RECENTLY PATENTED INVENTIONS. Engineering.

STEAM ACTUATED VALVE. - Henry Breitenstein, Laramie, Wyoming. For direct acting duplex engines this inventor has provided an improvement designed to utilize the steam to the fullest advantage, the construction being simple and durable. The two cylinders are each connected at one end with the opposite end of the other cylinder, the pistons moving in opposite directions in the cylinders, a slide valve controlling the inlet and exhaust ports of the cylinders, while there are puppet valves actuated by the pistons, and differential auxiliary pistons carrying the slide valve and controlled by the puppet valves.

STEAM TRAP. -Henry Creamer, New York City. This is a device of simple and durable construction for automatically conducting water of condensation from engines, steam heating systems, etc., back to the boiler. A receiver for the water of condensation is connected by a port with a fixed neck held on the cylinder and containing an inlet valve adapted to open on the down stroke of the pump piston to admit the water, there being a valve for discharging the water from the piston. The pump is stopped and started according to the quantity of water of condensation received by the receiver, and the pistons of the valve being steam cushioned, their action is comparatively noiseless

LIQUEFYING GAS.—Francis B. Deane, Lynchburg, Va. To liquefy gas by compression, this pump especially adapted to do the work effectively and economically. It comprises twin cylinders in which operate hollow pistons having annular enlarged upper chambers communicating with the pistons. The gas is first partially compressed, then forced into a much smaller chamber and reduced to liquid form, at the same time that a fresh supply of gas is being drawn in.

VITRIFICATION FURNACE.—Peter K. Sommer, Mannheim, Germany. This furnace comprises a set of gas burners in an inner burning chamber lined with refractory material and surrounded by an outer cylinder for the combustion gases, there being a second outer chamber through which the air passes to the gas burners. The furnace is especially designed for enameling the bottoms of cooking vessels, facilitating the application of heat not only to the bottom but to the sides of the vessel to be enameled.

Railway Appliances.

CAR COUPLING .- Battie K. Richardson, Nashville, Tenn. This is a coupling of the side latching type, of simple and durable construction, and adapted for automatic coupling with a similar coupling on another car, while the uncoupling may be effected from the sides or top of a car. It comprises a chambered drawhead within which are two oppositely pitched inclines, a pivoted latch block riding on the inclines when partially rotated, and sliding by gravity to interlock a notch on its under side with a shoulder on one incline. The device may be conveniently connected with an ordinary car coupling of the link and pin style. Some of these couplings have been tried in actual service, and are said to have proved highly satisfactory.

TRACK SANDING APPARATUS.—Oliver P. Murry and James V. K. Walker, Portsmouth, Va. According to this invention, a valve operating in unison with the engineer's brake valve controls an air blast from the main air reservoir to the sand discharge pipe. When the brake handle is in "full release" or in "running "position the supply of sand to the track is shut off, but when the handle is moved to "lap," before applying the brakes, the sand commences to run, and is forced out when the engineer's valve is moved to put on the brakes, a large quantity of sand being forced upon the rail when the handle is moved to the emergency stop.

CATTLE CAR. - Ferdinand E. Canda, New York City. The protection of the feed and water troughs of a cattle car against injury when the car is loaded with general; freight is the design of this improvement. Ordinarily the posts of the car are made wide, to allow the troughs to be folded up between them, and thus protect the troughs from injury, but according to this invention the troughs are pivoted between the posts and are flanked by protecting blocks, brackets and a guard rail, allowing the width of the posts to be greatly reduced, and at the same time effectively protecting the troughs from injury by freight.

TRAIN ORDER AND SIGNALING DE-VICE.—Leonard T. Crabtree, New London, Wis. This is an improvement upon formerly patented inventions of the same inventor in devices for railroads using the block signal, and embracing mechanism for the control of moving trains, embodying also a train signaling device and a co-operating train order annunciator. Combined with a rotatable pendently supported signal blade, of action.

Mechanical.

CARPENTER'S AND JOINER'S SQUARE. : piece. -Solomon H. Bretz, Battle Creek, Mich. This is a composite tool in which the limbs are jointed together and graduated on arcs of circles defined by two undercut opposite shoulders on one limb, and bevel edged and mating curved flanges on the other limb, flanges having a sliding contact with the shoulders and being radially coincident. The implement has also a plumb and level attachment, and rafter and brace tables to indicate lengths for such parts of a building, the tables being impressed upon a sunken portion of each limb, and thereby protected from obliteration by wear.

WIRE SWAGING MACHINE. — Albert De M. Ramacciotti, New York City (executor of Francis | of this paper.

Ramacciotti, deceased). This is a machine especially adapted for swaging wire strings for musical instruments, the machine being adjustable to operate upon strings of various lengths and of high tem per, leaving the strings at their flattened surfaces smooth and flawless. The improvement comprises a sliding carrier provided with a swaging block, a second carrier being an adjustable wedge section at a right angle, while a block section may be adjusted by the wedge section in direction of or away from the sliding carrier, the block having a swaging jaw adapted to face that of the sliding carrier.

MILLSTONE DRESS.--Joseph H. Brown Madison, Ga. According to this improvement the millstone has main furrows and auxiliary furrows extending to the skirt of the stone, and at the center the face is sloped slightly toward the eye or draft circle. Across the main and auxiliary furrows are shoulders facing in wardly, the dressing being of a novel character to partially overcome centrifugal force on the coarse particles, while preventing regrinding of fine particles to cause heating and undue wear of the stone. Stones with this dress can be run farther apart, and with less friction and cooler, than has been usual heretofore.

Miscellaneous.

WHEELED SCRAPER. -- William Ackerman and Albert A. Hasselquist, box No. 532, Elgin, Ill. This is a machine carrying a scoop, and adapted for inventor has provided a combined hydrostatic press and scraping roads or similar work, the scoop being entirely under the control of one man, who may also drive the team by which the machine is drawn along. The construction is simple and the scoop may be held positively ends and fixed hollow plungers fitting their main bore, in the position desired according as the ground is to be the plungers having at their lower end a valved inlet and scraped, or it may be raised to a carrying position above smaller valved outlet, and being surrounded by annular the ground, being raised or lowered at the will of the operator, and dumped by the action of the team.

> WAGON DUMPING DEVICE.—Charles H. Peardon, Smithshire, Ill. This inventor has provided improved means for elevating a loaded wagon and the subsequent dumping discharge of the load auto- LES MERVEILLES DE L'EXPOSITION DE matically. A framed structure is erected to afford an inclined way to the point where the dumping is to be effected, and at such place a platform is supported by a transverse shaft, whereby the platform may be rocked to tip the wagon body, there being connected with the structure a draft cable for attachment to a wagon, whereby the latter may be drawn up, on the application of power from a suitable source, and its load dumped when the platform is tripped.

PROPELLER. — Martin Davies, Jersey City, N. J. This inventor has provided an improved means of securing propeller blades to the hub or end of the screw shaft. The hub has radial bores, countersunk on the inner side, and the propeller blades have a perforated base, and screw bolts have their heads fitted in their countersinks and their shanks projected outward through the hub and bases of the blades. The heads of the bolts are preferably arranged to form part of the smooth hub bearing for the propeller shaft. This invention has been practically tested in a working propeller, and has been demonstrated to possess decided advantages.

PNEUMATIC VALVE.--Fredrick Fichter. Rockaway, N. J. This is an improvement especially adapted for use in connection with inflated cushions pneumatic tires, etc. The valve is provided with double cushions, and within one casing two valves are made to act in conjunction, both valves to be employed when the inflation is to be effected, after which one is to be re moved. The valve is of simple and durable construction and ready application, and, when closed, the escape of air through it is impossible.

DRUGGIST'S STILL -- Charl s R. R. Beck, Baltimore, Md. The conical condensing hood of this apparatus has at its apex a filling opening, and from base to top is surrounded by a water jacket, with inlet and outlet openings near the top and bottom to permit water circulation, while there is a base trough and a supplemental trough above it within the hood, the latter provided with a discharge pipe. The improvement affords improved means for distilling various extracts and waters, collecting all the condensations and conducting them out of the still, instead of permitting some of them to fall back into the heating vessel

ENVELOPE OR STAMP MOISTENER. Henry A. Fry, Chicago, Ill. This is a simple device to be conveniently worn on the thumb, to facilitate the rapid and efficient moistening of stamps and envelopes. It comprises a reservoir and keeper for attaching the reservoir to the hand, in connection with a moistening pad arranged beneath, and a valve-controlled connection between the reservoir and pad. The device may be very quickly operated, the shape of the pad enabling the moisture to be evenly applied.

CLAMP JOINT. — Frances Higbie, Brooklyn, N. Y. This is an extremely simple device, a top-heavy gravity block pivotally supported near its comprising a vertical standard or support, in the form of lower end, and a device connecting the block with the a rod, on which a bracket is conveniently adjustable up blade, is an electrical device which when active holds or down, while a base piece in horse-shoe pattern has the block nearly upright, and releases the block to allow at one edge a neck with an opening adapted to receive it to rock when the electrical device is dormant. The invention also embraces various other novel features de- engaged by a clamping arm. The device affords a consigned to simplify the construction and insure certainty venient means of supporting a cooking vessel at such height as desired above a lamp, the vessel being placed on the bracket, of a construction adapted for the purpose, and the lamp base being encircled by the base

> FAN.—Edward Ross, Brooklyn, N. Y. This is an improvement in fans having a folding web adapted to open in circular form, and the invention describes a simple and durable fan, which can be readily opened and closed and locked in either position. The handle is made solid, and not in two parts, as usual, giving the fan a neater appearance, and its web can be easier opened or closed without changing the grip on the handle.

Note.-Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date all newsdealers.

NEW BOOKS AND PUBLICATIONS.

E LATIN LETTER OF COLUMBUS. Printed in 1493, and announcing the discovery of America, reproduced in facsimile, with a preface. London: Bernard Quaritch. 1893. Pp. vi, 8. Price 30 cents.

HARIOT'S NARRATIVE OF THE FIRST PLANTATION OF VIRGINIA IN 1585. Printed in 1588 and 1590, reprinted from the edition of 1590 with De Bry's engravings. London: Bernard Quaritch. 1893. Pp. vi, 46, 25 plates. Price 60 cents.

THE SPANISH LETTER OF COLUMBUS WRITTEN BY HIM ON FEBRUARY 15, 1493. To announce the discovery of America. Reproduced in facsimile from the unique copy of the original edition. (Barcelona, April, 1493.) With a translation and introduction. London: Bernard Quaritch. 1893. Pp. xiv, 18. Price 40 cents.

These three very elegant publications are explained by their titles. They are of wide interestamong those who occupy themselves with the early history of the continent. The illustrations in some cases are exceedingly interest-

EXPERIMENTS ON AIR. PAPERS PUBLISHED IN THE PHILOSOPHICAL TRANSACTIONS. By the Hon. Henry Cavendish. Edinburgh: William F. Clay. London: Simpkin, Marshall, Hamilton, Kent & Co., Limited. 1893. Pp. 52. No contents, no index.

Cavendish's famous work referring to the period of 1784-1785 figures as the third of the Alembic Club reprints, and certainly cannot be considered the least valuable or interesting of them. This workwill certainly find its way to all chemical libraries. The absence of a contents and index we feel, however, cannot but be regretted.

CHICAGO. By N. Melnikoff. Odessa, Russia: 32 Rue Catherine. 8vo. Pp. 96, illustrated.

This work, which is in Russian, describes the principal exhibits. It is curious to note that M. Melnikoff is greatly in favor of introducing two articles into Russia which have generally been regarded as strictly American -peanuts and popcorn.

SCIENTIFIC AMERICAN

BUILDING EDITION

DECEMBER, 1893.-(No. 98.)

TABLE OF CONTENTS.

- 1. Elegant plate in colors showing a colonial residence at Stamford, Conn., recently erected for C. Cooper Clark, Esq., at a cost of \$9,500 complete. Floor plans and two perspective elevations. An excellent design. Mr. Augustus Howe, architect, New York.
- 2. Plate in colors showing the residence of Thomas C. Wordin, Esq., at Bridgeport, Conn. Two perspectiveviews and floor plans. Cost \$5,000 complete. A very attractive Queen Anne design. Mr Henry A. Lambert, architect, Bridgeport, Conn.
- 3. A dwelling erected for Edward W. Alling, Esq., at New Haven, Conn. Perspective and interior view and floor plans. An excellent design. Cost \$4,500 complete. Messrs. Stilson & Brown, architects, New Haven, Conn.
- 4. A very attractive residence recently erected for R. Burton, Esq., at Hartford, Conn., at a cost of \$7,800 complete. Floor plans, perspective view, etc. Mr. Henry D. Hooker, architect, New York. An excellent design.
- at cost of \$2,400 complete. Mr. Austin W. Pease, architect, Boston, Mass. A very attractive design.
- dwelling recently erected for P. H. Lucas, Esq., at Chester Hill, Mt. Vernon, N. Y., at a cost of \$7,000. Floor plans and perspective elevation, also an interior view. Mr. Louis H. Lucas, architect, Mt. Vernon, N. Y.
- A cottage at Mystic, Conn., erected at a cost of \$3,000 complete. Elevation and floor plans and an interior view. Mr. John S. Rathbone, architect. New London, Conn.
- A dwelling recently completed at Stamford, Conn., at a cost of \$3,500 complete. A picturesque design. Two perspective views and floor plans. Messrs. Munn & Co., architects, New York.
- 9. Miscellaneous Contents: The education of customers.-How to catch contracts.-Hints to readers.-The latest and best designs for houses.—Labor Day. Tests of paving materials.—The World's Columbian Exposition, a general view.—The builders' ed.-An improved woodworking machine, illustrated.—The Pasteur filter, illustrated. -The Rochester parlor heater and improved oil stove, illustrated.—A stovepipe radiator, illustrated.—An electric passenger elevator at the Exposition, illustrated .-Woodworking machinery at the Fair.-A new building material.-Torsion braided wire mattresses, pillows, cushions, etc., shown at the Exposition, illustrated.

The Scientific American Architects and Builders Edition is issued monthly. \$2,50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practically, a large and splendid MAGAZINE OF ARCHITEC-TURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

The Fullness, Richness, Cheapness, and Convenience of this work have won for it the LARGEST CIRCULATION of any Architectural Publication in the world. Sold by MUNN & CO., PUBLISHERS,

861 Broadway, New York.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue

"U.S." metal polish. Indianapolis Samples free. For pile driving engines. J. S. Mundy, Newark, N. J. Stavemachinery. Trevor Mfg. Co., Lockport, N. Y.

Improvediron planers. W. A. Wilson, Rochester. N.Y. Edmonds' Automatic Oil Burner. (Descriptive circular.) Bradford, Pa.

Microbe Killer Water Filter, McConnell Filter Co.,

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. Screw machines, milling machines, and drill presses The Garvin Mach. Co., Laight and Canal Sts., New York. Metal spinning, nickel plating, brass castings, experimental brass works. S. Newman, 64 Main St., Cin'ti, O.

Wanted to manufacture. new machinery of real merit. John M. Kramer & Bro. Machine Works, Maria Stein, O. Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. All sizes in stock. Irvin Van Wle, Syracuse, N.Y. Emerson, Smith & Co., Ltd., Beaver Falls, Pa., will send Sawyer's Hand Book on Circulars and Band Saws free to any address.

Model dynamo motor. Ingenious machine for students and experimenters. Elbridge Electrical Mfg. Co., Elbridge, New York.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail. \$4; Munn & Co., publishers, 361 Broadway, N. Y. Forthe original Bogardus Universal Eccentric Mill. Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, N. Y. Patent Electric Vise. What is claimed, is time saving. No turning of handle to bring jaws to the work, simply one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

Competent persons who desire agencies for a new popular book. of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office. 361 Broadway, New York.

**Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters,

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

References to former atticles 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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Winerals sent for examination should be distinctly marked or labeled.

(5543) F. G. H. asks: 1. Are No. 18 and No. 25 good sizes of wire to use on a medical coil? A. No. 25 wire is too thick. Use No. 30 or finer. 2. Which magnet will give the strongest current, one 4 inches long, wound with 1 ounce No. 18 and 3 ounces No. 24, or one Engravings and floor plans of a suburban residence 2 inches long wound with 1 ounce No. 18 and 3 ounces erected for H. McKay, Esq., at Boston, Mass., 24? A. If you refer to horse shoe magnets, the shorter one, if of same diameter of core, should give the best

(5544) J. O. J. asks: 1. Is tungsten steel the same as Mushet steel, and what tempering it requires to make permanent magnets (suitable for voltmeter, etc.)? A. Mushet steel and tungsten steel are much alike in their quality of soft tempering, but may not be of the component alloys. They must not be dipped in water for tempering, simply cool in the air. 2. I have in mind a silvered glass reflecting telescope. Mirror 41/2 to 5 inches diameter and 3 feet focal length. Are the measures well proportioned? A. A good proportion for a reflecting telescope is 12 times the diameter of the mirror for the focal length. 3. Is it necessary to grind the mirror to the meniscus form, or will a planoconvex do? Will the silvering process described in last week's Scientific American be applicable to silvering it? Where can I get considerable general information regarding reflecting telescopes? A. The silvering should be on the front surface, which should be perfectly polished to -Adurable and ornamental roof, illustration the proper curve. For the silvering process and description of requirement for grinding and polishing for astronomical telescopes, see Scientific American Supple-MENT, Nos. 581, 582, 583, 10 cents each mailed

(5545) J. F. H. says: Will you kindly explain through the Scientific American what is the difference between a mechanic and a machinist? A. A machinist is a mechanic, but all mechanics are not strictly machinists. Carpenters, wagon makers, millwrights, cabinet makers, and every one skilled in the practice of the mechanic arts are properly mechanics. Machinists are more properly constructors of machines and engines, and versed in the principles of construction of machinery.

(5546) M. P. H. asks: What progress, if any, has been made in hardening copper? Has any one since prehistoric times been able to get it so it would take a razor edge and hold it? If not, wnat would you think of a process that could harden an alloy of 85 per cent copper and 15 per cent tin to that degree that it would take and hold an edge sufficient for all wood-working tools? If this result has not been attained by any one else, I will send a specimen of what we have. A

equal to the asserted claims referred to the prehistoric Egyptians. Although parties in the United States claim to have hardening processes for copper, there appear to be no claims for making copperedge tools that will compare with steel. We have made bronze compositions of pure copper and tin that made fair cutting tools, such as kmves and cold chisels, that would cut wood, marble, and the softer metals, but when you come to strike into a granite or syemite block, the chisel is not there. We I use on a telephone line 1/2 mile long? A. Use coppe shall be pleased to have a specimen of your hard bronze that is a cutting tool.

(5547) T. T. H. says: Will you please let me know what horse power I can get 80 feet from the boiler through a $1\frac{1}{4}$ inch pipe with 5 ells on in the length with 60 pounds pressure at the boiler? A. You should be able to obtain from 8 to 10 indicated horse power with the pipe as stated, if well felted.

(5548) A. G.—Compressed air jets have been proposed for propelling boats.

(5549) T. H. M., Jr., says: 1. I want to (5945) T. H. M., Jr., Says: 1. I want to pole, circular polarization may be produced. Any method wells. The water is supposed to be 10 feet from the surface. wells. The water is supposed to be 10 feet from the surface, also 10 feet from the pump cylinder. $\;$ The above pump is only to have one standard and one cylinder. Will the above pump draw water out of all the wells? A. The pamp will draw from the three $% \left(1\right) =\left(1\right) \left(1\right)$ will draw from the three wells if the water stands at the same height in all of them. A dozen drive wells are sometimes connected to one pump. 2. What causes natural gas? A. Natural gas is supposed to be the product of the decomposition of petroleum.

(5550) J. L. asks: 1. Would gas-house tar, applied warm with a brush, have a greater tendency to clog the latter when it cools than when used cold? A. The hot tardries quicker than cold tar and would be more apt to clog the brush. 2 Would it be practicable to pass the tar through a coil pipe, contained in a cylinder and heated by steam, and is there any danger of the tar choking the coil when it cools? A. If the tar is fluid when cold, it would not choke the coil. Passing through a coil heated by steam would not change its drying quality and it would still be fluid after passage. 3. Will tar dry quicker, applied hot to a cold surface or applied cold to a hot surface? A. Tar dries quickest applied to a hot surface.

(5551) C.—The loss of power in steam engines from back pressure in the exhaust is very trifling. No engine, if properly piped, should have more than one-quarter pound back pressure per square inch, which would be but one-half per cent at 50 pounds mean pres-

(5552) J. A. W. says: A river 14 feet deep flows past our dock with a velocity of 3 miles an hour. What horse power can I derive from the river with a paddle wheel 6 feet broad and 34 feet in diameter, extending 12 feet down into the water, the shaft of which would therefore be 5 feet above the water, and therefore above the level of the dock? If the paddle wheel is not the best device for utilizing the force of the current, what other device is? A. You may obtain about 8 horse power from the paddle wheel, which is probably the best for the purpose

(5553) J. McB. asks how to purify spermoil for lubricating. I have a quantity which has become gummy. How can I treat it to remove gum? A. Add to each gallon of gummy oil, 1 ounce, each of chalk and slaked lime and $\frac{3}{4}$ of a pint of water; stir the mixture thoroughly, let it stand for a few days, and then add 34 of a pint of water and 3 ounces potash; stir and heat to nearly the boiling point. Then add a solution of 1 ounce salt to 34 pint of water, and slowly boil the mass for a half hour and pour into a vessel to settle, when the clear oil may be decanted, or you may simply expose to the sun for a few days, putting the oil in a lead tray.

(5554) L. A. H. says: 1. Will you kindly tell mehow copper oxide is made? A. Copper monoxide (cupric oxide) is made by calcining metallic copper at a red heat with full exposure to the air. Red oxide of copper or cuprous oxide is made by heating in a covered crucible a mixture of 5 parts black oxide of copper and 4 parts of fine copper filings. 2. Also of some solution which is rubbed on copper which causes the same to turn a beautiful highly colored polished red. A. The red copper surface is made by dipping the articles in a solution of 2 drachms sulphate of antimony and 1 ounce pearlash, dissolved in 1 pint of water. 3. 'Tell me how iron scroll work is made a dead black? A. For a black polish on iron boil together oil of turpentine 15 parts and sulphur 1½ parts. Put a thin coat on the iron and burn off with an alcohol lamp. 4. Also can silver nitrate be changed into chloride of silver, or can it be changed so that it can be used in an electroplating solution where chloride of silver is used? A. For the silver bath use 51/4 ounces nitrate of silver to 1 gallon soft water. Then add 8 ounces cyanide of potassium. You can precipitate silver chloride from a solution of the nitrate by adding hydrochloric acid. Then filter and wash and you have silver chloride ready for use in any formula calling for it. Do the work by gas light or in a dark room

(5555) M. H. S.—The Campania, like all the great ocean steamers, is flat on the bottom through the midship section.

(5556) A. G. G. asks: 1. On a clock circuit is a relay of 20 ohms resistance; this relay has under it a resistance coil of German silver wire connected on shunt. What is the resistance coil on there for? A. The resistance coil is designed to prevent sparking at the relay; it provides a path for the extra current. 2. I have a 20 ohms relay. If I add a resistance of 130 ohms on shunt, will this bring relay to 150 ohms, so it will work on main line where 150 ohms relays are used? A This depends upon the connections. We presume that the resistance should be comprised in the coils of the magnet, yet it is not at all certain that this is necessary in your case. Fuller details must be given to obtain a definite solution. 3. How is ferric ammonium citrate prepared? A. Dissolve 29 parts iron tersulphate in water, precipitate with excess of ammonia, filter, wash. and dissolve the filtrate with 30 parts citric acid, evaporate to 100 parts. To above add 331/2 parts solution of

Very little progress has been made in tempering copper | solidify. Use no heat exceeding 140° Fah. in any par

(5557) H. B. writes: I have a lot of scraprubber; can I use that for making hard rubber fo electric purposes? Or can you give me a good receip for a substitute? A. There is no good substitute for hard rubber. Fiber is sometimes used. •n an emergency use pasteboard soaked in hot paraffine. You can do nothing with the old scrap. 2. What size wire should No. 18 or iron wire No. 12.

(5558) J. R. D. writes: How can I bes magnetize a circular disk of iron or steel? I have trie numerous devices, but have been unsuccessful. A. I depends on how you want the magnetism distributed By placing it within a coil and passing a strong curren through the coil it will become magnetized in a general sense diametrically. By rotating it over the poles of horseshoe magnet, keeping its center over one pole an its periphery moving over the other, it may be magnetize radially. By spinning it horizontally in front of a stron probably be produced.

TO INVENTORS.

An experience of forty-four years, and the preparation of more than one hundred thousand applications for patents at bome and abroad, enable us to understand the laws and practice on both continents, and to possess un equaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and person contemplating the securing of patents, either athome of abroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broad way, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 28, 1893,

AND EACH BEARING THAT DATE

[See note at end of list about copies of these pat	ents.	į
Acid, method of and apparatus for concentrating	****]
sulphuric, H. Howard Adding machine, Dalton & Myatt. Advertising device, W. C. Johnston. Advertising machine, M. Anthony. Alarm. See Electro-magnetic alarm.	509, 664 509,722	J
Advertising device, W. C. Johnston	509,473 : 509,640 :]
Alarm. See Electro-magnetic alarm. Album.coin. H. Muller	509,546	1
Album, coin, H. Muller. An esthetic vapors, process of and apparatus for generating and applying, S. J. Hayes.	509.849	j
Animal trap, W. Vogt. Animal trap, W. Vogt. Antimony compound and making same, T. Mayer Armatures, shaft mount for, S. E. Hitt. Autographic register, W. M. Kinnard. Avie box, C. Pullar.	509,561 509,478]
Armatures, shaft mount for, S. E. Hitt	509,620]
Axle box. C. Pullar]
Band cutter, wire, J. Sindelar	509,410 509,694	Ì
Autographic register, W. M. Kinnara. Axie box. C. Pullar Ballot box. registering, E. H. Towne. Band cutter, wire, J. Sindelar Band cutting and grain feeding machine, A. J. Jacques. Banio. A. Anderson.	509,380	1
Banjo, A. Anderson	509,507 509,534	
Banjo, A. Anderson. Barrels, manufacture of, W. P. Hayne. Bath. See Retting bath. Battery box and case, L. F. Jordan. Bearing, ball, O. B. Jacobs. Bearing for centrifugal extractors, J. C. & E. F.	509,381]
Bearing, ball, O. B. Jacobs	509,739	j
Poland	509 665	j
Bed, invalid, B. Ottinger	509,674 509,471	1
Bees, device for preventing the swarming of, H.		
Bearing for centrifugal extractors, J. C. & E. F. Poland. Beater or stirrer, H. Jaquette. Bed, invalid, B. dittinger. Bed spring, J. T. Hood. Bees, device for preventing the swarming of, H. P. Langdon. Bell, alarm, W. H. Polleys. Belt shifter, B. S. Redding. Bicycle, S. Elliott. Bicycle, L. Shapiro.	509,438 509,679 509,604	
Bicycle, S. Elliott		
Bicycle, L. Shapiro Bicycle brake, F. C. Weston	509,692 509,636 509,771	
Bicycles, folding mud guard for, J. W. Shone Bit. See Expansible hit.	509,771	j
Bicycle, L. Shapiro. Bicycle L. Shapiro. Bicycle brake, F. C. Weston. Bicycles, folding mud gnard for, J. W. Shone Bit. See Expansible hit. Block. See Building block. Blotter, E. E. Johnson. Boat. See Steamboat. Boiler tuhe stopper, J. H. Pollard.	509.537	ŀ
Boat. See Steamboat. Boiler tube stopper, J. H. Pollard.	509,678	
Bolts or screws with threaded or similet points, machine for providing. W. R. Wilhar	509,638	
Bonehlack, revivifying, M. Weinrich	509,460 509,631	. :
Boat. See Steamboat. Boiler tube stopper, J. H. Pollard Boiles or screws with threaded or gimlet points, machine for providing. W. R. Wilbur Boneblack, revivifying, M. Weinrich Book carrier, H. Tollner Book, fireproof, F. A. Hatton Bottle neck and tool for threading same, G. Gray Bottle stopper fastener, C. Schroeder Bottling apparatus, C. B. & C. H. Beardsley Box. See Ballot box. Letter and bread box Match box. Miter box.	509,533	. }
Bottle neck and tool for threading same, G. Gray Bottle stopper fastener, C. Schroeder	509,525 509,586	
Box. See Ballot box. Letter and bread box.	509,647	
Match box. Miter box. Box stay, J. G. Mihelitch. Brake. See Bicycle brake. Vebicle brake.	509,753	. 1
		١,
son Brick machine separator, T. B. Campbell	509,428 509,361	٠ (
Bridges, element for building, J. Weiss Buckle, shield, F. D. Behrens	509,781	. 4
		: 6
Building block and making same. T. S. Pierce	509,822	
Building block and making same. T. S. Pierce Building construction, T. O'Shea Burial apparatus, F. C. Rockwell.	509,822 509,446 509,585	1
son. Brick machine separator, T. B. Campbell Bridges, element for building, J. Weiss. Buckle, shield, F. D. Behrens. Building block and making same. T. S. Pierce Building construction, T. O Shea. Burial apparatus, F. C. Rockwell Burner. See Gas burner. Oil burner. Butter moulding apparatus, P. O. Andreasen	509,822 509,446 509,585 509,714	
Button fastener, W. Howard	509,822 509,446 509,585 509,714 509,436	
Button fastener, W. Howard	509,436	
Button fastener, W. Howard	509,436	
Button fastener, W. Howard	509,436	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener, W. Howard. Camera. See Magazine camera. Panoramic camera. Camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling. Barrow & Roosevelt.	509,436 509,841 509,448 509,590 509,719 509,365	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Jacketod can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. Hessard. Car coupling, J. T. Render. Car coupling, J. T. Render. Car coupling, J. Sessard. Car coupling, J. Sessard. Car coupling, J. Render. Car coupling, C. P. Oldbam. Car coupling, A. J. Stanley. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, W. H. Wallace. Car door, T. Eubank. Car leater, M. A. Wicox. Car platform balcony, E. W. Appelman.	509,436 509,448 509,448 509,590 509,719 509,372 509,372 509,372 509,552 509,552 509,652 509,552 509,570 509,641 509,441	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Jacketod can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. Hessard. Car coupling, J. T. Render. Car coupling, J. T. Render. Car coupling, J. Sessard. Car coupling, J. Sessard. Car coupling, J. Render. Car coupling, C. P. Oldbam. Car coupling, A. J. Stanley. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, W. H. Wallace. Car door, T. Eubank. Car leater, M. A. Wicox. Car platform balcony, E. W. Appelman.	509,436 509,448 509,448 509,590 509,719 509,372 509,372 509,372 509,552 509,552 509,652 509,552 509,570 509,641 509,441	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Jacketod can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. Hessard. Car coupling, J. T. Render. Car coupling, J. T. Render. Car coupling, J. Sessard. Car coupling, J. Sessard. Car coupling, J. Render. Car coupling, C. P. Oldbam. Car coupling, A. J. Stanley. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, W. H. Wallace. Car door, T. Eubank. Car leater, M. A. Wicox. Car platform balcony, E. W. Appelman.	509,436 509,448 509,448 509,590 509,719 509,372 509,372 509,372 509,552 509,552 509,652 509,552 509,570 509,641 509,441	
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. Camera. See Magazine camera. Panoramic camera. Camera Subutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Medilen. Car coupling, T. Renwick. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilcox. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, acjustable fitting for freight, A. J. Sneed.	509,436 509,841 509,448 509,719 509,325 509,325 509,552 509,627 509,552 509,627 509,570 509,415 509,415 509,415 509,415 509,415 509,419 509,579 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419	
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. Camera. See Magazine camera. Panoramic camera. Camera Subutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Medilen. Car coupling, T. Renwick. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilcox. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, acjustable fitting for freight, A. J. Sneed.	509,436 509,841 509,448 509,719 509,325 509,325 509,552 509,627 509,552 509,627 509,570 509,415 509,415 509,415 509,415 509,415 509,419 509,579 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419	1 11 11 11 11 11
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. Camera. See Magazine camera. Panoramic camera. Camera Subutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, G. Blair. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Medilen. Car coupling, T. Renwick. Car coupling, A. J. Stanley. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilcox. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, acjustable fitting for freight, A. J. Sneed.	509,436 509,841 509,448 509,719 509,325 509,325 509,552 509,627 509,552 509,627 509,570 509,415 509,415 509,415 509,415 509,415 509,419 509,579 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419 509,419	
Button fastener W. Howard. Camera. Camera. See Magazine camera. Panoramic camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, T. P. Beadle. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Momullen. Car coupling, P. McMullen. Car coupling, P. McMullen. Car coupling, T. Renwick. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilco. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, adjustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, Ras engine, J. E. Caps. Carriage, convertible, F. Meyer.	509,436 509,841 509,590 509,739 509,739 509,372 509,383 509,587 509,575 509,575 509,575 509,416 509,416 509,416 509,697 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,462	
Button fastener W. Howard. Camera. Camera. See Magazine camera. Panoramic camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, T. P. Beadle. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Momullen. Car coupling, P. McMullen. Car coupling, P. McMullen. Car coupling, T. Renwick. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilco. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, adjustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, Ras engine, J. E. Caps. Carriage, convertible, F. Meyer.	509,436 509,841 509,590 509,739 509,739 509,372 509,383 509,587 509,575 509,575 509,575 509,416 509,416 509,416 509,697 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,462	
Button fastener W. Howard. Camera. Camera. See Magazine camera. Panoramic camera shutter, photographic, H. Casler. Can. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, T. P. Beadle. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Momullen. Car coupling, P. McMullen. Car coupling, P. McMullen. Car coupling, T. Renwick. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car coupling, A. W. Wallace. Car door, T. Eubank. Car fender, I. Bean. Car heater, M. A. Wilco. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Cars, adjustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, Ras engine, J. E. Caps. Carriage, convertible, F. Meyer.	509,436 509,841 509,590 509,739 509,739 509,372 509,383 509,587 509,575 509,575 509,575 509,416 509,416 509,416 509,697 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,409 509,697 509,462	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Magazine camera. Panoramic camera. camera Shutter, photographic, H. Casl er. can See Jacketed can. Reversible can. Car brake hand wheel. F. J. Pfenigar. Car coupling. T. P. Beaslie. Car coupling. G. Bair. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. T. P. McMullen. Car coupling. T. P. Goldham. Car coupling. T. P. Renwick. Car coupling. T. Renwick. Car coupling. T. Renwick. Car coupling. W. H. Wallace. Car coupling. W. H. Wallace. Car door, T. Euban. Car platform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car patform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car seat, railway. H. S. Hale. Car starter, L. W. Miler. Car wheel, G. W. Miler. Car wheel, G. C. Totten. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage and C. L. Comeaux. Case. See Egg case. Sow case. Casement holder, O. Eisele	509,436 509,841 509,448 509,590 509,719 500,385 509,817 501,817 501,828 500,552 501,655	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Magazine camera. Panoramic camera. camera Shutter, photographic, H. Casl er. can See Jacketed can. Reversible can. Car brake hand wheel. F. J. Pfenigar. Car coupling. T. P. Beaslie. Car coupling. G. Bair. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. T. P. McMullen. Car coupling. T. P. Goldham. Car coupling. T. P. Renwick. Car coupling. T. Renwick. Car coupling. T. Renwick. Car coupling. W. H. Wallace. Car coupling. W. H. Wallace. Car door, T. Euban. Car platform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car patform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car seat, railway. H. S. Hale. Car starter, L. W. Miler. Car wheel, G. W. Miler. Car wheel, G. C. Totten. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage and C. L. Comeaux. Case. See Egg case. Sow case. Casement holder, O. Eisele	509,436 509,841 509,448 509,590 509,719 500,385 509,817 501,817 501,828 500,552 501,655	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Magazine camera. Panoramic camera. camera Shutter, photographic, H. Casl er. can See Jacketed can. Reversible can. Car brake hand wheel. F. J. Pfenigar. Car coupling. T. P. Beaslie. Car coupling. G. Bair. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. T. P. McMullen. Car coupling. T. P. Goldham. Car coupling. T. P. Renwick. Car coupling. T. Renwick. Car coupling. T. Renwick. Car coupling. W. H. Wallace. Car coupling. W. H. Wallace. Car door, T. Euban. Car platform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car patform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car seat, railway. H. S. Hale. Car starter, L. W. Miler. Car wheel, G. W. Miler. Car wheel, G. C. Totten. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage and C. L. Comeaux. Case. See Egg case. Sow case. Casement holder, O. Eisele	509,436 509,841 509,448 509,590 509,719 500,385 509,817 501,817 501,828 500,552 501,655	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. See Magazine camera. Panoramic camera. camera Shutter, photographic, H. Casl er. can See Jacketed can. Reversible can. Car brake hand wheel. F. J. Pfenigar. Car coupling. T. P. Beaslie. Car coupling. G. Bair. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. J. Lessard. Car coupling. T. P. McMullen. Car coupling. T. P. Goldham. Car coupling. T. P. Renwick. Car coupling. T. Renwick. Car coupling. T. Renwick. Car coupling. W. H. Wallace. Car coupling. W. H. Wallace. Car door, T. Euban. Car platform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car patform balcony. E. W. Appelman. Car propeller J. P. Robertson. Car seat, railway. H. S. Hale. Car starter, L. W. Miler. Car wheel, G. W. Miler. Car wheel, G. C. Totten. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage and C. L. Comeaux. Case. See Egg case. Sow case. Casement holder, O. Eisele	509,436 509,841 509,448 509,590 509,719 500,385 509,817 501,817 501,817 501,817 501,817 501,817 501,652 501,653	
Button fastener W. Howard. Camera. Camera. See Magazine camera. Panoramic camera. Camera. Camera. Camera. Camera. Cane See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling. T. P. Beadie. Car coupling. G. Blair. Car coupling. J. Lessard. Car coupling. J. Renwick. Car coupling. C. P. Oldham. Car coupling. C. P. Oldham. Car coupling. C. P. Oldham. Car coupling. W. H. Wallace. Car car platform balcony. E. W. Appelman. Car pealer. J. P. Robertson. Car beeter, M. A. Wilcox. Car platform balcony. E. W. Appelman. Car seat, railway. H. S. Hale. Car starter, L. M. Woodcock. Car wbeel. G. W. Miller. Cars, adjustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. S. Rolfson. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, R. S. Rolfson. Carburetor, R. J. Rolfson. Carburetor, R	509,436 509,841 509,841 509,590 509,365 509,365 509,367 509,560 509,667 509,660 509,660	
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. See Magazine camera. Panoramic camera. Camera See Magazine camera. Panoramic camera. Carbara See Jacketed can. Reversible can. Car brake band wheel F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, Darrow & Roosevelt. Car coupling, T. Renwick. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car of the Carburant Carbura	509,436 509,841 509,841 509,448 509,590 509,385 509,387 509,582 509,587 509,587 509,587 509,687 509,687 509,6866 509,680	
Button fastener W. Howard. Camera. Camera. See Magazine camera. Panoramic camera. Camera. Camera. Camera. Camera. Care See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling. T. P. Beadle. Car coupling. G. Blair. Car coupling. G. Blair. Car coupling. J. Lessard. Car coupling. C. P. Oldham. Car coupling. C. P. Oldham. Car coupling. T. Renwick. Car coupling. T. Renwick. Car coupling. M. H. Wallace. Car coupling. W. H. Wallace. Car door, T. Eubank. Car fender. I. Bean. Car peopeller. J. P. Robertson. Car seat, railway. H. S. Hale. Car starter, L. M. Woodcock. Car wbeel. G. W. Miller. Cars, adjustable fitting for freight, A. J. Sneed. Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, R. J. Rolfson. Carburetor, Gas engine. J. E. Caps. Carriage, convertible, F. Meyer. Carriage, convertible, F. Meyer. Carriage top, Hubner & Von Seeberg. Cart, sugar cane, C. L. Comeaux. Case. See Egg case. Show case. Case ment holder, O. Eisele. Cash register, L. Ehrlich. Cash register, E. D. Gibbs. Cash register, L. Ehrlich. Cash register, L. Ehrlich. Cash register, L. Ehrlich. Cash register, See Folding chair. Rocking chair. Check row and drill, combined, C. H. & H. L. Dooley. Chest. See Flour chest. Churn and butter worker, combined, E. Silen. Churn mechanism, J. T. Walston.	509,436 509,841 509,448 509,590 509,345 509,345 509,345 509,359 509,375 509,457 509,457 509,457 509,457 509,457 509,457 509,457 509,457 509,457 509,457 509,666 509,666 509,666 509,666 509,772 509,778	
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. See Magazine camera. Panoramic camera. See Jacketed can. Reversible can. Car. See Jacketed can. Reversible can. Car brake band wheel. F. J. Pfenigar. Car coupling, T. P. Beadle. Car coupling, T. P. Beadle. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Mohullen. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car of the coupling, C. P. Robertson. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car platform balcony, E. W. Appelman. Car starter, L. M. Woodcock. Car wheel, G. W. Miller. Car wheel, G. W. Miller. Cars wheel, G. W. Miller. Cars acjustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Berlich, Cansalar Carles, Convertible, F. Meyer. Carriage convertible, F. Meyer. Carriage convertible, F. Meyer. Carriage top, Hubner & Von Seeberg. Cart, sugar cane, C. L. Comeaux Case. See Egg case. Show case. Casement holder, O. Eisele. Cash register, E. D. Gibbs. Cash register, E. D. Gibbs	509,436 509,841 509,841 509,448 509,590 509,397 509,387 509,587 509,587 509,577 509,772 509,686 509,679 509,679 509,686 509,779 509,772 509,772 509,779 509,779 509,779	
Button fastener W. Howard. camera. See Magazine camera. Panoramic camera. camera. camera. See Magazine camera. Panoramic camera. camera. Reversible can. Car. See Jacketed can. Reversible can. car brake hand wheel. F. J. Pfenigar. car coupling. T. P. Besalie. car coupling. G. Bair. car coupling. J. Lessard. car coupling. C. P. Oldham. car coupling. C. P. Oldham. car coupling. T. Renwick. car coupling. W. H. Wallace. car door, T. Eubank. car fender, I. Bean. car beater. M. A. Wilcox. car platform balcony. E. W. Appelman. car seat, railway. H. S. Hale. car wheel, G. W. Miller. car seat, railway. H. S. Hale. car wheel, R. C. Totten. cars, adjustable fitting for freight, A. J. Sneed, J. Carburetor, R. J. Rolfson. carburetor, R.	509,436 509,841 509,448 509,590 509,719 501,386 509,588 501,552 501,817 501,845 501,552 501,646 501,501 501,417 501,888 501,570 501,846 501,570 501,646 501,640	
Button fastener W. Howard. Camera. See Magazine camera. Panoramic camera. See Magazine camera. Panoramic camera. Camera. See Magazine camera. Panoramic camera. Camera See Jacketed can. Reversible can. Car brake hand wheel. F. J. Pfenigar. Car coupling, T. P. Besdie. Car coupling, T. P. Besdie. Car coupling, Darrow & Roosevelt. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. A. Hinson. Car coupling, J. P. Mollen. Car coupling, T. Renwick. Car coupling, A. G. Tupper. Car coupling, W. H. Waliace. Car door, T. Eubank. Car fender, I. Bean. Car platform balcony, E. W. Appelman. Car propeller, J. P. Robertson. Car seat, railway, H. S. Hale. Car starter, L. M. Woodcock. Car wheel, R. C. Totten. Cars wheel, G. W. Miller. Cars wheel, G. W. Miller. Cars wheel, G. W. Miller. Cars and sustable fitting for freight, A. J. Sneed, Jr. Carburetor, R. J. Rolfson. Carburetor, R. J. Berlich. Cash register, E. D. Gibbs. Cash register, E. D. Gibbs. Cash register, I. Ehrlich. Cash register, indicator, and check printer. L. Ehrlich. Cash register, check ejector for check printer. L. Ehrlich. Cash register, E. D. Gibbs. Cash register, check ejector for check printing, G. W. Grove. Chair, See Folding chair. Rocking chair. Check row and affill, combined, C. H. & H. L. Dooley. Chest. See Flour chest. Churn mechanism, J. T. Walston. Cigarette papers, package or wrapper for, F. Brousse. Cinders, device for burning and ejecting, R. H.	509,436 509,841 509,448 509,590 509,719 501,386 509,588 501,552 501,817 501,845 501,552 501,646 501,501 501,417 501,888 501,570 501,846 501,570 501,646 501,640	

	Ø		
rt	Cock, stop, J. G. Smith	509,628 5 0 9,845	Kite Kite
of	Collars, machine for forming turn-down linen, A.	509.514	Knif Knif Lace
or ·	Conduit provided with conduit couplings T C	509,687 509,383 509,567	Laci Lade Lade
or !	Converter core, laminated. C. F. Scott	509,770 509,543 509,619	Lam Lam Lam
g- in	fining of, Tuttle & Whitehead	509,634	Lant
ld er		509,819 509,496 509,483	Last Lava Leat
ا : t	Corset, V. H. Derly Corundum, machine for grinding gangue contain- ing, M. Balmes Cotton gin feed regulator. Hollingsworth & Ban-	509,789	Lens Lett Lifti
ed It	('Attan handling and fooding maching sood R &	509,536 509,765	Lifti Ligh Ligh
đ.	Munger	509,759 5 0 9,540	Lime Liqu
nt al a		509,848	Lock Lock Lock
nd		509,757 509,758	Loon
ed ng	Cultivator and planter, G. W. Kandolph	509,758 509,599 509,766 509,558	Lubi Maga Mail
od ill	Cultivator, harrow, and cotton planter, G. W. Randolph Cultivator, tree, A. Mojer	509,826 509,544	Mate Mea Met
- ;	Randolph Cultivator, tree, A. Moler Cupola or blast furnace, A. P. Rushforth Cusbion, W. H. Goodnow. Cut-out, N. F. Adams.	509,450 : 509,729 : 509,713	Mete t
) on	Cut-out, N. F. Adams. Cut-out, electric double pole fixture, H. E. Wer- line. Cut-out, electric pendant, H. E. Werline. Cutter. See Band cutter. Vegetable cutter. Detachable handle for pans, etc., C. H. Hommel.		Mill. Mill
a- ne:	Cutter. See Band cutter. Vegetable cutter. De tachable handle for pans, etc., C. H. Hommel Digger. See Posthole digger. Potato digger.	509,738	Milli Mine
A ill ns	Cutter. See Balle Cutter. Vegenatic Citter. Detachable handle for pans, etc., C.H. Hommel. Digger. See Post hele digger. Potato digger. Disinfecting device, G. G. Crosby. Door hanger, sliding, J. Balderson. Doorway conformator, J. Ort.	509,426 509,643 509,582	Mite Mop Mote
Or SS	Drill. See Jumper drill. Dust pan, G. B. Sarchet. Dye, brown, R. Lauch. Dye, brown. Ulrich & Bammann.	509,689 509,623 509,635	Mow
88 d -	Dye. brown. Ulrich & Bammann Dyeing, etc., apparatus for, A. & J. Graemiger Egg case. J. H. Bowley	509,431 509,838	Mus Mus
-	Dyeing, etc., apparatus for, A. & J. Graemiger Egg case, J. H. Bowley Egg case, J. H. Bowley Electric conduit coupling. A. Noll. Electric current meter, W. T. M. Mottram. Electric current regulator, J. H. Clark. Electric elevator, F. B. Ferkins. Electric elevator, F. B. Ferkins.	509,603 509,750 509,363 509,821	Mus Nail Noza
$\mathbf{S} $	Electric elevator, F. B. Perkins. Electric elevator. C. R. Pratt. Electric lighting system. J. B. McGiffert.	509,821 509,397 509,443	Nut Nut ●il t
ļ	Electric lighting system. J. B. McGiffert Electric machine, dynamo, C. Hoffmann Electric machine regulator, dynamo, E. Thomson	509,662 509,499	Orar Ores Orga
	son Electric machines, compounding dynamo, W. H. Knight. Electric machines, compounding dynamo, H. F.	509,475	Orga Daci
l İ	Electric motor and induction coil, combined, J. S.	509,486 509,445	Paci Pan Pap
E.	Nowotny. Electric motor switching apparatus, Wright & Kinsey.	509,505 509,539	Pen Pha Pho
1	Kunsey. Electric switch, C. J. Klein Electrical controller, E. A. Sperry. Electrical distribution, system of. T. A. Edison Electro-magnetic alarm. P. Rabbidge. Electro-magnetic reciprocating motor, R. Thiel-	509,776 509,517 509,680	Pick Pict
64	Electro-magnetic reciprocating motor, R. Threl- fall. Elevator. See Electric elevator. Liquid ele-	509,705	Pile,
22 73 40	vator. Sucker rod elevator.		Pipe Pipe Plan Plan
46 : 49	Ether motor, P. De Susini	509,406	Plar Plov
61 78	for J. A. Morrell Expansible bit, J. P. Lavigne Expansion engine, trule, J. Marshall Extractor, See Tack extractor.	509,749 509,667 509,752	Plov Poci Poli
20 82 84	lor	509,703	Post Post Post
110 194	lor Fan, S. H. Baer. Fare indica tor and register, F. Erhardt Farm gate, T. & J. Hohulin	509,835 509,799 5 0 9,374	Pota Pota Pota
80 507 34	Farm gate, T. & J. Hobulin. Fatty matters, purifying, E. Watel. Faucet, oil can, A. H. & T. A. Schlueter. Fence, hedge, B. R. Kirkpatrick.	509,589 509,769 509,812	Proc
81 739	Fence, wire, J. A. Grove. Fence, wire, O. C. & P. B. Moreland Fence wire ratchet. J. B. Morris.	509,731 509,755 509,580	Prin Prin
77 65 74	Fencing, machine for making wire and slat, H.		Prin Prin
71			Prin
138 579 504	Feiter, M. Kraker. 509,740, Filter, B. Medina-Santurio. Filter, water. O. Eastman. Fire alarm signal box, J. M. Gardiner. Fire arm, G. H. Garrison. Flow obset A. Mayor.	509,596 509,573 509,727	Pro Pug Pul
129 192 36 71	Fluid motor, rotary, E. E. Bardsley Folding chair, G. F. Hanson.	509,644 509,735	Pun Pun Pun
			Pun Pur Rac
37 378	Folding gate, A. F. Spencer. Forceps, M. McNalley. Furniture leg fastening, G. C. Goodyear. Game apparatus, W. E. Kelly. Game apparatus, H. Knight. Garment clasp, M. E. Ohrnstedt. Garment turner, W. Denton. Gas burner, heating, Williamson & Bushy. Gas lamps, lighting, I. Hartig. Gas miyer C. G. Freeman	509,618 509,601 509,813	Rail Rail
38 60	Garment clasp, M. E. Ohrnstedt	509,551 509,655 509,710	Rail Rail Rail
531 53 3 525	Gas regulator and cut-off, G. Palm	509,531 509,369 509,395	Rail Rail
586 547	Gear planer tool controlling mechanism. J. E.	509,516	Rail Rail
753	Gem cutting and polishing machine, W. C.	509,467 509,814	Rail Rail
128 361	Knuth Glassware engraving machine, H. A. Rube Grading powdered material, apparatus for, W. W. Gillespie	509,829 509.728	Rail (Rail
781 718 322	Grain binder, W. M. Holmes	509.470 509.523	Rail Rais
146 585	Gun, magazine, J. L. McCulloughGun, trap, M. S. Barker	509,774 509,548 509,716	Rak Ran Rat
714 136	Handle. See Detachable bandle. Knife handle. Hanger. See Door hanger. Harness, T. Decker	509,464	Ref Ref
841	Handle. See Detachable bandle. Knife handle. Hanger. See Door hanger. Harness, T. Decker. Harness, E. J. Schermerborn. Harness strap attachment, J. Reed. Harrow, J. J. ('allender Harrow, J. I. Hoke	509,690 509,449 509,791	Ref Reg
148 590 719	Harrow and cultivator, combined side, G. W. Randelph	509,767	Reg
365 372 317	Harrow. rotary, C. Robert	509,686 509,571 509,492	Ret
338 552 527	Harvesting machine, F. H. Rogers. Hat and coat hook, F. Taylor. 509,628, Hat holder, foldable, J. W. Thayer. Header, grain, Bebel & Jenkins.	509,630 509,832 509,648	Rev Rive Rive
157 779 588	Hearths, adjustable and detachable frame or	509,577	Rive Rive Roc
570 646 415	Heater or boiler, H. Stanton	509,495 509,366	Rod Roo
641 491 527		509,758 509,503 509,702	Ros Rot Rou
419 579 409	Heef etc. I. K. Rogers. Hide fleshing machine, A. E. Whitney. Hinge, T. Tangney Hitching strap, A. J. Cogley. Hobby horse, W. Sancto. Hoe and fertilizer distributer, horse, F. M.	509,652 509,451	Row Rule Salie
597 328	Haines Holdback book, W. G. Mauk	509,468 509,747 509,804	San Sash Sash
462 385			Saw Saw
172 125 353	Hook and eye, J. D. R. Lamson. Horse tail holder, J. F. Lavine. Hose mender O. H. Still McCormack. Hot water hea ter, J. H. McCormack. Hulling coffee, rice, etc., machine for and mode	509,458 509,6 6 9	Saw
556 658	of. L. A. Riester	509,606 509,830 509,420	Scal
6 5 7	of. L. A. Riester. Hydrocarbon motor, W. Seck. Lee cutting machine, D. R. & F. M. Woodsum. Incubator, New & Mittelsteadt. Indicating system, S. B. Thurston. Indicator, See Fare indicator. Potential indicator. Route indicator. Potential indicator. Route indicator. Potential indicator.	509,389 509,459	Scra Scre Scre Seal
5 6 0	cator. Route indicator. Losential indi- induction apparatus, M. R. Ruble	509.40 0 509.701	Seal Seal
797	Induction apparatus, M. R. Ruble. Ingot moulds, bottom plate for steel, B. Talbot Inbaler, F. A. Dietrich. Insulator, strain, C. H. Dey Ironing collar tips, machine for, A. W. Cummings, and the collaboration of th	509,701 509,465 509,614	Sew
772 780	Ironing colar tips, machine for, A. W. Cummings	509,513 509,510	Sew Sha
790 624	Jacketed can, M. A. Marzynski. Joint. See Lock joint. Rail joint. Universal	509,440	Shed
624 375	joint. Jumper drill. electrically-operated. C. Hoffmann. Key and knob fastening device, E. V. Reynolds. Kiln. See Lime kiln.	509,973 509,489	Shir Shir Shir
746	Kilnfor burning lime or cement rock, T. K. Nick-		Sho

	Kitchen cabinet, F. Coleman Kitchen cabinet, C. H. Ferriss Knife. See Orange knife.	509,653 509,466
	Knife banele, A. Pauls. Lace, veiling, or ribbon boleer, J. M. Schlesinger. Lacing book setting machine, W. Haikyard.509,733. Ladder apparatus, A. K. Goodwin. Ladder, extension, W. J. Osborne. Lamp, electric arc, E. P. Clark. Lamp, miner's safety, C. H. Wolf. Lampset, S. Gudmunson. Lanips, etc., lighting attachment for, Whipple & Gudmunson. Lantern, signal, C. H. Smith	509,762 509,691 509,734 509,598
3	Ladder, extension, W. J. Osborne Lamp, electric arc, E. P. Clark Lamp, miner's safety, C. H. Wolf.	509,673 509,842 509,418
	Lamps, etc., fighting attachment for, Whipple & Gudmunson Lantern, signal, C. H. Smith Last. H. L. Larrabee	509,563 509,696 509,384
	Gudmunson Lantern, signal, C. H. Smith Last, H. L. Larrabee Lavatory standard, W. Scott Leather marker, H. W. Gordon Lens, fluid, A. A. Ingram. Letter and bread bex, combined, W. E. Hart-	509,402 509,576 509,379
	mann. Lifting jack, A. P. Aiken. Lightning arrester, A. Wurts. Lightning arrester, universal non-arcing, A.	509,532 509,565 509,783
3	Lightning arrester, universal non-arcing, A. Wurts. Limekiln, G. A. Mace.	509,784 509,439 509,437
3	Wurts. Limekiln, G. A. Mace. Liquid elevator, S. Jenkins. Lock joint, J. W. Coffeen, Jr. Locomotive or other boiler, Fitzgerald & White. Loom pattern mechanism, H. Wyman Loom shuttle box operating mechanism, J. East-	
' •	Loom shuttle box operating mechanism, J. Eastwood. Loom warp stop motion, E. Smith	509,615 509,494
; ;	wood. Loom warp stop motion, E. Smith. Lubricator, B. Liebing. Magazine camera, L. & A. Chronik. Mail pouch, W. C. Wilson. Match box and lighter, combined, D. J. Morgan. Measuring vessel, G. Potter.	509,668 509,611 509,711 509,481
; ! !	ing coated, Lewis & Morgan	509,488 509,745
3	Meter. See Electric current meter. Water meter. Mill. See Picket mill. Pug mill. Sawmill. Sweep mill.	
į : 3.	mill. Mill cut-off, fees, J. F. Winchell. Milling machine, C. H. Norton. Minerals, washing and separating, W. S. Lockhart. Miter box, M. Hanson. Mop wringer, E. Beach. Motor. See Electric motor. Electro-magnetic reciprocating motor. Ether motor. Fluid	509,416 509,444
3	hart Miter box, M. Hanson Mop wringer, E. Beach Motor. See Electric motor. Electro-magnetic	509,818 509,736 509,717
3	motor. Hydrocarbon motor. Mower lawn T. Johnston	509.600
3	bausen & Riessner	509,358 509,612 509,414
) ·] · [;]	Nail bolding tool, J. C. Richardson	509,399 509,353 509,602
2	oil burner, H. Stacey	509,831 509,515 509,368
9 5	Organ, reed or pipe, M. S. Wright	509,506 509,850
5	Music box coin-controlled mechanism, Brachbausen & Riessner. Music rest and leaf holder, W. H. Curd. Musical instruments, stringing, C. S. Weber. Nail bolding tool, J. C. Richardson. Nozzle appliance. O. P. Austin. Nut lock, Miles & Commander. Nut lock, J. Taini. ©il burner, H. Stacey. Orange knife, C. A. Dietz. Ores, treating, E. C. Engelbardt. Organ, reed or pipe, M. S. Wright. Organs, adjustable combination pedal attachment for pipe, E. S. Votey. Packing, piston, T. Roberts. Packing, piston rod, G. Hagmann. Panoramic camera, R. W. Stewart. Paper, guillotine for cutting, T. Furnival.	509,803 509,698 509,522
5	Panoramic camera, R. W. Stewart Paper, guillotine for cutting, T. Furnival. Penholder regulator, F. Treier Pharmaceutical compound, F. Goldmann. Photographic retoucher, J. R. Dake Picket mil, F. W. Strob et al. Picture frame attachment, E. H. Patterson. Pile, W. Kennish Pile corpusation look, J. H. Lang	509,632 509,617 509,721 509,405
7	Picture frame attachment, E. H. Patterson Pile, W. Kennish Pipe connection lock, J. H. Lane	509,405 509,626 509,474 509,742
5	Pipe coupling, J. H. Lane. Pipe stop or shut-off, J. Gilligan. Pipe wrench, R. T. Torkelson. Planing machine, E. Holmes et al.	509,742 509,743 509,575 509,408
6		
7	Pocketbooks, etc., frame for S. Rosenzweig	509,688
3	Pool triangle register, C. F. Brown. Post hole digger, H. Paulson. Post hole digger, J. H. Sublett Potato digger, L. W. Hugelmeier.	509,424 509,487 509,778 509,378
9	Pool triangle register, C. F. Brown Post bole eigger, H. Paulson Post bole eigger, J. H. Sublett Potato digger, L. W. Hugelmeier Potato digger, D. J. McDougal Potential indicator G. A. Lintner Procious metal bearing slimes, treating, Tuttle & Whitelead	509,760 509,578 509,633
2 1 5	Preserving provisions on ice, pot for, E. Feuer- herd.	509,572 509,764
0	Printing oilcloths. machine for, G. F. Eisenhardt Printing press chases, machine for dressing, W.	
1	H. Price, Jr. Printing press inking plate and attachment, W. H. Price, Jr. Printing transfers from engraved rolls, machine for, T. Harper.	509,825 509,528
6 3 7	Printing transfers from engraved rolls, machine for, T. Harper. Projectiles, machine for forming, J. S. Griffin. Pug mill, T. B. Campbell. Pulverizer, W. Beiser. Pump, C. C. Shelburn (r). Pump, duplex steam, C. A. Goyne. Pump, vacuum, G. E. O. Lange. Punching machine, A. M. Parks. Purse. coin, W. J. Worden. Rack. See Whip rack. Rail brace and tie plate combined, C. T. Schoen,	509,730 509,360 509,357
5 2	Pump, duplex steam, C. A. Goyne Pump, vacuum, G. E. O. Lange Punching machine, A. M. Parks.	509,659 509,541 509,761
9 1 8 1		
3 1 5	Rall, guard, L. J. Baker	509,422 509,581
0 1 9 5	Railway, conduit electric, E. H. Johnson	509,421
6	Railway frogs, machine for the manufacture of,	509,518 509,442
7 4 9	Railways, automatic fog signal apparatus for J.	509,785 509,796
8	Chabeault. Railways, electric closed conduit system for, G. W. von Siemens. Railways, subway for cable, Vogel & McIntosh	509,651 509,403
8 4 8	Railways, subway for cable, Vogel & McIntosh Raisin seeder, S. B. Bliss Rake and loader, J. S. Bevers	509,833
Ğ	Range cooking C E Darling	509,649 509,852 509,654
9 1	Railways, subway for cable, Vogel & McIntosh Raisin seeder, S. B. Bliss Rake and loader, J. S. Beyers. Range, cooking, C. E. Darling. Ratchet wrench, E. B. Hyre. Refrigeration and storage, device for, C. S. Hardy	509,852 509,654 509,810
4	Refrigerator car. Barker & Reynolds	509,852 509,654 509,810
6	Refrigerator car. C. S. Haray	509,852 509,654 509,810
7 6 1 2	Refrigerator car. Barker & Reynolds. Refrigerator car. C. S. Hardy	509,852 509,854 509,810 509,805 509,836 509,836
2 0 2 8	Refrigerator car. Barker & Reynolds. Refrigerator car. C. S. Hardy	509,852 509,854 509,810 509,805 509,836 509,836
7612028 7	Refrigerator car. C. S. Haray	509,852 509,854 509,810 509,836 509,836 509,568 509,568 509,762 509,762 509,762 509,763 509,763 509,763
2 0 2 8	Refrigerator car. Barker & Reynolds. Refrigerator car. C. S. Hardy	509,852 509,854 509,810 509,836 509,836 509,836 509,554 509,652 509,782 509,782 509,663 509,782 509,663
2 0 2 8	Refrigerator car. Barker & Reynolds. Refrigerator car. C. S. Hardy	509,852 509,854 509,810 509,836 509,836 509,836 509,554 509,652 509,782 509,782 509,663 509,782 509,663
2 0 2 8	Refrigerator car. C. S. Haray	509,852 509,854 509,856 509,836 509,836 509,548 509,554 509,663 509,752 509,663 509,752 509,663 509,752 509,765 509,765 509,765 509,765 509,765 509,765 509,765 509,765
2 0 2 8	Refrigerator car. C. S. Haray	509,895 509,654 509,805 509,807 509,836 509,836 509,568 509,568 509,569 509,782 509,782 509,782 509,782 509,782 509,782 509,696 509,696 509,696 509,696 509,696 509,605 509,605 509,605 509,507 609,605 509,507 509,708 509,708
2028 7 5683221 874 5689 60	Refrigerator car. C. S. Haray	509,895 509,654 509,805 509,807 509,836 509,836 509,568 509,568 509,569 509,782 509,782 509,782 509,782 509,782 509,782 509,696 509,696 509,696 509,696 509,696 509,605 509,605 509,605 509,507 609,605 509,507 509,708 509,708
2028 7 5683221 874 5689	Refrigerator car. C. S. Haray	509,895 509,654 509,805 509,807 509,836 509,836 509,568 509,568 509,569 509,782 509,782 509,782 509,782 509,782 509,782 509,696 509,696 509,696 509,696 509,696 509,605 509,605 509,605 509,507 609,605 509,507 509,708 509,708
2028 7 5683221 874 5689 6009	Refrigerator car. C. S. Haray	509,683 509,654 509,654 509,815 509,836 509,586 509,586 509,586 509,693 509,782 509,782 509,783 509,783 509,783 509,787 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,574 509,595 509,574
2028 7 56832221 874 5689 60099 1 154	Refrigerator car. C. S. Haray	509,885 509,867 509,810 509,810 509,836 509,836 509,586 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,574 509,574 509,574 509,574 509,592 509,386 509,786 509,574 509,574 509,574 509,575 509,574 509,575 509,574 509,575 509,587
2028 7 56832221 874 56889 60099 1 15	Refrigerator car. C. S. Haray	509,885 509,867 509,810 509,810 509,836 509,836 509,586 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,574 509,574 509,574 509,574 509,592 509,386 509,786 509,574 509,574 509,574 509,575 509,574 509,575 509,574 509,575 509,587
2028 7 56832221 874 5689 600099 1154 30 0	Refrigerator car. C. S. Haray	509,885 509,867 509,810 509,810 509,836 509,836 509,586 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,574 509,574 509,574 509,574 509,592 509,386 509,786 509,574 509,574 509,574 509,575 509,574 509,575 509,574 509,575 509,587
2028 7 56832221 874 5689 60099 1154 30	Refrigerator car. C. S. Harayy	509,885 509,867 509,810 509,810 509,836 509,836 509,586 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,786 509,574 509,574 509,574 509,574 509,592 509,386 509,786 509,574 509,574 509,574 509,575 509,574 509,575 509,574 509,575 509,587