(68) W. W.—The "Universal Putz Pomade" consists of American bole mixed with sufficient oleic acid to form a paste, and perfumed with nitro benzol. The following is likewise said to be similar if not identical with the "Putz Pomade":

Levigated rotten stone	1 part.
Iron subcarbonate	3 "
Lard or olive oil	q. s.

To make the finished product the consistency of lard, perfume with oil of bitter almonds.

(69) F. S. P. asks: Suppose a very narrow pit 14,283 feet below the level of the sea or ocean, how much less than 30 pounds to the square inch would the atmosphere exert at the bottom of the pit? A. We have no records for so great a depth as this. The pressure is supposed to slightly increase in descending shafts about half a pound to 1,000 feet, which would make the pressure at such depth about 21 pounds to the square inch.

(70) E. K. says: I wish to use a fine metallic powder of iron and copper; could you advise me a cheap way to get it, in some quantity, possibly by grinding on emery wheels or else? The way of precipitation by hydrogen gas is too troublesome and expensive. A. A fine iron powder may be gathered in machine shops and foundries where much grinding is done with emery wheels. Copper powder may be obtained in the same way. We know of no trade in which copper is so ground.

(71) A. L. S. asks: Does it take more power to raise water out of a 160 ft. depth well with a 4 in. pipe than it does with an inch pipe, both pipes to have 2 in. cylinders at bottom of well? A. It takes less power by the difference in friction between the 4 in. pipe and the 1 in. pipe. With the small cylinder there will be no perceptible difference with a slow movement, the static pressure being the same in both pipes.

(72) E. B. H. says: I use considerable aluminum plate. My scraps I have not been able to remelt and roll out. I seem to destroy some properties of the metal in remelting. Anneal it as often as I will, it continues to crack or break in rolling Can you help me out? A. The melting of aluminum, if properly conducted, should yield good results. It fuses at about 700° C. In order to remelt aluminum scraps, a fusing mixture of common salt and potassium chloride must be employed, as the presence of other fluxes, such as borax, glass, etc., renders the metal very impure.

(73) W. H. H. asks: Can sperm oil be used again for lubricating purposes, after being used on an engine? A. Sperm oil that has been used on bearings is not suitable for reuse upon bearings or shafting, but is good for drilling or cutting threads, as bolts, nuts, etc., until entirely used up.

(74) A. P. L.—An ohm is a unit of electrical resistance which is equal to 330 feet of No. 9 iron wire (0·155 in. diameter). The term "mile ohm" means the weight in pounds of metal required to produce in a mile length of wire the resistance of one ohm.

(75) M. O. S. writes: During a heavy thunder storm which passed down the St. Lawrence, June 18, I noticed a somewhat strange phenomenon. While standing outside watching the progress of the storm, I saw a flash of lightning almost directly north at about 20 degrees from the horizon, followed by another and another, at, I may say, exactly the same elevation, flash succeeding flash, each one about 4 degrees due west from the preceding one. The whole succession of flashes extended from north to almost west, and from first to last occupied from 1½ to 2 minutes. It resembled exactly the flight of a firefly, the flashes occurring at about the same intervals which elapse between the flashes emitted by a firefly. What occasioned this form? A. Lightning takes the course of the least resistance. It is probable that the lightning followed a column of rarefied air, which remained undisturbed during the period of your observation.

(76) F. G. R. asks: Will you please tell me if I will be able to get anything that will be repelled by a magnet with the same power as soft iron will be attracted to it? A. Like poles of two magnets will repel each other with the greatest repellent force obtainable from magnets, but this force will not be equal to the attraction of either of the magnets for a piece of soft iron.

(77) J. H. T. asks for the most correct method of ascertaining the contents of a barrel or cask, the diameter of the head, the diameter at bung, and the length being given. You will see in Haswell's "Engineers' and Mechanics' Pocket Book." of the issue of 1878, page 102, an example thus: Diameter of head 17 inches, bung 19 inches, length 28 inches; volume, 7,689 cubic inches. Now, by what rule is this answer arrived at? I have figured it various ways, but cannot bring the answer as above. A. Find the mean diameter of the barrel, and the number of square inches in this curve, multiplied by the height of barrel in inches, will give the cubical contents. Owing to the difference in the forms of barrels and the different curves of the staves, it is impossible to make one rule for finding the mean diameter apply in all cases. We think the figures quoted are a misprint, as they do not correspond with our calculation; they are changed in a later edition, which gives rules for four varieties of casks.

(78) B. T. H. says: I have a portable gas machine, gas made from heavy oil passing over red hot retort, in use since 1856. The pipes from retort to gasometer have become partly filled with a thick tar. Can you suggest anything to pour in which will dissolve this tar? A. There is no practical or safe way of dissolving the tar out of the retort connections. Take them down and scrape them out. There should be a hydraulic main and a washer between the retorts and the gas holder, which will gather the surplus tar on a water surface and save the pipes from clogging.

(79) J. C. M. says: I have a parlor fountain, in which the water mixed with air runs through about 30 feet of glass tubing which gets very dirty, so we can't tell the difference between the bubbles of air or water (we use hydrant water). Can you inform me what to put in the water to clean the tubes and not hurt the zinc with which the tank is lined that feeds the fountain? A. Know of no better way than to take out the glass tubes and pour nitric acid through them. Fix the tubes so that the acid will run free. Make a little funnel of beeswax or paraffine around the top to enable you to pour the acid from a small bottle, catching it in a bottle at the bottom.

(80) C. P. asks for a receipt for a blue and white, for stamping on goods; one that will not rub off. A. The indelible blue coloring which is sometimes used consists of ultramarine mixed with burned linseed oil, ground together and printed on the white surface. It is practically the equivalent of blue printer's ink; the white coloring material which is similarly used consists essentially of white lead. The soluble colors which are applied are the simple ultramarine mixed with gum water, and likewise the dry white lead mixed with the same substance. The addition of a little potassium dichromate in the water added to the gum and then exposed to the light might possibly prevent its dissolving. Those who use these articles are very unwilling to give the formulas employed by them, claiming that they are trade secrets, for which they have paid money.

(81) J. D. P. asks: Who was the first person that invented a steamboat, and what part did George Fitch play in the steamboat world? A. There have been several claimants for the honor of being first in this field, and it is not quite clear how the credit should be divided; John, not George, Fitch built the first steamboat that was run in this country, making trips on the Delaware, above Philadelphia, in the summer of 1790.

(82) D. and R. ask for a receipt for coloring small tin articles different or various colors, by dipping them in some solution so as to give them a smooth, hard, and durable finish? A. There are no means of coloring tin except by lacquering and japanning. The latter is fully described in SCIENTIFIC AMERICAN SUPPLEMENT, 316, and for the former we would suggest that the articles be coated with some suitable metallic oxide or other coloring matter mixed with japan varnish and baked.

(83) J. D. F. says: 1. I have some old paint brushes which have become hard with paint; how can the paint be removed so as to make the brushes perfectly clean without injury to the bristles? A. To soften brushes that have become hard, soak them 24 hours in raw linseed oil and rinse them out in hot turpentine, repeating the process till clean; or wash them in hot soda and water and soft soap. 2. Can you tell me of something to put on awnings to prevent mildew? A. To remove mildew stains, mix well together two tablespoonfuls of soft soap, one of salt, two of powdered starch, and the juice of a lemon. Lay this mixture on both sides of the stain with a painter's brush, and then lay the articles on the grass, day and night, until the stain disappears.

(84) F. A. writes: I made a telephone as shown in the SCIENTIFIC AMERICAN SUPPLEMENT, No. 142. The phones are made of ebony, and are perfect. Magnets are about as close as can be to the diaphragm. I cannot get them to work; like to know the cause. A. We cannot say where your trouble lies without knowing more of the details of the construction of the instrument. You do not say which kind of telephone you made. You may have a broken conductor. Your magnet may be closed by an iron armature. Your diaphragm may touch the end of the magnet. If you have used horse shoe magnets, see that like poles are in contact with the pole extension. See also that the pieces used to clamp the magnets together are not iron.

(85) J. H. asks how shoe polish is made, the quality used by street boot blacks? A. Day & Martin's celebrated English blacking consists of bone black in a state of powder mixed with sperm oil until the two are thoroughly incorporated. Sugar or molasses is then mixed with a small portion of vinegar and added to the mass. Sulphuric acid is next added, and when all effervescence has ceased, more vinegar is poured in until the mixture is of proper consistency. The formula for a French shoe dressing is given on page 355 of SCIENTIFIC AMERICAN for Dec. 8, 1883. On page 150 of SCIENTIFIC AMERICAN for March 10, 1883, several other formulas are given.

(86) H. P. asks: 1. How can mother-of pearl be bent and straightened after it is cut from the shell? A. Mother-of-pearl is generally used in small pieces and thin layers which are held in their position by japan varnish. (See page 5058, SCIENTIFIC AMERICAN SUPPLEMENT, No. 317.) In the compressed mother-of-pearl the shells are submitted to a strong heat, which separates them into thin scales; these are then pressed in the cylinders of a flattened roller, and afterward pounded in a mortar. It is then sifted to get rid of the dust, and the powder is treated with gelatine, and shaped in form. 2. How can bone and ivory be bleached without the direct action of the sun, for instance, by the use of some fluid? A. Hydrogen peroxide is used to bleach ivory and bone. See SCIENTIFIC AMERICAN SUPPLEMENT, 339.

(87) "Buttons" asks: Can you kindly inform me in your answers to correspondents. 1 What articles or tools are used by professionals in stamping on felt, canvas, or other goods for embroidering, marking, or braiding, etc.? 2. Where these articles or tools could be purchased? A. 1 and 2. The tools are few and simple; they cannot be purchased, and are made to order by the special individual using them from his own designs. 3 If there is any other way more practical and convenient for a lady to do her own stamping? If so, how? A. The process is not practicable or convenient for a lady to undertake; it would be far cheaper in every instance for her to purchase the stamped pattern rather than to undertake the preparation herself. Where a dealer can, by having special stamps cut for him, sell a large number of similar patterns, the price will be considerably less than if a single one were prepared.

(88) A. B. says: I am putting a steam furnace into my house to heat it, and wish to wrap the steam pipes with common building paper. Can I saturate or cover the paper with a cheap solution that will prevent the paper from taking fire with the steam at 10 pounds? A. There is no danger from wrapping the steam pipe with paper in a low pressure heating apparatus. Old carpet cut in strips, or listing, makes a very good felting for the inside or next the pipe. The paper should be put on loosely and tied with twine. You may fireproof the paper by dipping it in a strong solution of borax and sal ammoniac or alum.

(89) H. D. Q.—Probably the best battery for your use is the Bunsen bichromate or electropoin battery. It is moderately constant, and has a high electromotive force. For a motor to be used only occasionally, the plunging bichromate battery is best. For full description of batteries see SUPPLEMENT 157, 158, and 159. You will find small electric motors described in the back numbers of the SUPPLEMENT.

(90) R. F. says: I have some monthly roses in my yard, and I find that the ants eat the leaves, and are always on them. I have tried kerosene and milk diluted with water, but it appears to kill the leaves, and still it does not kill or drive away the ants. Can you give me a remedy? A. We do not know of anything better than to put a ring of soft tar around the stems of the rose plants near the ground. Shake off all the ants, and see that all other communication between the leaves and ground is cut off. Wet the surface of the tar ring occasionally with kerosene oil to keep the tar soft. Ants do not love tar rings. You may also poison them by feeding them with mutton tallow into which a little arsenic has been mixed.

(91) S. R. G. says: A dry piece of lumber, a foot square, will soak up a half pint of water, and swell a half inch in width. A duplicate piece may be saturated with oil until it will bend like leather, and yet it will shrink. Why is this? A. The theory is that the water, having an affinity for the particles or atoms of the fiber, penetrates and unites with it, causing the fibers to swell; whereas the oil only enters the pores and lubricates the spaces between the fibers, causing them to easily move upon each other, making the wood elastic, the oil having no affinity for union with the particles of the fiber.

(92) B. F. W. writes: I have an engine with cylinder 10x12, rated at 20 horse power (center crank), boiler 42 inches by 11 feet with 36 three inch tubes, steam pipe 2 inches, exhaust pipe 2 inches (all new); have not power enough to run a 50 inch saw so as to cut more than 4,000 feet per day. Engine seems to run free and easy with 20 to 30 pounds steam while running light machinery in a sash factory, but nearly chokes down while running through a log with a 50 inch saw with steam at 80 to 100 pounds. What should be done to increase the power? What size should the exhaust pipe be? A. The exhaust pipe should be 2½ inches and as short as possible. If there is ample supply of steam, you might increase the speed of the engine by changing some of the pulleys, and gain a little power. Really, the engine is too small for the saw.

(93) J. D. C. asks: Does the report of a cannon fired over the water where a person has been drowned, bring the body to the surface? If it does, can you explain upon what principle this takes place? A. The firing of cannon near the spot where the body of a person that has been drowned is supposed to be lying upon the bottom, has in some cases caused bodies to rise: sometimes it fails. It is supposed that bodies that are liable to rise upon the firing of cannon are almost in an equipoise upon the bottom, and the intense vibration of the air, and consequently the water, tends to slightly distend such parts of the viscera as may contain gases under slight pressure. In this way a very slight distention of confined gas would overcome the difference in gravity between the body and the water, and cause the body to rise.

(94) M. D. asks: 1. How can I temper my two inch auger? It is soft. A. Temper an auger, if it is of steel by heating in a charcoal fire, a full or cherry red, and dip in water. If it is hard by trial with a file, you may have to draw the temper to a dark straw or light blue. If it does not harden, it is probably iron that has been casehardened. Any blacksmith can recaseharden it. 2. Will beef cook tenderer under 100 pounds pressure to the square inch than it will in open kettle? Or will 200 steam pressure be better? A. Beef cooks tender under slight pressure with steam; one or two hundred pounds pressure will disintegrate it, and destroy its flavor. 3. Ought not a water pump to work, working cylinder 27 square inches surface on piston of low pressure cylinder, 3 pounds pressure to square inch, piston one inch square, working against 70 pounds pressure to the square inch? A. You have 81 pounds gross pressure upon your steam cylinder, against 70 pounds upon the water cylinder, only 10 pounds difference, which is not enough to overcome the friction; you should have 50 per cent more steam pressure, or about 4½ pounds.

(95) S. G. N. says: When turning shafting, one center has to be dug over, and quite frequently the shaft has to be straightened after it has been reversed in the lathe. Now, what is the cause of this? A. We think the trouble is with the hole in the spindle There are very few lathes that have the hole absolutely true; you turn up your center, as you think, perfectly true, take it out, harden it, and put it back in some other position, and although you may not observe upon the taper point that it is not running true, it may nevertheless be out one-sixty-fourth of an inch. Springing in hardening is also a cause of eccentric center The pressure of the dog might also cause eccentricity with a blunt center; in this case the shaft would not be round.

(96) C. W. W. asks: What amount of hydrogen can be obtained from one cubic foot of water, by passing its steam over red hot iron turnings in iron retorts? A. One cubic foot of water, theoretically, will produce about 1,400 cubic feet of hydrogen and 700 cubic feet of oxygen. 2. What amount of iron turnings will it take to absorb the oxygen of the cubic feet of water by passing the steam over them in the manner stated. This will require about 192 pounds of iron for its absorption. 3. What amount of heating surface will it take to convert the one cubic foot of water into steam in one hour? A. To convert a cubic foot of water into steam in one hour will require from 10 to 15 square feet boiler heating surface, according to conditions of pressure, etc.

(97) C. W. W. asks: 1. What is the lifting power of 1,000 cubic feet of hydrogen gas, made by passing steam through red hot iron turnings, and purified in lime? A. The lifting power of pure hydrogen gas is 71 pounds per thousand cubic feet. In practice, owing to diffusion through the pores of the balloon, this would be considerably reduced, say 25 per cent to 50 per cent. 2. Would a cast iron cylinder 8 inches in diameter, half an inch thick and 8 feet long, do for a generator? A. The cylinder suggested is rather thin. 3. What size steam boiler would be necessary for generating the steam? A. The size of the boiler must be estimated on the basis that 11 feet of water will give 21 feet of hydrogen. 4. How often would the retort need recharging? A. Assuming that the retort would hold one-quarter of its internal volume of metallic iron in the form of borings, etc., one filling would yield about 3,000 cubic feet of hydrogen, if the iron was completely decomposed. 5. What amount of gas could be made in one hour? A. This depends on so many things that it is impossible to more than guess at it. Hydrogen is very troublesome to handle, on account of its diffusion.

(98) C. C. J. writes: I have a large number of India rubber articles, upon which I wish to put a firm, durable, white surface, as near an imitation of porcelain as possible, without being liable to crack or break off. The articles mentioned are for out door use, and must be weatherproof How shall I proceed? A. If the articles are of soft rubber, we do not think it possible to effect; if of hard rubber, it would be impossible to add a porcelain-like coating, for that would necessitate baking the articles, under which circumstances they would melt. We think therefore the most satisfactory thing to do would be first to apply some coloring substance in the way of a thin paint, and then finish by coating the objects with some of the best body wearing varnish.

(99) W. S.—Panclastite consists of about equal parts or carbon disulphide and hyponitric acid, and it is exploded by means of mercury fulminate or gunpowder.

(100) A. W. G. asks (1) how long it will take to let air out of a cylinder measuring 1 cubic foot, compressed to 300 pounds to the square inch? The hole to be an eighth of an inch in diameter. A. A rule for determining this will be found on page 891 of Clark's Rules and Tables for Engineers. 2. How is it that we don't see anything more about driving boats by pneumatic pressure? I've a boat partly made to be driven that way, but am afraid it will cost as much to compress the air as it would to furnish steam. A. Because there has been no economical success; the power developed from compressed air is often not more than about 40 per cent of that required for the compression.

(101) J. W. asks: How is the best piano polish made? A. We would recommend you to try the following: Very pale shellac 5 pounds, mastic 7 ounces, alcohol (90 per cent) 5 or 6 pints; dissolve in the cold with frequent stirring.

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

W. W.—The specimen is ordinary mica, and if the find runs like the sample it is of no value. Large sheets are frequently found, which can be used for stoves and the like; in such a condition it sometimes becomes worth as high as $10.00 per pound. The specimen also contains garnets.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

July 1, 1884,

AND EACH BEARING THAT DATE.

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

Advertising rack. J. N. Akarman 301,318
Agricultural implement, combined, T. H. Meinhard 301,334
Air compressor and exhauster, P. Ehlers 301,348
Alarm lock, A. F. McCollam 301,252
Amalgamator, H. McDougall 301,253
Anæsthetic agents, apparatus for combining, A. M. Long 301,377
Annealing and galvanizing wire, apparatus for, E. Tucker, Jr 301,184
Armor, metallic vest, G Grebe 301,358
Axle lubricator, car, F. Brown 301,334
Axle, vehicle, Williams & Taylor 301,419
Bag fastener, W. C. Smith *et al* 301,394
Bale tie, L. Williams 301,312
Baling press, W. D. Slauson 301,398
Bar. See Chain bar.
Barrels, bellows attachment for, H. B. Park 301,146
Battery. See Secondary battery.
Bed bottom, adjustable spring, M. N Lovell 301,130
Beer cooling apparatus, L. Schlather 301,394
Bicycle, W. F. Healy 301,234
Bicycle, E. G. Latta 301,245
Billiard cue tip fastener, C. Scher 301,284
Bit brace, W. R. Clarkson 301,339
Bitters, G. Mitchell 301,385
Blackboard, reversible, J. H. Rudolph 301,392
Blind slat adjuster, R. M. Martin 301,453
Block. See Game or toy block. Pulley block.
Board. See Blackboard.
Boiler. See Steam boiler.
Boiler furnace, A. Backus, Jr 301,324
Book support, Dupin & Morris 301,345
Books and papers, machine for trimming, G L. Cady 301,335
Books, wood binding for, J. D. Mets 301,255
Boot or shoe inner sole, A. G. Gardner 301,226
Bottle stopper, G. & W H. Chamberlin 301,093
Bottle stopper, M. B. Manwaring 301,139
Bottles, material for packing, O. Long 301,250
Box. See File box. Mail box. Pounce box.
Box fastener, H. Lorentz 301,135
Box machine, J. A. Paige 301,145
Brace. See Bit brack.
Brake. See Car brake. Cornice brake.

Breastpin, C. A. Fowler (r)..... 10,495
Brick and repressing machines, mould for, G. H. Kuntz..... 301,131
Brick kiln, Puerner & Haumerson..... 301,155
Brick kiln grate, T. & J. D. Tully..... 301,410
Brick moulds, automatic mechanism for sanding, J. A. Buck..... 301,087
Bricks, manufacture of, W. L. Gregg..... 301,359
Broom head, A. E. Funk..... 301,442
Brush, P. E. Wirt..... 301,196
Burial apparatus, A. McCreery..... 301,381
Butter worker, A. A. Skinner..... 301,167
Button and button fastener, T. Porter..... 301,269
Button and button fastening, Wise & Frost..... 301,463
Button attaching device, W. M. Hazel..... 301,365
Button fastener, E. Kempshall..... 301,450
Button fastener, H. J. Weldon..... 301,414
Button or stud, sleeve, J. Costello..... 301,340
Button setting implement, F. A. Smith, Jr..... 301,171
Button, stud, etc., O. T. Smith..... 301,292, 301,293
Buttons, attaching, G. W. Prentice..... 301,152
Cable for telegraphic and other purposes, A. Wilkinson..... 301,417
Camera. See Photographic camera.
Can. See Oil can.
Candles, finishing wax, F. Baumer..... 301,328
Cane mill, J. Rigney..... 301,160
Cannon, C. E. Hauck..... 301,233
Car and elevator combined, D. E. Teal..... 301,304
Car brake, G. F. Clemons..... 301,096
Car brake, J. C. Newcomb..... 301,386
Car brake and starter, A. B. Arnold..... 301,422
Car brake, automatic, F. F. Arnold..... 301,200
Car coupling, F. F. A. Brandt..... 301,430
Car coupling, H. G. H. Reed..... 301,275
Car coupling, J. B. Willaman *et al*..... 301,194
Car door mechanism for freight cars, grain, J. A. Hagan..... 301,117
Car seal, F. C. Gillmore..... 301,113
Car step, Baker & Yates..... 301,326
Car wheel and axle, D. W. Riordan..... 301,161
Carding machine, C. E. Whitworth..... 301,193
Carpet stretcher, Sawyer & Matteson..... 301,160
Carriage wheel, W. D. Orcutt..... 301,262
Carrier. See Cash carrier.
Cart, coal, C. C. Egerton..... 301,437
Cartridge loading implement, S. E. Cheeseman..... 301,465
Case. See Egg case. Needle case. Watch case.
Cash carrier for store service, W. S. Lamson..... 301,373
Caster, furniture, Scollay & Frick..... 301,396
Ceiling, metallic, A. Northrop..... 301,260
Chain bar and extension case, combined, W. S. Hicks..... 301,122
Chair. See Knockdown rattan chair.
Check receiver, C. W. Weiss..... 301,309
Check rower, Eatherton & Stackhouse..... 301,346
Chuck, C. H. Reid..... 301,277
Chuck, lathe, Hopkins & Van Norman..... 301,466
Clay pulverizer, G. J. Fritz..... 301,353
Clock, universal, A. M. Cory..... 301,315
Clothes rubber, hand, J. N. Proeschel..... 301,271
Clutch, friction, J. H. Elward..... 301,438
Coal boring machine, E. Wall..... 301,188
Cocks, boiler attachment for operating the test, H. P. Chapman..... 301,432
Coffin, Allen & Petticrew..... 301,321
Collar, horse, L. O'Connor..... 301,141
Cooking utensil, G. Campagnari..... 301,090
Cooler. See Milk cooler.
Copying pad, L. Bailey..... 301,202
Copying press, G. W. Williams..... 301,418
Corking machine, bottle, J. J. & G. J. Daley..... 301,342
Corkscrew, faucet, W. H. Bayles..... 301,425
Cornice brake, G. C. Keene..... 301,128
Corset, W. A. Craig..... 301,341
Corset, Z. De Ledochowski..... 301,451
Cotton press, F. E. Murphey..... 301,454
Coupling. See Car coupling. Thill coupling.
Crane, P. H. Griffin..... 301,231
Crayons, making, J. S. Lowe..... 301,137
Creamer, centrifugal, J. R. Pond..... 301,267
Cultivator, J. H. Jones..... 301,370
Cultivator, C. A. McElroy..... 301,382
Cultivator, C. C. Trinkle..... 301,409
Curtain and shade hanger, J. Haux..... 301,120
Curtain fixture, H. Linden..... 301,131
Cut-off valve, B. F. Olmsted..... 301,142
Cutter. See Pipe cutter.
Cutter head, Prybil & Mackintosh..... 301,272
Cylinder engine, revolving, S. Maltby..... 301,379
Damming ditches, device for, J. A. Oppy..... 301,143
Damper regulator, N. Curtis..... 301,099
Dental engine, W. S. How..... 301,237
Desiccating alum, A. E. Spencer..... 301,174
Die stock, J. M. Dodge..... 301,101
Door hanger, E. T. Prindle..... 301,388, 301,389
Drawer pull, F. W. Smith..... 301,290
Dredging machine, J. Call..... 301,209
Dredging machine, W. Harwood..... 301,364
Dyeing horse hair and bristles, A. N. Dubois..... 301,344
Egg case, C. C. Ball..... 301,327
Electric conductors, conduit for, Bannister & Blodget..... 301,203
Electric light, carbon for incandescent, N. S. White..... 301,192
Elevator, safety appliance, R. A. Chesebrough..... 301,213
Elevator safety device, R. C. Smith..... 301,172
Elevator safety gate, freight, R. Fyfe..... 301,109
Engine. See Cylinder engine. Dental engine. Gas engine. Gas motor engine. Pressure engine. Rotary engine.
Exercising apparatus, L. Stevens..... 301,298
Extractor. See Stump extractor.
Fare conveyor, J. H. Small..... 301,169
Fare conveyers, hopper for, J. H. Small..... 301,170
Fastenings, machine for inserting metallic, L. Godeu..... 301,114
Feed regulator for mills, W. R. Fox..... 301,107
Feed water purifier, P. J. Grau..... 301,116
Fence, S. L. Denney..... 301,435
Fence barb, A. J. Upham..... 301,186
Fence making machine, D. Young..... 301,315
Fence post, A. W. Furness..... 301,108
Fence wire, O. P. Briggs..... 301,086
Fencing, barbed, A. J. Upham..... 301,187
Fencing, making barbed metallic, E. Jordan..... 301,126
Fibers, producing moulded articles from substances containing ligneous, F. Thiemer..... 301,405
File, bill or letter, M. B. Hurly..... 301,368
File box, A. G. Lyne..... 301,452
File, paper, W. H. Fox..... 301,353
File, paper or letter, W. B. Berry..... 301,204
Filter, slime, J. L. Russell..... 301,460
Firearm, revolving, W. Trabue..... 301,180 to 301,182
Fire escape, K. Freeman..... 301,441
Fire escape, J. L. MacDonald..... 301,138
Fire escape, Oram & Dickerman..... 301,587
Fire escape, A. A. Starr..... 301,296
Fire kindler, C. J. Canan..... 301,210
Fire kindler, G. C. Kiesewetter..... 301,243
Fireplace, hot air, D. Pearson..... 301,264
Flour bolt cleaner, automatic, A. F. Mase..... 301,251
Flue expander and cutter, boiler, F. L. Kollberg. 301,130
Furnace. See Boiler furnace.
Gauge, M. P. Leonard..... 301,247
Game or toy block, W. S. Ravenscroft..... 301,158
Garment supporter, T. V. Phelps..... 301,150
Gas, apparatus for generating heating, S. N. Carvalho..... 301,092
Gas engine, G. M. Allen..... 301,320
Gas lighting apparatus, electric, W. H. Sawyer..... 301,393
Gas motor engine, C. H. Andrew..... 301,078
Gas under pressure, system for conveying and utilizing, G. Westingbouse, Jr..... 301,191
Gear cutting machine, F. A. Pratt..... 301,270
Gear wheel, B. W. & J. L. Leeson..... 301,246
Generator. See Steam generator.
Glass handles for trays, etc., manufacture of, W. Beck..... 301,330
Glass mould, W. Beck..... 301,427
Glass, plunger for pressing, W. Beck..... 301,329
Glass presses, packing ring or bushing for, W. Beck..... 301,426
Glassware, manufacture of, J. C. De Voy..... 301,100
Globe and shade holder, E. F. Gennert..... 301,112
Grain binders, cord holding mechanism for, J. W. Webster..... 301,190
Grate, L. Passmore..... 301,263
Grinding machine, H. Slack..... 301,168
Guard. See Key hole guard.
Hame, G. W. Davies..... 301,217
Hame, J. S. Mitchell..... 301,256
Hanger. See Curtain and shade hanger. Door hanger. Suit hanger.
Harness, draught attachment for, J. Bloedel..... 301,331
Harness trimmings of glass or earthenware, J. G. Eberhard..... 301,104
Harrow, Chapin & Rix..... 301,094
Harrow, G. R. Kelly..... 301,242
Harrow, Lawrence & Chapin..... 301,375
Harrow, B. F. Rix..... 301,163
Harrow, cultivating, J. Collins..... 301,214
Hat curling and trimming machine, C. H. Reid..... 301,278
Hat finishing lathe, C. H. Reid..... 301,279
Hat lining, F. H. Anderson..... 301,199
Hats, device for shaping the brims of felt, C. H. Reid..... 301,280
Hay tedder, F. Trump..... 301,183
Hinge and blind fastener, combined, Dwinel & Mason..... 301,224
Hinge, friction, Robson & Loughrey..... 301,164
Hoisting apparatus, M. Jacker..... 301,125
Hoisting apparatus, D. C. Prescott..... 301,153
Hoisting machine, C. G. Ross..... 301,281
Holder. See Globe and shade holder. Paper holder. Pen holder. Pencil, eyeglass, ticket, and bouquet holder. Tag holder.
Horse blanket, C. J. Canan..... 301,211
Horse detaching device, J. Buesch..... 301,207
Horse toe weight, J. C. Tallman..... 301,302
Hose nozzle, J. E. Gillespie..... 301,228
Hub cap, vehicle, J. G. Eberhard..... 301,103
Hydrometer for light and heavy liquids, H. Guth 301,444
Ice and refrigerating machine, P. G. & C. A. Randall..... 301,390
Ice creeper, T. J. Cain..... 301,089
Ice machine, J. Patten..... 301,457
Injector, P. Schneider *et al*..... 301,395
Insulator for electric wires, A. W. Hale..... 301,446
Jack. See Wagon jack.
Keyhole guard, E. C. Salter..... 301,283
Kiln. See Brick kiln. Lime kiln.
Knob attachment, door, T. Taylor..... 301,303
Knockdown rattan chair, G. Chandler..... 301,338
Lacing stud, M. Bray..... 301,332
Lactometer, H. Guth..... 301,445
Ladder, extension fire, J. E. Walker..... 301,308
Ladder, step, M. G. Gartrell..... 301,110
Lamp, hanging, R. B. Perkins..... 301,265
Lamp regulating device, electric, E. A. Sperry..... 301,175
Lathes, back rest for turning, Tyler & Railey..... 301,185
Leather, machine for cutting sole, A. M. Howe..... 301,238
Lime kiln, S. F. Alien..... 301,421
Lock. See Alarm lock. Nut lock. Safe lock.
Lubricator. See Axle lubricator.
Lubricator, A. W. Swift..... 301,300, 301,301
Mail box, E. Smalley..... 301,286
Manure loader, H. C. Davis..... 301,218
Map exhibitor, A. Dom..... 301,102
Measure, powder, A. D. Moulton..... 301,257
Milk cooler, S. J. & N. T. Wilson (r)..... 10,496
Mill. See Cane mill. Roller mill.
Moulding machine, C. T. Sweet..... 301,461
Neckwear fastener, J. B. Sultzer..... 301,401
Needle case, G. W. Rhodes..... 301,162
Needle, shoemaker's sewing, A. W. Austin..... 301,424
Nut lock, F. L. Brandon..... 301,085
Nut lock, H. G. Cady..... 301,208
Nut lock, E. F. Campbell *et al*..... 301,337
Nut making machine, J. B. & L. C. Clark..... 301 433
Nuts and washers, machine for making, J. Ashton..... 301,323
Oil can, E. M. Turner..... 301,411
Ordnance, breech-loading, C. T. W. V. De Bange. 301,220
Oven, bake, W. H. Albach..... 301,319
Oven grate, W. H. Keating..... 301,372
Overcoat, J. A. C. Hamill..... 301,118
Overshoe, J. E. Whitehouse..... 301,311
Oyster culture, apparatus for, C. Schmitz..... 301,285
Pad. See Copying pad.
Padlock case, F. W. Smith..... 301,291
Paint, mixed, H. C. Petty..... 301,149
Paper bags, tubing and printing, A. J. Boynton..... 301,084
Paper for checks and other documents of value, safety, F. Nowlan..... 301,455
Paper holder, C. A. Spiegel..... 301,295
Paper trimming machine, J. H. Stonemetz..... 301,178
Parcel carrying apparatus for stores, H. H. Hayden..... 301,121
Pavement, wood, W. M. Johnson..... 301,241
Pegging machine, M. A. Tyler..... 301,462
Pegging machine, Woodward & Weeks..... 301,449
Pen, dotting, L. T. Weiss..... 301,310
Pen holder, reservoir, L. B. Bertram..... 301,205
Pencil, eyeglass, ticket, and boquet holder, combined, Lilley & Chedister..... 301,183
Pendulum, A. T. Williams..... 301,195
Phosphates, manufacture of alkaline, S. G. Thomas..... 301,406, 301,407
Phosphates of alumina and iron, treating, Liebig & Gibbons..... 301,248
Photographic camera, C. R. Smith..... 301,400
Piano action, J. Herrburger..... 301,236
Pin. See Breastpin. Price card and tidy pin. Safety pin.
Pin ticket, A. Kimball..... 301,244
Pipe cutter, outside, Barnes & Strickland..... 301,080
Pipes, device for preventing percussion or water hammering in, F. Hyde..... 301,124
Pipes to bowls, conneeting, G. E. Poole..... 301,268
Pivots, axles, and shafts, bearing for, F. W. Ulffers..... 301,412
Planter and fertilizer distributer, cotton, P. R. Houpe..... 301,447
Plastering, plastic compound for brown and rough-coat, G. S. Ringland..... 301,459
Plow, T. C. Belding..... 301,428
Plow, C. B. Steane..... 301,297
Plow, F. W. Unterilp..... 301,306
Plow, rotary, W. B. Willis..... 301,313
Plow with planting attachment, listing, T. Pates. 301,148
Plows, die for shaping the standard heads of, T. Carlson..... 301,212
Portraits, method of and apparatus for transferring and enlarging, M. Hartsough..... 301,232
Post. See Fence post.
Pounce box, F. G. Ely..... 301,439
Power, transmitting, S. Maltby..... 301,380
Press. See Baling press. Copying press.
Pressure engine, fluid, S. Maltby..... 301,378
Price card and tidy pin, H. Bornstein..... 301,083
Printing presses, perforating attachment for, H. Loewenbach..... 301,249
Pulley block, G. Egelhoff..... 301,347
Pump, B. F. Caldwell..... 301,336
Pump, balanced, H. S. Ramsey..... 301,273
Pump regulator and water indicator, automatic steam, Fitch & Smith..... 301,105
Pumps, hand lever for steam, G. E. Elliott..... 301,349
Pumps, valve motion for steam, C. A. T. Sjogren. 301,287
Punch, cartridge crimping, A. W. Tice..... 301,179
Pyrometer and pressure gauge combined, A. Seyferth..... 301,397
Rack. See Advertising rack.
Rail and chair, tram, A. E. Adlard..... 301,317
Railway, overhead, Haskins & Sprogell..... 301,119
Railway, overhead, Sprogell & Haskins..... 301,177
Railway signal apparatus, electric, A. W. Hall..... 301,361
Railway switch and signal mechanism, C. H. Jackson..... 301,369
Regulator. See Damper regulator. Feed regulator. Pump regulator.
Reins, hand loop for driving, Rand & Audley..... 301,274
Respirator, D. Genese..... 301,111
Roller mill, A. Ingraham..... 301,240
Rotary engine, T. A. Hearson..... 301,235
Saccharine matter from bagasse, machine for the removal of, H. F. Yaryan..... 301,198
Safe lock, H. Gross..... 301,360
Safe, sectional kitchen, E. J. Junghans..... 301,449
Safety pin, W. F. Hyatt..... 301,448
Sash balance, Smith, Jr., & Williamson..... 301,289
Saw cleaner, gin, B. R. Eaton..... 301,225
Saw, drag, E. F. Crawford..... 301,216
Saw, drag, McFarlin & Plum..... 301,254
Sawmill carriages, steam brake for, W. A. Campbell..... 301,091
Saw swage, J. Dinning..... 301,345
Saw tooth, insertible, J. H. Brown..... 301,431
Sawing machine, band, F. H. Clement..... 301,095
Scissors and shears, H. Theis..... 301,305
Scraper, revolving sulky, Kinney & Tannehill..... 301,129
Scraper, wheeled road, S. Beckwith..... 301,081
Screw cutting apparatus, Rogers & Ballou..... 301,165
Screwdriver, C. F. Spencer..... 301,173
Secondary battery, D. G. Fitz-Gerald..... 301,351
Sewing machine bobbin winder, T. J. Cain..... 301,088
Sewing machine casters, locking mechanism for, S. A. Cyr..... 301,434
Sewing machine driving pulley, J. H. Palmer..... 301,456
Shade and curtain fixture, J. C. Ingalls..... 301,239
Shingle sawing machine, D. F. Hunt..... 301,123
Shirt, A. Plant..... 301,266
Shirt, S. D. Richardson..... 301,159
Shoe, C. E. Brown..... 301,333
Shutter, window, L. F. G. Boeckelmann..... 301,429
Sieves, brushing apparatus for, F. A. Price..... 301,154
Sifter, coal, M. N. Cobb..... 301,097
Siphon, J. P. Reinecke..... 301,391
Skate, H. A. Wilbur..... 301,415
Skate roller, O. N. Lloyd..... 301,376
Sleigh knee, G. W. Taylor..... 301,404
Spile or test tube for casks or vats, F. Gautzsch..... 301,354
Sponge substitute, medicated, J. S. Gamgee..... 301,443
Springs, machine for forming, G. Norwood..... 301,261
Starch, manufacturing, H. Duryea..... 301,436
Steam boiler, H. Lane..... 301,374
Steam boiler, base burning, M. E. Herbert..... 301,366
Steam generator, J. W. Bailey..... 301,325
Steel for reworking, preparing old, W. Parkinson. 301,147
Stench trap, H. Pietsch..... 301,151
Stopper. See Bottle stopper.
Stopping and starting mechanism, E. Gowdy..... 301,115
Store service carriers, conductor for, E. L. Giles.. 301,227
Striping, implement for, C. Tangenberg..... 301,402
Strontium, manufacture of carbonate of, Mebus & De Castro..... 301,383
Stump extractor, J. Seitz..... 301,286
Suit hanger, W. E. Ginn..... 301,356
Sulphur refining apparatus, F. Dickert..... 301,222
Supporter. See Garment supporter.
Suppository, hollow, E. H. Gibbs..... 301,355
Tack tool, carpet, G. C. Myers..... 301,140
Tag holder, J. Kydd..... 301,132
Tea kettle, G. Taylor..... 301,403
Theatrical plays, scenery for, F. L. Rees..... 301,276
Thill coupling, J. A. Aston..... 301,201
Tie. See Bale tie.
Tire setting apparatus, J. Jones..... 301,371
Tire tightener, T. M. Ferguson..... 301,350
Tobacco, machine, plug, W. W. Wood..... 301,197
Trap. See Stench trap.
Trap for lavatories, etc., C. F. Pike..... 301,458
Tricycle, F. Von Palstring..... 301 307
Trimming fabrics, mechanism for, R. J. Walker.. 301,413
Trunk, J. Biederman..... 301,082
Trunk or box fastener, W. B. Coulter..... 301,098
Tubes and pipes, machine for bending, E. P. Follett..... 301,106
Twist drills, machine for grooving, A. R. Arnold. 301,322
Umbrella or parasol, E. M. L. Biaquiere..... 301,206
Urinal, I. Davis..... 301,219
Valve for duplex engines, steam-actuated, M. W. Hall..... 301,363
Valve, oscillating, C. G. Toense..... 301,408
Valve, safety, H. G. Ashton..... 301,079
Valve, straight-way, S. W. Hoag, Sr..... 301,367
Valve, straight-way, A. B. Rohney..... 301,282
Valves upon their rods, adjusting and securing slide, W. E. Wiley..... 301,416
Vehicle spring, G. W. Stowe..... 301,299
Vehicle wheel, A. J. & J. M. Smith..... 301,399
Ventilator, C. Muller..... 301,258
Ventilating sewers, W. M. Green..... 301,230
Wafer, adhesive, A. Spitzli..... 301,176
Wagon, dumping, Zinkand & Hofferberth..... 301,316
Wagon jack, W. H. Gray..... 301,229
Wagon wheel, heavy, W. D. Orcutt..... 301,144
Washing machine, S. Gray..... 301,357
Watch case, J. Fahys..... 301,440
Watch case centers, machine for turning, C. V. Woerd..... 301,314
Watch case hinge, F. Rapp..... 301,156
Water by passing trains, mechanism for raising, Zinsmaier & Burt..... 301,420
Weather strip, W. J. Devers..... 301,221
Weather strip, J. T. Hall..... 301,362
Weather strip for window sashes, G. P. Rasck..... 301,157
Wheel. See Car wheel. Carriage wheel. Gear wheel. Vehicle wheel. Wagon wheel.
Wire cloth stretcher, L. W. Newton..... 301,259
Wire machine, barb, S. M. Kane..... 301,127
Wire stretcher, W. C. Watkins..... 301,189
Woodworking machinery, device for conveying and precipitating dust arising from, D. D. Drummond..... 301,223

DESIGNS.

Badge, C. H. Scanlan..... 15,118
Bottle stopper, C. A. Tatum..... 15,120
Bottle, toilet, J. P. Pray..... 15,115
Box, J. L. Somers *et al*..... 15,119
Breastpin, I. Rice..... 15,116
Chenille cord, C. F. Grahl..... 15,113
Dish cover, G. Vogt..... 15,122
Dish handle, R. Delinieres..... 15,111
Fan, F. Gillette..... 15,112
Paper weight, C. T. Woodbuy..... 15,123
Pendant, M. Bernhard..... 15,109
Type, C. H. Beeler, Jr..... 15,108
Type, font of printing, J. M. Conner..... 15,110
Type, printing, J. K. Rogers..... 15,117
Wall paper, P. Groeber..... 15,114
Watch case, H. Untermeyer..... 15,121

TRADE MARKS.

Beef extract called "Viande C. Favrot," J. Ferré. 11,291
Bitters, D. Dick..... 11,288
Elixir of phosphates and calisaya, compound, T. B. Wheeler..... 11,299
Flour, wheat, S. B. Pierson's Sons..... 11,294
Meat, smoked, Stevens & Benedict..... 11,295
Medicinal compound for the cure of catarrh and colds, Ely Brothers..... 11,289
Medicinal preparation for outward application, National Pharmacy Association of Baltimore City..... 11,293
Remedy for diseases of the generative organs, P. J. Jordan..... 11,292
Sewing machines. Companion Sewing Machine Company..... 11,297
Stoves, base burner, Brand & Co..... 11,286
Tobacco, either as chewing or smoking tobacco, snuff, cigars, cigarettes, and cheroots, manufactured, F. W. Felgner & Son..... 11,290
Velvets, velvettas, velveteens, corduroys, moleskins, and beaverteens, H. Mann, Son & Co..... 11,296
Wines, port, W. Burmester..... 11,287
Zephyr worsted, worsted and woolen yarns, and worsted embroideries, B. Ulmann & Co..... 11,298

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