asks (1) how to make a good and reliable rubber cement for soling and mending rubber boots. A. Dissolve pure, unvulcanized rubber in bisulphite of carbon or in benzine of turpentine. 2. What would be the most substantial way of patching rubber, that is hollow with great pressure, like a hose? A. Clean the surfaces thoroughly, apply the cement to the patch and to the surface to be patched, and hold the patch in place with considerable pressure until the cement is set. 3. Could I not dissolve crude rubber with odds and ends of vulcanized rubber and mix with sulphur and other articles, so as to make a solid dough or the composition hard and durable for soles for rubber boots at any thickness I desire? A. Vulcanized rubber cannot be entirely dissolved. It may be softened by any of the solvents of unvulcanized rubber.

(14) S. F. asks how to draw a picture on glass, for magic lanterns—the substances to be used for different colors and the way to use them. A. Very fine pictures may be drawn for the magic lantern with an ordinary lead pencil on ground glass, afterward varnishing the glass to render it transparent. If you desire to make colored pictures for the lantern, you may use any of the transparent tube colors, mixing them with varnish. You will find information on this subject in SUPPLEMENTS, No. 423, 173, and 424.

(15) A. A. S. writes: I recently attended a lecture on "The Great Atmospheric Weight" on the human being. Suppose a man could be so arranged as to have the air entirely exhausted from around his body, can you tell what his feelings would be? Appliances being arranged so that he could breathe. A. He would feel like bursting, if there were time enough of sensation to have any feeling, for the air inside the body would distend all and rupture a great many of the cells.

(16) K. O.—We know of no electric railway velocipede. We think it would hardly be practicable unless you are able to generate current by means of a dynamo as in electric railroads. We do not know that the limit of speed for electric tricycles has been

attained. It depends, of course, upon the power of the engine and the currents applied to it. It will probably require a one horse power motor to drive an ordinary tricycle.

(17) W. C. M.—Benzine or gasoline can be congealed by means of freezing machines, several of which are manipulated by means of ether and ammonia. As far as we can ascertain, the process is not a practical one, as there is no commercial demand for these articles in a congealed form. No acid would be necessary to cause it to resume its normal condition. The action is due to a frigorific and not to an emulsifying agent.

(18) J. S. T. asks if on the coast of this country such fishes are to be caught as the imported celebrated Swedish so-called "delicacies anjovis," and if so, where? A. The menhaden or alewives, found mostly on the coast of Maine and Nova Scotia, are very similar, although usually they are not so choicely put up. 2. Do you know any factory in this country preserving such fishes? A. There are several factories "down East" for putting up these fish, both as anchovies and sardines.

(19) J. W. T. asks (1) for a cement or paste to put patches and soles on rubber boots, and how to apply it so as to be durable. A. Use rubber cement which is, by digesting caoutchouc, cut in fine shreds, with about 4 volumes of naphtha in a well covered vessel for several days. Naphtha should not be used indoors. 2. Is there a work that treats on the shoeing of interfering horses, and if so, where can I get it? A. There is a work by Russell on Horse-shoeing, which cost 75 cents, that we can furnish you with.

(20) W. L. asks how to make oxymuriate of antimony, such as used by dyers as mordant for cotton. A. The best method for preparing the oxymuriate of antimony is to boil the commercial sulphide of antimony in fine powder with hydrochloric acid, till the liquid is saturated, hydrogen sulphide escaping all the while; leave the solution to cool; add to it, with agitation, small portions of water till it begins to show turbidity, then filter; mix the filtrate with 5 to 10 times its bulk of water, and wash the resulting precipitate thoroughly with cold water by decantation or on the filter. The addition of a small quantity of water and filtration before the complete precipitation is necessary, in order to remove a small quantity of hydrogen sulphide, which always remains in the acid liquid, but is carried down by the first portions of oxymuriate precipitated and thereby removed; if allowed to remain, it would cause the precipitate to turn yellow.

(21) A Reader writes: 1. I have two light yellow straw hats I wish to dye, one brown and the other dark blue. Will the Diamond dyes do for the purpose, and will the hats be as glossy as new? A. The Diamond dyes are not satisfactory for the purpose mentioned. For brown, dye with Bismarck brown, then immerse in a weak solution of hydrochloric acid to fix the color. For dark blue use a strong extract of indigo. The gloss is produced by varnishing with shellac. 2. How and where are plant bulbs obtained? A. Of agricultural supply and seed stores.

(22) J. T. W. writes: 1. Will the cure, formula, or receipt for removing pimples and blackheads, contained in the SCIENTIFIC AMERICAN for July 5, question 8, injure the skin? A. It is not injurious. 2. Is there any receipt for making imitation gold that will take a good color, and not tarnish, and how should it be melted? A. Orole gold is made by taking 100 parts of pure copper, 17 of pure tin, 6 of magnesia, 9 of tartar of commerce, 3 1/2 of sal ammoniac, and 1 1/2 parts of unslaked lime. The copper is first melted, and the other substances (except the tin) added, a little at a time, and the whole well stirred for 30 minutes, so as to produce a perfect mixture, when the tin is thrown in and stirred round until melted. The crucible is then covered and the fusion kept up for 25 minutes, and the scum taken off, when the substance is ready.

(23) H. M. writes: I am told that a wheel grease is or can be made from "dead oil," a residue from distillation of coal tar, by some process of using lime with it. Can you give me any light on the subject? A. Axle grease is produced by a combination or variety of saponification between lime and resin; this yields a mixture too hard for use, and consequently it is thinned by means of dead oil, and thus made pliable. About one part of pure slaked lime is used with 10 parts of the resin oil, and a sufficient quantity of the dead oil is added. The latter is generally mixed with a little lime and water first, and then gradually mixed with the resin oil, small portions being used at a time, and the mixing continued until the proper consistency is reached.

(24) M. H. F. asks as to a few methods used in making muclage. A. A good muclage for labels is made by macerating 5 parts good glue in 18 to 20 parts water for a day, and to the liquid add 9 parts rock candy and 3 parts gum arabic. The mixture can be brushed upon paper while still lukewarm. See also the article on Cements, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158.

(25) C. C. B. asks how to tin small articles, and the price of the material used. A. The "small articles" are presumably of iron. They should be washed in soda or potash water to free from oil, stirred in a bath of muriatic acid, in which scrap zinc has been dissolved, the acid being then drawn off and diluted with water so as to be only slightly acidulous to the taste. Skim the articles from the acid bath, and throw them into a box of powdered resin. Then throw them into a bath of melted block tin; let them remain a few seconds, lift them out with a skimmer, and throw them against a screen of sheet iron to free them from superabundant tin. Good black "strait" or "Banca" costs about 22 cents a pound by the pig.

(26) E. S. K. asks the best way of laying a street railroad on an improved roadway. Have about two miles of track, and have considerable trouble on account of its spreading. A. The practice here for street railroads is to use ties with stringers, all sawed timber, with knees of cast iron spiked to tie and stringer inside and outside of stringer. It is not necessary to have the ties sawed. Small logs with a place adzed off

at each end; or if the stringers are sawed to a gauge size, the ties may be notched to receive the stringers, and a locust pin driven through stringer and tie.

(27) C. L. H. asks how to construct a spur gear pattern, proportion 6 to 1, large gear 36 inches diameter, pinion 6 inches diameter; these gears to be proportioned so as to stand the strain of one engine 6x8 inches, pressure of steam 130 pounds, revolutions per minute 350. How large boiler should two steam cylinders have—6x8, revolutions per minute 300, exhaust into the stack? A. For a pinion upon the shaft of the engine, make pinion 7 inches diameter, pitch line 6 inches diameter, bottom of teeth 4 1/4 inches diameter, thickness of teeth at pitch line one-sixteenth inch less than space between the teeth; width of pinion, 3 inches; multiply by 6 for number of teeth and diameter of pitch line for large wheel; other sizes same as for pinion. For further details we refer you to a small work, "A Practical Treatise on the Teeth of Wheels." You will need about a 40 horse boiler.

(28) A. M. writes: How or in what form can ammonia be employed to raise bread? Is it as carbonate, dissolved in water cold or hot, and has it to be employed in connection with other ingredients? What proportion to the flour? A. By consulting the article by Dr. Graham on "The Chemistry of Bread Making," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 222, you will get at the whole theory of raising bread by means of carbonic acid. The ammonium carbonate is the substance generally used, dissolved in cold water.

(29) H. J. asks (1) the shortest diameter of railroad curves. A. 400' radius on main tracks; 200' radius for terminals—not much used. 2. The largest possible difference of level of two coupled cars? A. About 1 foot with special links; a few inches only with common links or couplings. 3. The maximal compression of buffer springs? A. Spiral springs may be compressed till the wires touch; rubber springs vary widely, according to quality.

(30) G. S. S. asks if there is a tool made for cutting tubes out of a boiler; if not, what kind of a chisel is best to use? Size of tubes, 3 inches outside diameter. A. If the tubes can be dropped to the hand hole, they may be cut off inside of the head by driving an ordinary thin cold chisel through the tube all round. Drop the tube, and pull out at the hand hole. Compress the expanded end of the short end in the head, with calking tool or blunt chisel, and drive it in. If a tube is to be taken out through the tube hole in the head, the end may be compressed with a blunt chisel applied around the end of the tube, and with a narrow cape chisel carefully cut a groove; or in other words, slit the end of the tube in 3 or 4 places, when it will easily compress under the blunt tool so as to allow of its being driven out of its bearing at the other end of the boiler, when it can be drawn out.

(31) J. W. F. says: I am dredging in salt marsh and have to boat my fresh water for boiler a long distance. What is the best form of condenser to condense salt water, and what size is required to furnish a 25 horse power boiler? A. We understand you wish to save the exhaust steam from your dredging engine, which for your 25 horse power boiler will probably use 100 gallons fresh water per hour. For the condensation of the exhaust steam use a coil of wrought iron pipe, called in the pipe trade a pedestal coil, which may be made of 1 inch pipe branching from a header of a caliber equal to the exhaust pipe, with enough pipes from the header to also equal the exhaust pipe area. The coil should contain 400 feet of 1 inch pipe, or 10 pipes wide, 6 pipes high, and 7 feet long. Place the coil in a tank, and circulate the salt water through the tank by means of a pump.

(32) A. B. says: Replying to a correspondent in your Notes and Queries of a recent number, you state the size of a balloon required to lift 100 pounds, filled with pure hydrogen, to be 12 feet in diameter. Estimating on that basis, I find the size required to lift 500 pounds to be 21 feet in diameter, and given the weight of the materials, oiled silk, cords, netting, baskets, etc., at 150 pounds, two passengers 350 pounds = 500. 1. Am I approximately correct? A. Yes. 2. Would it be practicable to condense hydrogen into a suitable receptacle with a hand pump when I wish to descend, instead of allowing it to escape, and allow it to expand into the balloon again when I wish to rise, thus dispensing with ballast? A. We think not. The weight of pump and tank together with their bulk will probably be found an insuperable objection. 3. Could the entire contents of the balloon be condensed when the ascent is finished, and stored for future use? A. Yes, but would cost more than the gas is worth. 4. How much time would it be necessary to occupy in condensing the contents to avoid excessive heat in the reservoir, and excessive cold when expanding? A. This depends upon the size of the pump and power used as well as the time. It is very slow and tedious work by hand power. 5. What is the best material for confining hydrogen under pressure? A. The best material for confining the gas is iron in cylinders. Answer on page 43, July 19, 1884, is correct; a balloon is not always a ball, but holds more than a globe of a given diameter. The rule for lifting power of a balloon is also found in Haswell, page 218, new edition.

(33) C. L. desires to know (1) if there is any place in New York city where I could receive instruction in electrical engineering, on evenings during the winter? A. There is no place where electrical engineering is taught in New York. 2. Also is bee farming in California considered a profitable business, and does it pay with moderate capital? A. Bee farming in California is a profitable enterprise if suitably managed. Helen Hunt gives a favorable account of it on page 814 of the Century Magazine for October, 1883, under the title of "Out Door Industries in Southern California." Success depends upon the individual. The outlay need not be great.

(34) H. H. asks how much power and how large a boiler it would take to run a skiff 15 feet long, and 3 feet wide in its widest place. The skiff is to weigh about 300 pounds without machine, and to travel about 8 miles an hour. A. Engine 2 1/2 inches cylinder and 4 inches stroke. Propeller 16 inches to 18

inches diameter, and 26 inches to 28 inches pitch. Boiler to have about 65 foot fire or heating surface.

(35) G. B. S. asks: Will you kindly inform me what quantity of liquid slate it requires to make a black board four feet high by sixty feet long, and how it is used and quality? A. The Harvard liquid surface slating, to which we presume you refer, is sold in condition to be applied by the brush, and 1 gallon of the paint is sufficient for 2 square yards.

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

Q. & Co.—Bole is a fine, compact, argillaceous earthy mineral which occurs in amorphous masses of various colors, as yellow, black, brown, and bright red, all probably derived from oxide of iron. The substance is probably disintegrated basalt. The expression is quite loosely applied, and the substance used by the North American Indians to make their pipes from was designated as bole. For the putz pomade any soft, fine clay will answer.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 16, 1884,

AND EACH BEARING THAT DATE.

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

Anchor, P. C. Herman..... 305,186
Animals while being shod, apparatus for secur-
ing, J. H. Lewis..... 305,202
Annealing furnace, J. W. Arlen..... 305,368
Awning, F. B. Mallory..... 305,317, 305,318
Axle bearings, compound for, L. P. Wendell..... 305,123
Axle, car, C. E. Eaton..... 305,373
Axle dust guard, J. R. Baker..... 305,129
Bak. See Mail bag.
Banjo tympanum, O. R. Chase..... 305,143
Bark peeling machine, F. Merzger..... 305,322
Battery. See Carbon battery.
Bearing, three-part, W. A. Loud..... 305,396
Bearing with periodically alternate action, rotary
double, H. Stange..... 305,351
Beer chip, B. Rice..... 305,227
Bit. See Plane bit.
Bit brace, W. F. & E. B. Dake..... 305,064
Bit stock, Marr & Maughlin..... 305,090
Block. See Die block.
Boiler. See Steam boiler. Water tube boiler.
Bolt, A. Corn..... 305,294
Bolt dresser, H. Egeberg..... 305,379
Boot or shoe, A. Van Wageningen..... 305,120
Boot or shoe, rubber, J. N. V. Sweet..... 305,407
Boot or shoe soles, belting for buffing, G. A. Ful-
leton..... 305,068
Bottle filling machine, Thatcher & Johnson..... 305,353
Bottle filling machine, siphon, J. Matthews..... 305,094
Box, S. Friend..... 305,067
Box for cleansing powders, I. H. Garson..... 305,171
Brace. See Bit brace.
Brick kiln, T. M. Bannister..... 305,268
Bridge safety gate, J. W. Wert..... 305,255
Broiler, G. B. Siegenthaler..... 305,343
Bronzing pad, Osborn & Hull..... 305,326
Broom rack, hanging, T. A. Goodwin..... 305,070
Brush blocks, machine for boring, C. A. Mahle..... 305,209
Brush blocks, making, C. A. Mahle..... 305,209
Brush, electric, M. McMullin..... 305,321
Building, construction, E. L. Ransome..... 305,226
Burial casket, W. H. Otto, Jr..... 305,402
Button, J. H. Walker..... 305,362
Button or stud, C. G. Bloomer..... 305,137
Cable grip, combination, G. A. Polhemus..... 305,107
Can. See Fruit can. Metallic can. Piston can.
Can cleaning and lacquering machine, R. H.
Curry..... 305,154
Can nozzle, R. C. Anderson..... 305,128
Caoutchouc substitute, J. J. Haug..... 305,184
Car, coal, D. Holt..... 305,189
Car coupling, Adams & Felthousen..... 305,261
Car coupling, D. L. Ryler..... 305,144
Car coupling, Lee & Horton..... 305,086
Car door, Wagner & Seath..... 305,361
Car, dumping, J. L. Gill, Jr..... 305,384
Car label holder, mail, C. W. Vickery..... 305,243
Car signal, D. M. Bornarth..... 305,048
Car ventilator, I. Townsend..... 305,251
Car wheel, S. Carlton..... 305,287
Carbon battery, T. W. Bryant..... 305,046
Card playing, T. W. Lawson..... 305,315
Carding engine, J. H. Lee..... 305,316
Carriage shifting rail attachment, W. B. C.
Hershey..... 305,309
Carrier apparatus, J. F. Downing..... 305,060
Cartridge implement, Jesse & Paxton..... 305,196
Cartridge loading machine, O. F. Belcher..... 305,136
Cartridge shells, machine for feeding, J. A.
MacDonald..... 305,087
Case. See Eyeglass case.
Cement, manufacture of Portland, R. W. Lesley..... 305,301
Chair. See Tree chair.
Chrome, making lemon, C. E. Hore..... 305,390
Chrome red, making, C. E. Hore..... 305,389
Chrome yellow, making, C. E. Hore..... 305,391
Chuck, C. H. Amidon..... 305,263
Churn dasher, F. T. Roots..... 305,384
Cigar bunching machine, W. Sternberg..... 305,247
Cigar lighter, electrical, R. N. Dyer..... 305,164
Cigar mould, N. Du Brul..... 305,161
Clamp, M. Potter..... 305,222
Clasp. See Shoe clasp.
Clothes pounder, F. T. Roots..... 305,385
Clutch, O. C. Burdick..... 305,372
Clutch mechanism, N. R. Kelley..... 305,197
Coal screen, G. A. Edwards..... 305,299
Coal scuttle, J. Van Hagen..... 305,119
Coffee pot, A. A. Foss..... 305,168
Collar, horse, T. F. Hagerty..... 305,179
Collar stuffing machine, C. Ewing..... 305,166
Confectionery lozenges, process of and machine
for manufacturing, O. R. Chase..... 305,046
Cooker, farina, C. Carr..... 305,047
Cooler. See Water cooler.
Coop, knockdown poultry, H. R. Armstrong..... 305,368
Copper and separating gold, etc., from copper, so-
lution for refining, J. S. Howard..... 305,152
Corkscrew, M. F. Williams..... 305,268
Cotton gin, F. H. Richards..... 305,238, 305,230, 305,232

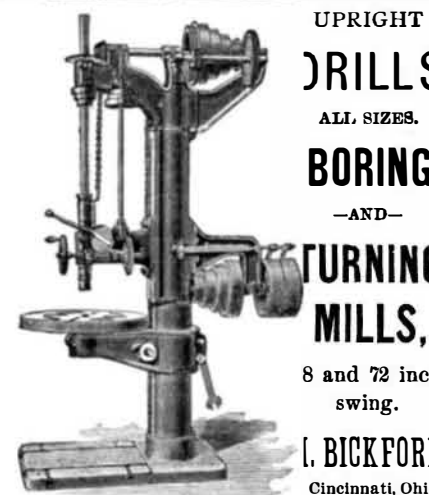
Cotton press, Halman & Winship.....	305,304	Locomotive, T. Mullrey.....	305,101	Stopper. See Projector stopper.	
Coupling. See Car coupling. Lightning rod coupling. Thill coupling.		Locomotives, device for thawing, D. M. Bornarth	305,042	Stove, heating, S. D. Vose.....	305,411
Crusher. See Ore crusher.		Log loader, M. Garland.....	305,170	Stove, oil, M. C. Armour.....	305,265
Cultivator, Judd & Ward.....	305,080	Lubricator. See Slight feed lubricator.		Stove, oil or gas, M. C. Armour.....	305,367
Curtain fixture bracket, W. E. Payne.....	305,106	Lubricator of arbors for shell rolls, N. Schermerhorn.....	305,340	Stovetop, extension, Armour & Galbraith.....	305,386
Cutter. See Meat cutter.		Machines, mechanism for controlling the action of, L. Gourdia.....	305,302	Surgical device for relief of hemorrhoids and similar affections, L. Chamberlain.....	305,146
Damper, M. S. Burroughs.....	305,373	Mail bag, B. F. Armstrong.....	305,367	Target, flying, G. Ligowsky.....	305,086
Damper regulator, Hooton & Jones.....	305,311	Marking machine, liquid line, G. F. Weston.....	305,124	Target, flying, B. Teipel.....	305,117
Derrick, W. H. Martyn, Jr.....	305,091	Match sticks, device for cutting, F. & B. Grabam.....	305,072	Target throwing traps, arm for, B. Teipel.....	305,116
Die block, G. W. Simmons.....	305,246	Meat cutter, R. B. Pumphrey.....	305,225	Telegraph, autographic, M. H. Wilson.....	305,259
Distilling low wines, apparatus for, Peterson & Sommer, Jr.....	305,329	Metal bars, machine for making flat, A. J. Bates.....	305,369	Telegraphic transmitter for unskilled operators, T. Ames.....	305,262
Distilling or reducing oils, apparatus for, R. Dean.....	305,066	Metallic can, Hammer & Nettleton.....	305,305	Thill coupling, T. A. Mayes.....	305,085
Drain and sewer pipe, Cooper & Bleg.....	305,150	Micrometer, C. H. Russom.....	305,337	Tbill coupling, W. S. Shanahan.....	305,342
Drill. See Grain drill.		Mill. See Fanning mill. Roller mill. Grinding mill.		Thrashing machine band cutter and feeder, E. F. Knight.....	305,394
Dye vat, J. P. Delahunty, Sr.....	305,155	Mould. See Cigar mould. Soap mould.		Tile laying machine, drain, I. Webster.....	305,363
Dyeing black, D. Jamieson.....	305,312	Mowers, reapers, etc., sickle head for, G. E. Waggoner et al.....	305,360	Tiles from concrete, mould for forming, J. P. Grant.....	305,308
Eccentric, shifting, C. R. Williams.....	305,257	Muzzle, J. D. Crockett.....	305,296	Tobacco, compound for treating, E. D. Wells.....	305,364
Electric circuit closer, J. H. Holmes.....	305,310	Nut lock, G. P. Cragin.....	305,051, 305,052	Toilet preparation, liquid, W. H. Bickler.....	305,272
Electrical circuit closer, T. W. Bryant.....	305,045	Oil can draught apparatus, R. C. Anderson.....	305,127	Tooth crown cap, artificial metal, M. Rynear.....	305,233
Electrical transportation of goods, etc., mechanism for the, F. Jenkin.....	305,194	Oil refineries, apparatus for treating refuse from, H. McManus.....	305,097	Torch, campaign, Dunlap & Riedel.....	305,377
Elevator. See Portable elevator.		Oils and fatty matters from animal, vegetable, and mineral substances, apparatus for the extraction of, Pratt & Benson.....	305,224	Toy, J. M. Jones.....	305,079
Elevator and carrier, Boughey & Kilborn.....	305,279	Ore crusher and pulverizer, Van Derveer & Hegeman.....	305,357	Transom lifter, S. A. Bishop.....	305,274
Emery wheel, Boynton & Stephen.....	305,139	Ore separator, F. R. Brown.....	305,284	Traveling bag handle connection, M. Scherwin.....	305,341
Emery wheel, Mansfield & Boynton.....	305,210	Oven, baking, J. L. Sharp.....	305,113	Treadle, foot, J. H. Rivers.....	305,332
End gate, P. Kratz.....	305,083	Pad. See Bronzing pad. Press pad.		Tree chair, portable, C. Moore.....	305,100
End gate, wagon, A. A. Williams.....	305,125	Paper fastener, E. W. Ball.....	305,040	Tricycle, J. F. Cumming.....	305,063
Engine. See Carding engine. Rotary engine. Wind engine.		Paper for checks, notes, stamps, etc., preparation, etc., of, W. J. Clapp.....	305,292	Truck, changeable gauge, G. W. Bemis, Sr.....	305,271
Engine reversing gear, T. Moore.....	305,215	Paper, making and preparing, Pease & Hunt.....	305,219	Truck skid for railway cars, A. E. Kiel.....	305,199
Engraving machine, G. M. Guerrant.....	305,177	Parer, apple, W. H. Boutell.....	305,290	Trunk, O. B. Gaston.....	305,069
Engraving machine, G. M. & J. C. Guerrant.....	305,178	Pavement, street, C. Peck.....	305,328	Trunk, C. Gungel.....	305,385
Eye bars, die for making, Simpson & Gladhill.....	305,345	Pencil sharpener and case, G. F. Gerrish.....	305,173	Trunk strap fastener, G. E. Marvine.....	305,092
Eye-glass case, A. K. Hawkes.....	305,185	Petroleum, apparatus for distributing crude, H. Halvorson.....	305,182	Tube welding apparatus, J. Sadier.....	305,239
Fanning mill, G. N. Mansfield.....	305,319	Petroleum, dividing and distilling crude, H. Halvorson.....	305,190	Turn table, horse car, C. F. Bollwitt.....	305,278
Farm gate, Fox & Rieby.....	305,382	Petroleum, preparing lubricating oils obtained from, H. Halvorson.....	305,181	Twine adjuster, H. D. Risley.....	305,110
Faucet, automatic, J. Lawson.....	305,084	Pipe. See Drain and sewer pipe.		Valve, balanced rotary, H. C. Behr.....	305,132
Feather renovator, B. Schapker.....	305,339	Piston can, H. Allen.....	305,126	Valve, balanced slide, H. C. Behr.....	305,134
Fencing, barbed, F. A. Blackmer.....	305,276	Plane bit, W. F. Kellett.....	305,393	Valve, engine, H. C. Behr.....	305,133
Fencing, barbed, A. J. Upham.....	305,355	Planter, corn, C. A. Pfeifer.....	305,330	Valve, straight-way, J. Homan.....	305,078
Fencing, barbed metal strip, A. J. Upham.....	305,354	Planter, seed, T. W. Rogers.....	305,111	Vaporizer for greenhouses, W. W. Carman.....	305,145
Fencing strip, barbed, W. E. Brock.....	305,282, 305,283	Planting machine, C. Snyder.....	305,349	Vat. See Dye vat.	
Fertilizers, treating phosphates for, Stillman & Koefed.....	305,249	Plow, R. & S. T. Bruce.....	305,285	Vehicle, side spring, Z. M. Howell.....	305,193
Fifth wheel, J. M. Herndon.....	305,077	Plow, E. Engelsb.....	305,006	Vehicle spring, C. W. Saladee.....	305,242, 305,338
Firearm, breech-loading, W. Anson.....	305,264	Plow weed book, S. J. Stofer.....	305,115	Vehicle, two-wheeled, Hucks & Johnson.....	305,187
Firearm, breech-loading, E. G. Dorchester.....	305,160	Plow wheel scraper attachment, D. N. Palmer.....	305,327	Velocipede, Ellis & Norman.....	305,061
Firearm magazine, R. F. Cook.....	305,090	Portable elevator, R. Dunbar (r).....	10,521	Ventilating apparatus, H. N. Wickersham.....	305,365
Firearm, magazine, W. Mason.....	305,093	Pot. See Coffee pot.		Ventilator. See Car ventilator.	
Fire extinguisher, G. Macomber.....	305,038	Power. See Foot power.		Ventilator, W. E. Roach.....	305,286
Fire extinguisher, hand grenade, C. T. Holloway.....	305,190	Press. See Cotton press. Hay press. Stamping press.		Vise, A. L. Adams.....	305,037
Flooring, waterproof, Cassard & Damman.....	305,288	Press pad for pantaloons, S. C. Rugland.....	305,112	Walk or pavement, brick, L. R. Sassinot.....	305,243
Fly paper, manufacture of, O. Thum.....	305,118	Printing, art of and mechanism for chromographic, Forbes & Osborne.....	305,169	Wall paper exhibitor, F. T. Forsaith.....	305,381
Foot power, pendulum, C. J. Olin.....	305,217	Printing machine, J. T. Hawkins.....	305,076	Washer. See Window washer.	
Fruit can, J. T. Robinson.....	305,333	Printing machine, chromatic, D. E. Mack.....	305,207	Washing and drying textiles, centrifugal machine for, J. Chevanne et al.....	305,049
Fruit jar, J. J. Quinby.....	305,218	Printing machine, J. T. Hawkins.....	305,076	Washing and scouring knit and other goods, machine adapted to, H. W. Scott.....	305,245
Fur collar, detachable, C. F. Butterworth.....	305,143	Printing machine, J. T. Hawkins.....	305,076	Washing machine, C. Nelson.....	305,324
Furnace. See Annealing furnace. Regenerator furnace.		Printing machine, J. T. Hawkins.....	305,076	Watch, stop, O. F. Doman.....	305,159
Furnace, K. Schroll.....	305,405	Printing machine, J. T. Hawkins.....	305,076	Water closet head, R. W. Cummings.....	305,375
Fuses, joint protector and igniter for, E. A. Thompson.....	305,250	Printing machine, J. T. Hawkins.....	305,076	Water closet shield, L. Brandeis.....	305,141
Gauge. See Saw table gauge.		Printing machine, J. T. Hawkins.....	305,076	Water cooler and refrigerator, J. W. Barnum.....	305,269
Gas extinguisher, W. F. Dinse.....	305,059	Printing machine, J. T. Hawkins.....	305,076	Water tube boiler, E. J. Moore.....	305,401
Gas making machine, A. & T. Henning.....	305,308	Printing machine, J. T. Hawkins.....	305,076	Webbing, E. F. Spencer.....	305,350
Gate. See Bridge safety gate. End gate. Farm gate.		Printing machine, J. T. Hawkins.....	305,076	Wheel. See Car wheel. Emery wheel. Fifth wheel. Wheelbarrow wheel.	
Gear cutting machine, F. H. Richards, 305,223, 305,231, 305,233 to 305,235		Printing machine, J. T. Hawkins.....	305,076	Wheelbarrow wheel, J. D. Jervis.....	305,313
Gear moulding machine, P. L. Simpson.....	305,346	Printing machine, J. T. Hawkins.....	305,076	Whiffletree hook, S. Ryder.....	305,404
Generator. See Steam generator.		Printing machine, J. T. Hawkins.....	305,076	Whistles, operating wind, A. Maurice.....	305,213
Glass, apparatus for the manufacture of polished, F. Del Marmol.....	305,376	Printing machine, J. T. Hawkins.....	305,076	Wind engine, H. R. Stevens.....	305,114
Glassware, decorative, J. Ferguson.....	305,380	Printing machine, J. T. Hawkins.....	305,076	Window screen, A. L. Benedict.....	305,370
Governor, steam engine, W. R. Michener.....	305,323	Printing machine, J. T. Hawkins.....	305,076	Window washer, J. F. Bentz.....	305,041
Grain binder, H. Behrens.....	305,135	Printing machine, J. T. Hawkins.....	305,076	Wire, barbed, A. J. Upham.....	305,356
Grain delverer for self-binders, C. Whitney.....	305,256	Printing machine, J. T. Hawkins.....	305,076	Wire cloth stretcher, J. Manning.....	305,039
Grain drill force feed, J. H. Keedy.....	305,314	Printing machine, J. T. Hawkins.....	305,076	Wood, etc., incombustible, composition for rendering, Gimenez & Yrigoyen.....	305,174
Grain drying, steaming, and cooling machine, E. H. Sawin.....	305,244	Printing machine, J. T. Hawkins.....	305,076	Wood, etc., tool for finishing surfaces of, J. Y. Simons.....	305,344
Grain separator, A. W. Lockhart.....	305,203	Printing machine, J. T. Hawkins.....	305,076	Wrappings, means for assisting persons in putting on outside, G. Sutton.....	305,406
Grinding mill, L. M. Devore.....	305,158	Printing machine, J. T. Hawkins.....	305,076	Wrench, J. D. Stanton.....	305,352
Hair dyeing, C. A. De Barbaran.....	305,057	Printing machine, J. T. Hawkins.....	305,076		
Hame, D. H. Grant.....	305,176	Printing machine, J. T. Hawkins.....	305,076		
Hammer, drop, J. H. Elward.....	305,165	Printing machine, J. T. Hawkins.....	305,076		
Handles to enameled vessels, attachment of, G. M. Heyde.....	305,389	Printing machine, J. T. Hawkins.....	305,076		
Harrow, J. Dugaw.....	305,162	Printing machine, J. T. Hawkins.....	305,076		
Harvester, J. F. Appleby.....	305,039	Printing machine, J. T. Hawkins.....	305,076		
Harvester, low-down self-binding, J. F. Appleby.....	305,038	Printing machine, J. T. Hawkins.....	305,076		
Hay press, G. W. Dunn.....	305,163	Printing machine, J. T. Hawkins.....	305,076		
Hay stacker, D. F. Oliver.....	305,325	Printing machine, J. T. Hawkins.....	305,076		
Headlight, locomotive, A. H. Handlan, Jr.....	305,306	Printing machine, J. T. Hawkins.....	305,076		
Hides and skins, spent tan, etc., centrifugal machine for drying, E. D. Solminiac.....	305,157	Printing machine, J. T. Hawkins.....	305,076		
Hinge for shutters, lock, J. Wolf.....	305,260	Printing machine, J. T. Hawkins.....	305,076		
Hitching strap holder, F. E. Kitzmiller.....	305,082	Printing machine, J. T. Hawkins.....	305,076		
Hoisting crane, A. J. Stevens.....	305,248	Printing machine, J. T. Hawkins.....	305,076		
Holder. See Scarf or tie holder.		Printing machine, J. T. Hawkins.....	305,076		
Hook. See Plow weed hook. Whiffletree hook.		Printing machine, J. T. Hawkins.....	305,076		
Horseshoe nails, punch and die for cutting out, H. D. Cowles.....	305,295	Printing machine, J. T. Hawkins.....	305,076		
Hose bridge for railway tracks, T. Reddy.....	305,108	Printing machine, J. T. Hawkins.....	305,076		
Hot water apparatus, W. N. Misted.....	305,400	Printing machine, J. T. Hawkins.....	305,076		
Hub, vehicle, J. Maris.....	305,397 to 305,399	Printing machine, J. T. Hawkins.....	305,076		
Hub, vehicle, G. Utley.....	305,263	Printing machine, J. T. Hawkins.....	305,076		
Hydrant, double-action, J. Deutch.....	305,058	Printing machine, J. T. Hawkins.....	305,076		
Hydraulic jack, E. Hall.....	305,386	Printing machine, J. T. Hawkins.....	305,076		
Illuminating device for frightening rats and mice, J. H. Nelson.....	305,102	Printing machine, J. T. Hawkins.....	305,076		
Incrustation preventive, A. A. Rosenberg.....	305,336	Printing machine, J. T. Hawkins.....	305,076		
Incubator, G. L. Enggren.....	305,065	Printing machine, J. T. Hawkins.....	305,076		
Indicator. See Leather indicator.		Printing machine, J. T. Hawkins.....	305,076		
Inkstand, combination, B. Hamburger.....	305,074	Printing machine, J. T. Hawkins.....	305,076		
Ivory, etc., plastic material to imitate, Lockwood & Hyatt.....	305,205	Printing machine, J. T. Hawkins.....	305,076		
Jack. See Hydraulic jack. Lifting jack.		Printing machine, J. T. Hawkins.....	305,076		
Jar. See Fruit jar.		Printing machine, J. T. Hawkins.....	305,076		
Joint. See Railway rail joint.		Printing machine, J. T. Hawkins.....	305,076		
Journal and box, vehicle, P. Hamel.....	305,387	Printing machine, J. T. Hawkins.....	305,076		
Kiln. See Brick kiln.		Printing machine, J. T. Hawkins.....	305,076		
Kitchen safe, sectional, W. C. Campbell.....	305,286	Printing machine, J. T. Hawkins.....	305,076		
Knitting machine needle, A. Wood.....	305,403	Printing machine, J. T. Hawkins.....	305,076		
Ladder, F. E. A. Smith.....	305,347	Printing machine, J. T. Hawkins.....	305,076		
Lamp, electric arc, E. Grauert.....	305,175	Printing machine, J. T. Hawkins.....	305,076		
Lamp, electric arc, N. McCarty.....	305,096	Printing machine, J. T. Hawkins.....	305,076		
Lamp, incandescent electric, W. Holzer.....	305,191	Printing machine, J. T. Hawkins.....	305,076		
Lamp mechanism, electric, E. Thomson.....	305,413	Printing machine, J. T. Hawkins.....	305,076		
Lamp shade, J. Dable.....	305,297	Printing machine, J. T. Hawkins.....	305,076		
Lap ring, jointed, J. H. C. Wilkening.....	305,412	Printing machine, J. T. Hawkins.....	305,076		
Lathing, metallic, L. W. Newton.....	305,108	Printing machine, J. T. Hawkins.....	305,076		
Leather indicator, E. S. Abbott.....	305,034	Printing machine, J. T. Hawkins.....	305,076		
Leather splitting machine, J. A. Safford.....	305,240	Printing machine, J. T. Hawkins.....	305,076		
Level, grade, Harris & Carpenter.....	305,183	Printing machine, J. T. Hawkins.....	305,076		
Lift, safety, M. Martin.....	305,212	Printing machine, J. T. Hawkins.....	305,076		
Lift safety apparatus, M. Martin.....	305,211	Printing machine, J. T. Hawkins.....	305,076		
Lifter. See Transom lifter.		Printing machine, J. T. Hawkins.....	305,076		
Lifting jack, T. O. Joyce.....	305,392	Printing machine, J. T. Hawkins.....	305,076		
Lighting rod coupling, S. Bradley.....	305,140	Printing machine, J. T. Hawkins.....	305,076		
Lock, I. Chase.....	305,304	Printing machine, J. T. Hawkins.....	305,076		

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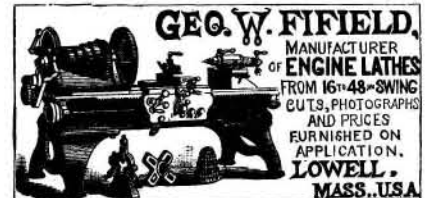


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