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The following table shows the particular numbers of the SUPPLEMENT included in each volume:

	Numbers included.		Numbers included.
Vol. I.	1—26	Vol. X.	235—260
" II	27—52	" XI	261—286
" III	53—78	" XII	287—313
" IV	79—104	" XIII	314—338
" V	105—130	" XIV	339—365
" VI	131—156	" XV	366—391
" VII	157—182	" XVI	392—417
" VIII	183—208	" XVII	418—443
" IX	209—234	"XVIII	444—469

Two volumes of the SUPPLEMENT are published annually.

Terms of subscription for the SUPPLEMENT, $5 a year. Issued weekly.

MUNN & CO., PUBLISHERS,
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Notes & Queries

HINTS TO CORRESPONDENTS.

Name and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) H. W. G. writes: 1. I have a so-called lightning saw, attached to a small machine. The saw works well in logs not larger than 1 foot 6 inches in diameter; by cutting larger logs, the saw will grind the dust into flour, and do no cutting at all. How would it do to file every third tooth down to a scraper, thus making two double teeth for loosening the dust and one double tooth to scrape it out? A. Probably your saw is too small for logs larger than 18 inches diameter. Every tooth should be capable of taking out its own cut. Sharp, well set teeth, proper feed and power will make the saw cut. 2. Will there be any success in taking letters patent for a corn planter which will plant corn in square hills without squaring off or using the rope or wire so-called check rower? A. The success of your corn planter depends upon its utility and originality and your business application. 3. What is the correct name for the gases known in the German language as sauerstoff, wasserstoff, stickstoff, and kohlenstoff? A. Sauerstoff, oxygen; wasserstoff, hydrogen; stickstoff, nitrogen; kohlenstoff, carbonic acid gas. 4. Do you know of any publication, Treatise on Perpetual Motion, in the German language? A. No, and consider any attempt to attain perpetual motion as effort wasted.

(2) M. S. asks (1) a receipt for making soap that will take grease spots out of cloth. A. Powdered fuller's earth 1 ounce; just moisten with spirits of turpentine, add salt of tartar 1 ounce, best potash 1 ounce, work the whole into a paste with a little soap. 2. A receipt for a paste or composition that will polish gold or silver, something to be put up in tin boxes? A. Equal parts of precipitated subcarbonate of iron and prepared chalk. An impalpable rouge may be prepared by calcinating the oxalate of iron. Take quicksilver with chalk half an ounce, and prepared chalk 2 ounces; mix them. When used, add a small quantity of alcohol and rub with chamois leather.

(3) J. A. G. writes: In using borax with salicylic acid to increase its solubility (equal weights of each), are the antiseptic or disinfecting qualities of the acid changed or diminished? Can you name a better plan? Dissolving in water alone is troublesome, and in alcohol is expensive. A. Borax is of itself an antiseptic, and therefore aids in its degree; alkalies and alkaline salts are said to increase the solubility of salicylic acid. Another method consists in dissolving 10 parts salicylic acid in 24 parts ammonia, and then adding 16 parts dilute acetic acid, or just enough to produce a slightly acid reaction. For bee culture a solution is made by dissolving one ounce of the crystallized salicylic acid in half a pint of French spirits; of this solution add one ounce to pint of soft water at 60° Fah. In cold weather perform this operation in a warm room. This is said to be the method used by all German masters.

(4) N. B. P.—In casting steel and other metals, does it form any longitudinal grain the way it runs, so that it becomes tougher one way than the other? A. No. 2. If combed and pressed in one direction while wholly in a liquid state, will that make it tougher one way than the other? A. No. Cast steel and cast iron are granular, not fibrous.

(5) E. B. asks: 1. What is the difference between a dynamo-electric machine and a magneto machine? A. A dynamo-electric machine furnishes a current which excites its own field magnet. A magneto-electric machine is provided with field magnets formed of permanent magnets, or with magnets excited by a current from another machine. 2. What would be the temperature of a vacuum if no heat was supplied from the outside? A. We do not know by what means the temperature of an absolute vacuum could be determined. The term itself precludes the idea; for to suppose a state of heat or cold implies that something is hot or cold. 3. Would a helix, if formed of steel wire and magnetized, attract soft iron the same as copper wire with electricity flowing through it; and would the attraction be permanent in the steel helix without the use of electricity, that is, if the helix was first magnetized? A. A helix formed of steel wire would act like a copper helix, but not to the same degree. If the steel is hardened, the helix may retain some magnetism, but a spiral form would not give the steel any advantage over magnets of other forms.

(6) W. F. H. writes: Ashes of forest trees here are chiefly carbonate lime. Is this common? Can you supply a few approximate analyses of common forest tree ashes, such as oak, fir, beech, or other? If our ashes are chiefly lime, and no potash to speak of, can we draw any conclusion as to best crop after burning the bush, while land is still too full of stumps to plow? A. The following analyses are taken from Professor Johnson's How Crops Grow, a standard authority on such subjects:

	Oak.	Fir.	Beech.
Potash	10·0	11·8	16·1
Soda	3·6	4·6	3·4
Magnesia	4·8	9·1	10·8
Lime	73·5	50·1	56·4
Phosphoric acid	5·5	5·8	5·3
Sulphuric acid	1·4	2·3	1·0
Silica	1·1	15·0	4·7
Chlorine	0·2	0·4	0·1

In each case you will notice that the lime exceeds in amount the other ingredients. We should therefore infer that your finding so much carbonate of lime perfectly normal. It would hardly be safe to calculate in regard to the crops, unless upon exact information.

(7) M. R. W. asks whether there is such a thing possible as keeping in solution the pulp from which fine paper is made, so that it might at any time be spread with a brush in the manner of paint, and then quickly harden and become paper, and adhesive? Or any chemical that will dissolve paper, and hold it in a liquid form? A. As the mixture of paper fiber and water which forms a paper pulp is entirely mechanical, we know of no way of sustaining the paper fiber in the water, except by means of size, water glass, or some similar substance. Collodion is the nearest approach to a solution of paper that we know of.

(8) W. H. K. asks if a battery can be made powerful enough to feed an incandescent lamp. If so, please tell me which kind of battery would do for that purpose, and how many cells of such a battery it would require. A. A battery may be used for supplying an incandescent lamp, but it is not an economical way of producing a light. 10 or 12 cells of plunging bichromate battery will operate a medium sized incandescent lamp; it will require 15 to 20 cells of Bunsen or Grove battery to do the same thing.

(9) N. W. writes: I claim that at the same number of revolutions per minute a 5 ton fly wheel of 30 feet diameter would be as effectual as a 20 ton fly wheel 15 feet diameter, because the rim of the 30 foot wheel has twice the leverage and twice the velocity of the rim of the 15 feet diameter, and what is true of rim is true of the weight in the arms. Other engineers say I am wrong. What do you say? A. You are about right as far as the momentum is concerned, but there are mechanical reasons inimical to the construction of large light fly wheels for the quick running modern engines, such as deep wheel pit, difficulty of truing, as well as height and floor space. The friction in air would also be greater than the additional friction of the smaller and heavier wheel upon its journals.

(10) P. S. M. asks: What are proper speeds for turning soft wood, hard wood, brass, cast iron, and wrought iron, and what are proper speeds for circular and band saws for ordinary wood sawing? A. The cutting quality of woods and metals is so variable that no empirical rule adapted to forms and qualities can be given. A good rule is to give the work all the speed it will bear without injury to tools. These speeds may be from 500 to 1,000 feet per minute for soft woods, about the same for hard woods, 30 to 60 feet per minute for brass, 10 to 30 feet per minute for cast and wrought iron. Much depends upon the size of the cut. Large cut should be slow, while a small water cut may be run at a high speed.

Speed of saws, 8 inches, 4,000 to 4,500 rev. per minute.
" 10 " 3,600 " "
" 18 " 2,000 " "
" 24 " 1,500 " "
" 36 " 1,000 " "

Intermediate sizes in proportion. Speed for band saws, 2,000 to 3,000 feet per minute.

(11) J. R. S. writes: We have a Worthington pump 10x10x7, double action suction pipe 4 inches diameter, distance from pump to river 2,900 feet, elevation 16 feet. We cannot find out why it does not work well. I think the distance is too far to fetch the water. My friend thinks not. Please give the cause of failure. A. You do not state enough particulars as to the lay of the pipe, or whether you have a foot valve. The pipe should be laid so that the air will naturally rise toward the pump, with a foot valve at the end of supply—an opening or stand pipe near the pump through which the whole pipe may be filled before starting. If there are siphons in the line that will retain air, they should have openings at their apices, with plugs that can be made air tight. The plugs to be used for filling the suction with water; also have a large air chamber near the pump. With these precautions we think you will have no difficulty. Air in a long suction is very elastic, and cushions in the clearance of the pump.

(12) R. D. G. writes: 1. What is the standard taper for steam and gas pipe thread, taps and dies, and number of threads of different sized pipes? A. Taper of pipe threads, ¾ inch in 1 foot in diameter; ⅛ inch pipe 27 threads; ¼ inch and ⅜ inch pipe 18 threads; ½ inch and ¾ inch pipe 14 threads; 1 inch, 1¼, 1½, 2 inch pipe 11½ threads; 2½ inch and upward 8 threads. 2. What is the best way to braze small articles ⅛ inch to ¼ inch diameter, outside open forge fire? Can I get heat enough any way from an alcohol lamp? I cannot get gas. A. You may braze small articles with a blow pipe and alcohol lamp, using a large wick, say ½ inch diameter, in a side nozzle like a tea kettle spout. This gives you facility for casting a downward flame upon the work. 3. Can you give me dimensions to go by to make a camera box for making 5 inch by 8 inch pictures, such as the amateur outfits sold by dealers? I can buy a lens, and make my own box if I could get measurements. How can I tell the focal distance by a lens, to place the ground glass screen? A. You require a good achromatic lens or a pair to make an acceptable picture. Get the focal distance by casting an image of the window upon the wall or a card, and measure the focal length. Better get the lens before you make the box.

(13) R. A. R. asks: 1. Does water running through piping produce friction? If so, at what rate? A. It does; the amount of friction is governed by the size of the pipe and rapidity of flow, or height of head. 2. Can water be brought a great distance on the siphon system, say 1¼ miles, with a fall of 30 feet, the water lower where it starts from than some of the intermediate points? Will a 1 inch stream run through an inch and a half piping one mile with a fall of 20 feet, and no intermediate points higher than where it starts from? Suppose, then, water can be conveyed 1¼ miles through piping on the siphon plan, when the fall is 30 feet with intermediate elevated points, about how many gallons of water would run through per day, when the piping at starting point is 2 inches for a quarter of a mile and 1½ inches for a mile? If larger piping is used at either starting point or stopping point, which point is it best to use it at to get the largest flow of water? Or is it as profitable to use 1¼ inch altogether, instead of 2 inch a part of the distance? A. If the apex of a local arched siphon is lower than the source of supply, the flow will be forced over it naturally. Or, in other words, if the source of supply is higher than any intermediate ground between it and the delivery, the undulation of the pipe laid over the ground will not materially affect the flow, although the air may have to be discharged at the apices where the undulation is excessive. With 1½ inch pipe the whole distance you will obtain a flow of 8,000 gallons in twenty-four hours. By putting down 2 inch pipe for a quarter of a mile, you will increase the flow about 1,000 gallons per day. We do not recommend two sizes of pipe in the line, but if two sizes are required for special reasons, put the largest at the supply end. In constructing a line over undulating ground that is higher than the supply source, arrangements must be made for starting the siphonage by putting openings with short standpipes at the high points for filling. After filling, the openings must be capped air tight. Cocks or plugs must be used at both ends while filling. Fill at the highest point, or, if you have a force pump, you may fill by pumping in the water at the source of supply, keeping the vents open until they overflow, then cap them.

(14) T. D. writes: A large amount of money is wasted by manufacturers in using a blast for gas. We heat our soldering irons in this way, and have often thought it a wasteful method. Would a row of small holes for small gas jets be cheaper? A. Mixed gas and air, either by concentric nozzles or the Bunsen principle, are now preferred for heating purposes.

(15) A. M. F. asks: What horse power is necessary to get best results to run the screw of a 300 ton boat of 125 feet length? A. The best result does not come especially from the power applied, but depends upon the lines of the boat and the form of the screw. A 75 horse power engine and boiler would probably give you a good working speed of say 7 to 10 miles an hour, according to lines and load. We do not know of the engine you mention, and if we understand your other question, would suggest pure rubber.

(16) T. D. G. asks (1) for the process of tin smelting. A. The metallurgy of tin is given quite fully in the English edition by Crookes and Rohrig of Bruno Kerl's well known "Practical Treatise on Metallurgy." Both the English and Continental processes of smelting are described, and illustrations of the furnaces used are given. 2. Will putting limestone in water used for drinking and cooking extract any of the lime, and make limestone water? A. The limestone if added to water will dissolve to a certain extent, and any free carbonic acid forming in the water will combine with the limestone, forming the bicarbonate.

(17) G. H. J. asks (1) the difference between benzine, naphtha, and gasoline. A. The names mentioned are given to products of the distillation of crude petroleum coming over at different degrees of temperature, and consequently they vary in their specific gravity thus: Gasoline is the lightest mentioned, and has a density of 95° to 80° Baume, naphtha 80° to 65° Baume, and benzine 65° to 60° Baume 2. Where can I find the process of boring artesian wells described, and the tools used? A. The subject of artesian wells has been very elaborately treated in a series of articles contained in the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 156, 157, 158, 159, and 160.

(18) M. C. writes: Please give me a receipt for sticking cork to metal, as cork to the keys of musical instruments. Do you know if a palissandre (rosewood) is liable to crack in our climate? If so, what is good to fill surface cracks, besides shellac? I can use the wax that is in use for express packages for cork to metal, but that will require heat, which I wish to avoid. A. For cement use shellac dissolved in alcohol. The condition of the rosewood must be considered before a definite answer can be given. Well seasoned wood should not crack. Filling composition or fillers can readily be purchased from painters or dealers in their supplies. These consist of whiting, plaster of Paris, pumice stone, and litharge with suitable coloring matter selected to match the wood. French yellow, asphaltum, Vandyke brown, and terra di sienna are the principal substances used for the coloring. After the proper shade has been determined, the selected ingredients are mixed with 1 part japan, 2 of boiled oil, and 3 of turpentine, and ground fine in a mill.

(19) N. Y. K. asks: Will you please tell me of some article that will effectually remove the color from hair? I tried peroxide of hydrogen, but it did not have the desired effect. A. Peroxide of hydrogen is undoubtedly the best bleaching agent that can be used to remove the coloring matter from hair. Gaseous chlorine has been used, but not with such great success as the hydrogen peroxide. In fact, the oxygen is the bleaching agent, and whether it be obtained from the various chlorine compounds or from other substances, its effect must be the same. 2. The best article you know of that will remove hair. A. Electricity is used to remove superfluous hair from the face. Various pastes made from the sulphide of the alkalies and alkaline earths are likewise used. The following is a well known depilatory: Mix 3 parts sodium sulphide crystallized, 10 parts finely powdered quick lime, and 11 parts starch. It should not be applied longer than 2 to 4 minutes.

(20) J. A. writes: Is there any particular rule for the manufacture of triangles? In a portion of this town the ringing of bells on locomotives is so frequent that the ordinary bell alarm on a fire station does not attract the attention of the people, and a triangle is suggested. We want a triangle containing about seven feet long of steel. What width and thickness is best, and is there any particular rule for the make of it? A. For a triangle, take a bar of good tool steel 1 inch square about 7 or 8 feet long. Suspend it by a cord at two points, or lay it upon two pieces of rope upon a bench about one-third of the length from each end. Strike the bar with a mallet and ascertain the axis of vibration by moving the bearings in or out until a full tone is obtained, then mark the bearings and bend the triangle.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 18, 1884,

AND EACH BEARING THAT DATE.

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

Air compressor, rotary, L. S. Chichester ... 308,061
Alarm. See Burglar alarm.
Aluminium, extracting the metal, W. Frishmuth. 308,152
Ammonia soda, apparatus for the manufacture of, B. D. Maguin ... 308,083
Anti-friction device, J. M. Weymouth ... 308,117
Axle box, J. White ... 308,223
Axle lubricator, car, W. H. Wright ... 308,123
Balance, proportional, D. L. Roberts ... 308,198
Barrel header, W. Hoffman ... 308,072
Beak horn, portable, revolving, E. Mansfield ... 308,084
Bearings, automatic alarm for friction, J. O'Connell ... 308,192
Belt fastener, M. Heffernau ... 308,257
Belt tightener, J. W. Bixby ... 308,051
Blackboard, W. H. Whittemore ... 308,296
Blanks, manufacture of split, W. Garrett ... 308,250
Bolt cutter, C. W. Levalley ... 308,267
Book, copy, E. P. Conner ... 308,141
Book, pocket memorandum, H. T. Whipple ... 308,295
Boot or shoe, F. M. Hoyt ... 308,074
Boots, machine for making felt, L. Ruel ... 308,282
Bootle cooler, E. Truxall ... 308,217
Box. See Paper box.
Brick machine, C. L. Carman ... 308,308
Buckle fastener, J. F. Button ... 308,130
Buffer, R. P. Garsed ... 308,069
Burglar alarm, B. S. Barckdall ... 308,048
Button, E. F. Bosworth ... 308,300
Button fastener, J. Lowe ... 308,268
Button fastener blank, P. H. Sweet, Jr ... 308,107
Button fastening, J. F. Atwood ... 308,299
Car coupling, G. O. S. Conway ... 308,304
Car coupling, W. D. Marshel ... 308,270
Car coupling, E. F. O'Haver ... 308,138
Car coupling, W. H. Paugh ... 308,277
Car coupling, L. & G. P. Stebbins ... 308,103
Car coupling, A. A. Stetson ... 308,320
Car coupling, T. Wood ... 308,229
Car, pilot, J. Pesaña y Piñol ... 308,325
Car starter, J. J. Anthony ... 308,232
Carpet stretcher, B. F. Williamson ... 308,122
Carrier. See Trace or shaft carrier.
Case. See Label case. Violin case.
Cash indicator, register, and recorder, W. L. Horne ... 308,259
Centrifugal machine, J. C. Poland, Jr ... 308,326
Chains, art of and machine for making, E. Oury ... 308,324
Chair, G. C. Winchester ... 308,226
Chimney cowl, M. Ludwig *et al* ... 308,317
Churn, A. C. Clark ... 308,240
Churn, J. H. Taylor ... 308,215
Churn, B. I. Williams ... 308,121
Cigarmaker's gauge, H. J. Watteyne ... 308,115
Clamp. See Thill clamp.
Cleaner. See Coal cleaner.
Clock regulating mechanism, F. A. Lane ... 308,265
Clover huller, F. Strobel ... 308,330
Coal cleaner, W. H. Shepherd ... 308,206
Cock, cylinder, Twiggs & Porter ... 308,353
Coffee roasting, method of and device for, R. S. Jennings ... 308,169
Coke oven, F. Carves ... 308,133
Cooler. See Bottle cooler.
Cotton press packing box, J. S. Smith ... 308,208
Cotton, treating certain kinds of, W. H. Martin ... 308,185
Coupling. See Car coupling.
Crusher. See Stone crusher.
Cultivator, M. H. Hitchcock ... 308,071
Cultivator, hand, J. B. Hurd ... 308,163
Cultivator shield, E. B. Jackson ... 308,166
Cut-off valve, J. H. Man ... 308,181
Cutter. See Bolt cutter. Stalk cutter.
Cutting apparatus, W. H. Sharood ... 308,328
Damper for smoke consuming furnaces, F. Whitehead ... 308,224
Desk, A. Cutler ... 308,142
Door hanger, W. Barry ... 308,125
Doors, stay roller for sliding, E. Laass ... 308,177
Drawers, Weishampel & Towles ... 308,221
Drawers, dust cover for, A. J. Hamilton ... 308,156
Drier. See Fruit drier. Grain drier.
Drier, F. Brotherhood ... 308,237
Drill. See Grain drill.
Electric cable support or hanger, A. S. Weaver ... 308,220

Electric circuits, apparatus for breaking, J. L. Huber ... 308,201
Electric machine, dynamo, S. H. Short ... 308,207
Elevator. See Hay elevator. Water elevator.
Fabrics, etc., machine for stretching and winding on woven, Lodge & Oldroyd ... 308,081
Faucet, lock, Howard & Locke ... 308,161
Faucet, self-closing, T. McHugh ... 308,186
Feed water heater and clarifier, J. Mahony ... 308,180
Ferric oxide and sulphurous acid from ferric sulphate, making, T. Terrell ... 308,289
Filter and cooler, combined, J. Carter ... 308,058
Firearm, breech-loading, W. S. Teall ... 308,216
Firearm lock, R. M. De Belleval ... 308,241
Fire escape, H. T. Linnenbrink ... 308,179
Fire escape, H. Rensch ... 308,279
Fire escape, cable, J. J. Oros ... 308,328
Firekindler, B. W. Connelly ... 308,140
Fire kindler, C. Leduc ... 308,178
Flanging machine, A. Wilbur ... 308,297
Flooring, etc, manufacturing parquets for, H. Gerike ... 308,313
Flooring, wood, D. J. Marston ... 308,184
Fork. See Hay fork.
Frame. See Grindstone frame.
Fruit drier, J. Bachelder ... 308,047
Fruit jar, N. W. Krouse ... 308,174
Fruit picker, H. W. Folsom ... 308,148
Fuel and making the same, artificial, W. Griffith ... 308,154
Furnace, A. Hopkins ... 308,073
Gauge. See Cigarmaker's gauge.
Game apparatus, J. A. Fitzgerald ... 308,147
Gangway for ferryboats, supplemental, C. W. Doten ... 308,308
Garment supporter, C. H. Yarington ... 308,230
Gas making machine, W. H. Hutchins ... 308,314
Gas, manufacturing illuminating, H. M. Paine ... 308,276
Gate. See Railway gate.
Gate, J. G. Miller ... 308,274
Generator. See Hot air generator.
Gigging machine, J. Woelfel ... 308,227
Grain and fertilizers, apparatus for distributing, A. J. Martin ... 308,271
Grain binder cord holder, C. Colahan ... 308,062
Grain drier, A. S. Tompkins *et al* ... 308,291
Grain drill, W. W. & F. M. Mullen ... 308,090
Grain drill, A. Runstetler ... 308,327
Grain transferring apparatus, E. S. Richards ... 308,095
Grinding mill, roller, C. T. Hanna ... 308,254
Grindstone frame, L. McDermott ... 308,086
Hame, J. J. Kelly ... 308,262
Hame strap, D. W. Emmons ... 308,068
Handcuff, I. Johnson ... 308,075
Harrow and seeder, combined, J. S. Corbin ... 308,305
Harvester and husker, corn, E. W. Quincy ... 308,094
Hat brim edges, machine for trimming, J. Nutt ... 308,191
Hay elevator, B. Oborn ... 308,275
Hay fork, horse, P. Werum ... 308,294
Heat, circulating pipe for the transmission of, B. Röber ... 308,197
Heater. See Feed water heater.
Heel trimming machine, J. B. Busell ... 308,056
Holdback, carriage, S. A. Prescott ... 308,093
Holder. See Ticket holder.
Hook. See Snap hook.
Hoop fastener, W. D. Richardson ... 308,280
Horse leg brace, H. D. Ward ... 308,114
Horseshoe, E. R. Marshall ... 308,085
Hose tube, W. L. Teter ... 308,331
Hot air generator, G. S. Sperry ... 308,288
Huller. See Clover huller.
Indicator. See Cash indicator.
Ink and paint mill, L. P. Clawson ... 308,133
Inkstand, M. Herzberg ... 308,157
Inkstand, J. S. Ross ... 308,100
Jar. See Fruit jar.
Label case, druggist's, B. Keith ... 308,076
Ladder, E. P. Wright ... 308,334
Lamps, machine for shaving conductors for electric, J. J. Bradley ... 308,301
Lasting jack, M. O'Fallen ... 308,091
Lasting tool, H. Brossel ... 308,058
Leather stretcher, R. S. Jennings ... 308,171
Leather stretching machine, R. S. Jennings ... 308,170
Lens, ophthalmoscopic test, C. A. Bucklin ... 308,302
Lock. See Trunk lock. Vehicle seat lock.
Locomotive, T. P. Chandler, Jr ... 308,060
Loom shuttle, J. Magee ... 308,318
Loom stopping mechanism, M. A. Furbush *et al* ... 308,311
Lubricator. See Axle lubricator.
Lubricator, A. Baur ... 308,127
Lubricator, Hodges & McCoy ... 308,258
Maguey mill, E. S. Barreiras ... 308,049
Mail bag fastener, C. W. Jefferson ... 308,168
Manure spreading machine, W. H. Crandall ... 308,064
Mattress frames, construction of spring, E. Hoskins ... 308,260
Measure, grain, J. W. Moyers ... 308,322
Measure, tape, F. M. Slagle ... 308,287
Medical compound, A. Bevier ... 308,050
Mica sheet, composite, J. L. Rorison ... 308,199
Middlings purifier, C. G. Rollins ... 308,099
Mill. See Grinding mill. Ink and paint mill. Maguey mill. Roller mill.
Mill burr, L. P. & C. Teed ... 308,108
Mining shovel, power, G. D. Whitcomb ... 308,118
Miter machine, Stilly & Lowery ... 308,213
Mitering machine, P. Cashin ... 308,134
Moulding, W. Gardner ... 308,312
Motion, device for converting, M. P. Buffum ... 308,129
Motor for light machinery, W. Vogel ... 308,218
Musical instrument, mechanical, P. Ehrlich ... 308,242
Nails and spikes, making, H. Greer ... 308,253
Nose bag, O. C. Hayward ... 308,256
Nut lock, S. A. Lesan ... 308,266
Oil meal, process of and apparatus for cooking, J. H. Vaile ... 308,112
Package, liquid containing, J. M. Stimpson ... 308,105
Packing, cupped leather piston, A. Campbell ... 308,239
Packing, piston, W. Heston ... 308,158
Paint for ships bottoms, drydocks, etc., composition, J. H. Dilks ... 308,066
Painter's sizing, fresco, H. De Rossi ... 308,143
Painting on glass, decorative, E. J. Irlande ... 308,164
Paper box, E. B. Munson ... 308,190
Paper feeding device, A. Sedgwick ... 308,285
Paper feeding machine, G. White ... 308,119
Paper folding machine, J. H. Stonemetz ... 308,214
Pawl, G. Roberts ... 308,097
Peg wood sharpener, W. G. Scott ... 308,204
Pegging machine, H. Schürhuber ... 308,203
Pen, stylographic, L. E. Dunlap ... 308,144
Piano action, J. Rudolf ... 308,201
Picker. See Fruit picker.
Pipe casing, J. F. & J. F. Wood ... 308,228
Plane, rabbet, J. A. Traut ... 308,332
Planter, check row, corn, J. Kirkwood ... 308,173
Planter check row, corn, J. D. Smith ... 308,336
Plow, M. Satterlee ... 308,283
Plow jointer, O. W. Haegg ... 308,335
Plow standard, J. R. Sampson ... 308,202
Postdriver, F. M. Ewers ... 308,310
Poultice, A. Elberson ... 308,248
Press. See Printing press.
Press for dishing hollow articles, J. Robertson ... 308,098
Printing press, T. Forknall ... 308,150
Propelling vessels, L. C. Thorp ... 305,109
Protector. See Vine and fruit tree protector.
Pulp in pulp engines, stirring, G. F. Harlan ... 308,255
Railway chair, Bryant & Hopkins ... 308,054
Railway, elevated, T. P. Chandler, Jr ... 308,059
Railway gate, automatic, H. C. Reynolds ... 308,196
Railway signaling apparatus, electric, B. Kronbiegel-Collenbusch ... 308,316
Railway switch, dynamo-electric, M. Marshall ... 308,369
Railway switch lock, P. L. Pettengill ... 308,278
Railway track clearer and flanger, M. Ellis ... 308,067
Rattan scraping and splitting machine, Clinton & Agroff ... 308,139
Refrigerator, D. H. Spicer ... 308,102
Refrigerator wagon, J. A. Frey ... 308,151
Revolver, J. M. Marlin ... 308,183
Revolver, double-acting, J. T. Aldrich ... 308,231
Revolving table, W. L. Fleming ... 308,245
Roller. See Shade roller.
Roller mill, O. A. Byrns ... 308,131
Ropes or cords, device for attaching loops to, A. McDonald ... 308,087
Rotary engine, P. B. A. Ganot ... 308,249
Rubber compositions, manufacture of, J. J. C. Smith ... 308,209
Rubber, devulcanizing and restoring vulcanized, J. J. Montgomery ... 308,180
Sails, reefing, T. Fearon ... 308,146
Sash fastener, I. N. Buck ... 308,055
Sawmill feed mechanism, J. Cook ... 308,063
Saw teeth, device for setting and jointing, D. Logan ... 308,082
Sawing machine, band, P. Miller ... 308,188
Scale, W. R. Morse ... 308,321
Scale, E. R. Puffer ... 308,195
Screw, J. Frearson ... 308,246
Screwdriver, J. Frearson ... 308,247
Sewing machine covers, hinge plate for, W. Klenha ... 308,264
Sewing machine shuttles, bobbin for, W. Koch ... 308,078
Sewing machine tuck folder, W. Matthews ... 308,319
Shade roller, J. Allen ... 308,124
Sharpening machine knives, device for, R. O. Owen ... 308,092
Shawl strap, T. Brooke ... 308,052
Sheet metal vessels, collar for, J. F. Ross ... 308,281
Ship's drag, F. Stanke ... 308,211
Shirt, S. A. Fishel ... 308,244
Shovel. See Mining shovel.
Shutter fastener, I. Brooke ... 308,128
Shutter worker, H. Camus ... 308,057
Shutter worker, M. E. Peterson ... 308,194
Skate, roller, F. B. Mueller ... 308,089
Skid, freight car, J. L. Rowe ... 308,200
Smelting nickel and cobalt ores, A. Krupp ... 308,175
Snap hook, G. A. Washburn ... 308,219
Soap, pyrethrum, J. Zacherl, Jr ... 308,172
Spikes and machine therefor, manufacture of, H. Greer ... 308,251
Spikes, die for and method of making, H. Greer ... 308,252
Spindle bolster, G. Jaquith ... 308,167
Square, try, W. B. Edwards ... 308,145
Stake cutter, G. W. & G. A. Davis ... 308,306
Stamp, hand, J. P. Ellacott ... 308,309
Steamer, J. G. Webb ... 308,116
Stone, art or process of and composition for making artificial, J. H. Trickey ... 308,111
Stone crusher, T. A. Blake ... 308,234 to 308,236
Stone, treating natural and artificial, J. L. Kessler ... 308,263
Stool, piano, H. W. Hadley ... 308,155
Stopper in washbowls, sinks, and bathtubs, M. F. Deegan ... 308,307
Stove and furnace grate, T. Kruse ... 308,176
Stove, heating, A. J. Weiss ... 308,222
Stovepipe thimble, A. J. Martin ... 308,272
Stove, steam generating, B. E. Sperry ... 308,210
Stoves and grates, construction of domestic, H. Thompson ... 308,290
Strap. See Hame strap. Shawl strap.
Straw stacking machine, C. E. Merrifield ... 308,088
Sucker rod, R. H. Black ... 308,233
Supporter. See Garment supporter.
Syringe attachment, C. H. Rutlin ... 308,238
Table. See Revolving table.
Tapping gas and water fittings, machine for, E. J. Manville ... 308,182
Telephone, J. N. McIntire ... 308,273
Telephone and time system, combined, R. W. Willson ... 308,225
Telephone exchange system, J. P. Freeman ... 308,248
Telephone exchanges, multiple switchboard for, M. G. Kellogg ... 308,315
Telephone system, C. A. Jackson ... 308,165
Telephonic instrument support, Tregurtha & Loring ... 308,110
Tetrahydro-parachinanisol, production of, Z. H. Skraup ... 308,286
Thermostat, A. W. Tubbs ... 308,293
Thermostat, Wilder & Clark ... 308,120
Thill clamp, H. K. Forbis ... 308,149
Thrasher and separator, combined, J. Davis ... 308,065
Thrashing machine cylinder teeth, blank for forming, J. Christian ... 308,135
Thrashing tooth, J. Christian ... 308,136
Ticket holder, J. H. Stewart ... 308,105
Tobacco granulating machine, M. Shirk ... 308,101
Tongue support, J. W. Schwarzel ... 308,284
Trace or shaft carrier, M. B. Carey ... 308,132
Track crossing apparatus, H. Aiken ... 308,398
Trees, device for felling, P. Miller ... 308,187
Trunk lock, E. T. Starr ... 308,212
Tube. See Hose tube.
Valve gear, A. B. Landis ... 308,079
Vehicle seat, J. Walton ... 308,113
Vehicle seat lock, A. E. Steel ... 308,104
Vehicle, two-wheeled, L. S. Clark ... 308,137
Vehicle, two-wheeled, J. Howell ... 308,162
Vehicle wheel, C. E. Tower ... 308,292
Vessel and apparatus for cutting channels in waterways, J. Gates ... 308,153
Vessel for dispensing fluids, P. Hartmann ... 308,070
Vine and fruit tree protector, E. D. Hill ... 308,159
Violin case, H. J. Kleinelck ... 308,077
Warming pan, J. Barton ... 308,126
Watch mainspring winder, A. F. Robbins ... 308,096
Watch spring holder, C. H. Morgan *et al* ... 308,320
Water elevator, Lobb & Strader ... 308,080
Wheel, J. I. Hoke ... 308,160
Windmill, C. S. Sellers ... 308,205

TRADE MARKS.

Biscuits, J. Beatty & Co ... 11,676
Biscuits, Johnston Bros ... 11,684
Blankets, W. Ayres & Sons ... 11,675
Carpet warp, Mount Ida Manufacturing Company ... 11,686
Cigars, Fitzpatrick & Draper ... 11,680
Cough and croup sirup, N. K. Mansfield ... 11,685
Cough sirup, J. M. Sparks ... 11,692
Crackers, milk, G. Young ... 11,697
Flour, wheat, P. H. Copland ... 11,678
Hame tugs, Underwood Hame Tug Company ... 11,693
Inhaling vapors and compounds for use therewith, apparatus for, C. B. Harness ... 11,677
Liver compound, D. W. Curry ... 11,679
Medical compound for the cure of skin diseases and purification of the blood, J. F. Pool ... 11,689
Medicines, certain specified, Hop Pill Manufacturing Company ... 11,683
Medicine for purifying the blood, patent, R. J. Smith ... 11,691
Panniers or bustles, Alaska Down Company ... 11,672
Poisonous compound for destroying animals and insects, Weeks & Potter ... 11,695
Remedies for rheumatism, A. H. Warner ... 11,694
Ribbons, velvet, Giron Freres ... 11,682
Siropmineral sulfureux, F. Renard ... 11,690
Steam boilers, Rice, Whitacre & Co ... 11,696
Tobacco, plug, Pfingst, Doerhoefer & Co ... 11,688
Tobacco, plug chewing, R. A. Patterson & Co ... 11,687
Tobacco, smoking and chewing, C. W. Allen ... 11,678, 11,674
Yeast, compressed, Fleischmann & Co ... 11,681

DESIGNS.

Air compressor frame, C. Beseler ... 15,551
Carpet, H. Horan ... 15,553, 15,554
Carpet, C. W. Swapp ... 15,568
Clock case, A. O. Jennings ... 15,558
Clock case, S. B. Jerome ... 15,559
Coffin handle, T. S. Powers ... 15,562, 15,563
Costume, lady's, M. Kavanagh ... 15,561
Costume, lady's, J. Q. Reed ... 15,564
Costume, lady's, S. J. Shiels ... 15,565
Costume, miss's, M. Kavanagh ... 15,560
Drip pan, C. Woehrle ... 15,570
Handkerchief, H. B. Wilson ... 15,569
Hatchet, W. S. Skinner ... 15,567
Lamp globe, J. J. Kittel ... 15,566
Pipe mouthpiece, M. Dittenhoefer ... 15,552
Type ornaments, H. Ihlenburg ... 15,555
Type, printing, H. Ihlenburg ... 15,556, 15,557

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