RECENTLY PATENTED INVENTIONS.

EXHAUST NOZZLE.—Charles W. Umholtz, Bristol, Va. This invention provides an improved locomotive exhaust having a main central and supplemental surrounding passage, but with the nozzle proper independent of and detachable from the standpipe and supported npon vertical pins projecting from the top of the latter, which also has a vertical flange surrounding the base of the nozzle, but separated from it by a narrow space, which serves as the exterior or supplemental steam passage. Through this supplemental passage the steam has practically free exit, and the nozzle proper may be readily detached when re-

VALVE GEAR.—Fred. E. Smith, Boston, Mass. A rocker is yieldingly connected through springs with the eccentric rod, the rocker being also connected with the valve stem and, by a piston, with an auxiliary fluid cylinder, preferably containing oil, the ends of the cylinder being connected by a pipe. The movement of the rocker is thus controlled by the speed with which the fluid passes from one end of the cylinder to the other, so that the valve will always travel at a constant rate of speed, and prevent racing of the engine, giving a uniform motion to the driving shaft.

Railway Appliances.

CAR COUPLING.—Charles W. Stillians, Pueblo, Col. This device is more especially designed for a freight car coupling. A normally elevated vertically sliding link tilter is located in therear of the linkengaging portion of a coupling hook or arm pivoted in the drawhead, in connection with mechanism for raising the coupling hook and depressing the link tilter. The coupling is strong and durable, and may be operated without danger to the trainmen, and the coupling link may be readily raised or lowered to suit opposing cars of different heights.

CAR COUPLING.—Hampton K. Smith, Union, S. C. This coupler comprises a drawhead cap able of an interlocking connection with an opposing drawhead, while valve heads are carried by the drawheads to receive the air pipes for air brakes or steam pipes. The valve heads are so constructed that when the heads of two opposed couplers are brought together a connection is established between the steam or air pipes of the heads, and when the drawheads are uncoupled the valves in the heads automatically seat themselves and prevent the escape of steam or air, the connection and disconnection of the pipes being thus automatically effected.

ILLUMINATING TRACKS.—William E. Ferguson, Montclair, N. J. This invention provides means whereby one or more lights may be arranged be tween the rails of a track for lighting up the roadbed, the lights being so arranged that trains may pass over without injuring them. A board having battens on its under face at each end engages the webs of opposite rails, and pendent from the board is a series of hangers, in which are held electric lights, brought in circuit in the usual manner.

Mechanical.

CLUTCH. - Daniel T. Denton, Duluth, Minn. A strong, durable, and effective friction clutch is provided by this invention, the friction faces of which may be held in contact without exerting longitudinal or endwise pressure on the shaft, while the clutch gear is idle and does not rotate when thrown out of gear or out of frictional contact, thus enabling the operator to make adjustments or alterations or repairs without stopping the rotation of the shaft. The construction is such that the whole clutch and frictional device may be made in halves or sections when used with the split pulley, thus enabling it to be placed on the shaft without removing the latter.

Miscellaneous,

MUSICAL INSTRUMENT.-Dwight Kempton, Summerland, Cal. An improvement designed to greatly enrich the tone of stringed instruments, such as pianos, and whereby also the weight of the instrument may be reduced, has been devised by this inventor. It consists of a series of harmonic sections, each comprising an independent stringed supporting bar provided with a bridge and pins for holding the strings in place. Each harmonic section carries as many strings as are necessary to produce the desired tone, the hammer striking the series of strings simultaneously, and the several sections are placed sufficiently apart to make them independent of each other.

PENCIL POINTER.—Frank E. Flagg, New York City. The casing of this device has a socket plate with a conical bore to receive the pencil, the extending through a heveled face of the plate while a disk having a beveled inner face and attached abrading material is held to revolve in close proximity to the beveled face of the socket plate, a clamp holding the pencil and a driving mechanism being connected with the disk and the clamp. The device is of simple construction, and is adapted to rapidly and perfectly point a peneil, producing a point as long as may be

EASEL ATTACHMENT.—Henry J. Muhlfeld and Frank J. Spillane, New York City. To enable a student to sketch from casts or life in a crowded school room, the canvas or drawing board needs a support and adjustment not easily obtained, an object this invention is designed to facilitate, providing therefor an attachment for chairs or other supports consisting of vertical supporting rods adjustable toward and from each other, and supports for such rods, there being pic ture supports mounted on the upper portions of the rods. The device consists of two sections, each attached to the vertical side rail of a chair back at the back.

WINDOW CHAIR.—Adolph Boettcher. South Stillwater, Minn. This is a scaffold or chair constructed in two side sections, adjustably connected by a bar, forming a light and strong structure, which can Master Car Builders' and Master Mechanics' Associa-

be quickly fastened in a window to extend outward beyoud it, being readily removable from one window to be carried to another. A guard rail may be used in connection with the device, and it is also well adapted for household use in the cleaning of windows, while it may be compactly disposed of when not in use.

VELOCIPEDE. - Martha E. Slocum. Meadville, Pa. The depending seat frame of this vehicle has outwardly projecting arms at its upper end, on which the hubs of large wheels are journaled, one on each side, an arm or arms rigidly mounted on the same axles carrying a supplemental small wheel or wheels. Motion is communicated from the treadle by sprocket wheels and chains to the axles of the large wheels, and the machine is designed to be especially safe and easy riding, so that it can be used by the most timid persons

WHIP SOCKET.—Henry E. Schreader. Manteno, Ill. This invention relates to whip sockets having locking devices to prevent the whip from being abstracted. The socket has at one side a lock case, in which is a transverse slide rack with an external operating handle, there being a whip retainer at the inner end of the rack, the latter being engaged by a toothed latch, and a series of sliding tumblers engaging the latch. Keys having projecting flugerpieces are pivoted in the case in engagement with the tumblers, and by changing the relative positions of the latter a great variety of combinations is made possible.

SIDE REFLECTOR.—Charles E. Plumtree, Spokane Falls, Washington. A reflector support which may be readily applied to any lamp is provided by this invention, the arrangement being such that the reflector can be moved to any position to throw the light where desired. The support has a collar secured by a set screw to the burner or other part of the lamp, a ring sliding in this collar having a socket in which is held an adjustable bar, from which the reflector is supported, the adjustment being maintained by set screws.

ADDRESSING MACHINE. - John P. O'Malley, Manistee, Mich. A type galley containing a series of addresses, at spaced distances apart, is supported on a longitudinally sliding carriage in a suitable frame. An impression block operated by a treadle effects the impression as the paper or envelope is held over the type bearing the desired address, and when the pressure is removed from the treadle the carriage holding the type galley is automatically moved forward the distance between two sets of addresses, the operation being repeated as many times as there are separate addresses on the galley.

SNATCH BLOCK.—Adams C. French, Seattle, Washington. This invention provides an inexpensive and durable block for hoisting purposes which may be readily detached from its hook, and which is connected with the hook in such a way that the frame cannot spread. The construction is very simple, and the parts may be easily detached or

Pump. - Melchi M. Grove, Garfield, Washington. This is a simple form of pump, which may be partially submerged in water, and which, by means of air pressure applied to the chambers, is designed to pump waterrapidly. It is a pump which may be used for any ordinary pumping purposes, but is especially intended for Irrigation, the invention covering various novel features of construction and combinations of parts.

GRAIN CUT-OFF.—Philander D. Thompson, Neligh, Neb. This invention relates to a combined cut-off and delivery spout for feed hoppers in granaries, elevators, and mills, providing a device which is inexpensive, and which can be operated either to cutoff the supply completely or to cut it off from one point and direct it to another. The construction is designed to prevent the escape of any grain between the operating parts to clog the machine, and the various openings are made to register accurately, whereby friction is avoided.

STOVEPIPE COUPLING. - Francis P. Hart, Strasburg, Pa. This coupling consists of a sleeve piece having one end folded to double its thickness, and longitudinally notched, the unjoined edges of the sleeves having hooks folded internally, and a thin wedge being insertible within and between the books. The device is designed to facilitate the making of a neat and secure connection between the ends of stove pipe sections, whether the sections are adapted to slip-joint together or are of equal diameter where joined.

ANIMAL SHEARS.—Charles and Harry Burgon, Maiin Bridge, near Sheffield, England. This invention relates to improvements in instruments for shearing or clipping sheep or other animals, and provides improved means for applying and adjusting the pressure of the upper cutiers upon the lower cutters, relieving the axis of the vibrating lever as far as possible from all bending strain. A spring latch retains the axis of the swiveling crosshead of the lever in its socket, while permitting it to swivel freely and allowing of its easy insertion and removal.

WINDOW FRAME AND SASH.—John Anderson, Hickson, North Dakota. According to this invention, one of the parting beads and one of the inner beads of the window frame are provided with a movable section, connected crank shafts in the frame connecting the movable beads to move them to and from the sashes, to permit the latter to swing outward. The attachment may be conveniently added to any window frame, and by its use the sashes may be wung outward to stand at a right angle, so that both sides of the glass may be conveniently cleaned.

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

NEW BOOKS AND PUBLICATIONS.

RAILWAY CAR CONSTRUCTION. By William Voss. New York: R. M. Van Arsdale. 1892. Pp. 177. No index. Price \$3.

Railway car construction, under the auspices of the

tions, has reached a definite standard. The object of the present work is to describe in detail the improved construction of all kinds of cars and of all their parts, by the aid of very numerous illustrations. This idea is very adequately carried out. The work, we should conceive, is one which would be indispensable in the car factory, as the numerous dimensions quoted on the plane give them all the meaning of a large scale drawing. The publisher is the proprietor of the National Car and notive Builder, and is therefore peculiarly well situated for publishing such a work. "Interchange of traffic codes," as adopted by the Master Car Builders' Association, are embodied, with illustrations as required. The work is without index, but its place is supplied by a very full table of contents.

HIGH MEDICAL CULTURE. By W. R. Dunham, M.D. Cambridge: Printed for the author. 1892. Pp. 225. No index. Price \$1.

The author of this work believes that the present tendency of the schools is to teach medical practice without the science, and, as far as they attempt to teach medical science, to teach it incorrectly. The work is radical and claims to touch on medical science as based on the four vital properties of laws of organic force One theory which he enunciates is that medicines by their presence provoke the various organs to increased, diminished or modified action, but are without action

THE METAL WORKER ESSAYS ON HOUSE HEATING. Arranged for publication by A. O. Kittredge. New York: David Williams. 1892. Pp. 407. David Williams. Price \$3.

This work is the outcome of prize essays on steam not water and hot air heating of dwellings, originally published in the Metal Worker. These essays are re-produced, together with a number of letters of criticism ipon the prize essays, which letters were alsooriginally published in the Metal Worker. The criticisms give a vivacity to the work which might have been found wanting in the more formal prize essays. A valuable feature is the addition of a section on the proportioning of radiating surfaces. The solution of this problem is precisely the great desideratum for practical work, and we welcome its publication in accessible form.

BULLETIN OF THE PHILOSOPHICAL SO-CIETY OF WASHINGTON. Vol. XI. Washington: Printed by Judd & Detweiler. 1892. Pp. xxxi, 618.

Quite a large range of scientific subjects is contained in this volume of reports. Geology and astronomy are perhaps the controlling motives of the proceedings. A contents and exhaustive index are embodied in the work. The volume makes a very large octavo and testifies to the scientific activity of the society.

ELEMENTS OF MACHINE DESIGN, By J. F. Klein. Bethlehem, Pa.: The Comenius Press. 1892. Pp. vi, 212. Price \$6.

Professor Klein has published the foregoing elements with notes and folding plates for the use of students in the Lehigh University, where he holds the chair of mechanical engineering. The work is profusely illustrated with cuts in the text as well as large plates. The index gives four columns of reference—to the page to the formula number, to figures and plates and to the page number of tables. After the index, which may be referred to as a realmodel in its way, an appendix of gear tables is given.

STREET RAILWAYS. By C. B. Fairchild. New York: The Street Railway Publishing Company 1892. Pp. vii, 441. Price \$4.

The above work is of interest as testifying to the enormous extension of the street railway industry. The introduction of electric and cable traction has greatly expanded the field of work. The subjects of electric, cable and horse traction, with a short notice of steam air and gas motors, open the book. Elevated roads, tower building, track construction, discipline and rules for employee and passengers, together with the charters, franchises, bookkeeping, and street railway accounts, are the general topics included. The treatment is as practical as the titles above summarized would indicate. An interesting feature of the work is contained in Chapter 13, in which different types of street cars, 47 in number, built by 18 representative car-building companies of this country, are illustrated.

FOURTEENTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF THE STATE OF CONNECTICUT. For the year ending November 30, 1891. With the registration report for 1890 relating to hirthe marriages doubted. lating to births, marriages, deaths, and divorces. Printed by order of the legislature. New Haven: Tuttle, Morehouse & Taylor, printers. 1892. Pp. xxxvii, 447, 202.

PRIMITIVE MAN IN OHIO. By Warren K. Moorehead. G. P. Putnam's Sons 1892. Pp. xv, 246. Price \$3.

The deeply interesting work in archæology and anthropology executed in Ohio during the recent years with particular reference to late discoveries is given in this book in most attractive shape. Numerous views of scenery and implements and plans of mounds and allied subjects give a vivid aspect to this treatment of an exceedingly popular subject. We note especially several references to Professor Putnam, who of late years has given considerable attention to Ohio anthropology, in the interests of the Peabody Museum.

SADDLE AND SENTIMENT. A sto the turf. By Wenona Gilman. Outing Company, Limited. Pp. 284. Price 50 cents. A story of ilman. The

Horse racing, the development of man's noblest servant, under the auspices of the enthusiastic Kentucky horseman, the excitement of the race track interwoven with a thread of romance so as to weave the whole into the form of an attractive novel are, the matter of "Sandle and Sentiment." It is enlivened by numerous illustrations, and will, we believe, find numerous readers,

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> Universal and Plain Milling Machines. Pedrick & Ayer, Philadelphia, Pa.

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. Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y. For Sale-Patent on burial device illustrated on page 146. For terms and particulars address John B. Beugler. Dayton, Tenn.

A large chemical works wishes novelties, specialties, and standard articles to manufacture. PeterT. Austen, 9 Cliff St., N. Y.

Wanted-Samples, price, for cheap mechanical novelties for exhibition and sale. M. C. Craig, Sydenham, Natal, Africa.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, 34; Munn & Co., publishers, 361 Broadway, N. Y.

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(4503) H. B. P. writes: 1. Some arcdvnamos, the Wood for instance, have two brushes on each side of the commutator, with several bars of the commutator between them. Kindly explain the reason for using the two brushes. What advantage is gained? Why is no arc formed at the brushes by the short-circuited coils? A. The object in arranging the brushes as stated is to cut out a portion of the armature winding, thus reducing resistance and giving the conductors time to cool. 2. I have been told that arc lamps connected in multiple series on an incandescent circuit will consume the + and - carbons equally fast. Is such the case? A. This will not occur unless the carbons are of unequal size, or unless the current is an alternating one. 3. Will you advise me if there is any book on arc lamps?-the trouble in them, how found, and remedied? A. There is no book treating on arc lamps of all descriptions. We believe that most manufacturers of arc lamps publish information for the benefit of users.

(4504) G. M. R. asks: How is the noise we call thunder produced or caused? Is a side crank on steam engine stronger or in any way better than a center crank? Why does oil or any other lubricant aid a cutting tool in metal, since it certainly cannot touch the cutting edge? Experience has shown that lard oil used in cutting a thread for a tap makes a smoother job than most other oils, and as it could get no nearer the cutting edge, I fail to see what different action it has. A. The cause of thunder and of its prolonged noise is not well understood. According to some the action is similar to the explosion of powder in a gun. When lightning strikes a tree or building, the noise is intensified by the sudden disruption of the solid material, as the splitting of a tree or the tearing apart of the materials of a building. All lubricants depend upon their conductivity of heat to keep the edge of the tool and the metal operated upon, cool,

Their capacity to resist evaporation by the heat generated at the cutting edge, with their capillary power, qualities to various lubricants. Lard oil, in addition to its high evaporating temperature, has a peculiar spreading or capillary property, which draws it in between the chip and the why? A. There is some danger that a current tool, thereby lessening the friction and absorbing the

Grenet battery about 1½ or 2 volts and I would like to of Representatives and in the Senate on the McKini make au induction coil to use for giving shocks to bill? A. Address Congressional Record, Washington people. Would you kindly let me know about how to D. C., for copies containing speeches, etc. make it? A. You will find a description of a shocking coil in Supplement, No. 567. 2. Also could you let me know what will keep catsup from fermenting or going sour? Some people let it ferment before they boil it into catsup, but then it is so sour that it is not fit for 10,000 pounds, and if dropped from the same distan use. Others put some kind of drug into it to keep it from fermenting. If you can tell me what to put into it to keep it all right, I would be very happy. A. Salicylate of soda has been discovered to exert a very decided chemical action in checking alcoholic fermentation, in this respect being somewhat similar to borax, although much more energetic. A small quantity of the salicylate will entirely arrest the fermentation of wine and also of milk. 3. Also would you tell me a good way to test vinegar to tell the strength of it? The way I tell is by taking 1 ounce vinegar and then put soda in to see how much soda it would take before it kills the acid in it. A. An accurate carrying out of the process you employ will give satisfactory results. 4. Also what is a non-poisonous color to color pickles (cucumbers) with? I use now burnt sugar, but I would like to know something hetter. A. Put a handful of spinach leaves in the boiling vinegar, which thereby acquires a green coloration, which it imparts to the pickles. This method is harmless; any receipt using any form of copper cannot be condemned too strongly.

(4506) G. H. L. asks: 1. How can I determine the voltage and amperage of an incandescent electric lamp? A. By measuring the resistance of the lamp and taking number of ohms and dividing electromotive force by the resistance, you will find the amper-How are carbon filaments made? A. Carbon filaments, synopsis of the patent laws of the United States and are made by carbonizing slender strips of hamboo in a vessel from which the air is excluded. 3. What is the contemplating the securing of patents, either at home a vessel from which the air is excluded, 3. What is the pressure in weight of air on a vacuum per square inch? A. About 15 pounds. 4. How can I tell when all the air is out of the receiver of an air pump? A. It is practically impossible to exhaust all the air from a receiver. You can tell the degree of exhaustion by means of a manometer made for the purpose, or a very high vacuum is indicated when the spark of an induction coil will not pass between points located in a vacuum chamber and separated by a distance of one-sixteenth of an inch. 5. Can a patent be issued to a minor? A. A minor's patent must be applied for by a parent or

(4507) E. B. asks: 1. Suppose two cylinders were filled, one with steam at 1 pound pressure, the other with an ordinary gas mixture at 1 pound pres sure. The gas is exploded and free to expand at the same time the steam is free to expand. What would be the proportionate volume of the two vapors after expansion? A. The steam would expand about one-fifteenth of its volume; the explosive gas mixture would expand from four to eight volumes according to composition and amount of air contained. 2. I want to maintain a pressure of 30 pounds in an air tank with a constant outlet 16" x 16". I can run my pump at 150 revolutions. What should be the diameter and stroke of the pump? A. If the pump is single-acting, it will require a cylinder 11/2 inch by 21/2 inches stroke.

(4508) A. H. asks what tri-sodium phosphate is made of. A. Acid calcium phosphate, made by decomposing bone ash with salphuric acid, is precipitated with a slight excess of sodium carbonate. By crystallization disodium phosphate is separated from the solution. The crystals are dissolved in water and caustic soda is added in proper quantity to form the trisodium phosphate, which is separated by crystalliza

(4509) O. D. asks: What causes brass to break when bisulphate of mercury is applied to it? A. The mercury being reduced from the bisulphate forms an amulgam with the brass, which is weaker than the unamalgamated brass.

(4510) G. K. C. asks: Can a sheet of mica be softened by any process? If so, how? A. No. It is sometimes ground up and mixed with shellac and the mixture moulded by heat and pressure.

(4511) H. P. S.—The plant is Cassia nictitans. " wild sensitive plant."

(4512) K. M. I. says: Suppose a reservoir stands 100 feet or more above the point of discharge of a line of pipe and all points in the pipe line to be low the level of reservoir, is it known to engineering practice that not a drop of water might be discharged at the outlet, owing to the presence of air in the pipes? An individual supposed by many to be emment authority has told me that he himself was an eyewitness to such a phenomenon. He also told me that he could philosophically account for it, but that it would take too long a time to explain it to me. A. The condition of resistance of air as stated is well known to the engineering profession. If there are inverted siphons in the line of pipe, with uptakes in all, amounting to as great or greater height than the total beight of the head, there will be no flow of water through the pipe. The theory and fact is that the water separates from the air in the siphons, occupying the rising leg, while the air remains in the downslope When the water has reached the last uptake, which represents a greater height than the whole height, it will stop. Drawing the air from the bottom of the siphons relieves the back pressure.

(4513) L. P. G. asks: 1. Is it true that drowned bodies which have sunk may be brought to the surface of the water by firing heavy gans? A. It is said that sunken bodies have been brought to the surface by firing cannon near the spot.

2. If so, what is the scientific explanation of the fact?

A. The vibra. Cistern cleaner, E. B. Ravenci.

Cleaner, E. B. Ravenci.

tion or shock of the discharge is supposed to libera or expand confined gases in the body, making the bo lighter by its enlargement. 3. Is it dangerous to lea windows open during a thunder storm? A. It is saf to close windows during a thunder storm. 4. If s warm moist air from the interior of the room may a as conductors for the discharge. The building t (4505) G. A. W. asks: 1. I have a said reports of all the speeches made in the Hou

> (4514) F. S. T. says: In a complete vacuum A says that the attraction the earth has is same to a feather as it is to a cannon ball weighi that they would both reach the ground together. says the cannon ball would reach the ground fire Who is right, A or B? A. A is correct. It is only the atmosphere or other resisting medium that the b will have the fastest fall.

> (4515) A. W. N. says: I understan that pneumatic street cars are a success, but that s tions are required to charge the cylinders. Would i a small 1 or 2 horse power steam motor and air pun continuously running on board the car or adjoini car, charge an 8 or 10 horse power air engine? T frequent stopping and down grades furnishing am time to keep up the required amount of pressure. The condition of power accumulation as stated wor be a millennium in mechanics. The realization of motor power is now but about 40 per cent of the init power. There is progress proposed and now being p into operation, so that by the heating of the compres air in the motor car an efficiency of over 60 per ce may be realized.

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An experience of forty years, and the preparation more than one hundred thousand applications for tents at home and abroad, enable us to understand laws and practice on both continents, and to possess a The voltage is usually marked on the lamp. 2. equaled facilities for procuring patents everywhere abroad, are invited to write to this office for price which are low, in accordance with the times and our tensive facilities for conducting the business. Addr MUNN & CO., office SCIENTIFIC AMERICAN, 361 Brosway, New York.

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Car coupling, W. H. Harris.	481,399
Car coupling, E. C. Welch	481,449
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Car ventilator, railway, W. S. Rogers	481,196 481,173
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Cash register and indicator, G. M. Howe	481.495
Cas register, indicator, and recorder, C. F. Brown	481,459 481,524 481,531
Cas register, indicator, and recorder, C. F. Brown Casket handle, J. D. Ripson. Casting car wheels, chill for, C. A. Treat. Castings, making malleable iron, B. Talbot. Center board for boats, F. M. Eaton.	481,531 481,442
Castings, making malleable iron, B. Talbot	481,313 481,484
Chatelette, programme and score card, E. R.	
Checking and recording apparatus, workman's, C.	481,195
P. Cöttrell. Chuck, W. F. Schmidt Clgar rolling machine, J. S. Winget. Circuit changing apparatus, A. D. Page. Cistern Cleaner, E. R. Ravencroft.	1,274 481,426 481,453 481,281
Circuit changing apparatus, A. D. Page.	481,453 481,281 481,423
Cistern cleaner, E. B. Ravencroft	481,423

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ve	Clothes drier, J. L. Mather Clothes drier, E. Powell Clutch, R. Shettler
er 30,	Clutch, friction, F. H. Richards
of ict	Collar bolder, shirt, F. L. Robinson Commode, J. W. Clerke
00	Closet. See Water closet. Clothes drier, J. L. Mather. Clothes drier, E. Powell. Clothes, R. Shettler. Clutch, R. Shettler. Clutch, friction, F. H. Richards. Coal or ore jigger and washer, S. Stutz. Colin receptacle, pocket, F. H. Brown. Collar bolder, shirt, F. L. Robinson. Commode, J. W. Clerke. Condenser head, S. H. Woodbridge. Corset, W. P. Bigelow. Cotton, pneumatic conveyer for unloading, G. A. Stafford.
ise i	Stafford. Countershaft supporting Jack, H. J. Garbutt. Coupling. See Car coupling. Gas main safety coupling. Pipe coupling. Thill coupling. Crank handle fastening. Heard & Birkinshaw. Culinary vessel, H. F. Thurston. Cultivator, W. Sobey. Cup. See Oil cup.
ey on,	coupling. Pipe coupling. Thill coupling. Crank handle fastening, Heard & Birkinshaw
,	Culinary vessel, H. F. Thurston
te	Curling iron, F. H. Deknatel
he ng	Cutter. See Spoke tenon cutter. Cutter bar, G. A. Vandament
ce B	Cylinder mould, closed, F. X. Black. Dental clamp, J. S. Deardorff.
st. in	Cultivator, W. Sobey. Cup. See Oil cup. Curling iron, F. H. Deknatel. Cut-out, thermal, A. P. Seymour. Cutter, See Spoke tenon cutter. Cutter bar, G. A. Vandament. Cylinder lock, J. B. Price. Cylinder mould, closed, F. X. Black. Dental clamp, J. S. Deardorff. Dental engine, F. A. Damon. Dice box, puzzle, H. Goujon. Die plate, L. C. Wetzel. Dock, hydraulie lifting, R. Moran. Door jamb setter, J. Ritterbeck. Door spring, J. A. Cooper. Draught attachment, spring, H. Barber.
all	
nd	Door jamb setter, J. Kitterbeck. Door spring, J. A. Cooper Draught attachment, spring, H. Barber. Draught equalizer. A. Hunt. Drier. See Clothes drier. Drying apparatus, W. D. Sunderlin. Dust collector and conveyer, B. F. Mohr. Egg tester, J. B. Garland. Beetric circuit controlling and interlocking apparatus, pneumatic, Slater & Barnes. Electric elevator, W. Baxter, J. E.
ta-	Drying apparatus, W. D. Sunderlin
ot p,	Egg tester, J. B. Garland
ng he	Electric elevator, W. Baxter, Jr. Electric motor and generator, Bradley & Wood. Electric switch, J. H. Clark. Elevator. See Electric elevator.
ple	Electric switch, J. H. Clark. Elevator. See Electric elevator. End gate Hawk & Franch
A. ıld	Electric switch, J. H. Clark. Electror. See Electric elevator. End gate, Hawk & French. Engine. See Dental engine. Rotary fluid pressure engine.
air ial	Engraver's block, A. Mueblmatt. Extractor. See Spoke extractor. Eyeplasses, A. H. Hartmann. Eyerlasses, A. H. Hartmann. Eyerlasses, Company of the Company o
out	Eyeglasses, A. H. Hartmann. Fabric. See Knit fabric. Waterproof fabric.
ent	Fabric. See Knit fabric. Waterproof fabric. Fatty substances, purification of, J. Massignon. Ferrule, locking, A. G. Benson. Fertillzer distributer, Stabl & Johnston. Fertilizer distributer, R. B. Thomas. Fire escape, J. D. Brainnard. Fisbing reel, G. E. Medley. Fisbing tackle, deep water, S. C. Darrow. Floor construction, freproof, W. Orr. Floor jack, E. A. Bullock. Frame. See Picture frame.
	Fertilizer distributer, R. B. Thomas Fire escape, J. D. Bratnard
	Fishing tackle, deep water, S. C. Darrow Floor construction, fireproof, W. Orr
of oa-	Floor construction, fireproof, W. Orr
he	
A A	Gauge. See Marking gauge. Water gauge. Garment supporter, G. J. Cline. Gas black machine, bydrocarbon, L. J. McNutt
all ons	Gas black machine, hydrocarbon, L. J. McNutt Gas main safety coupling, A. Garretson Gaseous fuel generator and burner, N. Horn Gate. See Cargate. End gate.
or ces	Gate. See Car gate. End gate. Generator. See Fuel generator.
ess	Generator. See Fuel generator. Girth, saddle, R. A. Lane
ad-	Granite, etc., device for polishig, G. L. Badger. Grate, fire, J. H. Mehrtens
	F. C. Feicker
\mathbf{S}	Grinding mower knives, machina for, B. Dutton. Guard. See Hailway stock and eattle guard. Gun breakdown K. A. Hollenbeck.
	Grain binder, H. E. Pridmore
	Hair clipper, C. Carleton
	Harvester, J. T. Mides
E.	Harvester gear shifting mechanism, G. Schuber Harvester reel support, J. F. Appleby. Harvester reel support, C. A. A. Rand Hat supporter, W. Applegath. Hay carrier track, E. L. Ferris. Hay rack, H. S. Hoy. Hay rack, S. H. Plomberg. Hay rack, S. H. Plomberg. Hay rake, borse, W. R. Mann. Hay stack cutting machine, Evans & Douglass Heating apparatus, G. A. Watson. Heel plate. Ayres & Foster. Hinge, J. F. Hirst. Hitch, borse, A. Johnson. Holder. See Blacking holder. Collar bolder. Napkin holder. Faper bolder. Penbolder
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,249 ,527	Hay rake, horse, W. R. Mann
.4 07	Heater. See Water neater. Heating apparatus, G. A. Watson
345 190 514	Hinge, J. F. Hirst. Hitch, borse, A. Johnson.
184	Napkin holder. Faper bolder. Fenholder Pen and pendi holder. Pillow sham holder Type holder. Yard stick holder. Holder or rack, C. Warden. Hook. See Gal hook.
,350 ,33 5 ,298	Holder or rack, C. Warden
,298 ,385	Horse blanket fasterer, C. A. Harvey Horsesboe, O. E. Brown. Horsesboe toe calk, T. S. Very Horseshoer's tool, O. Handeland. Hydrocarbon burner and device for automatically
270 375 476	Horseshoer's tool, O. Handeland Hydrocarbon burner and device for automatically
,536	Hydrocarbon burner and device for automatically feeding the same, C. F. A. Convert. Identification device, B. H. Weeks. Indicator. See Train indicator. Inkstand, L. B. Manley. Insulator, A. J. Wylie. Iron. See Curling iron. Isek See Countershoft supporting teck.
,390 ,236 ,538 .460	Inkstand, L. B. Manley
,460 ,387	Jack. See Countershaft supporting jack. Floor jack. Plug spring jack.
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	Ladder, fire, Salverds & Shadbolt Lamp extinguisher, J. B. Price.
,379	Lamp state, meantescent elegate, Sapek & Sip Lamps, reflecting shade for incandescent, L. T Stanley
,505	Stanley Lamps. reflecting shade for incandescent electric L. T. Stanley. [Jantern, tubular, J. S. Gall
,307 ,363 ,537	Latch and lock, combined, J. A. Giese. Lathe, turret, J. Hartness. Lathes, stop mechanism for turret, F. H. Rich
,177	Lawn sweeper, O. D. Thompson
454	Leather, composition for softening enameled, R
,172 ,264 ,213	L. Tugor. Life-saying and pleasure craft, A. B. Shearer Lifting machine, J. S. Crouch. Lock. See Bicycle lock. Cylinder lock. Nu lock. Safe lock. Seal lock.
,370	Lock, J. Loch
,431 ,413 ,343 ,233	Locomotive fire boxes, brick arch for, F. W Johnstone Locomotives, starting gear for compound, R
,233 ,225	Lindner
,234 ,163	Loom nicker, B. Wharton
,525 1.325	Loom stop motion, W. M. Aikley. Lumber carriers, hanger for, J. E. Harder Magnetic separator, G. Conk ling. Mall has thrower. Winsor & Cummings. Marker, gore, W. B. Kinsley.
,399 446	Marker, gore, W. B. Kinsley Marking gauge, J. A. Traut Massage apparatus, A. Kahn Mast arm, A. Wright
1,449 1.540	Mast arm, A. Wright Match and toothpick machine, J. Boulard Matrices, forming C. L. Redfield Measuring the velocity of fluids, gauge for, S. W
,535 ,388 ,468	Measuring the velocity of fluids, gauge for, S. W Robinson
,196 ,173	Robinson. Meat sliver, J. V. Bohannan Mechanical movement, F. Meny Mechanism, E. Patten Mining machine, G. F. Myers Mould. See Cylinder mould.
,228	Mining machine, G. F. Myers Mould. See Cylinder mould.
,222	Monument, memorial, J. Mitchell
,372 178	Mower, W. R. Baker
1,178 1,361 1,495	Napkin holder, I. T. Brown. Needle, ribbon, G. G. Weigand. Net bow or hoop, A. G. Benson. Nozzle, exhaust, P. Swenson.
,459 ,524	Notzle, exhaust, P. Swenson
4531 442	Nut lock, J. Broadley
,313 ,484	Nut lock, J. C. McQuilkin
	Nut lock, J. C. McQuilkin. Nut lock. A. Warenskjold. Oil cup, J. T. Smith. Ordnance, tool for horing breech-loading, G. Ger
,195 ,274	Notzale, exhaust, P. Swenson. Nutand bolt wrench, J. Hoval. Nutblank threading device, J. C. Stuchel. Nut lock, J. Broadley. Nut lock, J. C. McQuilkin. Nut lock, J. C. McQuilkin. Nut lock. A. Warenskjold. Oil cup, J. T. Smith Ordnance, tool for boring breech-loading, G. Ger dom. Ores of zinc and lead, treating sulphide, Lewis & Petraeus.
,195 ,274 1,426	Ores of zinc and lead, treating sulphide, Lewis & Petraeus. Ores, treating sulphide, Lewis & Petraeus.
,195 ,274	Ores of zinc and lead, treating sulphide, Lewis & Petraeus.

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	481,518 481,294	Pasting machine, bindery, J. L. Dennis	481,258 481,404
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gine. Rotary fluid pres- eblmatt	481 938	Rail joint, G. G. Stacy	481,403
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ation of, J. Massignon Bensonahl & Johnston	481,502 481,462	Railway foint, U. H. Hane	481,171
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eyter. S. C. Darrow	481,252 481,330 481,165	Railway stock and cattle guard, automatic, J. Walton Railway switch, Peterson & Baland. Railway switch, automatic, W. Spielman. Railway time signal, S. Smitb. Railway trolley, electric, W. F. Jenkins. Raike. See Hay rake. Reaming and drilling macbine, Opsion & Hooper.	481,533 481,401
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uge. Water gauge.	481,464	Register. See Cash register Roofing and siding, J. Winslow Rotary fluid pressure engine, E. Towlson. Safe lock, J. White. Sand plant for heating and controlling, F. V.	481,441 481,319
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enerator.	481,180	Saw, D. C. Schlabach Saw, cross-cut, I. S. Wilson.	481,201 481,321
le	481,530 481,366	Greene. Sash balance, N. Hamlet Sash fastener, D. H. Taylor Sash lift, H. E. Willer. Saw, D. C. Schlabach Saw, cross-cut, I. S. Wilson. Saw set, Ruence & Bash Saw straining device, M. Jincks. Scraper, road, J. M. Brooks. Screw, L. J. H. Vinson. Screw, L. J. H. Vinson.	481,221 481,496
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her handles, machine for, Walker.		Screwdriver. changeable speed, H. Hubbell Seal, S. E. Cheeseman Seal lock, Simpson & George	
, machine for, R. Dutton ock and cattle guard.		Seat. See Venicle illiin seat.	
odward	481,327 481,290	Seats and valves, hardening, J. Powell	481,416 481,539
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ndle. lerwood	481,289	Sewing machine, E Patten. Shears, E. A. Sanders. Shing, seeing and marking machine, I.T. Bush	481,200 481,200
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r holder. Collar bolder.	481,492 481,231	Springs, machine for knotting the ends of spiral, P. Fraser.	481,396
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ndicator.		Structure, circular roofed, C. Cunningham, Jr	481,207
idicator.	481,457	Stuffing how C. K. Longenecker	481,347 481 402
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t supporting jack. Floor	401,407	Supporter. See Garment eupporter. Hat sup- porter. Umbrella supporter. Suspender end attachment, J. Lees, Jr Suspension device. G. W. Baldwin.	481,360 481,157
t supporting jack. Floor ick. Railway joint. . G. Ashley. Sbadbolt.	481,351 481,510 481,199	Supporter. See Garment eupporter. Hat sup- porter. Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Swing, J. B. Sweetland. Switch. See Ballway switch. Trolley switch.	481,360 481,157 481,439
t supporting jack. Floor ick. Railway joint. . G. Ashley. Sbadbolt.	481,351 481,510 481,199	Supporter. See Garment eupporter. Hat sup- porter. Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Swing, J. B. Sweetland. Switch. See Ballway switch. Trolley switch.	481,360 481,157 481,439
t supporting jack. Floor lock. Railway joint. A. G. Ashley. Shadbolt. 3. Price. ent electric, Salick & Step e for incandescent, A. L. L.	481,351 481,510 481,510 481,268 481,285 481,378	Supporter. See Garment eupporter. Hat supporter Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Switch. See Railway switch. Trolley switch. Tablet, memorandum, G. H. Seymour. Tag fastener, O. E. Abbey. Telegraphy, Ji G. Smith. Telegraphy, J. G. Smith. Telegraphy, A. B. W. H. Cords.	481,360 481,157 481,439 481,429 481,382 481,223 481,247 481,284
t supporting jack. Floor lock. Railway joint. A. G. Ashley. Shadbolt. 3. Price. ent electric, Salick & Step e for incandescent, A. L. L.	481,351 481,510 481,510 481,268 481,285 481,378	Supporter. See Garment eupporter. Hat supporter Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Switch. See Railway switch. Trolley switch. Tablet, memorandum, G. H. Seymour. Tag fastener, O. E. Abbey. Telegraphy, Ji G. Smith. Telegraphy, J. G. Smith. Telegraphy, A. B. W. H. Cords.	481,360 481,157 481,439 481,429 481,382 481,223 481,247 481,284
t supporting jack. Floor nek. Railway joint. A. G. Ashley. Shadbolt. 3. Price. The electric, Salick & Sipple for incandescent, L. T. for incandescent electric, Gall. ed, J. A. Giese.	481,351 481,510 481,199 481,268 481,285 481,276 481,286 481,276 481,261	Supporter. See Garment eupporter. Hat supporter Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Switch. See Railway switch. Trolley switch. Tablet, memorandum, G. H. Seymour. Tag fastener, O. E. Abbey. Telegraphy, J. G. Smith. Telegraphy, J. G. Smith. Telephone A. Rettig Telephone arm rest, Balley & Lincoln. Telephone system, R. N. Dyer Telephon, J. W. Gibboney	481,360 481,157 481,439 481,429 481,382 481,223 481,244 481,243 481,244 481,253 481,483
t supporting jack. Floor tok. Railway joint. G. Ashley. Shadbolt. 3. Price. ent electric, Salick & Stype for incandescent, L. T. for incandescent electric, Gall. ed, J. A. Giese.	481,351 481,510 481,199 481,268 481,285 481,285 481,276 481,261 481,356 481,192	Supporter. See Garment eupporter. Hat supporter Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Swing, J. B. Sweetland. Switch. See Railway switch. Trolley switch. Tablet, memorandum, G. H. Seymour. Tag fastener, O. E. Abbey. Telegraph, ship's, A. B. W. H. Cords. Telegraph, J. G. Smith Telephone, A. Rettig. Telephone arm rest. Balley & Lincoln. Telephone system, R. N. Dyer. Telephony, J. W. Gibboney. Thill coupling, A. L. Straw. Thrashing machine belt tightener, E. Huber. Ticket, time limit, J. H. Stedman.	481,360 481,157 481,439 481,429 481,382 481,223 481,247 481,244 481,233 481,483 481,529 481,483 481,176 481,210
t supporting jack. Floor ick. Railway joint. A. G. Ashley. Shadbolt. 3. Price. The destrict Salick & Sipple for incandescent electric. Gall. ed, J. A. Giese. 188 189 199 199 199 199 199 199 199 199	481,351 481,510 481,199 481,268 481,285 481,276 481,276 481,261 481,261 481,269 481,269	Supporter. See Garment eupporter. Hat supporter Umbrella supporter. Suspender end attachment, J. Lees, Jr. Suspension de vice, G. W. Baldwin. Swing, J. B. Sweetland. Switch. See Railway switch. Trolley switch. Tablet, memorandum, G. H. Seymour. Tag fastener, O. E. Abbey. Telegraph, ship's, A. B. W. H. Cords. Telegraph, J. G. Smith Telephone, A. Rettig. Telephone arm rest. Balley & Lincoln. Telephone system, R. N. Dyer. Telephony, J. W. Gibboney. Thill coupling, A. L. Straw. Thrashing machine belt tightener, E. Huber. Ticket, time limit, J. H. Stedman.	481,360 481,157 481,439 481,429 481,382 481,223 481,247 481,244 481,233 481,483 481,529 481,483 481,176 481,210
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