

(26) H. B. asks: 1. Through what process is paper passed that it may resist the influence of water and fire? A. For processes of waterproofing paper, consult SCIENTIFIC AMERICAN SUPPLEMENT No. 96. A saturated aqueous solution of sodium tungstate may be used to render paper unflammable. 2. What chemicals are used in the manufacture of lumber from paper? A. Usually a concentrated aqueous solution (hot) of zinc chloride.

(27) J. T. G. asks how to remove the paper patterns from scroll work. A. Moisten it and scrape it off. It is better to trace the pattern than to paste it on the work. It is a good plan to paste the pattern on a piece of veneer and preserve the whole as a pattern after sawing.

(28) P. B. C. writes: 1. I have a well, 14 rods from house, at 26 feet rise from well to house. I have common force pump, 1 1/4 inch diameter by 4 inches stroke. Will the pump force water through a 3/8 inch pipe to the house? A. Do not use less than 3/4 inch pipe. 2. Will an air chamber on the pipe help it any? A. Yes. 3. How large a windmill will it take to drive the pump? A. 8 feet.

(29) J. M. H. asks for dimensions for a pleasure skiff twenty feet long. A. 20 feet long, 3 feet 3 inches wide at bottom and 4 feet at top, and 18 inches deep, 7 inches shear forward and 4 inches aft; stern 2 feet 10 inches wide.

(30) G. L. W. asks: 1. What would be the power of an engine 8 inches by 10 inches stroke, with 100 lbs. steam pressure, making 100 revolutions per minute? A. See page 267 (4), current volume of the SCIENTIFIC AMERICAN. 2. What is meant by mean effective pressure? A. Average pressure on the steam side of the piston, greater than the retarding pressure on the exhaust side.

(31) "Subscriber" writes: 1. We have a line of steam pipe, one hundred and twenty-one feet long, and have some difficulty in keeping our union joints tight. Would we gain anything by putting expansion joint in the line, and if so, would one be sufficient? A. Certainly, put in an expansion joint, or else suspend the pipe so that it can expand and contract freely. 2. Will asbestos cement rust steam pipe or a boiler? A. We think not.

(32) H. F. asks: Is there any astronomical reason known why the earth, one of the smaller planets, was selected by the Almighty to be the habitation of man? A. Neither known nor possible to be known. It does not fall within the province of astronomy to discover the motives of the Almighty in ordering things as they are. Science endeavors to discover the conditions of phenomena; it has no business with the infinite why of existence.

(33) C. P. M. writes: I have made a phonograph from drawings in SCIENTIFIC AMERICAN SUPPLEMENT No. 133, but fail to make it work. I have followed directions implicitly, and I thought perhaps you might give me some light as to some essential part that I had overlooked. The needle makes the groove all right, but does not seem to make any dots if I speak into it, nor does it reproduce sound when turned back. A. It may be that your diaphragm is too thick or too heavily damped, or it may be that your mouth piece is not tight. You should also bear in mind that it is necessary to speak quite loudly and clearly to the instrument.

(34) J. J. B. H. asks for the meaning of the term "angular aperture," as applied to microscopical objectives. A. The angular breadth of the cone of light which a microscope receives from an object, and transmits to the eye, is called its angular aperture.

(35) T. E. W. writes: If a hole were made through the earth, passing through the center, and a bullet dropped into the hole, would the bullet stop at the center, or pass through nearly to the other side, oscillating to and fro, losing a little distance each time, until it finally settled at the center? I hold that it would not pass the center; that at the center the weight would be nothing, the attraction nothing (or balanced), and the velocity nothing. My friend holds that it would reach the center with enormous velocity, and be carried through to the other side. Please say which is right. A. We think your friend is right. The bullet, upon arriving at the center of the earth, would have an amount of accumulated energy (so to speak) or momentum, that would be expended by passing beyond the center against the action of gravitation, then would return again under the action of gravitation.

(36) "Student" writes: 1. I have an engine, 8 inches diameter and 12 inches stroke. Purchased it for 15 horse power, but with 100 lbs. steam and 100 revolutions per minute, I calculate 2450 by your rule, allowing 1-5 for friction. 1. Am I correct? A. Yes; but have you sufficient boiler? It is a badly proportioned engine to get that amount of power from. 2. Have I sufficient power to run a 56 inch circular saw in heavy pine timber and 3 wood turning lathes at the same time? A. Not at proper speed. 3. Can I run a 24 inch burr corn mill and 70 saw cotton gin at once? A. We think not, to their full capacity. 4. What rate per minute must I run my saw and grist mill in order to obtain the best results? A. Consult a good millwright, as it depends upon the kind of work your mills are to do. 5. Is a 5 foot driving wheel too large for 12 inch stroke? A. No.

(37) A. B. B. writes: I have a mercurial barometer from which some of the mercury has been spilled. Will it indicate the changes in the weather correctly? A. No, it should be refilled. This you may do by inverting it, pouring in mercury, and jarring it to remove every particle of air.

(38) T. A. S. asks: 1. Would it not increase the power of an electro-magnet if, with a given battery power, I connected ground wires; connecting the - pole directly with the earth by one wire, and running the current from + pole to another ground wire after passing around the magnet? A. No. 2. Would a magnet made of 3/8 inch iron, the poles 3 1/2 inches long, wound with Nos. 20 or 21 wire, and connected with two cells Calladu battery, attract with much force at 3/8 inch from the

poles? A. No; magnetic attraction is inversely as the square of the distance.

(39) F. A. S. asks: 1. Will several magnets in close proximity, if insulated, retain each their separate power? A. No. The magnets will mutually enfeeble each other. 2. Does pointing a magnet concentrate its power at the points? A. Yes, to some extent. 3. How near the neutral line on a magnet can the coil be placed, and still have its effect in the telephone? A. The coil of a telephone should be near the end of the magnet. We do not think the telephone would work at all with the coil near the mean line of the magnet; that is if the magnet were of any considerable length.

(40) J. M. S. writes: Suppose we place 3 wheels on the axle of a locomotive secure, and let the outside wheels be twice as large as the center one, and then we raise the track for the middle wheel so that they may all have an equal bearing on the tracks. Now in traveling a certain distance of course it does not take as many revolutions of the large wheels as of the small one, but as they are all fast to the same axle, one cannot make more revolutions than the other. How is the distance gained by the small wheel, and does it slip on the track? A. As you have two large wheels and but one small one, and the same weight supposed to be resting on each, the small one must slip.

(41) G. W. E. asks: If you take two cog wheels of the same diameter, the same number of cogs etc., place one of them stationary and revolve the one around the other, how many revolutions will the movable one make passing once around the other? A. Two.

(42) E. F. writes: I would like to know if there is anything made so as to filter the water before entering boiler, and is now in successful operation, and where it can be seen or had; or is there any composition or liquid, when mixed with the water, would precipitate the sediment to the bottom as in a tank. A. If you are troubled with a lime deposit, there are various feed water heaters that will relieve your trouble, as they are arranged so as to deposit most of the lime in the heater. Various materials are used to aid in the removal of deposits, but an analysis of the water should be made before proper advice could be given.

(43) C. C. S. asks (1) whether two lubricated hard substances will wear longer together than one hard and one soft. A. Yes. 2. Would the result be the same where there is no lubricator used? A. Yes, that is, the hard surfaces would wear the longest.

(44) J. O. H. asks: Can you give me a remedy for excitability, while reading or speaking before a school? A. Force of will and practice are the best remedies. It is said that a momentary inhalation of the vapor of ether will quiet the nerves and give a feeling of confidence, but we should greatly prefer the other remedies.

(45) T. S. V. asks: How hard or how soft will cast steel require to be before it is tempered? I claim that it is tempered when it is extremely hard, or when it is annealed very soft. Am I correct? A. Tempering is reducing the hardness of a piece of steel to any degree short of the softness produced by annealing by the application of heat. The operation of hardening does not properly include tempering.

(46) J. R. B. asks: Can you give me any receipt for bending white oak save the ordinary way by steaming? Is there any composition used? A. We do not know of any composition for this purpose. Boiling the wood in water is sometimes preferred to steaming.

(47) F. P. asks how much and what size wire he should use on electro-magnet, with core 7-16 inch diameter and 2 1/2 inches long, to be operated by one or two cells Grove's battery. A. You do not mention the purpose for which you intend using the magnet. Supposing you intend it merely for experiment, we suggest winding each core with 8 or 10 layers of No. 20 wire.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated: J. C. McL.—It is a fine sample of asbestos.

COMMUNICATIONS RECEIVED.

On a Solution of the Convict Labor Question. By D. D. S. On Solar Circulation: Heat and Light. By E. F. D. On Rotary Motion. By H. J. M. M.

OFFICIAL.

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending May 6, 1879, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Animal trap, R. Lynex ..... 215,140
Annunciator, C. W. Hubbard ..... 215,124
Axle box, car, D. Pinney ..... 215,021
Axle maker, carriage, C. Young (r) ..... 8,705
Bag fastener, J. J. Boyer ..... 215,087
Band cutter, wire, R. Conarroe ..... 215,100
Basket, W. Schneider ..... 215,168
Bed bottom, E. Johnson ..... 215,130
Bed, crib, Bostwick & Riblet ..... 215,040
Bedstead, wardrobe, E. Kiss ..... 215,134
Billiard cue tip, F. Kuhn ..... 215,061
Boot and shoe edge trimmer, J. D. Westgate ..... 215,189
Boot and shoe heel stiffener, H. A. Thompson ..... 215,184
Boot and shoe nailer, L. Goddu ..... 215,116
Boot strap, W. Smith ..... 215,174
Boots and shoes, making, J. Hobart ..... 215,059
Boots and shoes, making, W. R. Miller ..... 215,147
Bottle stopper and fastener, C. S. Thompson ..... 215,079
Bottle stopper, internal, Parrett & Bailey ..... 214,987
Box fastener, J. L. Stevens ..... 215,179
Brazing, process of, W. Mason ..... 215,013
Bretzel machine, Lampert & Huber ..... 215,008
Broom handle stripper, S. Lang ..... 215,137
Brush, D. White ..... 215,032
Button, R. Bruel ..... 215,042
Calendar, W. H. Cars ..... 215,094

Car brake, F. A. Mathews ..... 215,014
Car brake, N. Webb ..... 215,187
Car coupling, H. Webster (r) ..... 8,701
Car door, freight, G. O'Brien ..... 215,019
Car door, freight, C. R. Shellert ..... 215,071
Car dumping, S. Johnson ..... 215,129
Car seat, C. C. Mason ..... 215,141
Car, stock, F. B. Hall ..... 215,119
Car, street, Hardie & James ..... 215,198
Carbureter, F. G. Schuchard ..... 215,072
Carriage top iron, T. F. Van Luven ..... 215,029
Chain, driving, H. W. Hall ..... 215,056
Chain or scarf, fastening for a guard, L. F. Brooks ..... 215,043
Check hook, W. J. Owen ..... 215,020
Cheese box, A. Winston ..... 215,194
Chicken brooder, E. S. Renwick ..... 215,070
Churn, W. H. Lightcap ..... 215,139
Churn dasher, W. R. Walker ..... 215,186
Churn power, W. H. Swogger ..... 215,087
Clock, ship's bell indicating, H. H. Ham, Jr. .... 215,057
Clothes horse, T. W. Green ..... 215,118
Clothes pounder, J. Hass ..... 215,122
Clothes pounder, D. Squire ..... 215,176
Clothes wringer, J. D. Van Dusen ..... 215,185
Coal breaking cylinders, device for extracting teeth from, E. H. Jones ..... 215,131
Coal washer, bituminous, S. Stutz ..... 215,181
Coffin, M. A. Frost ..... 215,055
Collar fastener, shirt, L. E. Lambert ..... 215,062
Conductor, A. T. Stearns ..... 215,177
Convertible chair, P. Jensen ..... 215,127
Copper, refining, M. Chapman ..... 215,096
Corpse cooler, M. A. Frost ..... 214,998
Cotton press, steam, R. Stenhouse ..... 215,076
Counting register, G. C. King ..... 215,133
Cultivator, W. H. Dickey ..... 215,106
Currycomb, Fairchild & Hazeltine ..... 215,110
Damper, draught regulating, R. S. Dunham (r) ..... 8,693
Dental engine, E. T. Starr (r) ..... 8,704
Dentist's chair, E. T. Starr ..... 215,075
Derrick stake, R. P. Williams ..... 215,190
Drill hole, self-adjusting, Burgner & Pader ..... 215,000
Drying apparatus, G. F. Wilson ..... 215,192
Drying apparatus, Wilson & Carlin ..... 215,191
Explosive compound, A. Dieckerhoff ..... 215,199
Fare register, passenger, F. O. Deschamps ..... 215,105
Feather renovator, E. Schmidt ..... 215,167
Fence, J. W. Tenby ..... 215,183
Filter press, A. Drevermann ..... 215,108
Fire escape, W. Royce ..... 215,166
Fire kindler, R. & T. B. Monosmith ..... 215,066
Fire place, C. L. Lefebvre ..... 215,063
Fish trap, H. Webb ..... 215,031
Fluting machine, M. W. Boon ..... 215,103
Folding chair, W. Dieffenbach ..... 214,995
Gases, process and apparatus for generating compound, C. M. T. Du Motay (r) ..... 8,695
Gasoline burner, F. A. Lyman ..... 215,009
Governor regulator, steam engine, L. C. Taber ..... 215,182
Grain binder, H. A. Adams ..... 214,980
Grain binder, Baker & Withington (r) ..... 8,702
Grain drying kiln, C. W. Boynton (r) ..... 8,692
Grain from cars, unloading, T. L. Clark ..... 215,045
Grain meter, E. Reiser ..... 215,160
Grain separator, J. H. Sturgeon ..... 215,078
Grinding mill, middlings, J. Jones ..... 215,132
Gun lock, W. M. Scott ..... 215,022
Hinge fastening, S. L. Denney ..... 214,963
Harvester, S. W. Moore ..... 215,033
Harvester, G. H. Spaulding (r) ..... 8,703
Hat bodies, etc., machine for felting and hardening, J. G. Meeker ..... 215,144
Hat sweat lining, S. Beatty ..... 215,068
Hay feeder fork, F. G. Butler ..... 215,092
Hoe, A. J. Stone ..... 215,077
Hoisting machine, T. N. Davey ..... 215,102
Holdback, vehicle, H. F. Morse ..... 215,150
Horse rake, C. R. Patterson ..... 215,068
Horseshoe calk, G. C. Flower ..... 215,052
Hot air furnace, H. M. Chittenden ..... 215,097
Hub, vehicle wheel, N. P. Bowsher ..... 215,095
Hydrant, E. A. Benson ..... 215,084
Ice planer, E. B. Haley ..... 214,999
Injector and ejector, steam, J. H. Irwin ..... 215,126
Jewelry, manufacture of, G. H. Fuller ..... 215,113
Key board instrument, self-playing attachment for, E. F. Neill ..... 215,155
King bolts, series of dies for forming the heads of, R. R. Miller (r) ..... 8,694
Kitchen cabinet, C. Romine ..... 215,165
Knife grinder, L. H. Stellmann ..... 215,025
Knitting machine, J. L. Branson ..... 214,989
Ladder and ironing table, combined step, H. C. & E. L. Shanahan ..... 215,171
Lantern, L. G. Massow ..... 215,012
Leather working, edging tool for, Z. B. Putnam ..... 215,159
Lightning rod maker, W. B. Nunn (r) ..... 8,696
Mandrel, saw, T. N. Egery ..... 215,050
Mash tub, M. L. Scivalley ..... 215,169
Measuring machine, rope, Simms & Porter ..... 215,073
Medical compound, J. E. Kleber ..... 215,135
Metallic can, G. L. Merrill (r) ..... 8,700
Micrometer gauge, E. A. Bourquin ..... 215,041
Mining, placer, W. C. Kerr ..... 215,004
Motor for sewing machines, etc., T. B. Carr ..... 215,095
Musical box, H. J. A. Metert ..... 215,146
Muzzle, horse, P. F. Shumaker ..... 215,172
Nail feeding machine, F. Myers ..... 215,153
Nails and shoe rivets, making wire, H. Evans ..... 215,063
Nailing machine, L. Goddu ..... 215,117
Non-conducting platform design, H. L. Palmer (r) ..... 8,697
Nozzle, variable exhaust, Congdon & Wood ..... 214,992
Outlet pipe for sinks, etc., H. W. Atwater ..... 214,983
Oven, baker's, G. Brake ..... 215,088
Packing ring for piston heads, J. Harper ..... 215,121
Painting wire cloth, machine for, J. H. De Witt ..... 214,994
Paper bag holder, W. H. Douty ..... 215,049
Paper boxes, construction of, T. W. Dowling ..... 215,196
Paper feeding machine, C. Ellery ..... 215,051
Paper, machine for making wood pulp for, R. D. Mossman (r) ..... 8,698
Paper sheets, machine for feeding, L. Harlow ..... 215,058
Pianoforte graffe, C. W. Brewer ..... 215,089
Picture frame, R. Hill ..... 215,123
Picture nail head, J. J. Laughlin ..... 215,007
Pipe coupling, W. Coler ..... 214,991
Plow beam, W. J. Ball ..... 214,986
Potato digger, R. W. Gates ..... 215,115
Printed fabric steamer, J. Smith ..... 215,173
Printing press, oscillating, H. A. Manley ..... 215,011
Projectile, L. A. Merriam ..... 215,015
Pulley, loose, M. R. Webster ..... 215,188
Pump, direct-acting, H. Strater, Jr. .... 215,026
Pump, double-acting, H. T. Drain ..... 215,107
Pump, double-acting, Seymour & Chamberlain ..... 215,170
Pump force, D. B. Hiser ..... 215,173
Pump rods, adjustable clamp for, A. Wallace ..... 215,080
Pumps, waste valve for, P. A. Peer ..... 215,156
Rack for supporting articles over lamps for heating, I. W. Stiles ..... 215,180
Railway rails, roll for utilizing the fag ends of steel, M. McDowell ..... 215,065

Railway, street, H. E. Jones ..... 215,003
Railway track, C. MacDaniel ..... 215,010
Railway switch mechanism, street, C. A. Pingree ..... 215,069
Reciprocation regulator, automatic, J. E. Crisp ..... 215,047
Rein guide, check, J. K. P. Pine ..... 215,157
Rock drill, U. Cummings ..... 215,101
Rock drills, sliding valve for, T. J. Murphy ..... 215,152
Rubber, coating metallic articles with vulcanized, I. Adams, Jr. .... 215,034
Saw, fire wood drag, Fagan & Henry ..... 215,109
Sewers, etc., trap for, H. W. Atwater ..... 214,984
Sewing machine, C. B. True ..... 215,080
Sewing machine, truck marker, A. Johnston ..... 215,060
Shingle machine, D. W. Emery ..... 215,197
Shoe soles, etc., composition for waterproofing and lubricating, H. Ober ..... 215,018
Sifter, ash, A. Fenner ..... 214,997
Skate roller, W. C. Turnbull ..... 215,081
Slate, C. C. Shepherd (r) ..... 8,699
Spinning machine, buck, T. Mayor ..... 215,142
Spinning mules, automatic clearer for, J. Bramble ..... 214,988
Spools, tool for turning the ends of, T. E. King ..... 215,005
Spring clasp, E. U. Atkinson ..... 215,037
Square, try, L. S. Starrett ..... 215,024
Stamp battery for quartz mills, R. F. Bridewell ..... 215,040
Stamp, hand, F. B. Wood ..... 215,195
Stamp mill, C. S. Stanchfield ..... 215,074
Stamp protector and wing retainer, beer, F. A. Stegner ..... 215,178
Station indicator, P. Lichtenstein ..... 215,138
Steam and hot air kiln for drying lumber, C. Wilcox ..... 215,143
Steam boilers, surface blow-off for, L. Reinhardt ..... 215,161
Stovepipe thimble, N. D. Morey ..... 215,149
Stoves, means for attaching urns to, C. Fuller ..... 215,112
Tap wrench, C. E. Billings ..... 215,039
Target and target stand, Wright & Thorne ..... 215,083
Target, ball, C. V. Boulton ..... 215,085
Telegraph box, fire, A. Ballard ..... 215,083
Telegraph key and switch, W. E. & J. W. Buzby ..... 215,093
Tent, G. C. Doane ..... 214,996
Testing machine, hydraulic, T. Olsen ..... 215,067
Thrashing machine, flax, G. W. Estabrook et al. .... 215,052
Thrashing machines, grain feeder and band cutter for, C. Cleveland ..... 215,098
Toy, candy, R. H. Moses ..... 215,151
Track cleaner, G. Buck ..... 214,990
Trap for waste pipes from wash basins, H. W. Atwater ..... 214,985
Truck, bay, G. H. Smith ..... 215,175
Trunk bolt or catch, O. D. Hunter ..... 215,125
Trunk, electro-magnetic burglar alarm, A. W. Hall ..... 215,120
Turnstile register, F. O. Deschamps ..... 215,104
Type writing machine, P. Deering ..... 215,048
Type writing machine, F. F. Warner ..... 215,082
Valve attachment, safety, H. G. Ashton ..... 214,981
Valve, slide and steam, A. H. Mathesius ..... 215,064
Valve, vent and check, F. Richardson ..... 215,163
Vapor and gas burner, H. McConnell ..... 215,143
Vehicle spring, H. Gardner ..... 215,114
Vehicle seat back and shifting rail, S. B. Cox ..... 215,046
Veneer, wood, A. B. Rice ..... 215,162
Vessel for preventing the shifting of cargoes, marine, D. Knowles ..... 215,136
Violin, S. B. Sexton ..... 215,023
Wagon body, H. H. Richards ..... 215,164
Washing machine, J. C. Merritt ..... 215,145
Waste pipe attachment, H. W. Atwater ..... 214,982
Water cooler, G. H. Mettee ..... 215,016
Weather vane, E. S. Turner ..... 215,218
Weir or caisson, floating, K. Moller ..... 215,148
Wells, tube clamp for oil, L. N. Hinderliter ..... 215,001
Wheel supporting device, automatic, E. D. Olin ..... 215,154
Whiffletree, D. Foley ..... 215,111
Whiffletree, S. Loomer ..... 215,008
Whirligig, H. V. Hartz ..... 215,000
Wind wheel, S. E. Alden ..... 215,095
Windmill, T. Alsop ..... 215,036
Window ventilator, J. A. Conover ..... 215,099
Window washer, G. Pirrung ..... 215,158
Wrench, J. G. & G. Johnson ..... 215,128

TRADE MARKS.

Artificial precious stones, Franklin Jewelry Co. .... 7,266
Baking powder, J. Hewson ..... 7,261
Bitters, Sieger & Hijos ..... 7,258
Cigars, B. Leidersdorf & Co. .... 7,262
Cigars, Krohn, Feiss & Co. .... 7,267
Cigarettes and chewing tobacco, Goodwin & Co. .... 7,274
Cigars, cigarettes, and chewing and smoking tobacco, J. Rauch ..... 7,256, 7,257
Crackers, biscuits, etc., J. J. Tangles & Co. .... 7,268
Hats, R. Dunlop ..... 7,276
Lamp chimneys and shades, Pabst & Arming ..... 7,263
Medicinal pad or cushion, J. A. Hatry ..... 7,271, 7,272
Medicinal compound for the cure of scrofula and the like diseases, H. R. Stevens ..... 7,265
Medicinal compound for the cure of pain and inflammation, H. R. Stevens ..... 7,264
Reed organs, J. Estey & Co. .... 7,259, 7,260
Shirt waists and drawers, Morrison & Hutchinson ..... 7,255
Soap, R. M. Burwell & Sons ..... 7,269
Whisky, J. W. Gaff & Co. .... 7,270, 7,273
Whisky, W. H. Holmes ..... 7,275

DESIGNS.

Badge, L. J. Churchill ..... 11,180
Clock fronts, H. J. Davies ..... 11,181
Dress trimming, J. Gerson ..... 11,178, 11,179
Fireman's hats, E. Cairns ..... 11,176
Font of printing types, A. Little ..... 11,185
Font of printing types, J. M. Conner ..... 11,184
Group of statuary, J. Rogers ..... 11,183
Trimming, R. Werner ..... 11,187
Toy wheelbarrow frame, A. B. Greenwalt ..... 11,177
Umbrella tip cup, E. Putnam ..... 11,182

English Patents Issued to Americans. From May 9 to May 13, inclusive.

Boot nailing machine, L. Goddu, Winchester, Mass.
Checks, preventing alteration of, G. C. McEwen, New York city.
Clothes hanger, European and United States Patent Exchange, New York city.
Firearms, J. P. Lee, Hon. N. Y.
Furnace for steam boilers, W. E. Kelly, New Brunswick, N. J.
Gun barrels, brazing, Colt's Patent Firearms Manufacturing Company, Hartford, Conn.
Lamps, W. B. Robins, Covington, Ky.
Lubricating machinery, C. Pershall, Detroit, Mich.
Ore separator, C. M. Buel, New York city.
Railway, H. Reese et al., Baltimore, Md.
Railway switch, H. Greenway, Brooklyn, N. Y.
Refrigerating apparatus, J. G. Wolf, New York city.
Rotary engines, E. Hall, Boston, Mass.
Seed planter, J. Ellis, Oakland, Ga.
Sewer connections, W. Pickhardt, New York city.
Steam engine lubricator, W. P. Phillips, Boston, Mass.
Water meters, W. B. Mounteney, Chicago, Ill.