RECENTLY PATENTED INVENTIONS. Engineering.

Boiler Setting.—Charles V. Kerr, Favetteville. Ark. The setting and furnace of the boiler flames are carried twice the length of the boiler before entering the boiler tubes, the flames impinging upon the bottom and sides of the boiler in such a way, through a novel arrangement of flues in the masonry, as to produce an even heat, and utilize all the heat before the smoke enters the stack, thereby giving great efficiency with economy of fuel.

PUMP.-Vett S. Reed and Daniel Apgar, Loveland, Col. This is a rotary pump in which the casing has a fixed transverse partition from which leads a platform, inclines leading downward to the bottom of the casing, while a rotatable piston head carries a series of pistons arranged to slide through it, and a plate spring fixed to the top of the stationary casing is arranged over the partition in the circular path of the several pistons, the free end of the spring bearing upon them as they pass successively beneath it and drop off the platform. The invention constitutes a lift and force pump designed to be very efficient and to utilize the power to the greatest advantage.

Railway Appliances.

DRAWBAR GUIDE,-Heinrich W. F. Jaeger, Sandusky, Ohio. This is a device adapted to be readily applied on the draw timber of freight cars. It has on its inner face a recess for receiving the followers, end flanges to be bolted to the inner face of the drawbar timber, an offset extending out from the guide between the flanges to engage a recess in the inner face of the drawbar timber, and a rib projecting from the offset to engage a further recess in the drawbar timber. An essentially horizontal flange extends outward from the guide at the bottom, and beyond the outer face of the rib, the flange being adapted to be bolted to the bottom surface of the drawbar timber.

HAND CAR.-Joseph McMurrin, Shostead of near the center of the car, to leave a clear space in the center in which ballast, rails, etc., may be piled. is provided, pinions on the axles being turned by gear wheels, actuated through a crank from a driving rod, the latter being driven by a hand lever.

Electrical.

ARC LAMP.-Harold E. Bradley, New Bedford, Mass. In this lamp are a feed rod and tilting lever, and main and shunt magnets to tilt the lever and operate the feed rod, with a spring plate cut out and a provement is designed to simplify and cheapen arc lamps and improve the feed, while the resistance and cut-out automatically short circuit the lamp if the current becomes too strong. The lamp is durable, easily placed in position and designed to give a steady light.

Agricultural.

PLOW.-Richard E. Hopkins, Mc-Gaheysville, Va. The point may be slid into the share of this plow so as to project a considerable distance beyond, or be withdrawn within it, rendering the point as long or as short as desired, or it may be so located that when thrust outward it will have a downward as well as an outward movement, being extended or withdrawn while the plow is running. There is also a vertical cutter at the forward portion of the share, and a horizontal shear cutter at the lower forward side of the wing or mold board, the shears or cutters being readily removed for sharpening and quickly and easily replaced.

POTATO PLANTER.—Millard F. Myers Greenville, Ohio. This machine is designed to feed either large or small seed, depositing it in the hill. A horizontally rotating planting disk has a series of adjustable pockets, there being a driving connection between the axle and the disk, over which is a hopper containing the seed. Two operatives are necessary to work the machine and place the seed, but the machine is of very simple and inexpensive construction and designed

FERTILIZER DISTRIBUTER.—Lewis Roat, Milton, Pa. This machine consists of a hopper- either entirely open, partly open, or completely closed. like body supported on wheels in such way that it may be used as a cart when not employed as a fertilizer distributer, and there is combined therewith a removable pulverizer and spreader composed of a toothed cylinder. a detachable shaft having a spline connection with the cylinder, a drive shaft connected with the detachable shaft, and means which operatively connect the axle and drive shaft.

HAND SEED SOWER.-William R. Bowen, Clayton, Fla. This is an inexpensive device for sowing ordinary garden seeds or for sowing broadcast small seeds, fertilizers, insecticides, etc. It consists of a cup with a handle and rounded bottom, near the center of which is a good-sized opening, while to the bottom are journaled two disks-a dropping disk and a broadcast disk. The former has a series of openings to permit the discharge of seed when the disk is adjusted in register with the larger opening in the cup bottom, while the broadcast disk has other adjustable openings for the discharge of seed, insecticides, etc.

HOP CLEANING MACHINE.— Raphael M. and John P. Mackison, North Yakima, Wash. This machine has an elongated frame supporting an inclined bed with a carrying apron to carry away the dirt, dust, leaves, etc., deposited by the hops, which are delivered to a carrier or apron from a chute in the upper end of the frame. Means are provided for adjusting the bed, which is adapted to clean the apron on its under side, and the construction is such that perfectly clean hops may be delivered rapidly from one end of the machine.

Miscellaneous.

This is a device for systems which become operative when the heat rises above a certain temperature. It has fusible parts arranged in such a way that they do not direct y or indirectly affect the sealing of the head, which is normally closed by an automatic valve so supported are so constructed, according to this invention, that the that the water pressure forces it open when the fusible stops are softened. The valve also forms a deflector to throw the water evenly around all sides of the sprinkler head.

> BOOT TREE.—William J. Yapp, 210 Sloane Street, London, S. W., England. This device has a toe and heel portion, jointed to which is an intermediate adjustable thrust rod adapted to act as a toggle to apply pressure to the front or toe portion. The action of the device applies the pressure in an upward thrust be packed away in small space.

Box Lifter.—Henry Eddishaw, Philadelphia, Pa. For handling boxes placed overhead out of ordinary reach, this inventor has devised a light and easily operated device which may be used instead of a ladder, for facilitating the taking down of the box. It comprises a supporting pole, on which is a head with upwardly extending arms, a shelf being supported beneath the head, and one of the parts being revoluble with respect to the other. There is a lever mechanism at the lower end of the pole for operating the shelf, which slides on the pole, and a pivoted lever for engaging the of the arms and on the neck are engaging bevel wheels, end of the rod projecting from the shelf, so that the box may be handled with safety by the device, without fear of dropping it.

WALL PLASTER COMPOSITION.—James E. Summers, Clifton Forge, Va This is a composition which freezing does not injure and moisture does not penetrate. It is made of pulverized lime, cement, plaster of Paris, pulverized furnace slag, and other ingredients in specified proportions, made of the desired consistency with water. As a plaster it can be easily finished with one coat, becoming as hard as stone.

DENTAL PLUGGER.—Augusto A. Nouel, Jr., Puerto Cabello, Venezuela. This invention consists shone, Idaho. According to this invention, the propellof a head or stock fitted to slide and having a socket to ling mechanism for the car is arranged at its ends, increase the point or tool, a spring-actuated, hammer lenders. of a head or stock fitted to slide and having a socket to gaging the head and a hand lever lifting the hammer and then releasing it to permit it to suddenly exert its force A simple, strong and easily operated driving mechanism on the head. The construction is simple and the device works automatically.

COPY BOOK CABINET.—Robert E. Ash brook and Milton H. Ingram, Paducah, Ky. In this case or cabinet the books will be kept from warping and getting out of shape, the leaves being kept smooth and prevented from drawing up. It has a movable shelf guided by or carried to or from a stationary shelf by exterior mechanism, and the case may thus be made to take the place of a letter press for ordinary letter copy relatively stationary plate in its path of travel. The im- ing. The framework consists of skeleton sides, between which the shelves are arranged in pairs, one shelf of each pair being stationary and the other adjustable to o

> VEHICLE DOUBLETREE, - Samuel J. McDonald, Gallatin, Mo. According to this invention where the doubletree is pivoted on the draught pole, the ends of a curved bar are secured to the doubletree, the bar having on its under side spaced ears projecting down on opposite sides of the pole, while a forked brace plate is secured to the doubletree and to the curved bar. The attachment is designed to obviate the tendency of the doubletree to rock on its coupling bolt under strain, and prevent the elongation of the bolt hole

> FIFTH WHEEL - Samuel K. Paden. Petersburg, Ohio. Combined with an axle and wooden bolster having recesses or sockets in opposite sides is a base plate having pendent, parallel, integral flanger which closely embrace the sides of axle and bolster, pendent tubular bosses fitting in the bolster sockets. The mvention is an improvement in that class of fifth wheels in which the king bolt or analogous connection is dispensed with, and plates or disks rigidly attached to the axle and bolster are employed, the disks rotating on each other and being held together by side clips.

> SASH FASTENER.—Ferdinand F. Unkrich, Galion, Ohio. The working parts of this device are adapted to sound an alarm if tampered with. It is a sash lock of simple and inexpensive character, adapted to retain the sash at any desired point of sliding adjustment, affording means of securely locking the sash

CULINARY VESSEL.—David C. Wood Matamoras, Pa. This is a double-walled vessel, with a bottom and side space for water and steam, the cooking being effected in the interior compartment. The cover has a connection with the side steam space, and is provided with a steam exit, and the cover also has a steam chamber which covers the entire inner compartment, the heat from the steam compartment of the cover contributing to the cooking at the top of the articles in the in- 12. The Cast e of Bonnetable. Half page engraving. ner vessel, and the cooking being effected without danger of burning.

ROASTER,-Neils H. Jensen, Philadelphia. Pa. This construction is more especially designed for roasting coffee beans, cocoa, etc., without requiring a large amount of fuel. It comprises a lower furnace and an upper spherical roaster having trannions journaled in the furnace door to swing with it, the roaster having a covered opening for inserting and removing its contents, and an outlet at right angles for shells and impurities, there being a flaring or dished shield on the interior of the roaster around the outlet opening.

HEATING DRUM. -Henry I. Grennell, Ashland, Wis. This is a drum to be ordinarily inserted in the pipe to form a passage for the smoke and gases, and a controllable passage for air, to be heated thereby and contribute to the heat of a room, the drum being readily connected with stoves, furnaces, etc. The passage of the smoke and gases through the shell of the drum is retarded, that they may give up all their heat to the regulated air currents for which channels are provided through the drum.

SPRINKLER HEAD FOR AUTOMATIC Ky. This is an improvement readily applicable to show FIRE EXTINGUISHERS.—John H. Dixon, Marietta, Ohio. cases, packing boxes, etc., and is cheap enough to be

applied to almost any box or case. It is a top or side of such construction that the boxes or cases in which it is used may be piled safely one upon the other, and yet have the goods in them readily displayed. The improvement comprises a pair of swinging doors, a tight joint being formed between them, and the doors being closed automatically by a spring attachment. When one of the doors is swung open, a stop holds it in open position for such time as desired against the tension of the spring.

LOGGING APPARATUS.—Anderson W. Brown, Rhinelander, Wis. For drawing logs over icy roads this invention provides a sleigh-carrying engine and boiler, there being on the sleigh transverse shafts having sprocket wheel and chain crank connection with against the front of the upper near the instep. This boot the engine, the shafts operating eccentrics with legs tree is very light, easily applied and adjusted, and may whose feet have cutting toes. The latter engage the ice in the road to push the apparatus forward, the eccentrics being so setthat some of the legs wil always be pushing, and the apparatus being designed to draw heavy loads, and move forward evenly.

> MECHANICAL DOLL.—Daniel S. McElrov. New York City. Movable legs, arms and head are so connected, according to this invention, that by moving one of the arms the leg on that side will be moved in the same direction, the same movement also causing the turning of the head. The leg and arm of either side are connected by a train of gearing, and on the pivot of one the moving of one of the arms causing the legs to move in imitation of walking, the head at the same time turning from one side to the other.

DESIGN FOR A WASHBOARD PLATE. James A. W. Sears, Menominee, Mich. In the upper side of this plate are parallel transverse ribs and intervening flat surfaces, the flat under side of the plate having rounded grooves opposite the ribs of the upper side.

SCIENTIFIC AMERICAN

BUILDING EDITION

SEPTEMBER, 1894.-(No. 107.)

TABLE OF CONTENTS.

1. An elegant plate in colors, showing a Colonial resi dence at Portchester, N. Y., recently completed for Geo. Mertz, Esq. Two additional perspective views and floor plans. An attractive design. Mr. Louis Mertz, architect, Portchester, N. Y.

Plate in colors showing a residence recent y completed for R. H. Robertson, Esq., at Southampton, L. I. Two perspective elevations and floor plans. A picturesque design and an admirable model for a seashore cottage. Mr. R. H. Robertson, architect, New York City.

3. Residence of Frederick Woollven, Esq., at Rosemont,
Pa. Two perspective elevations and floor plans. A neat design in the Colonial style. Cost complete \$4,800. Mr. J. D. Thomas, architect, Philadelphia,

A cottage at Roger's Park, Ill,, recently erected for Edward King, Esq. Two perspective elevations and floor plans. A unique design. Mr. Geo. W. Maher, architect, Chicago, Ill.

Cottage at Hollis, L. I., recent y completed for the German-American Real Estate Co. Two perspective elevations and floor plans. Cost complete \$3,200. Mr. Edward Grosse, builder, same place.

Perspective elevation with ground plan of Saint Gabriel's Chapel, recently erected at Hollis, L. I. A unique and most excellent plan for a small chapel. Cost complete \$6,500. Mr. Manly N. Cutter, architect, New York City.

Two perspective elevations and an interior view, also floor plans, of a residence recent y erected at Orange, N. J., for Homer F. Emens, Esq. Mr. Frank W. Beall, architect, New York City. A pleasing design in the Colonial style.

Perspective elevation and floor plans of a cottage recent y erected at Flatbush, L. I., for F. J. Lowery, Esa. Cost complete \$4,600. Mr. J. C. Sankins, architect and builder, Flatbush, L. I.

hillside dwelling. Perspective elevation and floor plans. Messrs. J. B. Snook & Sons, architects. New York City. Club House of the Sea Side Club, Bridgeport, Conn.

A good example of Romanesque style. Perspective elevation and floor plans, also an interior view. Messrs. Longstaff & Hurd, architects. Bridgeport.

A residence at Hinsdale, Ill., recently erected for C. E. Raymond, Esq., at a cost of \$7,000 complete Perspective elevation and floor plans. Mr. J. H. Shannon, architect, Hinsdale, Ill.

13. Miscellaneous Contents: The irrigation of laws. illustrated with two engravings.—Viaduct for street railways, Cincinnati, Ohio, illustrated.-The fireproof building construction of the New Jersey Wire Cloth Co., illustrated.—Silvester's remedy against dampness.—Palmer's "Common Sense" frame pulley.-"The Old Hickory Chair." illustrated.—An improved hot water heater, illustrated. -The Caldwell Tower, illustrated.—The American Boiler Co.-The "Little Giant" floor clamp, illustrated.-The Akron air blast furnace.-Laundry glaze.-The "Piqua" metallic lath, 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 LABGEST CIRCULATION Box Top.-Lyman Miller, Lexington, of any Architectural Publication in the world. Sold by MUNN & CO., PUBLISHERS, all newsdealers. 361 Broadway, New York.

Business and Personal.

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

"C. S." metal polish. Indianapolis. Samples free.

For pile driving engines. J. S. Mundy, Newark, N. J.

Wood pulp machinery. Trevor Mfg. Co., Lockport, N.Y. Distance Reading Thermometers.-See illus. adver-

ement, page 159. Ward & Doron, Rochester, N. Y Screw machines milling machines and drill presses The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps. Capacity, 100 to 40,000 gals. per minute. Allsizes in stock. Irvin Van Wie, Syracuse, N.Y.

Guild & Garrison, Brooklyn, N. V., manufacture steam

Emerson, Smith & Co., Ltd., saw manufacturers. Beaver Falls, Pa., will send Sawyers' Hand Book on Circulars and Band Saws free to any address in the world.

For the 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.

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.

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,



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

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 prompt y supplied on receipt of

price.

Minerals sent for examination should be distinctly marked or labeled.

(6241) A. N. J. writes: 1. An empty tin can 91/6 inches long and 41/6 inches square, with an opening 34 inch in diameter at the top, well corked so as to be air tight, was sunk in about 70 feet of water. The cork was withdrawn while at that depth, and upon pulling the can to the surface the can was badly crushed in. Can you tell me when the collapse took place, and what was the cause thereof? A. The can probably commenced to collapse at a few feet below the surface, as its square form had but very little resistance to the increasing pressure as it sank, which at 70 feet would be 30 pounds on each square inch of its sides. The air on the inside had no resistance until it was compressed by the collapsing sides. 2. Will brass stop cocks injure, for photographic purposes, hyposulphite of soda and alum solutions? A. Brass stop cocks are not suitable for hyposulphites. The sulphur attacks the brass.

(6242) W. G. J. asks: Can rubber be mixed with asphalt so as to make it flexible? A. By masticating pure rawirubber in benzole, and thinning asphalt with the same or with naphtha, the two can be A residence at Yonkers, N.Y., recently completed mixed by grinding or rubbing, and the benzole, etc., can for Mrs. Northrop. A very unique design for a then be distilled off. The mixture may be quite flexible. The use of turpentine instead of benzole will make it more flexible and sticky.

> (6243) F. F. M. says: Can you give me formula for glycerine of cucumber?

White castile soap..... Pommade de concombre 1 Glycerine..... 2 fl. oz.

Cut up the soap small and dissolve it in about 4 ounces water. Melt the pomade and put it in a hot mortar. Gradually add the hot soap solution, stirring until thoroughly mixed, then slowly add the rest of the rose water then let stand for some hours, sti ing occasionally. Properly manipulated, a perfect emulsion is obtained. When completed it may be perfumed as desired. The soap employed should be of good quality.

(6244) F. A. writes: Referring to query 6203, in yourissue of September 1, 1894, of SCIENTIFIC AMERICAN: 1. What is the E.M.F. of the sulphate of mercury battery described in query as above? A. About 1½ volts. 2. How does the resistance and capacity for work compare with same size of bichromate of potash cell? A. It is not used for heavy work. 3. Does the battery run down on open circuit? A. It maintains itsélf very well.

(6245) A. N. M. asks: 1. What size storage battery would be required to run a 4 horse power electric motor 6 hours? A. Allowing 7 square feet of positive plate per cell, 40 cells would be required. 2. And how many 6×8 gravity cells would be required to charge storage nattery? A. A prohibitive number. The minimum would be 100, and 10,000 would be none too

(6246) S. E. G. says: What causes the disease on fruit trees called "black knot," also the treatment for it? A. Answer by the Department of Agricul-

ture.-Black knot is caused by a fungus known as Plowrightia morbosa. Spores or seeds enter the tissue through cracks in the bark, multiply and grow, forming the "knots." Experiments in Massachusetts indicate that painting the knots with linseed oil or kerosene will prevent further growth. Best and surest way is to cut off branches or knots from large branches and paint wound with some sort of varnish or put on grafting wax to keep out the air.

(6247) J. U. asks: In making the induction coil described in "Experimental Science," what size spark would I get by using No. 30 wire instead of No. 36? A. The spark would probably, for the same weight of wire, be not over one one-hundredth the original length.

TO INVENTORS.

An experience of nearly fifty years, and the preparation of more than one hundred thousand applications for parens at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled 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, 381 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 18, 1894,	G
AND EACH BEARING THAT DATE.	G
[See note at end of list about copies of these patents.]	G
Account keeping device. E. McCulley	G
Account keeping device. E. McCulley. 528,194 A :1d, making ntric, M. Prentice. 528,116 A ijustable bracket, A. W. Browne. 528,020 Air brake coupling, W. Borbridge et al. 528,123 Air brakes, automatic lock for, W. Mable. 528,189 Air or gas compresser, H. A. Barber. 520,288 Aluminous cake and making same, J. V. Skog-	G
lund	G
hold	G H H
Ball. See Foot ball. 526,287 Band cutter and feeder. V. C. Bailey. 526,287 Band cutter and feeder C. H. Hill 526,361 Barrel, W. H. Cadwell 526,069 Battery. See Electricsecondary battery. 526,069	
Barrel, W. H. Cadwell 520,000 Battery, See Electricsecondary battery. Bearin , roller, B. D. Tabor. 526,120 Bed, 3 Ma, Gillen & Godfrey. 528,150 Bicycle, V. Belangers. 526,360	. H
Bicycle, V Belangers	H
Blower, T. Kitson	! B
Boller See Steam boller furnace, smokeless P. J. Bode See See See See See See See See See	H
Conkey. Boot or shoe polishing machine, E. O. Bicknell, 526,321 Boring machine, Pringle & Brodie. 526,361, 526,362	H
Bottor shoe poising machine, E. O. Bicknell, 528,382 Boring machine, Pringle & Brodie	H I
Bottling apparatus, A. A. Pindstofte. 525,035 Bracket. See Adjustable bracket. Brake. See Velocipede brake. Wagon brake.	Ir Ir Ir
Brake mechanism, automatic fluid pressure, H. Guels 526,187 Bridle bit, M. Lesser 520,241	J
Guels. 526,187 Bridle bit, M. Lesser. 526,187 Bridle bit, M. Lesser. 526,284 Budfing machine, S. W. Winslow. 526,187 Buggy boot, W. J. Kaufman 526,233 Buggy cushion, F. Lon 526,041 Burning garbage, etc., apparatus for, J. C. Anderson. 526,284	J
Burning garbage etc., method of and apparatus	· K
for, J. C. Anderson	
Calculator, F. G. Nelson	Ļ
Can. See Oil or gasoline can. Car and air brake coupling, combined, S. W. Summers 526,118 Car coupling, W. F. Drew 528,337 Car coupling, W. F. Drew 528,337 Car coupling, S. Duggan 528,152 Car coupling, J. M. Brance 526,252 Car coupling, J. O. Miller 526,252 Car, carpress, Morel & Ferrer 526,261 Car, ergess, Morel & Ferrer 526,191 Car, rargess, Morel & Ferrer 526,191 Car, rail way passenger, J. Krebbiel 526,262 Cash register and indicator, J. P. Cleal 526,262 Cash register and indicator, J. P. Cleal 526,262 Chain, conveyor, J. Dick 528,275 Chain, drive, J. H. Mitchell 526,161 Chain, galvanle, F. Fritsche 326,182 Chair, See Dental chair, Revolvin chair.	I I
Car coupling, J. O. Miller. 528,256 Car coupling, J. J. Schulter 526,202 Car, express, Morel & Ferrer. 528,191	
Car, 1reignt, J. Khoads. 522,231 Car, gate, A. M. Black. 526,214 Car, rail way passenger, J. Krehbiel. 526,134 Cash register and indicator, J. P. Cleal. 526,234	I
Cereals, preparing, W. Onderdonk. 528,256 Chain, conveyor, J. Dick. 528,073 Chain, drive. J. J. Mitchell. 528,161	i M
Chain, galvanle, F. Fritsche	
Check, conductor's, A. Ross. 526,26: Cheese curds in a continuous manner, producing, E. G. N. Salenlus. 526,16: Chromium, electro deposition of, Placet & Bon-	
Chromium, electro deposition of, Placet & Bon- net	
Clamp. See Fence clamp. Clippers for wool or hair, construction of me- chanical, Asbberry & Barnes	1 1 1
Clamp. See render stand. Clippers for wool or hair, construction of mechanical, Asbberry & Barnes. 526,575 Clothes drier, L. W. Pond. 526,115 Clutch, friction, R. T. Wingo. 526,117 Coal or coke fork, J. Kreitz 526,108 Coal or rock drilling machine, E. Carnduff. 526,232 Coarne or t. Tobin 526,232	5 N 1 · 1 9 N
Coal or rock drilling machine, E. Carnduff. 526,282 Coffee pot, J. Tobin. 526,333 Coffin hand lift, W. H. Pope. 528,133 Collins, machine for forming turndown or rolled, R. N. Martz. 552,432 Condenses, multiplase, H. O. C. E. Wagemann. 526,68	1 1
Condenser, surface, F. M. Wheeler 526,20 Converter, multiphase, H. O. C. E. Wagemann 526,06 Cooler. See Milk cooler.	6 C 8 I 3 I
Core for casting hollow cylinders, F. Gandy 526,02 Cores for casting, apparatus for manufacture of,	$f{1}_{f \parallel}^{f \cdot f \parallel}$
J. C. Potter	- 11
Coupling. See Air brake coupling. Car coupling.	1.1
Car and air brake coupling. Hose coupling. Pipe coupling. Water closet coupling. Crib, folding, J. S. Mackie	8 7 3
Curtain attachment, window, J. M. Freeman 526,30 Cushion. See Buggy cushion. Cut-offmechanism, W. W. Wallace 526,27 Cutter. See Band cutter.	6 1 4 1
Cultier. See Band cutter. Cylinders, securing teeth to, J. H. Dunbar. 526,3 Dental chair, E. B. Cushing 526,00 Dental plates, forming, G. W. Traphagen. 526,00	14 1 1 1 12 1
Cutter. See Band cutter. Cylinders, securing teeth to, J. H. Dunbar. 528,30 Dental chair, E. B. Cushing 526,07 Dental plates, forming, G. W. Traphagen. 526,33 Depth gauge. A. G. Hollister 523,10 Dial transmitter, Pearce & Brotch 526,35 Dislintecting device. W. Moackler 526,25 Dislintegrating florous plants, machine for, A. L. Evia. 526,18	6 2
Display holder, A. L. Stone	18] 15 10
Display holder, A. L. Stone 526,18	2 28
Draught equalizer, H. Sturm 526,22 Dress shield, E. M. Welcker 526,22	6

	Scientitic	
-	Drier. See Clothes drier. Drying kiln, W. G. Galloway. 526,343, 526,350	Rai Rai
ı¦ e.	Drier. See Clothes drier. Drying kiln, W. G. Galloway 526,343, 526,350 Drying machine, P. C. Hewitt 526,228 Drill head, A. J. Cooper 526,227 Drill rod grab, W. H. Wisherd 526,368 Dust arrester, A. Volm 526,368 Dust arrester, A. Volm 526,227 Electric drout, E. E. Hersh 526,227 Electric generator, H. O. C. E. Wagemann 526,064 Electric machine, dynamo, D. H. Wilson 526,173 Electric motor, A. W. Meston 526,083 Electric motor, E. Thomson 526,168 Electrical connector, J. B. Henck, Jr 526,173 Electrical connector, J. B. Henck, Jr 526,078 Electrical yoperated register for barrels, etc., H.	Rai Rai
t	Dust arrester, A. Volm	Rai
f 1	Electric indicator, C. J. Coleman 526,220 Electric machine, dynamo, D. H. Wilson 526,170 Electric motor, A. W. Meston 526,083	Reg
9	Electric motor, E. Thomson 525,172 Electric switch, L. Winterhalder 525,172 Electrical connector, J. B. Henck, Jr. 526,078	Rer Rev Rifl
- t	Electrically operated register for barrels, etc., H. J. Bang. 526,140 Elevator shaft gate, Lamb & McClure 526,237 Engine. See Blowing engine. Explosive en	Rol
		Ror Sad Safe Safe
- :	Envelopes, adjustable perforator and cutter for business, P. H. Flynn. 526,347	Sali San Sas
•	bined, A. W. Robinson	Sas Sas Sas Sau
1	Engine shaft rotation indicator, J. W. Ray. 526,259 Envelopes, afety, C. F. Molly. 526,112 Envelopes, adjustable perforator and cutter for business, F. H. Flynn. 526,347 Excavating and amalyamating machine, combined, A. W. Robinson. 526,666 Explosive engine, H. F. Fraser. 526,228 Explosive engine, H. F. Fraser. 526,342 Explosive engine, H. F. Fraser. 526,342 Explosive engine, H. F. Fraser. 526,342 Feed regulator, J. A. McAnulty 526,332 Feed regulator, J. A. McAnulty 526,332 Feedwater for steam boilers, purifying. C. Stuckle 526,332 Feedwater heater, F. Willey 64, 526, 536 Feedwater heater, F. Willey 64, 536, 536 Feedwater for steam boilers, purifying. C. Stuckle 526, 536 Feedwater heater, F. Willey 64, 536, 536 Feedwater for steam boilers, purifying. 526, 536 Feedwater frager. Barris. 526, 537 Feedwater frager. Barris. 526, 538 Feedwater frager. 526, 536 Feedwater frager. 536, 536 Feedwater. 536, 536 Feedwater	Sau
e	Feedwater for steam bollers, purifying, C. Stickle 528,339 Feedwater heater, F. W. Lycett. 528,188 Fence clamp, wire, Boots & Eakright 528,123	Saw
l ;	Fence fastener, J. Harris 326.311 Fence, wire, E. D. Barling 526.363 Fiber drying apparatus, W. Saulmann 526.301 Fiber of the control of the co	Sea Sea
8	Fire extinguisher, C. J. L. MacLeod	Sea Sec Sep Sev
- 1	Musselmann 526,355 Flagstaff, T. J. Murray 525,258 Flask See M oulder's flask 526,136 Footbealt, W. R. Thomlinson 526,136 Footwear, F. T. Kee 526,234 Fork See Coal or coke fork Fuel support or grate, E. Fales 526,073 Furnace See Boiler furnace Het air furnace Smokeles furnace	Sba
<u>.</u>	Footwear, F. T. Kee. 526,234 Fork. See Coal or coke fork. Fuel support or grate. E. Fales. 526,073	Sha Shi
إ َ	Furnace. See Boller furnace. Heating furnace. Hot air furnace. Smokeless furnace. Fuse for shells, time, Dreger & Wratzke 526,344	Sig Sig
į	Furnace. See Boiler rurrace. Heating furnace. Hot air furnace. Smokeless furnace. Fuse for shells, time, Dreger & Wratzke	Sm
ĺ	Gas apparatus, water oil, H. Fourness	Son
! : •	Pope. 526,267 Gasometer, coin-controlled, Alexander & Thompson. 526,187	Sta
	Gate. See Car gate. Elevator shaft gate. Safety	Sta
4 :		Sta Ste Ste
6 90 19	Generator. See Electric generator.	Sto
15	Governors, speed recorder of motive power engine, E. Lachmann 526,321 Grain separator, W. Reid 526,200 Grate, combined dumping and shaking, E. Fales 526,321 Grinding mill, W. N. Hartsborn 526,313 Grinding mill, S. Schwarzenberger 526,313 Grinding or facing machine, L. L. Lamb 526,238 Guns, cartridge stop for magazine, G. T. Thorn-bill 526,272 Hand bag, lady's, A. Hinkel 526,037	Sto Str Str
)5 7)8	Grinding mill, S. Schwarzenberger. 526,203 Grinding or facing machine, L. L. Lamb. 526,233 Guns. cartridge stop for magazine, G. T. Thorn-	Sw Sw
77 50	bill 526,272 Hand bag, lady's, A. Hinkel 526,037 Handle. See Umbr ella handle.	Tal Tal
37 51	bill 526,772 Hand bag, lady's, A. Hinkel 526,077 Handle, See Umbr ella handle, Handle bar, adjustable, A. O. Very 526,333 Harvester, G. G. Hunt 522,332 Harvester, corton, W. S. Osborn 626,137 Harvester, cotton, E. Whiting 528,239 Harvester elevator, A. Stark 526,146 Hat blocking and band cutting machine, C. M.	Tai Tai Tel
69 20		T11
20 : 50 : 60	Snell 526,269 Hay and stock rack, combined, E. N. Avery 526,133 Hay carrier track, J. W. Provan 526,052	To
14 66	W. P. Kimbrell	Tra Tra Ty
36 ! 31	Heater. See Faedwater heater. Heating furnace, water, A. Anderson	Um
89 48 66	Hinge, spring, A. A. Page. 526,162 Hoisting apparatus, L. Rosenfeld 526,263 Horseshoe M. F. Poupped 526,050	Va Va Va
21	Heater See Feedwater heater. Heating furnace, water A. Alderson	Ve Ve Ve
62 9∺ 29	Hose coupling, A. L. Balley 526,174 Hot air furnace, W. Ryan 526,987 Hot sir beater, W. Hec kert 526,316	Ve Ve
09 47 77	Indicator. See Electric indicator. Engine shaft rotation indicator. Station indicator. Ingot extracting apparatus, Aiken & Wood 526,094	∇e
96	Inlaid work for decorative purposes. H. A.	Wa
87 41 84	Jack. See Lifting jack.	W
37 33 41	Journal bearing, D. J. Davis. Journal bearing, adjustable, L. Hollingsworth. Journal box, H. B. Williams. Jugs, etc., mount for, Fryer & Coles. 326,104 Kiln. See Drying kiln.	W
84	Kiln. See Drying kiln. Knife. See Pocket knife. Knife clamping or securing device, H. S. Buck-	Wa Wa Wa Wa Wa
83 24	land 526,292 Knives, making, G. M. Griswold 526,393 Knitted doll, S. E. Holmes 526,319 Lacing hooks, machine for setting, I. E. Chand-	
76 96	ler	W
19 03	Lantern, J. C. Shull	w
02 28 50 02	Lasting pinchers, F. Eckert. 528,153 Lifting jack. S. S. Joy 528,153 Limbs, coaptating pad for artificial J. F. Rowley. 528,057	W
91 61	Lock See Door lock. Nut and bolt lock. Lock case, Magovern & Scanlan	
14 156 296 256	Lock. See Doorlock. Nut and bolt lock. Lock ease, Magovern & Scanlan. Loom Jacquard mechanism, B. H. Gledbill. Loom pattern mechanism, Hill & Smith. See, See, See, See, See, See, See, See	Bo Ca Ce
72 61 82	Measuring and marking machine, fabric, A. H. Sutton. Measuring or packering fabrics speed regulating	Ga Ga Sp
180	Sutton 526,061 Measuring or packaging fabrics, speed regulating attachment for machines for, R. W. Watson. 526,275 Mechanical movement, W. W. Beaumont 526,213 Meter See Gas meter.	!
204 264 165	Meter. See Gas meter.	A:
114 192 177	Moulder's flask, F. Morris. 526,113 Motor. See Electric motor. Wave motor. Motor governor, J. Dow. 526,301	
	Nail machines, wire feeding device for, C. W. Richards S26,117	Bu
359 115 171	Neck wear pin, H. B. Rich	Ca
109 294 331	Non-conducting coverings, lastening for, P. Carey	∵ Ca
134 246 208	Carey 526,022	Co Do Fo
063 029	Pad. See Blotting pad. Paper sheets, case for, J. Yeates. 526,282 Pavement block, L. Weinman. 526,090 Pen rack, stand, and case, combined, W. J. Hun-	
10 1	Pen rack, stand, and case, combined, W. J. Hun- ter	LOM
326 158	Pin. See Neckwear pin. Pipe coupling. J. D. Anderson	P
	Placards, etc., machine for bordering, M. Funke 528,397 Plane iron. W. F. Kellett. Plating one material with another, T. A. Edison 528,147	Si
081 038 207	Plow, J. L. Aldred 536.12 Plow, T. J. Kelley 537.23 Pneumatic tool, J. G. Carlinet 537.33	· T
053 306	Pocket knife, D. A. Stiles	T
274 304 071	rress. See issuingpress. Printing press. Stereo- typing press. Pressed steel seat. Wadsworth & Avery	3 Y
332 105	Printing press, D. Maurer 526,248	oris } a.ı } is
356 252 103	Pump, air, R. C. Barbour. 522.17 Pump, centrifugal. H. A. Barber. 526.17 Pump, oscillating, A. Geiger. 524.17	25 01 B
135 190 164 232	Pump, steam vacuum, Zschech & Sumbling 526.06	7 v
462	Pen rack.	1 2

Railway switch, automatic, C. Dietz	526,152
Reed. Railway time signal, A. C. Gordon	526,054 526,032
Refrigerator, G. A. Greene	526,300 526,225
Register. Sée Cash register. Regulator. See Feed regulator. Pressure regulator.	į
Rendering tank, A. White	526,091 526,045
Rifles, method of and dies for the manufacture of band forgings for military, Bailey & Bowen Rolling mill, McMurtry & Stitt	526,286 526,195
Rolling mill, tube, C. G. Larson. Ropeway clip, elevated, W. R. Wiggins. Saddle, riding, J. M. Martin	526,092 526,133
of band forgings for military, Bailey & Bowen Rolling mill, McMurtry & Stitt. Rolling mill, tube, C. G. Larson. Ropeway clip, elevated, W. R. Wiggins. Saddle, riding, J. M. Martin. Safe bolt work, E. W. Fowler. Safety gate, F. W. Young Salicyl anild, S. Radlauer. Sand band, W. M. Farr. Sash fastener, C. Rolffes. Sash fastener, J. Seadler. Sash fastener, J. Seadler. Sash fastener, J. S. Sharp. Sash fastener, D. B. Wesson. Sash sastener, D. Sharp. Sashases into links, machine for forming, H. Lefeber.	526,181 526,211 526,258
Sand band, W. M. Farr. Sash fastener, C. Rolffes.	526,075 526,262
Sash fastener, J. Seatuer. Sash fastener, J. O. Sharp Sash fastener, D. B. Wesson	526,208 526,118 526,278
Sausages into links, machine for forming, H. Lefeber	526,080
Saw and resaw, combined band rip, E. C. Mershon Saw attachment, R. McLane	526,160 526,255
Scholar's companion, F. D. Martin	526,110 526,815 526,218 526,217
Mershon Saw attachment, R. McLane. Scholar's companion, F. D. Martin Scrubbing machine, foor, W. W. Head. Seal, E. J. Bruoks. Seal, anap, E. J. Brooks. Seat See Pressed steel seat. Secondary electric betters. There & Oblasser (r)	528,217
Secondary electric battery, Theryc & Oblasser (r) Separator. See Grain separator. Sewing machine, S. H. Wheeler	11,442 526,335
Sewing machine, shoe, G. R. Peare	526,325 526,108 526,125
Shingle strips, machine for manufacturing supplementary metallic, C. H. Dana	526,299
Signal. See Railway time signal. Signal apparatus, J. P. Coleman	526,186 526,179
Signal apparatus, Thomas & Seward	526,168 526,085 526,193
Snow shoe, folding, H. Hremer Soap, inserting floats in cakes of, W. Berry	526,193 526,216 526,068
Seat. See Pressed steel seat. Secondary electric battery, Theryc & Oblasser (r) Separator. See Grain separator. Sewing machine, S. H. Wbeeler. Sewing machine, S. H. Wbeeler. Sewing machine, shoe, G. R. Peare. Shaft support, vehicle, C. H. Knight Sharpener, razor, P. J. Caesar. Shingle strips, machine for manufacturing supplementary metallic, C. H. Dana Show top, S. S. Goldman. Signal See Railway time signal. Signal apparatus, J. P. Coleman. Signal apparatus, Thomas & Seward. Smokoless furlace, C. Murray. Snow shoe, folding H. Bremer. Soap, inserting floats in cakes of, W. Berry. Sounds, apparatus for collecting, concentrating, and distributing, S. D. McKelvey. Speed of pulleys, etc., mechanism for regulating,	526,046
Stand. See Washstand.	526,199 526,111
Stutistics maching for compiling ortabulating	
H. Hollerith. Statistics, machine for tabulating, H. Hollerith. Steam boiler, Connelly & Schafer. Steam boiler, J. J. Tonkin. Stereotyping press, W. J. Egan. Stoker, mechanical, T. R. Butman.	526,130 526,024 526,062
Stereotyping press, W. J. Egan. Stoker, mechanical, T. R. Butman. Stopper, See Bottle stopper.	526,148 526,341
Stove, cahoose or other, J. Spear	526,206 526,260 52 6,222 526,221
Stoker, mechanics J. T. R. Butman Stopper. See Bottle stopper. Stove, cahoose or other, J. Spear. Stovepipe attachment, L. Reaser. Street sweeper, F. W. Dessau. Stringed instrument, J. Connery. Swing, C. E. Hobbs. Switch. See Electric switch. Railway switch.	526,221 526,151
Switch. See Electric switch. Railway switch. Switch apparatus, J. G. Schreuder. Switch apparatus, J. G. Schreuder. Table, J. W. Carver. Tank. See Rendering tank. Tanning composition, J. B. Hodges. Tap or faucet. M. P. Schetzel. Tap or faucet. M. P. Schetzel. Telephone transmitter, H. L. Baldwin. Tile, tilluminating, C. W. Mark. Tile, ill aminating, J. W. Mark. Tile, ill aminating, J. W. Mark. Tile, ill aminating, J. W. Mark. Tool securing device, H. S. Buckland. Tool setting the securing device, H. S. Buckland. Tool securing device, H. S. Buckland. T	526,328 526,353
Table, J. W. Carver	526,144 526,229
Tap or faucet, M. P. Schetzel Telephone transmitter, H. L. Baldwin.	526,327 526,139
Tile, ill uminating, J. W. Mark	526,245 526,185
Tool clamping device, H. S. Buckland526,290. Tool securing device, H. S. Buckland526,290. Top, W. A. Dunlap.	526,283 526,291 526,305
Transit, pocket, D. W. Brunton	526,021 526,183 526,106
Umbrella, W. D. Kimball Umbrella handle, J. Gilbert	526,106 526,155 526,184
Valve, J. A. Blair Valve for steam engines, rotary, F. Lester Valve gear, Sare and & Rice. Valve mechanism for hydraulic elevators, W. F.	526,040 526,267
Valve mechanism for hydraulic elevators, W. F. Cole. Vehicle seat corner fron. C. C. Field	526,146 526,223
Cole. Vehlcle seat corner iron, C. C. Field. Velocipede brake, Hendrick & Fay. Velocipede, ice, S. Young.	526,146 526,223 526,317 526,210
Velocipede saddles, means for supporting, C. de Rossetti	526,265
Vessels, apparatus for raising sunken, E. B.	. 520,001
Petrie. Wag on beds or wire stretcher. machine for mov- ing, Irvine & Anderson	
Wagon, mail, J. H. Martin. Wagons, self-closing roller top for transport, H.	526,042
Wagons, self-closing roller top for transport, H. Muhlberg Washetand and watercloset, combined, A. A. Leyare. Washer. See Bottle washer.	. 526,324 . 526,240
Washer. See Bottle washer. Washing machine, D. R. Borneman Watch case pendaut. A. N. Gauthier	. 526,143 ¹ . 626,030 ₁
Washing machine, D. R. Borneman. Watch case pendant, A. N. Gauthier. Water closet, J. F. Wolff. Water closet coupling, J. H. Savill. Water closets, connection for broken, A. W	526,065 526,089
Ayling	526,285 526,310
Wells, construction of oil, O. Fay	526,082 526,346
forming, F. H. Howe	. 526,230 626,354
Wrench. See Pipe wrench.	- www.pel012
DESIGNS.	
,	23,646
Bonbon, E. J. Kaltenbach. Campaign souvenir, N. Grevstad. Centrifugal machine casine, H. B. Welper. Game apparatus base. F. M. Whiteman. Garment fastener, D. H. Warner. Spoon handle, etc. G. W. Shiebler.	23,648 23,647
Spoon handle, etc., G. W. Shiebler	23,643

	Bonbon, E.J. Kaltenbach	23,646
	Campalgn souvenir, N. Grevstad	23,644
	Centrifugal machine casing, H. B. Welper	23,648
•	Game apparatus base. F. M. Whiteman	23,647
	Garment fastener, D. H. Warner	23,645
	Spoon handle, etc., G. W. Shiebler	23.643
		,

TRADE MARKS.

	TIMED MITTIES.	
	Axles and axle boxes for vehicles, J. T. Richards Baking powder, S. Guckenheimer & Sons Beds. spring, Foster Brothers Manufacturing	25.251
	Company Buttons and studs, cuff, collar, and other orna- mental. Paelzer Brothers & Company	20,200
	Canned goods, spices, flour, meal, sugar, tea, cof-	
•	fee, pepper, and salt, Shaw Brothers	, i
)	and pickles, Huntoon & Gorham	25,254
	beater and range fittings, malleable and gray iron, Berger Brothers	25 259
	Cornmeal, Indian Rice Milling Company	25,252
	Dolls, Hinrichs & Company. Food prepared from sterlized milk and other in-	20,209
	gredients, fermented milk, Y. T. Matzoon Company	25,255
i	Liniment for internal and external use, U. M. T. Samuels & Company	25,249
)	Medicine. named, Sharp & Dohme	25,248
	Paper, safety, American Bank Note Company, 25.237,	25,238
7	Preparation, skin, N. H. Outland	
	Company Snuff, B. F. Weyman	25,248 25,246
į	Stone and cement payements, etc., tools and im-	
;	Niemier	25,258
ļ	Company	25,242
)	Yarns and threads, linen and hemp, Finlayson,	25,236
3	Bousfield & Company	25.241
)		

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1883, will be furnished from this office for 5 cents. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 361 Broadway, New York.

Movertisements.

ORDINARY RATES.

Inside Page. each insertion - - 75 cents a line Black Page. each insertion - - - - \$1.00 a line EF For some classes of Advertisements, Special and Higher rates are required.

The above are courses per agate line—about eight words per line. This notice shows the width of the line, and is set in agate type. Engravings may bead advertisements at the same rate per agate line, by measurement, as the letter press. Advertisements must be received at Publication Office as early as Thursday morning to appear in the following week's issue.



LATHE Seroil Baws, Circular Saws Lathes of all our Machinery

Seneca Falls Mfg. Co. 695 Water St., Seneca Falls, N.Y.

LATHES, Shapers, Planers, Drills, Machine Shop Outfits, Foot Lathes, Tools and Supplies. Catalogue Free. SEBASTIAN LATHE CO. 120 CULVERT ST., CINCINNATI, O.



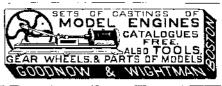
We take pleasure in anno noing that by arrangements made with J. G. Pohle, we are enabled to furnish our customers with the

with the POHLE AIR LIFT PUMP,

protected by numerous American and Foreign patents.
This department of our business will be under the personal supervision of Dr. Pohle, the inventor and pat'ee. THE INGERSOLL-SERGEANT DRILL CO., Havemeyer Building, 26 Cortlandt St., New York.



THE NEW TOWER BRIDGE, LONdon.—Description of the new bascule bridge recently erected over the Thames, in the vicinity of the Tower; with a comparison therewith of the Van Buren street with a comparison therewith or the van buren street drawbridge, and the Halsted street lift bridge, Chicago. With 7 illustrations. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 973. Price 10 cents. To be had at this office and from all newsdealers.



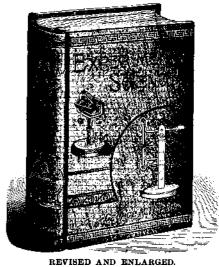
FINE DRILLING MACHINES for Hand and Power Use. Also Bolt Cutters, Screw Plates,

Reamers, etc.
Superior Workmanship. Send for Catalogue.

WILEY & RUSSELL MFG. CO., Greenfield, Mass., U.S.A.

NOW READY!

Fourteenth Edition of Experimental Science



120 Pages and 110 Superb Cuts added.

Just the thing for a present for any man, woman, student, teacher, or any one interested in science.

In the new matter contained in the last edition will be found the Scientific Use of the Phonograph, the curious optical illusion known as the Anorthoscope, together with other new and interesting Optical Illusions, the Optical Projection of Opeque Objects, new experiments in Projection, Iridescent C. ass, some points in Photography, including Hand Cameras, Cane Cameras, etc.; systems of Electrical Distribution, Electrical Ope Finder, Electrical Rocker, Electric Chimes, How to Color tantern Slides, Study of the Stars, and a great deal of other new matter which will prove of interest to scientific readers.

840 pages, 782 fine cuts, substantially and beautifully bound. Price in cloth, by mail, \$4. Half morocco, \$5.

Send for illustrated circular.

MUNN & CO., Publishers, Office of the SCIENTIFIC AMERICAN, 361 BROADWAY, NEW YORK,