

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

CABLE GRIP.—James S. Patten, Baltimore, Md. This is a gripper of simple construction and easy to manipulate, which is adapted to grip the cable by lateral pressure and drop it vertically when released, while the grip can be quickly adjusted to again pick up the cable without the aid of lifting levers or other additional means. When a cross cable is reached, the grip automatically lets go its cable, rides over the other cable, and drops into position to again pick up its cable on the application of the gripman's lever. The clamp jaws are incapable of slipping or loosening their hold on the cable after they are applied, thus saving frictional wear.

ELEVATED CABLE RAILROAD.—William R. Heylman, Rich Hill, Mo. According to this invention, the cars are suspended below the rails, which form a duct for the cable propelling the cars. A novel means of switching onto side tracks is provided, with means for actuating the grip to engage or release the cable. This road can be set up at a moderate cost on sea beaches, etc., and is more especially designed for pleasure trips, but can be readily arranged to carry freight.

Mechanical.

MORTISING MACHINE.—Simeon J. Hicks, Englewood, Ill. This is a machine especially adapted to make mortises in the stiles of doors, although useful for other purposes. It has a longitudinally reciprocating carriage carrying work-holding clamps, a transverse reciprocating frame with chisels moving above the carriage, and a clutch-controlled driving mechanism reciprocating the frame and carriage. The machine is designed to perform its work very nicely and rapidly, the mortising chisels operating from both sides of the work, while the article to be mortised may be quickly placed and removed.

SUPPORTING JOURNAL BOXES.—J. Friedrich Hey, Strasburg, Germany. The bracket or hanger is provided with a disk having a circular recess, while the bearing support is provided with an eccentric disk or flange having an offset projecting into the recess of the disk of the bracket. A ring clamp secured to the bracket engages the front face of the eccentric flange or disk. The device is simple and durable, and permits of a wide range of adjustment.

Agricultural.

PLOW.—Agustin M. Chavez, Mexico, Mex. This is an improvement in plows whose beams are attached at their front ends to a truck or wheeled frame. A stirrup is fastened to be attached to the straight section of the plow beam, and by sliding this stirrup toward the rear curved portion of the beam, the plowshare may be made to enter the ground more or less deeply, the nearer the stirrup is carried to the share the deeper being the furrow. In connection with the plow a sod cutter is employed, clipped upon the plow beam in such a manner that the turner will be adjustable.

STOCK WATERING DEVICE.—Anson Carey, Ashland, Neb. This is a device for watering hogs and other stock, and consists of a trough with a water supply pipe in its rear, a gravity lid or nose gate hinged in its rear being adapted to close down on the trough, and having an upwardly and outwardly inclined lip at its forward end arranged, when the lid is down, to leave the top of the trough open in front. A stopper to the supply pipe is pivotally connected with the hinged nose gate for operation by the latter in both directions. According as the nose gate is raised is the flow of water to the trough, and the animal always has a fresh supply of water, but none is wasted, the flow stopping when the nose gate closes itself.

Miscellaneous.

WIND WHEEL.—Benjamin J. Sykes, Skylesville, Pa. This invention relates particularly to improved connections between the power shaft and plunger rod, facilitating the utilizing of the power of two wheels simultaneously, and equalizing any difference of speed between the wheels, preventing jerking or binding upon one side of the plunger rod. The construction is such that the entire machine is designed to be perfectly balanced, thus having great strength and durability. In operation, one of the wheels is turned to face the wind, and the back of the other wheel corresponds with the face of the one in the wind, the wheels revolving simultaneously in opposite directions.

VEHICLE SEAT.—Jacob Ruch, Mount Eaton, O. This invention provides improved connections between the seat and the vehicle body. The seat has a hinged back, and a crank rod mounted on the under side of the seat has arms pivoted to its cranks and secured to the seat back, a lever being secured to the crank rod and a fastening device to fix the position of the lever. The seat is especially adapted for two-wheeled vehicles, the position of the seat back being readily shifted to make the seat easy, and also for its adjustment to bring the weight of the load in the right position in relation to the wheels, thus enabling the vehicle to be properly balanced, so that it will ride and draw easily.

DISINTEGRATING BITUMINOUS ROCK.—Ben Hager, Salt Lake City, Utah Ter. This is an apparatus especially designed for disintegrating rock or dry asphaltum, and the kettles in which the material is placed have each a stationary grate, between the bars of which oscillating bars are made to swing, a steam pipe delivering steam beneath the grate while another pipe delivers steam above the grate. As the steam disintegrates the asphaltum the oscillating bars force it down to the bottom of the kettle, from which it may be drawn out as desired, the operation being preferably carried on in two connected kettles, so that the work is continuous.

POST HOLE DIGGER.—John Tipton, Hymers, Ind. This device has a cylindrical body of iron or steel, with its lower edge notched and beveled to form cutters, and within the cylinder is an adjustable or sliding disk having a central opening, the disk being rigidly attached to a rod, which extends upward, and ends in a ring surrounding the handle. When the digger is forced

into the ground, the dirt is tamped inside the cylinder by the operator pressing with his foot upon the ring, thus forcing the disk down upon the dirt, and enabling the latter to be lifted with the digger out of the hole.

FLOOR CLAMP.—Mathias Lutgen, West Bend, Ia. This device has a base plate carrying a lever, and means for fulcraming the body of the implement on a joist, a rocking dog being movable with the plate in response to the throw of the lever, the latter serving to rock the complete implement on its fulcrum. The device greatly facilitates the clamping and pressing up of the boards of a floor while it is being laid, to close the joints between the boards, and provide for nailing the boards while so closed and held one against the other.

FENCE.—William P. Sharp, Lowell, Kas. This is a fence designed to be conveniently set up and taken down, and is well adapted for use upon even as well as upon uneven ground. It consists principally of supports and panels, the supports being formed of two posts crossing each other near the upper end and connected at about the middle by a cross bar. The panels have at each end a post or batten, to which are secured longitudinal rails adapted to engage the supports, the adjacent panel posts being connected with each other at their upper ends by a link.

SUPPORT FOR BRACKET TABLES.—John N. Tiffany, San Diego, Cal. A novel, convenient, and substantial support is provided by this invention for a small table top that may be adjustably attached to a chair or bedstead for the use of an occupant, affording means for holding an open book at any desired angle before a reader, and projecting the book support over the bed or the chair, as may be desired. The table top is also available to hold writing materials and to write upon. When not in use the support may be packed together in compact form.

SASH FASTENER.—Emanuel and Henry S. Ensminger, Bloomington, Ill. This is a cheap lock, quickly applied to any window, so that it cannot be accidentally unlocked by the rattling of the sashes. The invention is an improvement upon a former patented invention of the same inventors. The latch is pivoted on the top of the lower sash, and a spring concealed in a transverse recess in the under side of the latch engages a stud to press the latch normally inward to lock the sashes. The sashes may be held at any desired height, or the lower sash may be raised and held as desired without moving the upper sash.

FOLDING TABLE.—John C. and Hiram A. Carl, Allentown, Pa. This invention provides an extremely cheap and simple table to which any kind of a table top may be applied, which may be extended when desired to form a long table or an ironing table, or be folded into small compass to make a neat and compact stand. The table, whether extended or folded, is very strong, and the invention covers various novel features of construction and combinations of parts.

HAND STAMP.—Samuel A. Harrison, New York City. This is a registering or counting stamp, which will positively count every impression and display the amount so that it may be easily read. Its construction is simple, and such that it is not likely to get out of repair, and it may be conveniently reset whenever necessary or desirable. The dial is in a glass-covered case in the top of the handle, and the hands are moved every time the stamp is pushed down to make an impression.

LAP RING.—George Bobb, Yokena, Miss. According to this invention the two members of the ring are connected by a loose universal or swivel joint, which adapts it to be easily and quickly applied to or detached from single and double trees, chain links, etc. The ring thus made is very strong and durable, since the joint between the two hooks is not formed by aid of a pin, rivet, or pindle, as usual in such devices, but by circular eyes, which are integral portions of the hooks.

Designs.

HEAD FOR FUR COLLARS.—Bernard Cohen, New York City. This design represents an animal's head, to be used as an ornament, a rib-like figure being produced in relief upon the muzzle and extending around the edge of the mouth, and the curved tongue lying upon the under jaw.

RUG FASTENER.—George B. Shellhorn, Montgomery, Ala. This fastener is a triangular-shaped body, having concave edges and tapering extensions projecting at right angles from the body, one of the extensions projecting oppositely to the other two.

HEEL OR SOLE PLATE.—George J. Davison, Richmond, Va. The leading feature of this design consists in the shape and ornamentation of the completed article, of segmental shape, and with V-shaped openings with prong-like projections.

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 of this paper.

NEW BOOKS AND PUBLICATIONS.

AIDE-MEMOIRE PRATIQUE DE PHOTOGRAPHIE. Par Albert Londe. Paris: J. B. Bailliere et Fils. Pp. 337.

THE DAILY NEWS ALMANAC AND POLITICAL REGISTER FOR 1893. Compiled by George E. Plumbe. Ninth year. Issued by the Chicago Daily News Company. Pp. 424. Price 25 cents.

From the Chicago Daily News we have received its almanac. It is a work containing in excellent shape the exhaustive data now found in the different newspaper almanacs.

TIPS TO INVENTORS. Telling what inventions are needed, and how to perfect and develop new ideas in any lines. By Robert Grimshaw. New York: The Practical Publishing Company. 1893. Pp. 84. Price \$1.

Dr. Grimshaw is well known as a very bright and graphic writer. In these hints to inventors he makes a

number of suggestions of what people might invent, and many of them seem exceedingly well put. Exactly what he means by the following "tip," however, is not very clear: "The chemist who will make from cotton seed either a drying or a non-drying oil should not want for cash if he manages his affairs properly" (pp. 21, 22). Exactly how this is to be considered a tip to inventors is not clear. The advice on perfecting and developing patents and on selling patents makes very good reading.

MARKET GARDENING AND FARM NOTES. Experiences and observations in the garden and field, of interest to the amateur gardener, trucker and farmer. By Burnet Landreth. New York: Orange Judd Company. 1893. Pp. iv, 215. Price \$1.

The subject of truck farming in this work seems treated thoroughly up to date. The author is not restricted in his knowledge to American gardening operations, but he is able to contrast American processes and customs with those of other lands. This gives the work an international character which makes it really attractive reading. We believe that it should be in the hands of every enterprising cultivator of vegetables.

HOW TO MANAGE THE DYNAMO. A handbook for ship engineers, electric light engineers, and electro-platers. By S. R. Bottone. New York: Macmillan & Co. 1893. Pp. 63. Price 60 cents.

This very short treatise is designed as a handbook for ship engineers, electric light engineers, and electric platers. It is elementary, therefore, and quite practical in its treatment. Of its 63 pages, 17 are devoted to definitions, so that altogether the amount of matter given is not very large. It has no table of contents, but has an index adequate for its size.

THE "PRACTICAL ENGINEER" POCKET BOOK AND DIARY. 1893. Edited by W. H. Fowley. All rights reserved. Second edition. Technical Publishing Company, Limited, London. John Heywood, Manchester. Price 60 cents.

In addition to very numerous horse power tables, notes on heat, waste of materials, and the usual data given in works of this character, a memorandum diary is found, making the work a useful compact companion for the civil or mechanical engineer.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & CO., 361 Broadway, New York.

SCIENTIFIC AMERICAN BUILDING EDITION.

MARCH, 1893, NUMBER.—(No. 89.)

TABLE OF CONTENTS.

1. Elegant plate in colors, showing an attractive dwelling at Springfield, Mass. Floor plans and perspective elevations. Cost \$9,750 complete. E. L. Chesebro, architect, Springfield, Mass.
2. Plate in colors showing the residence of the Hon. John J. Phelan, at Bridgeport, Conn. Two perspective views and floor plans. Mr. A. H. Beers, architect, Bridgeport, Conn. An excellent design. Cost \$8,000 complete.
3. A dwelling at Springfield, Mass., erected at a cost of \$4,000 complete. Perspective views and floor plans. Messrs. Granger & Morse, architects, Springfield, Mass. A model design.
4. A cottage erected near Brighton, Mass., at a cost of \$2,800. Floor plans, perspective view, etc. A. W. Pease, architect.
5. Engravings and floor plans of a residence at Greenwich, Conn. A beautiful design in the Colonial style of architecture. Mr. W. S. Knowles, architect, New York.
6. A dwelling recently erected at Brookline Hills, Mass., at a cost of \$5,300 complete. A picturesque design. Perspective elevation and floor plans. Messrs. Shepley, Ruton & Cooledge, architects, Boston.
7. Sketch of a tasteful design for a three-family cottage, to cost about \$4,500.
8. Plans and elevations of an English cottage of quaint and pleasing design.
9. View of the Fifth Avenue Theater, New York. A splendid example of modern architecture in the style of the Italian Renaissance. Together with a portrait and biographical sketch of Francis H. Kimball, architect, New York City.
10. Miscellaneous contents: Paving estimates.—World's Fair items.—Painting the World's Fair buildings.—Drawing instruments for colleges, etc., illustrated.—A tasteful fireplace design, illustrated.—An improved steelspring hinge, illustrated.—Vegetable growth in water mains.—American machinery in London.—A foot radiator valve for hot water radiators, illustrated.—New tin plate plant.—An improved furnace, illustrated.—Cincinnati woodworking machinery.—An improved door hanger, illustrated.—A big heater company.

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 ARCHITECTURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

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

MUNN & CO., PUBLISHERS, 361 Broadway, New York.

Business and Personal.

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

Acme engine, 1 to 5 H. P. See adv. next issue.

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

Improved iron planers. W. A. Wilson, Rochester, N. Y. Patent Open-Side Planing and Shaping Machines. Pedrick & Ayer, Philadelphia, Pa.

Lathes 20' swing, planers 24' x 24', at special prices. F. C. & A. E. Rowland, New Haven, Conn.

Have you tried "aluminum Babbitt metal"? Write A. W. Cadman Mfg. Co., Pittsburgh, Pa., about it.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Stow flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y. See adv., page 174.

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. All sizes in stock. Irvin Van Wie, Syracuse, N. Y.

Steam engine, electric motor, and dynamo castings. Send stamp for catalogue. C. A. Sturtevant, Hartland, Vt.

For Sale—Patent on improved mine car. See illustrated notice on page 180. For terms and particulars address Homer Durand, Starkville, Col.

To Let—A suite of desirable offices, adjacent to the Scientific American offices, to let at moderate terms. Apply to Munn & Co., 361 Broadway, New York.

Hydrocarbon Burner (Meyer's patent) for burning crude petroleum under low pressure. See adv. page 381. Standard Oil Fuel Burner Co., Fort Plain, N. Y.

Fine Castings in Brass, Bronze, Composition (Gun Metal), German Silver. Unequaled facilities. Jas. J. McKenna & Bro., 424 and 426 East 23d St., New York.

For Sale—New 5 horse power upright engine, 5' x 6' cylinder and 30 x 5 ft. boiler, upright, new. All guaranteed. Spot cash, only \$181. Wm. C. Codd, Baltimore, Md.

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.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 25 to 36 Rodney St., Brooklyn, N. Y.

Canning machinery outfits complete, oil burners for soldering, air pumps, can wipers, can testers, labeling machines. Presses and dies. Burt Mfg. Co., Rochester, N. Y.

Will sell or lease foundry and machine shop, with tools and stock. Good waterpower. No steam required. Rare chance for general or special work. Box 230, Milford, Del.

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.

For Sale—Electro-plating dynamos. Three 12 inch Weston for silver or nickel, one 8 inch Weston for silver, and one American Giant No. 4. Address Crane & Breed Mfg. Co., Cincinnati, Ohio.

Any Manufacturer of hardware or machinist's specialties, desiring to be represented in New York City or vicinity, will find it to his interest to address E. J. Hussey & Co., 80 John Street, New York. We are centrally located, active workers and can furnish best of references.

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.

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.

(4787) G. W. V. asks how to make a Lalande oxide of copper battery in the cheapest way possible. I heard that they could be made of tin tomato cans. A. See SUPPLEMENT 732.

(4788) F. T. G. asks: If one heat unit raises the temperature of one pound of water one degree, how many heat units will be required to raise the temperature of one cubic foot of air one degree? A. One heat unit will raise one pound of air one degree. One pound of air at sixty degrees is equal to thirteen cubic feet. Then one-thirteenth of a heat unit will heat one cubic foot of air one degree.

(4789) F. W. Q. asks whether he can get the same amount of electricity from a battery by immersing the zinc half way into the solution instead of all the way; as, for instance, in the Grenet battery described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157. A. By immersing the zinc one half way into the solution, you will get less current than you will if it is entirely submerged; the electro-motive force, however, will be the same in both cases.

(4790) A. P. J. asks what wash or prevention, if any, may be used to arrest powder posting in a chestnut bookcase. Fine powder issuing from small holes in the shelves is a constant annoyance. Reply by Prof. C. V. Riley.—Without having seen specimens of the author of the injury described by your correspondent, it is impossible to definitely determine the insect which is injuring his chestnut bookcase. There are several coleopterous insects of the family Ptinidae which are notorious as infesting the hard wood used in the manufacture of desks,

household furniture, the handles of various implements, etc., and these are known as powder post beetles. Some of these belong to the genus *Lyctus*, of which *L. striatulus* is known to do similar injury to that described. These beetles are, however, more often found working outdoors, and the damage may be done by another common Ptinid beetle, the *Sitona penicilla*, which more often affects woods indoors and made into cabinets. The presence of these insects is always indicated by small circular holes, through which the beetles have entered the wood, or by small heaps of the dust which is pushed out by the burrowing larvae. The beetles are small, of a brownish color, and their larvae are small, six-legged, somewhat hairy, yellowish-white grubs, with their bodies more or less curved toward the extremity. Wood once thoroughly infested by the beetles or larvae is beyond redemption; but in the case of the beginning of the injury, or as a preventive, washing, and if possible soaking, the wood in kerosene will act as a preventive and also destroy the beetles and larvae as far as the oil penetrates. Where the wood is of such a nature that it can be submitted to stove or kiln heat without damage, it may be thus disinfected.

(4791) C. G. writes: I notice in SCIENTIFIC AMERICAN of March 4 a cut of a storage battery. Do I understand you as meaning that there are no zinc plates used at all? Is it simply sheet lead plates coated with red lead? Do I use same connections to charge battery as discharge it? Must the cell be air tight? How shall I know when it is charged? What book can I get to give me good knowledge on storage system complete? A. There are several different types of storage batteries. In many of the types both plates are formed of lead; no zinc is used, and the lead plates are coated with red lead. The same connections are used for charging and discharging the battery. The cell should not be air tight, as gases or vapors are generated which require a way of escape. For information on charging and using batteries, etc., we refer you to Salomon's "Electric Light Installations," price \$2.

(4792) G. A. R. asks: What is meant by "ampere hour," so often referred to in battery circulars? Does it mean that the capacity is say (in a 50 ampere hour cell) 50 amperes for 1 hour, 1 ampere for 50 hours, or 10 amperes for 5 hours, etc.? Where can I obtain directions for making gas out of coal on a small scale, and the purifying of the same, storage, tanks, etc.? What power would a 6 foot windmill of the "air motor" pattern develop? A. One ampere hour is 1 ampere of current flowing for 1 hour, one-half an ampere of current flowing for 2 hours, one-tenth of an ampere flowing for 10 hours. On the other hand, 10 ampere hours may be 1 ampere for 10 hours or 10 amperes for 1 hour. We think of no small work on the manufacture of gas. We can refer you to "Gas Works: their Arrangement, Construction, Plant, and Machinery," by F. Colyer, price by mail, \$8. The windmill to which you refer will probably average about one-half horse power.

(4793) O. J. asks: 1. In making fluid for bichromate batteries, do you add the sulphuric acid to water the first thing and then the bichromate potassium or bichromate potash to water and then sulphuric acid? A. The correct way to make the bichromate solution is to dissolve the bichromate first and afterward slowly add the sulphuric acid. 2. A recipe for a good luminous paint. A. For information on luminous paint, we refer you to SUPPLEMENT 497. 3. Is there any action on the zinc in a bichromate potash battery when the circuit is open? A. In the Fuller and Bunsen batteries there is scarcely any action on the zinc when the battery is not in use; but in plunging batteries the zinc, if left in the solution, is soon destroyed.

(4794) A. B. writes: I built the dynamo shown in SUPPLEMENT 600. Used it about three weeks on an arc light, when it burned out. Tried resistance in circuit, but it heated just the same and dimmed the light. Do arc light machines heat more than incandescent machines? Have a pair of field magnets like those shown in SUPPLEMENT 600. Can't I make a two horse power machine by making the following changes? Place a piece of iron one-half inch thick between the pole yokes (where the pole pieces are bolted together) and face off the bottom of the poles, and add an inch thickness to each one, and then bore out to about 4 1/2 inches, taking care to throw the hole as much down as possible. The object of the pieces is to save stock. I would then wind ten layers of No. 16 wire on each pole in five pieces, each piece forming two layers, and add a shunt of fine wire on the outside, making a compound winding. Am sure the field could be made strong enough this way, even for a three horse power machine. What size wire should I use on armature say for about 60 volts? and how many coils ought there to be? Would there be any advantage in making the rings with four holes on the sides for ventilation? A. In regard to your arc light, we would suggest that you adjust the lamp so as to give a longer arc, thus increasing the resistance of the circuit. If this does not prevent the overheating of the armature, add 15 or 20 ohms resistance to the circuit and run the dynamo at a little higher speed. There is no reason why an arc light machine should heat more than an incandescent one if it is constructed for arclighting. You could arrange your field magnet for a larger armature in the manner proposed. We cannot, without considerable calculation, furnish you the information you desire for the winding of your new armature. Probably your readiest way of getting at the matter is to see a machine of about the size desired and get your measurements from that. There will be an advantage in making ventilating holes in the armature, providing you do not cut out too much metal.

(4795) F. B. asks whether England or the United States produces the largest amount of steel now. A. The United States now produce the largest amount of steel, to wit, for 1890, 3,500,000 tons, Great Britain 3,250,000 tons.

(4796) H. A. asks: 1. What are the rules for finding the pitch of a propeller wheel? A. The pitch is obtained by multiplying the circumference in feet or inches by the cotangent of the angle of the blade with the center line. Or take the angle by opening a folding rule on the edge of the blade and in line with the shaft aft. Lay off two lines at right angles and place the angle of the rule on one line at a distance of the circumference of the wheel from the line representing the center of the shaft and extend the line represented by the opening of

the rule to meet the central line. This forms a right angled triangle, of which the shaft line is the pitch in the same manner (feet or inches) that the circumference was taken in. 2. Does it require more power to run a boat at a certain rate of speed with a small propeller wheel than with a larger one? A. Yes. Propeller wheels should be as large as possible to run in solid water for economy. 3. How much pitch should a propeller have which is 14 inches in diameter, and how many revolutions should it make a minute to give a speed of 6 miles an hour to a shell boat, 16 feet long, with a very sharp bow, the boat weighing 230 pounds? A. A 14 inch screw for a boat with fine lines should have 80 inch pitch and make 275 revolutions per minute for 6 miles per hour, allowing 20 per cent slip. 4. When the pressure in a boiler is up at a certain point, say 70 pounds, does it require more fuel to keep it there than at a lower point of pressure? A. The amount of fuel required to keep the steam at a specified pressure depends entirely upon the power used. It takes more fuel for a given power at the lower pressure.

(4797) J. G. C. says: Will you please give a recipe for a paste that I can use on the face of a photograph, so I can mount the print face down on glass, something that will not discolor the face of the print and is not costly? A. To mount prints on glass follow the directions given by J. E. Dumont; that is, take 4 ounces gelatine and soak half an hour in cold water, then place in a glass jar, adding 16 ounces of water; put the jar in a large dish of warm water and dissolve the gelatine. When dissolved pour into a shallow tray. Have your prints rolled on a roller, albumen side out; take the print by the corners and pass rapidly through the gelatine, taking great care to avoid air bubbles. Hang up with clips to dry; when dry, squeeze carefully on to the glass. The better the quality of glass the finer the effect. From "The Scientific American Cyclopedia of Receipts, Notes and Queries."

(4798) A. S. writes: I would like to make a steam whistle, 12 inches diameter. What would be the proper length and what would the proportions be for a whistle one octave higher in tone than the 12 inch? A. A 12 inch whistle is usually made from 20 to 24 inches high. For an octave make the whistle about one-half the volume, subject to corrections for thickness of metal.

(4799) B. & T. ask: What will take off lampblack that is used in mortar and has got on the face of the brick? Our mason used muriatic acid and then put on linseed oil. What will clean it, if anything? A. Rub with a piece of pumice stone or sandpaper.

(4800) F. M. W. and others ask for a cement for use in making aquariums. A. Litharge, fine, white, dry sand, and plaster of Paris, each 1 gill; finely pulverized resin, 1/2 gill. Mix thoroughly and make into a paste with boiled linseed oil to which drier has been added. Beat it well, and let it stand four or five hours before using it. After it has stood for fifteen hours, however, it loses its strength. Glass cemented into its frame with this cement is good for either salt or fresh water. It has been used at the Zoological Gardens, London, with great success. It might be useful for constructing tanks for other purposes or for stopping leaks. Or take linseed oil, 3 ounces; tar, 4 ounces; resin, 1 pound; melt together over a gentle fire. If too much oil is used, the cement will run down the angles of the aquarium. To obviate this it should be tested before using by allowing a small quantity to cool under water. If not found sufficiently firm, allow it to simmer longer or add more tar and resin. The cement should be poured in the corners of the aquarium while warm (not hot). This cement is pliable, and is not poisonous. Paraffine applied to the bottom, if it is of wood, will make it waterproof. Have the wood dry and very hot; rub the paraffine in thoroughly.

(4801) B. W. P. says: Will you inform me whether any kind of grapes may be used to make raisins? A. No. The Muscatel is the principal grape grown to make the raisin, and its flavor excels that of all other varieties. For many years Malaga, Spain, has produced the best fruit, and previous to the introduction of Muscatel cuttings into California, our supplies were brought from that port. There is a difference of opinion in regard to the quality of the fruit produced in Malaga and California, the people in the far West claiming the latter to be superior; but unbiased experts consider the former superior in flavor, richer in sugar, more tender, and larger fruit.

(4802) H. N. says: I want to know what will be the pressure per square inch when air is compressed to one-half its natural bulk or size. Also what the pressure when pressed to one-third of its natural bulk. Would there be any difference if the quantity were large or small? A. For ordinary practical purposes, if the air is to be measured at a uniform temperature (isothermal compression), and calling the atmospheric pressure equal to 15 pounds the formula, pressure \times volumes = pressure = the pressure of compression. Taking your inquiry, $15 \times 2 = 30 - 15 = 15$ pounds pressure and $15 \times 3 = 45 - 15 = 30$ pounds pressure. This will not be the pressure at the instant of compression, because the heat generated by compression expands the air, and at the moment of leaving the cylinder it may have a pressure of 20 pounds in the first case and 50 pounds in the latter. With water-jacketed cylinders, much of the heat of compression is absorbed and the final pressure drops nearer to the isothermal line. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 793, on air compression.

(4803) N. G. writes: About twelve miles from here is a very large spring. I think it must be about one thousand feet higher than this place. A mountain (or hill) higher than the level of the spring lies between us. Which do you think would be the best and cheapest means of conveying water to this city—by siphoning it from that spring, over the hill to a reservoir here, or by pumping it with steam from a river that runs through this place to a reservoir about one mile distant? Also please tell me where would be the best place to send my son to get a thorough knowledge of machinery, both steam and electric. A. If the flow from the spring is large enough for your city supply, it will be the best and cheapest water supply, considering the expense of pumping. A siphon of 10 or 15 feet lift might be made available, but will have to be often relieved of accumulating air. For siphon, any height above 15 feet could not be made practicable in so long a line of pipe. You do not

give details enough for the best advice. It is worth your while to have a survey made as to the whole grade and ascertain whether a detour could be made for a gravity flow. If the water in the river is good, a large ram with a fall of 4 or 5 feet would make an economical water supply. Steam is a constant expense. Perhaps windmills could be used. The Rose Polytechnic Institute, Terre Haute, Ind., is one of the best schools in mechanical and electric engineering in the West, also the Vanderbilt University, Nashville, Tenn.

(4804) J. E. S. writes: 1. I have a well 140 feet to water, which is inexhaustible. By going 40 feet deeper we find dry sand, which absorbs all the water unless plugged below the water line, or we stop drilling before we get through a very hard rock that lies directly on top of the dry sand bed. Can I raise the water with a hydraulic ram? Give instructions for putting in. If not, is there an automatic apparatus that will raise the water? A. You cannot raise water from bored well with a ram, unless by enlarging it, you can sink a pipe through to the absorbing stratum below, to carry off the water used to work the ram and create the necessary pressure. There are oil and gasoline engines and air engines used for pumping water from wells. They all require care. A windmill will be the best automatic machine. 2. Does the moon revolve on an axis as the earth does? If so, why is it the same spots face us all the time? A. The moon makes one revolution on her axis in the same time that she makes one revolution around the earth, and that is the reason why the same parts face us all the time. 3. What shades the moon or causes its different phases? A. It is the reflection of the sun's light on the moon that makes her appear to vary in form. 4. How near has any of the heavenly bodies ever been to the earth, and what is the nearest to the earth at present? A. The moon is the nearest heavenly body. She is 240,000 miles distant from the earth. 5. What body or bodies will cause the eclipse of the sun April 16 and October 9, and their distance from the earth? A. The moon coming between the sun and the earth produces an eclipse of the sun.

(4805) C. M. H. says: I have a steam vacuum irrigating pump which draws water through an 8 inch pipe from a river 18 feet below. My supply pipe now runs diagonally from the pump into the stream, and as the pump is set some distance back from the edge, the supply pipe is necessarily 54 feet long. Will the lift of the water be less if I cut a ditch from the river to a point directly underneath the pump and run my pipe vertically down? If so, how much less will be the weight of the water? A. The weight of the water in the suction pipe is due to its vertical height only. There will be no difference in the pull of the pump due to the two positions alone. The vertical pipe will have less friction than the inclined pipe, as well as less volume, and will require less power to overcome its inertia at the change of stroke in the pump, unless the vacuum pump is of a kind that will keep the water in the long suction pipe under a constant and equal velocity. As this is doubtful, and the possibility that the friction may add a foot, more or less, to the suction head, we advise the open ditch and vertical suction.

(4806) E. J. A. writes: We have a building 16 feet square, 16 feet posts, tight. We wish to place steam pipes in this for the purpose of drying slack barrel heading. We would ask: Our boiler is 25 horse power. Engine uses (develops) but 5 or 8 horse power. Will that not leave boiler steaming capacity to make plenty of steam for this size kiln? We have excellent fuel. Boiler and engine are about 60 feet from kiln building. Will we lose much heat, piping this distance, if we lay pipe in ground, using asbestos packing? What size pipe, to use live steam, would we need, and how many feet, in building, to develop all the heat possible, as there is not much danger heating the material too fast or too much, so as you don't burn it up? Do you think it practical to use steam for drying? We want to develop 150° or 160° of heat in kiln if we can. Boiler pressure 80 pounds. A. You can make a good drying room with the spare steam that you have, without waste of heat. The steam pipe should be thickly felted and the line underground laid in a box 8 inches clear inside, with 1 1/2 inch pipe well felted and supported in the center. Pipe in the drying room should be in flat coils under a lattice floor, 2,000 feet of 1 inch pipe, laid in sections so that it will clear itself of water. The heading should be piled in racks above the floor. The condensed steam should be led back, through a pipe in the box and returned to the boiler.

(4807) W. T. P. writes: I would like information how to build a breast or current water wheel and to gear same to run centrifugal pump. I want to raise anywhere from twelve hundred to twenty-four hundred gallons per minute of time fifteen feet high for irrigation purposes. I want to know the length of wheel and diameter and how to gear wheel so it would adjust itself to rise and fall in river and how to prevent drift from injuring wheel in river. I have abundance of water in river to get the power, if I could get some way to utilize the power in the river. A. You will require a wheel of about 15 horse power. You will find the wheel that you describe illustrated and described in SCIENTIFIC AMERICAN, January 21, 1893, 10 cents mailed. This form of wheel will have to be constructed to suit the velocity of current or the height of the breast. A millwright or clever carpenter should be able to build a wheel to suit the power required.

(4808) L. W. S. asks: 1. When does the patent on the Bell telephone receiver expire? A. The patent on the Bell telephone receiver expires in January, 1894. 2. In making one of the above telephones, would No. 38 wire be better than 36, when the telephone is to be used on a line two or three miles in length? A. No. 38 would be better for use than No. 36, but it is more difficult to wind. 3. Is it the resistance in the line wire that causes telephones to fail on long distances? A. The failure of the telephone on long distances is due to leakages more than to resistance.

(4809) H. V. F. asks: 1. Does the telephone, described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 142, need any battery? A. No. 2. Will the telephone work on a line 450 feet long? A. Yes. 3. What size of copper wire should I use? A. No. 18 will answer for the distance given. 4. Will the above suffice if I use the telephone call in Fig. 5 on page 2571 in SCIENTIFIC AMERICAN SUPPLEMENT, No. 162? A. Yes. 5.

Shall I use return wire or return through the earth? A. Either return will answer.

(4810) M. J. B. asks the size of stack that should be put on dry kiln, size of which is 82 feet by 27 feet by 7 feet, and containing 5,000 feet of steam pipe. We would like to remove the air out of the room about every ten minutes. A. Assuming the steam pipes are on or near the floor and the lumber piled above the pipes, the ventilation in so large a floor space should be divided so as to make an even flow of air throughout the room. For this purpose at least six uptakes should be made through the ceiling, 18 inches square, equally dividing the areas of the ceiling. These uptakes need be no more than 8 or 10 feet high, with hoods to keep out rain, and dampers, so that they may be closed when steam is first turned on.

(4811) A. F. writes: Are the numbers by which the different sizes of electric wires are called arbitrary numbers or do they refer to measures, fractions of inches, etc.? Suppose that for making a telephone you say that No. 18 wire is used, how can I convert that number in millimeters, as the diameter of wires is given in that measure? A. The numbers of the American wire gauge are arbitrary. For this reason you will have to get the sizes in mills or circular mills from some of the existing tables. You will find such a table in Sloane's "Arithmetic of Electricity," price by mail \$1.

(4812) N. H. E. asks the cheapest and best way to color brass black. A. Dip the clean brass in a solution of chloride of platinum.

(4813) W. B. R. asks how lead pipes are joined together by the use of a blow pipe. A. For soldering lead pipes with a blow pipe, a jump joint is made by opening one end bell mouth and scarfing the other end to fit in, when, by powdering the joint with resin and placing a piece of strip solder around the joint, it can be heated by a blow pipe until the solder runs in and makes the joint.

(4814) W. E. H. writes: Please give the process for etching brass signs. Also the japan or black material used to fill in with. A. The brass sign is painted all around the letters with asphalt varnish and a wall of putty or soft asphalt raised outside the lettering to keep the acid from flowing away. Use nitric acid 1 part, water 2 parts, mix and pour on the plate to a depth of 1/8 inch. When bitten deep enough, wash dry and fill with melted asphalt or black sealing wax.

(4815) C. C. M. asks: Can you give us any information about the use of aluminum for shoeing race horses? We have tried it, but find the metal too soft. Is there any way to harden it? A. As we assume that your object is to make a light shoe, we recommend an alloy of from 3 to 5 per cent of copper to aluminum. This will make the aluminum slightly heavier, but harder and tougher. Probably the 3 per cent alloy will be all that is required.

(4816) T. T. asks: In firing a cannon, at what point will its projectile attain its greatest velocity? Also, how is the velocity of projectiles measured? A. The velocity of a shot is greatest at the muzzle of the gun.

(4817) J. G. W. writes: I am making a quantity of very light castings with a core inside. The castings want to be very soft, so as to drill and tap easily. No strength is required. I find that while I have the iron soft enough on the outside, the core seems to chill the iron somewhat on the inside, thus making it hard on the tap. The core is made of boiled oil, resin, and moulding sand in certain proportions. What I want to know is this: Is there any formula for making cores that has a softening effect at the junction of the iron with the core? A. For cores try new mouldings, and mixed with as little paste as will allow the sand to hold together, and bake thoroughly dry in an oven.

(4818) M. B. writes: I have to arrange a calendar for 1894, but have no tables from which I can find the time for the rising and setting of the moon for every day and in different places. Can you give me some information regarding such tables? A. The Nautical Almanac gives the moon's position for every day in the year, with the necessary formulas. It is published by the government at Washington.

(4819) F. B. says: I want a receipt for a paint to apply to a copper-lined bath tub from which the tin has been worn in patches. I would prefer some white color. A. Use ordinary white paint.

(4820) J. H. H. asks: 1. How can I mix bronze powder in a liquid form? With what can I cut it? A. Mix the bronze powder in thin mastic varnish. 2. What size and how many blades should a propeller wheel be to propel a 13 foot canoe? A. A two-blade screw 10 inches diameter for the canoe.

(4821) J. C. R. writes: I am building a small non-condensing compound marine engine of the following dimensions: Diameter of cylinders, H. P. 3/4 in., L. P. 1 1/2 in., stroke 3/4 in., size of ports H. P. cylinder 1-16 x 3-16, exhaust 3-32 x 3-16, L. P. cylinder 1-16 x 9-32, exhaust 3-32 x 9-32. Are the cylinders and ports in the proper proportion? If not, give size of L. P. cylinder. If the cranks are fixed at right angles to each other, give relative position of eccentrics to cranks. A. The cylinders are a good proportion, as are also the ports. The longer diameter of the eccentrics should be slightly ahead of a line at right angles to the crank. See "Model Engine Making," by Pooock, \$1 mailed.

(4822) J. H. R. writes: I wish to lay out my yard in walks. I do not care for brick, but a preparation to put on the ground. Now is there any cement or preparation similar to cement that will stand freezing? And if there is, can you give me cost per square foot or yard? A. Probably hydraulic cement mixed with sand, 1 of cement to 2 of sand, makes as good walks as anything that you can handle. The cement is about \$1.25 per barrel, and 1 barrel should make about 4 square yards of walk 1 inch to 1 1/2 inch thick. Mix dry, and wet and spread quickly. Smooth with a trowel.

(4823) S. Z. asks for a solution for plating metal goods a jet black, that will not peel or crack when said goods are squeezed. A. The coloring of the surface of metals black may be done by chloride of pla-

tinum and other receipts in our "Cyclopedia of Receipts," but do not stand squeezing or pressing without marking the surface. Such surface color should be done after finishing.

(4824) F. W. C. says: I am desirous of knowing how to make aluminum present a matted appearance, such as would look well in jewelry. Also, if there is a better material to polish aluminum than rouge. A. The matting of aluminum is done with polished matting tools or stippled with a broad lining or stipple, the same as silver plate. The tools can be obtained from dealers in jewelers' tools. For the bright finish on aluminum, use Vienna lime after the rouge.

(4825) J. T. asks how far a 124 ton gun will throw a projectile, the kind Krupp will exhibit at the World's Fair, also the quantity of explosives to fire each round. A. The 124 ton gun is intended to carry solid shot of half a ton with a charge of 700 pounds of powder, with a range of 12 or 13 miles.

(4826) C. E. E. asks: What can I use for the porous cup in a battery? What will do that I can find here without buying one? A. Porous flower pots may be used for the porous cells of batteries by stopping the hole in the bottom of the pot. Such porous cells, however, are not as efficient as those made for the purpose.

(4827) S. B. write: We have two large iron columns, one on each side of boilers, in basement, both essential supports to a six story building. They get very hot. Will you please advise us if expansion and contraction of same is any indication of danger? A. There is no danger from the influence of the heat, if the columns are outside of the brickwork of the boiler setting.

TO INVENTORS.

An experience of forty-four 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, 381 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

March 21, 1893,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions such as Adding machine, A. J. Brooks; Aeration and purifying the water of wells, etc., means for, H. A. Strong; Alarm, see Burglar alarm, Pneumatic alarm, Shoal alarm; Almond or walnut huller, A. Gamble; Amalgam, portable, J. D. Schiele; Amine, treating hydrated phosphates of, S. L. Goodale; Anchor, E. T. Starr; Animal shears, Moffat & Virtue; Animal shears, W. Silver; Armatures for dynamo-electric machines, system of winding, W. M. Thomas; Auger, earth, A. J. Greiner; Automatic gate, A. M. Whiteley; Awning, E. B. Warren; Banjo, F. B. Converse; Banjo, W. Mayer; Banjo, J. E. Quinn; Barrel washer, U. Eberhardt; Battery, see Secondary battery; Beam hanger, machine for making, J. Grant; Bearing for conveyers, shaft, J. B. Ivey; Bearing for propeller shafts, thrust, H. C. Pedersen; Bearing roller, Edgerton & Holtz; Bed, folding, P. J. Harrsh; Bedpan or commode, E. Phillips; Beehive, Hawkins & Ray; Beer, etc., distributing apparatus for, J. Hartin (P); Beer saucers with registering attachment, Paproth & Aster; Belding, link, O. Maxon; Bench, see Laundry bench; Bin, see Flour bin; Blacking box, J. M. Wheat; Block signal system, J. La Burt; Board, see Drawing or plotting board; Plaster board; Boiler, see Wash boiler; Boiler furnace, W. J. Richards; Boiler furnace, steam, Sutton & Buckley; Book covering machine, H. J. Arnold; Book, memorandum sales, R. Gar; Book rest and holder, O. C. Mitchell; Boring machine, double, C. H. Purdy; Boring machine, horizontal, A. J. Frith; Bottle moulding apparatus, C. D. & H. F. Crickier; Bottle stopper, G. H. Clifton; Box, see Packing box; Breadbox; Fruit box; Match box; Sample box; Brace, see Corner brace; Brake, see Car emergency brake; Pressure brake; Sled brake; Vehicle brake; Bread of cake pan, T. S. Peacock; Bread raiser, J. C. Nicollis; Brick kiln, A. B. Horne; Brick kiln, continuous, J. P. Veirs; Bridges, side rail for suspension, E. E. Runyon; Broiling appa, meat, J. G. Weldon; Bronzing machine, G. Newsum; Brooder, poultry, D. E. Becker; Buckle, J. Cantner; Buckle, P. A. Raymond; Buckle, back band, W. F. Anthony; Building or paving blocks, sectional mould for, G. M. Graham; Burglar alarm, H. Pratt; Burner, see Gas burner; Buttonmaking machine, Sheridan & Draher; Button setting machine, J. Mathison; Caddy, W. H. Wood; Calipers, beam, G. A. Colton; Camera, see Photographic camera; Camp chair, folding, J. Harpfer; Can, see Milk can; Oil can; Canal digger, J. McMullen et al.; Candy mould, M. M. June; Car coupling, H. R. Dore; Car coupling, Harvey & Kane; Car coupling, J. C. Lock; Car coupling, T. L. McKeen; Car coupling, C. Morst; Car coupling, G. Runge; Car coupling, Scurr & Cotton; Car coupling, Scurr & Whipple; Car coupling, W. Wallace; Car, electric, C. Brown; Car, elevated railway, H. S. Peck; Car emergency brake, J. Goodfellow; Car frame, W. Robinson;

Table listing inventions such as Car, oil tank, J. D. McMillan; Car sanding device, E. H. Plinkham; Car starter, Phil & Hult; Car step, W. Ripberger; Car transfer, C. Chambers, Jr.; Car wheel guide, railway, Turnbull & Council; Carbureting apparatus, air, P. H. Fontaine; Card table, folding, A. A. Griffin; Carding engine, Clarenbach, Jr., & Zoll; Carding machine stopping mechanism, I. F. Lewry; Carpet fastener, Gallinger & De Lisle; Carpet lining, packing, etc., T. D. Holcomb; Cash register, barbers, M. J. Sarsfield; Caster, ball, A. M. Leinwather; Centrifugal machine, J. Sell; Chair, see Camp chair; Rail chair; Chairs, electrical attachment for rocking, C. E. Hartelius; Check register, C. T. Daniels; Chopper, see Potato chopper; Chuck, drill, C. E. Billings; Churn, W. N. Mason; Churn, Gibson; Churn dasher, F. M. Lucas; Churn motor, J. H. Dameron; Chute, coal, G. Susemihl; Cigar lighter, electric, W. M. Thomas; Cigarette machine, A. E. Decouffe; Clock striking mechanism, electric, W. Kalsing; Cloth napping machine, G. H. Bauche; Cloth scouring machine, M. H. Kohrausch; Clothes drier, G. Tyler; Coffee grinding mill, E. Schmidlin; Coin-pressed engine, J. G. Cumming; Compound engine, J. S. Farmer; Conveyor, L. Hassell; Corner brace, H. White; Corrugated tube for boilers, etc., L. Silverman; Corset stiffener, C. K. Pevey; Cotton conveyer, seed, F. C. Gammons; Cotton gin brush, Elam & Thomas; Coupling, see Car coupling; Insulating coupling; Cradle, swinging, P. T. Resser; Cuff, A. D. Marble; Cultivator, W. Hammer; Cultivator, H. M. Little; Cultivator, later, J. H. Spencer; Cultivator, roller, H. H. Henson; Cut-out, automatic electric, F. B. Badt; Cut-out, electric, Crockett & Allen; Cut-out, rosette, C. E. Barry; Cycle pedal attachment, W. L. Ferguson; Decorticating rhea, etc., machine for Longmore & Alston; Dental appliances for obtunding nerves, W. P. Horton, Jr.; Dental boring apparatus, Weber & Hampel; Dental disk holder, N. Moran; Dental plate, J. A. A. Schoondermark; Den taphite, J. R. Watson; Digging, see Canal digger; Post hole digger; Door, E. B. Hayes; Door or window screen, E. Coff; Drawing or plotting board, G. M. Graham; Drawings to stones, etc., transferring, L. Benoit; Dredging machine, centrifugal, Allison & Nash; Drill, see Electric drill; Drilling purposes, etc., self-feeding ratchet brace for hand, W. H. Heeson; Duplicating apparatus, F. F. Daus; Eaves trough attachment, G. L. Fisk; Electric commutator and cut-out, Crockett & Allen; Electric currents, system for transmitting, E. Raines; Electric drill, reciprocating, W. A. G. Birkin; Electric light fixtures, switch for, J. Hutchinson; Electric lighting system, S. W. Rushmore; Electric machine and motor, dynamo, H. P. Brown; Electric machine, dynamo, F. Bain; Electric machine, dynamo, S. Hellebrandt; Electrical appliance, C. H. Folger; Electrode, secondary battery, Donaldson & Macrae; Elevator, see safety; H. H. Day; Elevator safety device, W. H. Hultgren; Engine, see Carding engine; Compound engine; Locomotive engine; Pumping engine; Rotary engine; Steam or pneumatic engine; Engines, method of and apparatus for operating aqueous ammonia, C. L. Horack; Envelope, P. T. Webster; Exhaust head, G. W. Christoph; Eyeglass hook, W. W. Hayden; Fan, H. Scheuer; Fan, revolving hand, H. C. Durgin; Fan rate, D. W. Jewett; Faucet, C. P. Howes; Feed box, I. L. Martin; Feedwater heater, G. H. Conklin; Fiber separating machine, S. B. Allison; Fil d'letter, V. Astier; Filter, oil, F. A. Nusbaum; Filter, water, J. P. Saitz; Filters, collecting tube for, G. H. Moore; Floor or roof, breeder, N. Poulson; Flour bin and sifter, J. A. McClellan; Flue or chimney lining, Y. W. Smith; Fruit box, A. H. Meesch; Fruit press, N. Gaudron; Furnace, see Boiler furnace; Furnace, G. F. Gallagher; Furnace for burning coal screenings, F. L. Bartlett; Furnace or stove, J. H. Scholding; Fuse, projectile, J. Rapp; Gauge, see Air gauge; Veblen; Game counter, S. B. Miller; Garment supporter, W. H. Ralph; Gas apparatus, C. F. Cattell; Gas apparatus for manufacturing, J. W. Kennevel; Gas apparatus for the manufacture of, A. T. Bennett; Gas burner, A. T. Bennett; Gas generator, J. H. Miller, Jr.; Gas, incandescent burner for hydrocarbon, J. S. P. Stutley; Gate, see Automatic gate; Farm gate; Generator, see Gas generator; Glass, see Prescription glass; Glass blowing apparatus, H. Hilde; Glass, machine for manufacturing articles of, W. Bechtold; Glass, marbled, C. F. E. Grosse; Glove fastening, E. J. Kraeger; Glove turning device, E. Schwabach, Jr.; Grate front and hearth, folding, W. H. Vance; Grinding and sharpening shearing combs and cutters, etc., machine for, Moffat & Virtue; Grinding machine, D. H. Church; Grinding machine, roll, G. Vine; Guitlar, W. Becker; Gun rack for tents, S. S. Pague; Hame fastener, M. Potter; Hammer, carpenter's, E. G. Duryea; Hammer, power, J. O'Brien; Hand saw, see Saw; Hand saw, folding; Harp, Bolan, C. J. Holbrook; Harvester, corn, E. A. Harrington; Harvester, corn, Myers & Anderson; Harvester, corn, R. Pederson; Harvester, cotton, G. Lipenard; Harvester, grain binding, L. Miller; Hay press, L. F. Gressett; Heater, see Feedwater heater; Heating apparatus, portable, J. E. McElfatrick; Hoof trimmer, H. C. McCleave; Hook, see Eyeglass hook; Horse checking device, J. H. Gibson; Horse power, W. M. Lewis; Hub attachment, electric, Veblen, L. Harris; Hub, cycle, A. Perkins; Huller, see Almond or walnut huller; Ice cream freezer, T. H. Besse; Ice cream freezer, J. W. Bowley; Index and balance indicator for account books, combined, J. H. Rand; Indicator, see Station indicator; Insulating coupling, E. Ballet; Insulator, trolley wire, Hathaway & Kelleher; Iron, see Sad iron; Jack and truck, combined, W. Beckert; Jar stopper fastener, fruit, J. H. Forrest; Joint, see Rail joint; Journal bearing, self-lubricating, J. J. Wood; Journal box, H. J. Thompson; Keg or tool rack, W. E. Pierce; Kettle, T. Cascaden; Kettle, W. J. Pecker; Knife, see Pocket knife; Knife, see Brick kiln; Wood drying kiln; Knife, see Mould forming knife; Knitting machine cam guard, G. H. Coburn; Knitting machine, circular, Griffith & Caswell; Lacing stud, P. A. Raymond; Ladder, C. Childs; Ladder, safety, A. Necker; Ladder, store carrying, H. Fresh; Lamp, cooking, L. Wojcikow;

Table listing inventions such as Lamp, electric arc, E. Thomson; Lamps, thermal cut-out for electric, Lemp & Wiktman; Latch, see Lock; Latch, see Grant; Latch, Chandler; Lathe attachment, O. J. Beale; Lathe, pulley, A. Street; Lathing, metallic, E. Hawes; Laundry bench, E. A. Whiting; Lid holder, D. O'Leary; Lighting apparatus, H. A. Stevens; Lighting arrester, H. O. Henneberg; Liquids, method of and apparatus for dispensing, J. P. Day; Liquors by electrolysis, apparatus for purifying, J. Becker; Loading device, L. A. De Mayo; Lock, bicycle; Lock, electric, A. Phillipsborn; Locomotive engine, F. W. Johnstone; Loom, swivel, O. W. Schaum; Loop, bullet, W. P. Gelabert; Lubricator, G. B. Essex; Lubricator, C. O'Leary; Match box, H. Cramer; Match box and cigar cutter, combined, W. W. Hayden; Meat scorer, Rader & Heist; Metal apparatus for forming conoidal articles; Metal articles, method of and apparatus for compressing and shaping, J. Robertson; Metal bars, machine for tapering and shaping, T. & J. Coulter; Metal tubes, method of and apparatus for shaping and drawing, J. Robertson; Metal, see Zinc; Metal, see Tin; Milk can, G. H. Wright; Mill, see Coffee grinding mill; Mining machine, F. N. Slade; Mould, see Candy mould; Mould forming knife, L. His; Motion, mechanism for transmitting, G. F. Evans; Motor, see Churn motor; Rotary motor; Musical instrument, A. Peterson; Musical instrument trances, pin for, G. A. Ernst; Nozzle, exhaust, H. C. Reskan, Jr.; Nut lock, Miles & Commander; Oil can or other oil receptacle, T. A. Schlueter; Ordnance, mechanism for firing breech-loading, W. H. Driks; Ores, extraction of metal from, J. Turton; Packing for piston rods, stuffing box, W. H. Apple; Packing, metallic rod, C. F. Churchill; Pad, see Wax pad; Paint, manufacture of, J. K. Hawkins; Pan, see Bed pan; Bread or cake pan; Paper box machine, W. H. Coffin; Pawl ratchet, D. J. Reardon; Peeling machine, combined, Compal; Penulator, collapsible, E. Martin; Performing machine, J. F. Cramer; Phonograph speaking tubes or other purposes, support for, W. G. Henderson; Photographic camera, H. A. Benedict; Photographic camera, A. A. Davis; Printer, see Graphic printing device; W. Ohe; Pianoforte, D. A. Barber et al.; Piano stringing device, A. Bollermann; Pipe wrench, J. A. Smith; Plane, bench, G. W. Wright; Planter and fertilizer distributor, seed, J. R. Board; A. S. Parker; Plaster board, J. D. Baker; Platform, see Unloading platform; Pneumatic alarm, S. P. Hasey; Post hole digger, L. Gibbs; Potato chopper, C. F. Compton; Power, transmission of, T. A. Edison; Precious metals from their ores, process of and solvent for separating, W. A. G. Birkin; Prescription glass, J. O. Adair; Preserving perishable articles, vessel for, W. B. Franz; Press, see Hand press; Press, rotary; Pressure, fluid, R. W. Bayley; Printers' chases, lock-up for, F. Weese; Printing, C. B. Woodward; Printing press ink apparatus, J. L. Cox; Printing press ink apparatus, G. E. Martin; Printer, see Hand press; Printer, see Hand press; Pulley, friction clutch, C. Johnson; Pulp screening machine, G. D. Rowell; Pulverizer and leveller, S. L. Allen; Pump, oil, E. English; Pumps for locomotives, apparatus for cleaning; Pumping engine, steam, C. C. Webber; Punching machine, A. Hourahan; Punching machine, H. Schurig; Purifier and separator, G. A. Culver et al.; Puzzle, J. Green; Puzzle, A. Nembach, Jr.; Quilting machine, J. P. Saitz; Rack, see Gun rack; Keg or tool rack; Rail chair, sleeper, and tie, W. G. Olfherts; Rail joint, J. D. Blanton; Rail joint, F. Mulville; Railway block signal, R. D. Peters; Railway conductor, J. P. Saitz; Railway conduit electric, H. P. Feltrow; Railway converter system, A. Du Bois-Reymond; Railway foot guard, M. Riley; Railway, marine, E. Kaye; Railway rail splice, W. J. Williams; Railway signal, electric, Bradford & Williams; Railway signal, electric, H. V. & A. C. Miller; Railway signal, electrical, S. W. Miller et al.; Railway splice, Quinn & Berry; Railway switch, C. M. Fitch; Railway switch, electrically operated, P. Evans; Railway tie, metallic, A. E. Roberts; Railway trolley, electric, J. P. Saitz; Railway trolley, electric, G. W. Von Siemens; Railway conduit system for electric, E. Hazleton; Refrigerating apparatus, D. L. Holden; Refrigerator, F. H. Zahn; Register, see Cash register; Check register; Registering device, package, R. F. Anderson; Riveting machine, F. Heyde; Rotary engine, J. Matthews; Rotary motor or pump for steam, water, or compressed air, F. Schroder; Rotary screen for screening kaolin or analogous substances, J. W. Burgess; Sadiron, H. I. Noble; Sample box, R. Gar; Satchel or bag frame, R. Flocke (P); Saw, A. Lyker; Saw, crosscut, L. E. Dean; Saw, crosscut, J. V. Hotchkiss; Saw handle, crosscut, T. J. Ely; Saw, miter, R. Uhl; Saw sharpener, W. H. Nogar; Sate, letter, E. May; Screen, see Door of window screen; Rotating screen; Self-cleaning screen; Window screen; Scrubber, O. Smith; Seat, see Wagon seat; Secondary battery, L. Bristol; Self-cleaning screen, A. Fereva; Sewer water trap, Bude; Sewing machine, Spink & Chapman; Sewing machine, G. Speight et al.; Sewing machine bobbin, J. Scott; Sewing machine tension device, J. M. Merrow; Sewing machine thread waxing and tension device, E. Morgan; Sewing machines, combined presser foot and thread holder for, Johnson & Porter; Shade holding mechanism, J. B. Thurston; Shades, attachment to frictional holding mechanisms for spring-actuated, E. T. Burrows; Shampooing the hair and scalp, device for, W. C. Vose; Shears, see Animal shears; Shears, A. Renscheld; Sheet metal, machinery for pressing boats from, W. Heslop; Shingle sawing machine, F. Challoner; Shutter, see Camera; Shovel, see Excavator; Shoal alarm, S. H. Janney; Shoe, A. F. Herrman; Shoe fastener, P. A. Raymond; Shoe shank stiffeners, machinery for making metal, E. Fay; Shutter work, L. Kutscher; Signal, see Railway signal; Railway block signal; Sled brake, H. Buncker; Slotting machine, C. B. Baldwin; Smoke arrester and separator, Born & Parkin; Snow plow, M. D. Schaefer; Spectro-gram, B. Mackay; Spinning machine, saddle for top rolls of, E. Dixon;

Table listing inventions such as Sprinkling tanks, strainer cover for, F. E. Bowman; Stage appliance, theatrical, D. I. Towers; Stages, hand, implement for taking down build; Staple, Mahler; Staple driving tool, S. C. Davidson; Starch, manufacture of, J. C. Dubiel; Starching apparatus, fabric, J. M. Beerwester; Station indicator, M. Fiset; Steam, garment, H. Johnston; Steam apparatus for condensing exhaust, F. L. McGaban; Steam calorimeter, R. C. Carpenter; Steam or pneumatic engine, J. W. Powers; Steamer, G. Wiley; Steering apparatus, T. Ellis; Still, shoe, W. R. Stewart; Stirrup, saddle, J. A. Kewson; Stopper, see Bottle stopper; Jar stopper; Stove burner, oil, E. M. Wright; Stove, oil, L. F. Wilder; Stovepipe thimble, E. F. Neumann; Stoves, chill core for moulding sockets for, O. Daman; Stoves, furnace, air pump attachment for, Boyler & Rothwell; Strap, N. Nilsson; Straw stacker, J. W. Nethery; Sugar wagon, G. Van Wagenen; Sulky, S. Elliott; Sulky, pneumatic, A. M. Shurtleff; Suspensory, M. Feldman; Switch, see Railway switch; Syringe, J. M. Wardell; Table, see Card table; Tap, ale, J. Neumann; Telephone, C. T. Bloomer; Telephone, combined, listing and ringing key for, W. M. Goodridge; Tellurian, W. R. Dunham; Testing machine, O. Reeser; Thrashing machine feed regulator, G. W. Hallett; Ticket controlling apparatus, L. J. Hunter et al.; Ticket, transfer, and receipt controller, L. J. Hunter; Tie, see Railway tie; Time lock, G. J. H. Goehler; Tire, bicycle, E. F. Ryder; Tire, pneumatic, E. Barrett; Tire, pneumatic, F. H. Irons; Tobacco, see Smoking apparatus; Tobacco box clamping machine, J. H. Kester; Tooth plate, artificial, G. A. Juterbock; Toy, J. G. Hunt; Toy, P. E. McDonnell; Trap, see Sewer water trap; Trapline, J. A. Mackenzie; Trimmer, see Hoe; Trimmer; Truck safety attachment, car, R. J. Spearling; Truck, street car, S. Harris; Trucks, safety shoe and brake attachment for car, R. J. Spearling; Tube, see Corrugated tube; Tube making apparatus, J. Robertson; Tug, thill, M. Potter; Typewriting machine, and duplicator, combined, J. T. Davis; Unloading platform, E. J. Coler; Valve for triple valve mechanisms, graduating, J. T. Hayden; Valve for stop valve mechanism, stop, H. Baum; Valve, suction, W. H. Brenner, Sr.; Valve, throttle, A. J. Pitkin; Vehicle, L. Landreth; Vehi cleboler, T. H. Glancy; Vehi clebrake, M. J. Bobo; Vehi clebrake, rotary, J. S. O'Connell; Vehi clebrake, rotary, W. Bonner; Vehi clebrake, rotary, H. W. Hamell; Vehi cle, two-wheeled, D. S. Gallatin; Vending device, J. C. Ayer; Vending machine, coin-operated, H. Byron; Ventilator, W. McFarlane; Wagon seat, Geller; Wash boiler, S. A. Mackie; Washer, see Barrel washer; Washing compound, C. R. Ely; Washing machine, J. H. Conner; Washing machine, W. M. Coventry; Washing machine, C. Flatfords; Washing machine, E. Worden; Washing, A. E. Worden; Watch bow fastener, W. F. Bingham; Watch dials, embossed plate for enameled, F. Hess; Watch key, W. F. Bingham; Watchmaking and setting mechanism, J. W. Numamaker; Water meter, rotary, Westinghouse, Jr., & Ruud; Water wheel, Bookwater & Tyler; Wax pad, J. L. Lucas; Weaving machine, circular, N. Lombard; Weigher, rotary grain, B. Simons; Weighing machine, automatic, H. E. Smyser; Weighing machine feeding device, H. E. Smyser; Wheel, see Wagon wheel; Wheel, see Wagon wheel; Whiffletree guard, L. Dimock; Whistle, steam, H. R. Frisbie; Windmill, tower, T. Snow; Window, P. Vandernot; Window screen, D. Stone; Wire fastener, C. F. Erb; Wire stretcher, I. Cross; Wood drying kiln, I. Ungar; Wrench, P. Mandigo;

TRADE MARKS.

Table listing trade marks such as Antiseptic compound for purifying the blood, E. Man & Powley; Beer, lower, Chattanooga Brewing Company; Bicycles, J. E. Geigan; Boots and shoes, Hayden, Guardenter & Co.; Burlap, J. T. Bailey & Co.; Burlap and buckram, J. T. Bailey & Co.; Coffee classifiers, hullers, rollers, power screens, pulpers, and elevators, M. Mason & Co.; Corsets, corset waists, and shoulder braces, Williamson Corset and Brace Company; Dermatol preparations, J. A. Maxim; Lamps and lamp burners, Bridgeport Brass Company; Liniments, Hofbauer Bros.; Macaroni, vermicelli, egg noodles, and similar compounds, A. M. Cafe; Medicinal tonic, Allaire, Woodward & Company; Medicine for external use, liquid, Cyona Company; Oil, French, macerons, harlots vert, figelets, macedones, truffes, sardines, prunes d'ente, and similar articles, olive, A. M. Cafe; Paper, albumized, Seovill & Adams Company; Paper, writing, Springfield Paper Company; Perfumed toilet preparations, including soap, V. Klotz; Remedy for certain named diseases, Macura Drug Co.; Remedy for rheumatism, W. H. A. Nesbitt; Ribbons, silk, W. Openhym & Sons; Rubber goods, certain named, A. U. Betts; Sarsaparilla and cough syrup, Red Seal Remedy Co.; Soap, toilet and laundry, Amalgam Soap Company; Stoves and ranges, Famous Stove Co.; Threads and silk fabrics, sewing, knitting, and embroidery silk, Brainerd & Armstrong Company; Twine, binder, J. T. Bailey & Co.; Valves, machinery, Mason Regulator Company; Washing fluid, E. Wartenberg; Watchcases, J. Macher; Whisky, Kaufmann Bros. & Co.; Whisky, Manhattan, and other cocktails, A. S. De Lissa; Wine, orange quinine, Meagher Bros. & Co.

DESIGNS.

Table listing designs such as Bottle, H. J. Heinz; Ewer, H. Brumby; Metal, W. McCain; Plate, compartment, W. B. Gulick; Spoon handle, J. W. Maillot; A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print published since 1882, will be furnished from this office for 1 cent. In ordering please state the name and number of the patent desired, and remit to Munn & Co., 381 Broadway, New York. Canadian Patents may now be obtained by the inventors for any of the inventions named in the foregoing list, provided they are simple, at a cost of each sheet. If complicated the cost will be a little more. For full information, address Munn & Co., 381 Broadway, New York. Other foreign patents may also be obtained.