

Our Debt to Inventors—Shall we Discourage Them?

Dr. R. H. Thurston, director of Sibley College, Cornell University, contributes to the May Forum an able and interesting article under the above title, from which we make a few abstracts:

"In a single generation, it is agreed among statisticians, the inventors have promoted the efficiency of human labor, and have diverted to the use of man such enormous amounts of Nature's energies that production has been increased fifty to seventy-five per cent more rapidly than population, and wealth has been correspondingly augmented. A day's labor produces two-thirds more in agricultural implements, or in carriages, and a half more in machinery, and eighty per cent more in boots and shoes, than in 1860. One dollar has been made capable of buying fifty per cent more of cloth, a quarter more of every kind of staple food; five men do the work of eight, and both wages and the purchasing power of the dollar have increased together. Labor can to-day produce twice as much in a given time, and secure more than twice as large a share of the product, as in the days of the origin of our patent law. In the time of Watt and Fulton, six weeks were required to cross the Atlantic, and the inventor and the mechanic and the engineer now send the steamship across in six, and will soon make the voyage in five days. They transport a ton a mile at sea with the combustion of the amount of fuel represented by a single one of the millions of letters in the modern foreign mail bags. They have reduced the cost of transporting wheat from New York to Liverpool from twelve cents a bushel to four cents, and of meat from absolute commercial impracticability to one cent a pound. They have given the world nearly a half-million miles of railroads, and transport 150,000,000 tons a mile each year. Without protection of the inventor's rights to his own absolute creation and brain property, we should to-day not have the aid of the fifty or seventy-five millions of horse power of the steam engines of the world and their equivalent aid—that of three or four times the working power of the whole population of the globe. . . .

"The telegraph and the telephone, those great 'monopolies' so much inveighed against at the moment, have not only presented the world with the grandest illustrations of the helpfulness of modern science in promoting commerce and the industries of production; they promote also, directly and indirectly, and in a thousand ways, the intelligence and culture of the race. Morse and his colleagues among inventors gave the world, as a contribution to education and a

stimulus to moral growth, inestimable profit upon all its patrons have paid into the treasury of the telegraph companies—to be redistributed to the world. The telephone, however 'business-like' its management, is a gift from the inventor of vastly greater worth to the world than all the dividends ever declared by the telephone companies. Edison, and Thomson, and the General Electric and the Westinghouse companies, representing contributions to the world of invention and the mechanic arts, as a limited tribute, have given handsome profits to the world of users of their inventions and products. . . .

"The steam engines of James Watt, of Frederick Sickles, of George Corliss, which constitute the foundation of the whole system of modern industries, and furnish, practically, the whole sum of the mechanical power which has built up existing material civilization, were given to us by their inventors in response to the inducements held out to them by the patent law—itsself the most important invention of all. . . .

"It has been universally admitted that the United States has owed to the simple and inexpensive and effective action of the patent law system, as well as to the freedom of its political institutions—the two forming units of a whole—the mighty march of its development and civilization. The blessings of the patent law have been inconceivably great.

"But a spirit diametrically opposed to the spirit in which the patent system was conceived and enacted has within a few years sprung up, and its malevolent influence has been promptly seen and felt in the tone of legislation and in the decisions of the courts. The old feeling of indebtedness and of gratitude to the inventor and to the exploiter of inventions has become tempered by criticism and by a caviling spirit, which seeks to deprive these greatest of benefactors of the race of the intellectual property which they create and the material benefits which they, in comparatively slight degree, share with the world. In many ways both legislation and the decision of the courts are curtailing their rights and depriving them of the just share, which was formerly cheerfully granted to them, of the gains made by the world through their inventions. The inventive genius and his wholly beneficent work are now too often looked upon with suspicion, jealousy, and a mean opposition, which are in strange contrast with the grateful and generous spirit which characterized every legislative and judicial act early in the century, and which pervaded the whole people of the United States from the time of Watt to the time of Corliss, of Fulton, of Stephenson, of Howe, and of Morse. . . .

"The killing of the goose that lays the golden egg is contemplated even by 'statesmen' and by the courts with complacency. They would nullify the patent system and put a summary end to this era of progress. They would terminate the period of supremacy of their country in all the industrial arts. . . .

"When the United States loses its regard for the rights and privileges that were justly and fairly accorded to inventors in our earlier life as a nation, and, instead of gratitude and generous reward, gives them grudgingly less than a fair and liberal share of the profits which they so lavishly secure for the world, a long step will have been taken toward that decadence which, historians are accustomed to assure us, inevitably, sooner or later, comes to every people. The immediate and complete repeal of every obstructive law and the inauguration of a new period of good-will and generous encouragement of that highest of industries is the right way and the only way to insure permanence of that growth in material prosperity which has for a hundred years, and until the present moment almost, been the most marked characteristic of our history.

"The promotion of the arts and manufactures by suitably rewarding inventors and providing that they shall be permitted to collect profits, as in all other departments of business, as large as the business will yield, and in due proportion to the value to the country of the invention or discovery, is one of the most important features of an enlightened public policy; and it is the duty of every intelligent and patriotic citizen, and especially of every one in any manner connected with any department of engineering, of manufactures, or of the mechanic arts, to exert every power and to apply all his influence to promote the perfecting of the patent system, to increase the facilities of the Patent Office, and, especially, to insure to the inventor of new and valuable devices a liberal period of possession of the products of his genius."

Canadian Natural Gas Lines.

The Detroit Gas Company has made arrangements with the Ontario Gas Company for a new pipe line between the natural gas fields of Kingsville and Walkerville and a third pipe line across the river to Detroit. Although that city was supplied by only one line last winter, it was considered safer to have three lines than two in case of a break. The expense of constructing the line from Kingsville to Detroit will be \$200,000, and it is expected that the work will be finished by next October.

RECENTLY PATENTED INVENTIONS.**Engineering.**

STEAM CONDENSER AND OIL SEPARATOR.—Edward Rowe, Indiana, Pa. This is a simple construction more especially designed for condensing exhaust steam from engines, returning the water of condensation to the feed pump, at the same time purifying the water to prevent incrustation of the boiler. The invention consists principally of a series of connected vessels, of which the first receives the steam, and each vessel has air tubes for the circulation of air to condense the steam circulating in the vessel, no water jackets or other circulating devices being necessary. The impurities of the water of condensation are skimmed off in a separate tank to which the water of condensation flows before passing to the feed pump.

Railway Appliances.

CAR FENDER.—Charles E. Montell, White Plains, N. Y. According to this improvement a frame is attached to the car platform, and to this frame is pivoted an auxiliary or receiving frame, there being a bed of yielding material attached to the upper portion of the fixed frame and the outer front portion of the receiving frame. There is a sprocket wheel and chain connection between the two frames, whereby the forward frame may be lowered by the motorman pressing upon a lever. This frame has wheels adapted to travel on the rails or on the surface. When the receiving portion of the fender strikes an object in the path of the car, the object is thrown back into a cushioned section, and the forward portion of the fender rises, forming a pocket which will safely hold a person thus taken up from falling out.

CENTER BEARING FOR RAILROAD CARS.—Samuel Walters, Warren, Pa. This bearing comprises a bottom plate to be fastened to the truck bolster and a top plate to be fastened to the car body, a center pin in the bottom plate engaging the top plate, while a slide or lock bar locks the center pin in position to hold the top and bottom plates in a united position. With this improvement the car body may be conveniently lifted off the truck without lifting the body very high, and accidental displacement of the car truck and body is prevented. The center pin does not pass through the truck bolster, weakening the latter, as is so frequently found in the usual practice.

CONTINUOUS DRAWBAR.—James Seath, Terre Haute, Indiana. This is an attachment for railway equipment which is simple and durable, and capable of application readily to any form of drawbar. Combined with a yielding drawbar having straps attached to its opposite sides is a thimble secured to the straps, a draught rod passed around the thimble being adapted for connection with the draught rod of another coupler, and the thimble having a sliding movement between the members of the draught rod. The device can be used with single or with multiple buffing springs, or it may be used in connection with otherspring devices.

CAR AIR PIPE AND STEAM PIPE COUPLING.

—Robert L. Munson, Silver City, New Mexico. This inventor has devised an improvement in automatic couplings of the hook and catch type, in which automatic interlocking connection is made and the engaged couplings may be detached from either side or the roof of the car. The improvement provides for the simultaneous coupling of air brake pipes and steam heat pipes, the couplings being engaged or detached as the train is made up or broken up, and dispenses with the usual handling of couplings for the air and steam pipes, thus effecting a saving of time and labor.

Mechanical.

WRENCH.—Frederick J. Bourn and William R. Hale, Gualala, Cal. This is a wrench especially adapted for use on vehicle wheels. It will simultaneously clamp the hub of the wheel and the lock nut of the axle, so that when the wheel is removed the lock nut and its washer will be held in their proper relation to the hub, and will not fall to the ground or be lost, and on being again returned to position the nut will engage with the thread of the axle spindle, thus preventing the soiling of the hands and permitting the quick and convenient oiling or lubricating of the axle.

Mining, Etc.

AMALGAMATOR.—George W. Downs, Port Townsend, Wash. This invention relates to gold-saving apparatus having amalgamating plates, and provides a simple form of portable amalgamator, conveniently operated by hand power, to readily save the float gold in river or beach sand. It comprises a casing with removable sides in which are journaled wheels geared together, each wheel having amalgamating wings so arranged that the sand rolls down from one wing on the next following wing, while a hopper at the top of the casing has a screened bottom discharging on to the upper faces of the wings of the first wheel.

Agricultural.

HAY RAKE.—Isaac G. Lunday, Hubbard, Texas. This invention covers an improvement in revolving hay rakes, and the inventor has devised a rake which is free to move backward without danger of injuring any of the parts, the rake head and teeth turning freely, and whereby, with a simple arrangement of lever mechanism, the ground pressure of the teeth can be instantly regulated. The machine is of simple and inexpensive construction, and the several lever devices are disposed near the driver's seat, facilitating the easy operation of the machine.

Miscellaneous.

BICYCLE ATTACHMENT.—Charles A. Coey, Fairfield, Wash. This is a simple and inexpensive device, applicable to any safety bicycle, enabling the wheel to be run with speed and safety by an inexperienced rider on the rails of an ordinary railway track. It

consists of a third wheel, with concave rim, connected with the frame of the bicycle by removable and adjustable braces, constituting a rigid framework for spanning the track, while being very light. The attachment may be quickly applied to or removed from an ordinary bicycle, and when removed may be folded into very small compass.

ROLLER SKATE.—Richard H. Lahey, Canadice, N. Y. A skate which may be readily and firmly attached to the foot, and which affords an elastic and easy support, has been devised by this inventor. It is provided with a ratchet device to prevent the wheels from turning backward, and a brake which is actuated automatically or by a hand line or cord. The foot rest consists of a front portion and a heel portion, the two portions being slidable in relation to each other to enable the rest to be easily fastened to the foot.

TAP AND FAUCET.—Jacob Siebert, Jr., Yonkers, N. Y. This is an improvement in faucet taps designed to be permanently secured in the head of a barrel, and provided with a valve opened by the aid of the faucet introduced into the tap and through which the liquid is to be drawn. The invention simplifies the construction, and provides a tap in which the faucet may be readily inserted, and when the faucet is manipulated to secure it in the tap, the valve of the tap will be simultaneously and automatically opened, the valve being also automatically closed when the faucet is withdrawn. The improvement is also designed to prevent any possible leakage between the valve chamber and the receiving chamber for the faucet.

FLUE STOPPER.—Louis J. Haberkorn and Edward O. Beckman, Chatsworth, Ill. This device comprises a head with a segmental slot, a collar on the inside of the head having one end fixed and at its other end an arm projecting through the slot of the head, with means for locking the arm in the slot. It may be conveniently applied and locked in place in any sized thimble or flue body, effectually preventing smoke from entering a room. It also has a scoop section which will receive the soot which may accumulate in the thimble, and when the stopper is removed the soot will not be spilled upon the floor.

MACHINE FOR RAISING LIQUIDS.—Richard Wegner, Neu-Britz, Germany. This is a siphon apparatus working on the principle that the variations in the volume of air confined in a vessel, in the presence of combustion, are utilized for raising the liquids without the assistance of a plunger or pump. A burner making a constant flame in a closed vessel causes a partial vacuum, and the suction pipe for raising the liquid enters this chamber, while a float-controlled mechanism establishes communication between the interior of the vessel and the outside air when the vessel is filled with liquid to a predetermined level. Another float-controlled mechanism closes the communication when the vessel is essentially empty, and there is an outlet for the discharge of the liquid.

APPARATUS FOR SEPARATING HEAVY FROM LIGHT MATERIALS.—Frank Pardee, Hazleton, Pa.

For the separation of coal from slate, and ores and other materials from impurities, this inventor provides a tank with inclined bottom, in which is a dirt receptacle and chute, a frame parallel to the bottom being supported to be swung by means of a belt and pulleys, whereby the heavier material is carried up and delivered into the chute, and the lighter material travels downward. The material is carried through water, and simultaneously subjected in the water to a shaking motion, a traveling motion, and a floating action, to effect the separation.

WIRE FENCE STAY.—Solon M. Thompson, Whitesville, and William H. Bulla, Empire Prairie, Mo. For the staying of the strands in wire fences at points between the main posts, these inventors have devised a novel and simple form of bent wire braces, adapted to be removably connected with a series of fence wires, to hold them spaced apart and stiffened, and also afford ground conductors for electricity. The brace or stay comprises two nearly parallel members connected together at or near their ends and having an eye at each end, each member having lateral loops to receive fence wires, and a locking rod passing through the eyes.

PENCIL SHARPENER.—Oliver J. Lane, Chicago, Ill. The body of this device has a transverse throat or aperture, the upper side or back of the body having side flanges, and a slotted curved bit being pivoted between the side flanges and extending through the throat. A screw extends through the bit slot into the upper side of the back, the head of the screw bearing on the upper convex side of the blade. A pencil of any size may be quickly and properly sharpened with this device.

LAMP WICK TRIMMER.—William Chandler, North Bend, Canada. In lamp wick trimming shears this inventor has devised improvements whereby the shears will retain the charred wick or snuff that has been trimmed off, while the upper blade has a spring action rendering the device more efficient in use, making altogether a superior device which will be cheap to construct. The blades are preferably formed of sheet steel or by drop forging, or they may be cast, and both blades are curved and flanged, the guard flanges extending around the curved outer terminal of both blades.

COMBINATION KITCHEN CABINET.—John Tischer, St. Joseph, Mo. This inventor has combined in one article of furniture a table, safe, flour bin, sifter, kneading board, knife and fork trough, together with a sink, soap box, and various compartments for the storage of pots, pans, etc., to facilitate kitchen work. With this cabinet, all the things required by one working in a kitchen will be at hand, and dishes may be washed and placed in the cabinet without crossing the room or moving away from the tray.

COMBINED COUCH AND STORAGE CHEST.—Robert A. Caruthers and Charles P. Savage, Waco, Texas. According to this improvement the main couch section forms a hinged cover for a hollow body, and this section has wheels to run on suitable tracks connected with the body, and adapted when in closed position to be moved longitudinally in either direction, and projected beyond the end of the hollow body, afford-

ing ready access to the interior. The head piece is hinged at one end to the end of the body, the sides of the head section forming a longitudinal continuation of the sides of the body when swung downward on its hinged connection.

SCREEN DOOR.—Albert Schreiner, South Evanston, Ill. This door has a panel attached to its free vertical edge and located at an angle to the door, the panel extending from top to bottom of the door, and a horizontal panel connecting the door and vertical panel at the top, a caster being carried by the vertical panel whereby it may be opened and closed. This screen door is designed to prevent the entrance of insects into the room when the door is opened.

INVALID'S TABLE.—Max Lesser, Duncansby, Miss. This is a simple form of table arranged for convenient attachment to a bed, to permit an invalid to use the table when eating, drinking, reading, etc., without the assistance of a nurse or others. Projecting from a support are vertical rods on which slides an adjustable bracket carrying the table, there being an adjusting mechanism for raising and lowering the bracket and table.

BED.—Alonzo R. Turner, Spragueville, N. Y. According to this improvement the bed bottom comprises two similar series of spring wire sections that cross at right angles, each section having parallel side members and two upright undulating bow springs formed on each end. Supports for each spring section project inwardly from the side rails of the bedstead frame and engage the upper ends of the bow springs for the support of the spring bed bottom.

NEW BOOKS AND PUBLICATIONS.

THEORETICAL AND PRACTICAL AMMONIA REFRIGERATION. By Ilyd I. Redwood. With 25 pages of tables. New York: Spon & Chamberlain. London: E. & F. N. Spon. 1895. Pp. v, 146. Price \$1.

Everyday the importance of a knowledge of the laws of ammonia ice plants is increasing, and this acceptable little manual is to be recommended as appearing at a good time. It seems to be written throughout in a very practical way, and to be decidedly to the point. Its compact size and moderate price will insure it wide appreciation.

SCIENTIFIC AMERICAN BUILDING EDITION.

MAY, 1895.—(No. 115.)

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2. Perspective elevation and floor plans of a cottage at Tenafly, N. J., erected for Chas. Vogt, Esq., at a cost of \$5,800 complete. Mr. W. L. Stoddard, architect, New York. An attractive design.
3. A dwelling at Kennebunkport, Me. Three perspective elevations and floor plans. A most picturesque residence, with many artistic features. Mr. Henry P. Clark, architect, Boston, Mass.
4. A log cabin chapel recently erected at Black Rock, Conn. Perspective elevation and ground plan. Mr. Bruce Price, architect, New York.
5. A cottage at Park-Hill-on-Hudson, N. Y., recently erected for Geo. L. Rose, Esq., at a cost of \$12,000 complete. Two perspective elevations and floor plans. Mr. A. F. Leitch, architect, New York. A well executed design, showing many excellent features.
6. A house at Orange, N. J., recently completed for Thomas L. Smith, Esq. Messrs. Child & De Goll, architects, New York. A pleasing design in the Colonial style.
7. The Yonkers Public School, No. 8, at Bronxville, N. Y. A good example of school architecture.
8. A dwelling of modern design, recently erected for M. Strong, Esq., at Montclair, N. J. Two perspective elevations and floor plans. Cost complete, \$6,000. Mr. Christopher Myers, architect, New York.
9. A house at Indiana, Pa. Perspective elevation and floor plans. Cost complete \$3,100. Architect, Mr. E. M. Lockard, Indiana, Pa. An attractive design in the Colonial style.
10. A very attractive residence at Montclair, N. J., erected for Frederick S. Gage, Esq. Perspective elevation and floor plans. Mr. E. R. North, architect, Montclair, N. J.
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14. Miscellaneous Contents: A State park in the Catskill Mountains.—To prevent the slamming of screen doors, illustrated.—Quarrying by means of fire.—A new lawn sprinkler, illustrated.—Art in metal tile roofing, illustrated.—An improved hot water heater, illustrated.—A macadamized road through swampy land.—Tinner's hardware and roofers' supplies.—Screen doors, illustrated.—Stair finishing, illustrated.—A hoist for use over hatchways, illustrated.—Ventilating the school room.—Gas burning range, illustrated.

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Notes & Queries

HINTS TO CORRESPONDENTS.

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 articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. 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. Minerals sent for examination should be distinctly marked or labeled.

(6523) A. H. P. writes: Please answer in SCIENTIFIC AMERICAN if there is an improved paddle which can be used on a stern or side wheel steamboat. I mean some paddle that can go in the water and come out with less resistance than old style stationary paddle on a wheel. I remember a good while ago, in the SCIENTIFIC AMERICAN, of a cut of a sound steamer that was so equipped. A. The feathering paddle wheel is an old device now brought into use in our large sound steamers.

(6524) H. C. P. asks: What is the weight (avoidpoids) of a box 5x8x4 inches of pure gold. Also of the same size, of pure gold dust? Also the length over all of the new steamship St. Louis? A. The weight of the box of gold as stated, 111.44 pounds avoidpoids, of gold dust about 3/4 that amount. The St. Louis is 554 feet over all. See SCIENTIFIC AMERICAN, August 11, 1894, for illustrated description.

(6525) C. S. writes: I have a private telephone line about 2 3/4 miles long, on which are four instruments or stations; the transmitters are of my own make, as described in the SCIENTIFIC AMERICAN some years ago, called the bipolar telephone; the receivers and magnetic call bells I bought of an electric company. I first put up the line only one mile long, and since adding two more instruments and lengthening the line, the call bells do not respond so readily. Yet the transmission of speech is about as good as before, which is quite satisfactory if talked close into the transmitter. Do you think the instruments would work as well if the line were lengthened one or more miles, and another instrument added? A. The telephones probably would; the bells would not. 2. Would it improve the working of the telephones if the ground wire at the terminals were connected to good ground plates instead of lightning rods as they now are? A. It might, especially as regards the bells. It all depends on how good a ground the lightning rods have. 3. The line comes in contact with a good many branches from trees. Would it improve by trimming the trees so as to leave the wire perfectly free? A. This would tend to improve the service. 4. Would it transmit the sound louder and clearer to add stronger, larger, horseshoe magnets or batteries? A. Not necessarily; it might or might not. The best conditions can only be found by experiment.

(6526) W. M. B. asks: 1. Please mention a good book (late as possible) giving rules for size and length of wire, amount of iron in fields and armature, etc., in constructing a motor or dynamo to be run by given current, or to furnish given current? A. We recommend and can supply Sloane's "Arithmetic of Electricity," \$1 by mail. 2. Can two small motors in series, 15 volts 10 amperes each, be run with direct current of 114 volts, and how must I connect same? A. You will require about 7 ohms resistance in circuit with the dynamo. 3. How must I put the red oxide of lead on storage battery plates? What good book treats of subjects? Is there any solution into which I might put the plates to harden the red lead without injuring its efficiency? A. Make it into a paste with dilute sulphuric acid. Roughen well the surface of the plate. There is no such solution. For storage battery management, we recommend and can supply, "The Management of Accumulators," by Salomons, price \$1.50; Reynier's "Voltaic Accumulator," price \$3.

(6527) D. J. S. asks if there is any rule by which weight can be ascertained according to the height, viz., if a drop hammer on a derrick weighed 3600 pounds, and has a drop of 15 feet, what would be the

weight of the blow? A. There is a definite rule for finding the force of the fall of a weight, as a pile hammer by gravity, or the force of a blow, as with a hand or steam hammer. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 862, on "Impactor the Force of a Blow," in which the details of computation for various percussive forces are described, 10 cents by mail; 3,600 poundsx15 feet=54,000 foot pounds, and if the fall of the weight is arrested within three inches after contact, the impact force equals 54,000x3/4=216,000 pounds static load, less the loss by friction of air and slides on the falling weight.

TO INVENTORS.

An experience of nearly fifty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled 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 persons contemplating the securing of patents, either at home or 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 Broadway, New York.

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May 7, 1895,

AND EACH BEARING THAT DATE.

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Alarm. See Burglar alarm. Animal trap, D. W. Leedy. 538,972. Anvil, nut cracking, C. H. Williams. 538,717. Armor, manufacture of hard-faced, Sampson & Ackerman. 538,010. Atomizer, W. H. Hughes. 538,967. Automobile, J. D. Bowman. 538,723. Automatic sprinkler, C. Neracher. 538,739. Barrel pitching apparatus, O. Dorn. 538,809. Batteries, absorptive material for storage, E. H. Knowle. 538,919. Beating engine, W. H. Ethell. 538,903. Bed, cast iron, J. D. Bowman. 538,723. Bicycles, lantern or other carrier for, F. E. Heese. 538,965. Billiard table leveler, C. H. Hamilton. 538,074. Boat. See Collapsible boat. Boiler, T. A. Myers. 538,925. Boiler base, J. J. Richardson. 538,713. Boiler furnace, steam, E. Shydecker. 538,885. Bookmark, D. Sexton. 538,706. Boots or shoes, etc., bar or tack for, A. E. Burk. 538,833. Bottle case, E. C. Brown. 538,866. Bottle holder, M. L. Lytle. 538,873. Bottle wrapper, H. Redlich. 538,639. Bottles, device for preventing fraudulent refilling of, P. McCoy. 538,974. Box. See Folding box. Stamp box. Box making machine, M. Eschenbeck. 538,770. Brake. See Engine brake. Vehicle brake. Wagon brake. Brake apparatus, fluid pressure, E. F. Teal. 538,851. Broom head, J. R. Gilbert. 538,672. Brush machine, W. F. Hutchinson. 538,782. Brush machine box, W. F. Hutchinson. 538,783. Brushing machine, Van Felt. 538,821. Buckle, harness, B. Parkinson. 538,978. Buildings to reduce fire risks, construction of, J. C. Paulsen. 538,696. Burglar alarm, W. C. McLellan. 538,789. Burner. See Gas burner. Camera. See Mag. zinc camera. Photographic camera. Can. See Oil can. Can opener, F. C. Smalstig. 538,934. Cans, mechanism for closing tops and bottoms of, J. A. Schell. 538,890. Cane work, machine for inserting diagonal strips in woven, Bancroft & Rich. 538,812. Car coupling, R. F. Ludlow. 538,005. Car coupling, H. Raymond. 538,638. Car coupling, W. F. White. 538,804. Car dumping, M. Van Felt. 538,821. Car fender, H. A. Benson. 538,721. Car fender, R. Thompson. 538,082. Car fender, L. F. Trinchard. 538,936. Car fender, Wickes & Reinhardt. 538,940. Car fender, automatic, W. Hemstreet. 538,963. Car fender, or life-saving attachment, G. W. Archer. 538,943. Car guard, street, H. A. Howe. 538,873. Car unloading device, G. H. Hulet (fr). 11,494. Cars, fluid pressure brake apparatus for, B. F. Teal. 538,850. Carriage, convertible, F. A. Ralston. 538,791. Carriage, J. A. McLean. 538,842. Carriage, convertible, G. Kroil. 538,970. Cart, road, G. J. Overshiner. 538,843. Carving wood, etc., apparatus for, J. Heilwell. 538,779. Case. See Bottle case. Display case. Cash register and indicator, E. S. Smith. 538,658. Casting hollow articles, apparatus for, S. L. Kneass. 538,836. Chair, E. J. Smith. 538,708. Clamp. See Harrow tooth clamp. Clamp fastener, E. M. Johnson. 538,730. Clock, alarm, W. W. Harris. 538,732. Clock, electric time alarm, M. Leibecke. 538,686. Clock, electric tower, Gerry & Schmidt. 538,773. Clock, electric watchman's, O. E. Hausburg. 538,777. Clock holding frame, Horn & Copper. 538,866. Clockwork, N. M. Glanville. 538,741. Cock for supply pipes of flushing tanks, ball, T. J. Sullivan. 538,802. Coffin lid, M. M. & J. Hoffmann. 538,913. Coke oven, horizontal, F. J. Collin. 538,898. Collapsible boat, Smith & Fuller. 538,749. Comb, fluid, J. C. Lindley. 538,819. Combination lock, P. A. Kistrom. 538,909. Commutator, J. P. B. Fiske. 538,855. Compass deviation, apparatus for showing, J. A. Arvidson. 538,689. Conduit, interior, Traphagen & Fitzpatrick. 538,683. Conveyor, E. J. Drayer. 538,822. Conveying granulated or pulverulent substances, channel for, H. Bittiger. 538,890. Corn sheller, H. A. Adams. 538,856. Corn sheller, Merrill & Lovell. 538,787. Corn silking machine, J. C. McIntyre. 538,007. Coupling, See Car coupling. Hose coupling. Crimping tool, J. Wood. 538,942. Crusher. See Ore crusher. Cultivator, Butt & High. 538,655. Cultivator, M. A. Sattley. 538,747. Current motor, J. W. Cover. 538,819. Current motor, alternating, E. Arnold. 538,648. David operating mechanism, boat, J. W. Kellinon. 538,008. Dental foss holder, M. Deutsch. 538,662. Discount wheel, J. G. Huffman. 538,916. Dish cleaner, C. F. Black. 538,723. Display case, M. F. Spry. 538,849. Display device, L. Von Orth. 538,853. Door opener, L. Dunn. 538,900. Doors, compensating stay roller for sliding, J. A. McMill. 538,691. Down from feathers, manufacturing, J. Burton. 538,654. Drinking fountain, W. F. Cunningham. 538,820. Drying apparatus, S. C. Davidson. 538,728. Ear and throat protector, A. Carrette. 538,018. Easel, china decorator's, T. Millebrown. 538,957. Electric elevator, G. H. Reynolds. 538,700. Electric lighting system, R. N. Chamberlain. 538,019. Electric machine dynamo, A. G. Waterhouse. 538,757. Electric motor safety device, R. Eickemeyer. 538,699. Electric motor speed regulator, F. B. Rae. 538,744. Electric transfer switch, A. Ekstrom. 538,670. Electrical connection, J. M. Faulkner. 538,904. Electrically-operated switch, H. A. Hartman. 538,871. Electrode, catery, M. F. Laubach. 538,971. Elevating apparatus, A. Ray. 538,933. Elevator. See Electric elevator. Engine. See Beating engine. Gas engine. Rotary engine. Steam engine. Vapor engine. Engine brake road, E. T. Wright. 539,013. Engine for road, for consumable vapor, L. G. Wooley. 538,865. Exhibiting samples of garments, system of, M. A. Adler. 538,761. Fabrics, manufacture of figured, F. Boyer. 538,863. Faucet, automatic, J. Sarazin. 538,746. Feeder, measuring, N. MacLade. 538,738. Feeder, automatic stock, E. P. Tucker. 538,755.

Ferrule for umbrella sheaths, E. H. Hirsch. 538,872. Fiber preparing machine, J. C. Todd. 538,754. File cabinet, J. W. Hill. 538,704. Filing indicator and page, L. F. Camp. 538,804. Filing machine, J. F. W. W. 538,941. Filter, W. Lorey. 538,875. Filter, water, C. P. Allen. 538,720. Fire escape, L. L. Lewis. 538,735. Fire extinguisher, G. W. Coon. 538,016. Fireplace, R. B. Fowler. 538,839. Flood gate, S. G. Hindeley. 538,832. Flue cleaner, G. B. Essex. 538,955. Folding box, Sanders & Selley. 538,847. Foot warmer, H. W. Earl. 538,953. Fountain. See Drinking fountain. Funnels, automatic, R. A. Brown. 538,766. Furnace. See Boiler furnace. Heating furnace. Oil furnace. Plumber's and tinner's portable furnace. Smoke consuming furnace. Furnace, T. Burmeister. 538,726. Furnace, R. Muller. 538,737. Gage. See Water gage. Game platform, J. Tuttle. 538,756. Gas, apparatus for manufacture of, V. B. Lewes. 538,923. Gas burner, vapor, J. Stubbers. 538,801. Gas engine, L. M. Johnston. 538,800. Gas, manufacture of water, E. Gobbe. 538,908. Gas, process of an apparatus for charging liquids with, H. Hoffmann & Van Horn. 538,833. Gate. See Flood gate. Glassware, etc., decorating, A. R. C. Brocuff. 538,014. Glassware, ornamenting, E. Kaye. 538,917. Gloves, shoes, corsets, etc., fastener for, Offord & Rice. 538,927. Grate, F. K. Gesslein. 538,829. Grave guard, L. C. Moe. 538,788. Gravity motor, Pink & Buschling. 538,881. Grinding mill, R. C. Penfield. 538,637. Guitar, W. H. Howe. 538,679. Guns, ejecting mechanism for breakdown, Thorn & Bodin. 538,810. Hair dressing apparatus, D. C. Foglesong. 538,826. Hammer, steam, T. R. Morgan Sr. 538,840. Harrow, T. P. Navin. 538,692. Harrow tooth clamp, W. Sobey. 538,848. Harvester attachment, C. Stucke. 538,535. Harvester, corn, A. S. Peck (fr). 538,832. Heating furnace, R. E. H. Robinson. 538,701. Hinge pin and tip, butt, C. Glover. 538,907. Hinge spring, E. & A. J. Bommer. 538,891. Hoist machine, G. P. Wern. 538,990. Hook and eye for garments, E. M. D. Landenberger. 538,684. Horse boot, B. Larsen. 538,685. Hose coupling, electrically arranged, W. Fowler. 539,017. Hose holder, Warren & Van Deusen. 538,939. Hose signaling apparatus, electrical, W. Fowler. 539,000. Hose reel, N. Casson. 538,640. Hydraulic motor, A. Gerstenhofer. 538,943. Indicator. See Filling indicator. Station indicator. Ink pad, J. B. Laughton. 538,837. Knitting loom, J. Bradley. 538,453. Knitting machine take-up device, L. Jones, Jr. 538,834. Knitting machine, take-up mechanism. Bradley. 538,834. Knitting riding breeches, M. Clausen. 538,767. Knobs to their shanks, attachment of, W. F. Donovan. 538,952. Lamp, J. E. Bohner. 538,862. Lamp, electric, S. S. Ailin. 538,877. Lantern, K. E. Brown. 538,759. Lawn sprinkler, J. Byler. 538,727. Lead, manufacturing chromate of, Brown & Chaplin. 538,998. Leather staking machine, R. Holmes. 538,914. Leather working machine, cylinder, G. W. Baker. 538,944. Linotype machine, J. A. Erickson. 538,902. Lithographic stone, removing previous drawings from, W. Wefers. 538,903. Lithotrite, J. S. Forbes. 538,827. Lock. See Combination lock. Loom, loom bed motion, power, W. McMichael (r). 11,493. Loom shuttle, J. N. Corbin. 538,977. Loom shuttle, carpet, W. H. Kynett. 538,683. Loom warp beams, brake for, A. Biedermann. 538,722. Lubricator, J. Gross. 538,909. Magazine camera, Marchal & Joux. 538,736. Magazine camera, C. B. W. W. W. 538,736. Making thresholds, etc., device for, G. S. Towner. 538,715. Match machine, M. Young. 538,888. Metal into cups, etc., apparatus for drawing, G. F. Butters. 538,656. Mill. See Grinding mill. Rolling mill. Stamping mill. Miller, A. C. Brantingham. 538,815. Monkey wrench, V. J. McDonnell. 538,641. Motor. See Current motor. Gravity motor. Hydraulic motor. Multiplying or dividing machine, O. Steiger. 538,710. Musical instrument, A. M. Phelps. 538,933. Nail filing machine, J. Stevenson, Jr. 538,752. Name holder for trunks, valises, etc., G. W. La Baw. 538,874. Nozzle, can, G. F. Henry. 538,003. Nut, axle, E. P. Churchill. 538,769. Oil can, F. Heim. 538,779. Oil can pump, F. Smith. 538,798. Oil furnace, Whiteley & Mallen. 538,854. Oil presses, press box for horizontal, P. Lelardoux. 538,687. Oils, thickening, A. Gentzsch. 538,828. Operaglass, J. Murphy et al. 538,838. Ore crusher, H. Schier. 538,884. Ores, treating refractory, S. C. Clark. 538,951. Pall cover, fire, G. H. Bryant. 538,949. Pantograph machine, H. G. Grier. 538,776. Papermaking machine, wire frame for, S. Smith. 538,894. Pen, drawing, or Alteneder. 538,819. Pen, fountain, J. G. Gray. 538,900. Photographic camera, M. Bauer. 538,846. Photographic negatives, treating, J. A. Bisbee. 538,816. Piano, V. Sezemsky. 538,797. Piano pedal, composite, R. W. Tanner. 538,713. Pipe wrench, V. C. Rocholl. 538,745. Pipe wrench, A. E. Smith. 539,012. Pipe wrench, G. P. Woelfel. 538,994. Pipes, preventing electrolysis of street, R. Watkins. 538,758. Placket fastener, E. M. Johnson. 538,730. Plane, combination, J. W. Tripp. 538,937. Planter, holder, W. A. Mills. 538,878. Planter, corn, F. J. Becker. 538,947. Planter, corn, C. H. Hopwood. 538,915. Plow for street or road work, C. B. Williams. 538,901. Plow, desk, E. P. Spaford. 538,709. Plow, shovel, W. F. Hartig. 538,962. Plumber's and tinner's portable furnace, C. H. Seaman. 538,704. Pole and neck yoke connection, H. L. Kinsley. 538,632. Power transmitting band, L. A. Casgrain. 538,836. Pressure regulator, fluid, J. C. Lindley. 538,819. Printer's galley, O. L. Carter. 538,804. Printing attachment, chromatic, T. J. Turley. 538,987. Printing, chromatic, T. J. Turley. 538,985. Printing device, chromatic, T. J. Turley. 538,990. Printing machine, W. H. R. Toy. 538,852. Printing machine, fluid, A. B. Dick. 538,819. Printing, multicolor, T. J. Turley. 538,984. Printing, plate, A. H. Smith. 538,750. Printing prestinting attachment, T. J. Turley. 538,716. Pump, A. Marbach. 538,877. Pump pin, J. W. Mupps. 538,824. Pump vent, combined, J. R. R. R. 538,824. Pumping machine, by hydraulic, E. W. Naylor. 538,880. Radiator drum, T. B. Snyder. 538,687. Railway, W. F. Hutchinson. 538,784. Railway, closed conduit electric, G. E. Baird. 538,649. Railway, electric, MacLean & Kornetzke. 538,650. Railway supply system, electric, W. Lawrence. 538,638. Raisin squeezer, C. M. Fowler. 538,905. Range ventilating device, E. Bookhout. 538,997. Reel. See Hose reel. Refrigerating and ventilating car, B. L. Baldwin. 538,945. Refrigerator, G. A. Bowen. 538,724. Refrigerator and freezer, combined, G. F. Quinn. 539,009. Register. See Cash register. Register alarming on predetermined count, R. Miehle. 538,973. Regulator. See Pressure regulator. Resaw, band, E. C. Mereson. 538,688. Robber, device for protection against, Jackson & Rice. 538,998. Rolling mill, C. J. & H. Green. 538,775. Rotary engine, D. Car Skaden. 538,659. Rotary engine, H. J. Davis. 538,821. Ruler, desk, E. P. Spaford. 538,709. Sad iron polishing machine, C. P. Peterson. 538,743. Safe drawer, Eastman & Hart. 538,954. Sales recorder, cash till, and coin displayer, manual, G. H. Gledhill. 539,001. Sash fastener, W. E. Dixon. 538,686. Sash holder, B. M. Horner. 538,678. Sash weight, J. Haib. 538,910. Scale, calculating, E. P. Herbert. 538,676. Scale, weighing, P. L. Stewart. 538,981. Scarf pin, H. H. Baker, Jr. 538,762. Seal, snapper, E. J. Brooks. 538,832. Seamer, H. H. Baker, Jr. 538,762. Seed deliner, cotton, J. J. Faulkner. 538,670. Separator. See Starch separator. Sewing machine, P. Diehl. 538,684. Sewing machine, Diehl & Grieb. 538,685. Sharpener, scissors, J. G. Hermes. 538,864. Shawl strap, B. Ussher. 538,688. Sheet metal fenders, manufacture of, G. Russell. 538,883.