

the floor and thereby causing a fire. The operation would be greatly facilitated by the employment of a safety pan, such as that illustrated, into which the stove ash-pan may be drawn to a more accessible position, and then easily removed. This safety pan is provided with folding legs, so that it may be properly supported when in use, and at other times folded as in Fig. 1 to occupy a minimum space. The legs, it will be observed, are pivoted together at their centers and to the pan at their upper ends; but the forward upper pivot is adjustable toward and from the rear upper pivot, being secured to a bar sliding in a guideway. A thumb-nut is provided, which may be screwed up to secure the bar in any desired position. The height of the pan from the floor can thus be regulated to a nicety. The lower ends of the adjustable legs are provided with lugs, to prevent the legs from reaching and passing the center, which would lock them and render it impossible to adjust the legs by means of a slide.

United States Patents in 1902.

The annual report of Mr. F. T. Allen, Commissioner of Patents, for the calendar year ending December 31, 1902, has been forwarded to Congress. It appears that during the twelve months its statements embrace there were 48,320 applications for patents filed in the Patent Office, 1,170 applications for design patents, 151 applications for a reissue of patents, 2,602 applications for registration of trade marks and 1,121 applications for registration of labels. On these applications there were 27,776 patents issued, including designs; 110 patents reissued, 2,006 trade marks registered, 767 labels and 158 prints. The number of patents that expired was 23,331. The number of allowed applications awaiting the payment of the final fees was 9,284. The number that were forfeited by non-payment of fees was 4,471. The total expenditures of the office were \$1,393,345.54. The excess of receipts over expenditures was \$159,513.54, and the total balance to the credit of the Patent Office in the treasury of the United States was \$5,488,984.61.

More patents were issued to citizens of the District of Columbia in proportion to population than any other State or Territory in the United States, the ratio here being 1 to every 1,080 of the population.

The Patent Office issued 27,886 patents during the year 1902, the largest annual issue in its entire history.

The number of mechanical patents issued during the year 1902 is 27,136, exceeding by 1,578 the issue of such patents for the preceding year, which was then the largest number issued by this office in any year.

In the work of handling this business it should be noticed that the class of mechanical patents, which has increased so largely in numbers during the last year, comprises those cases which involve the largest amount of work in their consideration. The increase of work indicated by the figures given has been met in some degree by the increase in the number of examiners which was provided in the appropriation bill for the year 1902-'03.

The work of classification of patents has progressed satisfactorily during the past year, and the results of this valuable system are now available to facilitate the examination of the question of novelty of inventions.

The duties of the assignment division of this office are to record assignments of patents and inventions and to furnish manuscript copies of records of the office when required. During the year 1902, 24,091 deeds were received for record, of which 22,833 were recorded. Copies of records were also made, which included 16,576,150 words. The number of deeds received was 1,102 in excess of the number for the preceding year, and the number of words written in furnishing copies of records was 2,056,110 more than for the preceding year. These figures serve to indicate the rapid growth of this portion of the work of this office.

During the last year Section 4883 of the Revised Statutes was amended by act of Congress, approved April 11, 1902, the change making it no longer necessary that patents should be signed by the Assistant Secretary of the Interior.

Another Patent Dedicated to the Public.

Following the example of Col. J. J. Astor, who, it will be remembered, recently presented his turbine patents to the public in a letter addressed to the Editor of the SCIENTIFIC AMERICAN, Brig.-Gen. William Crozier, Chief of the Bureau of Ordnance of the War Department, dedicates to the public in a letter to the Commissioner of Patents, his invention of certain improvements in wire-wound guns. Gen. Crozier has taken this step in order that inventors who desire still further to improve on the gun may have the opportunity to use his invention as the basis of their work. In his letter he says that:

"A feature of my invention consists in the manner of so locking together the parts of the gun that they cannot separate in a longitudinal direction under the action of the forces to which the gun is subjected, at the same time interrupting in a very slight degree the continuity of the wire envelope."

Brief Notes Concerning Patents.

Mrs. Sarah Wood Clarke, of New York, is the inventor of a device which is said to greatly increase and improve the sound of the piano. There was recently given a demonstration of the improvement at one of the leading hotel ballrooms of New York. The device is a shell-shaped construction placed inside the lid of a grand piano, and when this is opened as usual for a performance the shell acts as an auxiliary sounding board, improving the tone of the instrument and increasing its volume.

A. A. Phipps, who is the inventor of a self-heating branding iron, has just returned to his home in Denver, Col., after a trip through all the principal countries of Europe in the interests of his invention. Although this method of branding was introduced only a short time ago, it is now being widely adopted through the West. The device consists of a copper brand on the end of a steel tube. The latter acts as a reservoir for gasoline, which is turned into gas and burned inside the branding metal, which is thereby kept hot constantly. The self-heating branding iron is now patented in fourteen countries.

A paper improvement is announced from Chicago, by which the strength of the paper is greatly increased. This process was worked out by Dr. John Weisner and Adolph Gehrman, both of the Columbian Laboratory. The latter was until recently the City Chemist connected with the Health Department. The process is not ready to be announced, but Dr. Weisner says they

have gone far enough to say positively that they have discovered a formula by which the strength of all paper can be increased four or five times by the addition of some chemicals while the paper stock is in the course of manipulation.

The manufacture of lightning rods has declined to such an extent that the business has almost been lost sight of. There appears to be no mention of it in the census reports, there being no reports of any output of this character made by any electrical manufactory, and only one firm of electrical engineers announces the design of lightning rods as a part of their business. Lightning strokes are reported to be more rare, especially in the cities where there are such an abundance of electrical wires which serve to protect the surrounding properties.

Miss Ida May Fuller has brought suit for infringement against Messrs. Gilmore & Thompson, of the New York Academy of Music, and Frank McKee, manager of the "Ninety and Nine" Company, which filled a date at that house recently. The alleged infringement consisted of the use of a device by which the flames are realistically imitated by the use of widths of silk, moved by the action of a rotary fan, the illusion being heightened by the colored rays from a limelight. One of the thrilling scenes of this performance is the passage of an engine through the leaping flames, going to the assistance of some fire-stricken pioneers.

Mention has been made here before of the process invented by the artist J. F. Raffaelli, now in Paris, who has devised a means of solidifying colors so that superior effects can be secured without the use of the palette and brush. It is also stated that the new method has the advantage of rapidity. An exhibition of seventy-two works of various character, done by twenty different artists, was held recently at the Durand-Ruel gallery in Paris and attracted a great deal of attention, not only because of the novel method by which they were made but because of the excellence of the results attained.

A hollow axle for railroad cars is being made by the Howard Axle Company, of West Homestead, Pa., which concern is controlled by the Carnegie Company. For the purpose of fully determining the value of this innovation, the axles are being fitted to one of the pressed steel cars of the latest design, which after six months of service will be examined and compared with another car, fitted with the solid axle, which has been in the same service. The axle is made under the Mercader patent and the advantages claimed for it are less weight, lower cost, and greater service. The manufacture of the hollow axle is a much simpler operation than that of the solid axle.

A new steam yacht in New York waters is the "Revolution," which was built at the works of the Charles L. Seabury Company, at Morris Heights, to demonstrate the adaptability of steam turbines to commercial marine purposes. The engines are the design of Charles C. Curtis, and the boat is 178 feet over all, 16½ feet beam and 7 feet draught. While the boat was not built for speed, she has shown herself to be one of the fastest crafts in the waters around New York. The "Arrow" of Charles R. Flint, which has a reputed speed of 39 knots an hour, barely beat her in a three hours' run, and the turbine boat pulled all around the "Monmouth," which is said to be the "Arrow's" second.

RECENTLY PATENTED INVENTIONS.

Electrical Inventions.

VISIBLE-SIGNAL TELEGRAPH.—W. A. FARRELL, Wellsville, N. Y. In this visible-signal telegraph the object of the invention is to form letters of the alphabet and similar characters by simultaneously flashing a plurality of lights arbitrarily selected from different clusters for the purpose of forming the characters of a prearranged alphabet. The main features of the apparatus consist of a switchboard provided with switches for operating an electric current and a series of lights, preferably nine in number, arranged in distinct clusters, each cluster being made up of lights of different color and the several clusters being alike.

ELECTRIC MOTOR OR GENERATOR.—J. A. TITZEL, SR., Franklin, Penn. This electrical device belongs to the class capable of use either as motor or generator, and the inventor has for his object the production of a strong and uniform magnetic field, so that the apparatus will be thoroughly efficient in either of its capacities. This application is a division of another one previously filed by Mr. Titzel.

ELECTRIC CUT-OUT.—C. WAGNER, Brooklyn, N. Y. This invention bears on improvements in electric cut-outs particularly adapted for use in connection with the wiring of electric lamps; and the aim is to furnish a cut-out of simple construction designed for connection with a lamp-supporting tube or standard, through which the wires pass and arranged to have a rotary movement in one direction to cut the current in or out.

Engineering Improvements.

APPARATUS FOR CONTROLLING THE

PASSAGE OF STEAM OR WATER.—E. M. EDEN, No. 76 Adelaide Road, London, England. This contrivance has for its object to provide in connection with a steam-boiler, steam-trap, or other steam-container, valve-operating means whereby to cause a valve controlling the passage or escape of steam or water to be automatically operated for the purpose of regulating directly or indirectly the action of a feed pump or injector, also for permitting the escape of water from a steam-trap, or for allowing the passage of steam to a whistle in the case of a high or low water alarm, the action of the valve-operating device being dependent on difference or equality of pressures established within the device, according as the temperature of the contents differs or not from the temperature of steam at the pressure within the steam-container with which it may be connected, whatever that pressure may be.

Mechanical Devices.

FARRIERY-MACHINE.—S. J. McDONALD, Gallatin, Mo. The primary object of this farriery machine is the provision of means by which either a plain-toed shoe or a clip-toed shoe may be produced in an easy and quick manner. It answers the demand among farriers for a simple, strong, and compact machine which will hold a horse or mule shoe in a position convenient to the workman in finishing up any portion of a horseshoe, either the plain-toed shoe or the shoe having a toe-clip, and also to finish an outwardly standing calk at the toe of the shoe, as well as the heel.

SAFETY APPLIANCE FOR DUMB-WAITERS.—H. DONOHUE, New York, N. Y. The purpose of this invention is to prevent the fall-

ing of a waiter in case of breakage of the hoisting cable. When the weight of the dumb-waiter is thrown upon the free end of the lever, the end is moved upward, thereby compressing a spring. With the lever in this position, whether the waiter is raised or lowered, the spring is usually compressed. If, however, the hoisting-cable breaks, the elasticity of the spring asserts itself, the lever's long or free end is instantly thrown down, and a revolvable roller engages the lever, thereby pressing the shoe into contact with the stationary cable, thus locking the waiter upon the cable.

MACHINE FOR MAKING PIPE-MOLDS.—J. INGHAM, J. POULSON, and J. W. MOORE, Phillipsburg, N. J. The improvements developed by this invention relate to a machine for making pipe-molds of plastic material, such as sand combined with a suitable adhesive substance; and it involves a vertically disposed flask and pattern with a number of stamps arranged to work between them. The particular improvement within the scope of this invention, is the manner of feeding the material and of driving the stamps.

Technological Advances.

CONCENTRATED HOPPED WORT AND PROCESS OF PRODUCING SAME.—H. A. HOBSON, 54 Church Road, Acton, London, England. In this process the inventor secures the production of a hopped wort from which beer, either alcoholic or non-alcoholic, may be made by the mere addition of yeast and water or of water alone, as the case may be. In the ordinary brewing process, at times the bitter of the hop is unfavorably affected, objectionable resinous matters are extracted, and the volatile aroma of the hops to a great ex-

tent lost. In the present invention these defects are avoided.

MULTICOLOR-PRINTING.—E. T. NEBEN, East Orange, N. J. The present invention relates to multicolor-printing by engravings or otherwise. It provides the face of a metallic plate with projections, and forms thereon by a photographic-printing process any design or transfer print or drawing of the object to be treated in color, and stains the print to render it visible, then forms non-printing portions in the plate by cutting out such portions, and also forms graduated and solid printing portions on the plate, by burnishing the portions.

SILVER BROMID GELATIN AND PROCESS OF MAKING SAME.—A. COBENZL, Bingen-on-the-Rhine, Germany. In this process all the difficulties in making a sensitive silver bromid gelatin which does not cloud are avoided, and a product always without failure is obtained in an easily-washable form. The product possesses an even degree of sensitiveness and all desirable qualities. The gelatin is manufactured by subjecting a solution of the emulsion in a hot state to the action of alcohol. It is then permitted to ripen, then to cool by agitation so that the gelatin precipitates as a fine-grained sandy powder, which is finally separated and washed.

PROCESS OF SOLIDIFYING VOLATILE HYDROCARBONS AND ALCOHOL AND PRODUCTS THEREOF.—A. H. CRONMEYER, New York, N. Y. The aim of this invention is to offer new means of solidifying inflammable hydrocarbons in order to obtain a congealed product which when ignited will burn without melting the body of the product and without danger of explosion. The process in question is chiefly applicable to the solidification of

alcohol, naphtha, benzol, benzin and gasoline; and consists in adding sodium hydrate, wood-alcohol, stearin and resin (colophony) to the hydrocarbon to be solidified. The product can be handled, packed, shipped and used with absolute safety.

Railway Improvements.

RAILROAD CROSSING.—E. J. O'NEILL, Ada, Ohio. Mr. O'Neill's invention is an improvement in railroad crossings, having for an object to provide a simple construction whereby there is furnished a continuous track in one or the other direction of the crossing, by means of swinging rail sections and by which the swinging rail sections are locked in their different adjustments. The invention dispenses with breaks in the rails at the crossing, and thus avoids the blows of the wheels, which result in much damage, not only to the rails and wheels, but to other portions of the cars.

Vehicles.

MEANS FOR LOCKING THE STEERING MECHANISM OF MOTOR-VEHICLES.—E. DEVLIN, Paterson, N. J. The invention of Mr. Devlin pertains to improvements in means for locking the steering-gear of motor-driven vehicles of any kind, and this design is adapted for use in connection with the steering-gear of such vehicles as automobiles, locomobiles, and wagons or carriages of any description used for pleasure or business purposes, and which may be propelled by electrical energy, steam, gas, gasoline, or any other agent or motive power. The essentially new feature of the contrivance is a device for locking and holding with positive certainty the steering gear against turning accidentally.

Miscellaneous.

CAN-OPENER.—JAMES M. NETLES, Shubuta, Miss. This implement will readily and easily open oyster, sardine, and other tin cans. It is claimed for the device that it is entirely different from any other can opener, both in the manner of its construction and its use, there being no danger of cutting the hand with the can opener or the tin while in operation.

EGG-TESTER.—J. CARLEN, Havana, N. D. An improved device for testing eggs has been invented by Mr. Carlen. The device comprises a tray, a casing therein adapted to receive the lamp, a dark chamber at one side of the casing, and a sight tube leading into this dark chamber. Means are provided for carrying the eggs through the dark chamber where they are examined through the sight tube.

WORT-COOLER.—A ZIGER, Brooklyn, N. Y. An apparatus for cooling wort as it comes from the kettles in the brewery is provided by this invention. It embodies certain novel features of construction, which enable it to be used not only as a wort-cooler, but also as a strainer to remove the hops from the wort, thus permitting the wort to be run directly from the cooler into the fermenting room, and dispensing with the necessity of the "hopper jack" which has heretofore been used.

DRY-COMPOUND FIRE-EXTINGUISHING TUBE.—A. and T. R. HOPPER, Highland, N. Y. The tube or receptacle is so constructed that it will not allow the compound to fall in large masses and thus exert but little influence on the fire, but which, through the action of the hand in throwing the material from the tube in conjunction with a diffusing device at the mouth of the tube, will produce a large quantity of well-diffused powder resulting in a greater generation of fire-extinguishing gas.

SPRINKLER-HEAD.—J. K. S. RAY and W. D. McNEILL, Whitire, S. C. The invention relates to fire extinguishers arranged to release a valve having thermal-action at a predetermined temperature. The sprinkler head is so constructed as to insure a free flow of water whenever the fusible brace is melted and even in case the valve should stick at one point owing to undue corrosion, sediment, or other causes.

INDICATOR DEVICE FOR DRIP-PANS.—F. E. WIENSER, Washington, D. C. Mr. Wiesner's invention is an improvement in the indicating devices for drip pans, designed especially for use in connection with refrigerators, and by which to indicate the height of water in the drip pan at one side of the refrigerator.

CAR-REPLACER.—A. R. BATCHELDER, Portsmouth, N. H. In the embodiment of this improved car replacer two members of peculiar construction and connected by a special hinged joint are employed. One member rests upon, and is locked to the track; the other serves to guide the car wheel from its derailed position back to the track rail.

GARMENT-SUPPORTER.—L. WERTHEIM, New York, N. Y. This improvement relates to a hose-supporter which is suspended from the waist of the user. The object of the invention is to supply an effective supporter which may be very quickly applied and removed and which will also serve somewhat the purposes of an abdominal pad. When once in position the device will securely support the garment.

FLOATING FISH-TRAP.—A. C. BURDICK, Seattle, Wash. This invention provides a floating fish-trap adapted especially to be towed or drawn by steamers or like vessels. The trap

is so constructed that a single heart only is used in connection with the pot, which heart extends over the seine. The pot is yieldingly supported upon scows or like floats in such a manner that the rocking of the scows by action of waves will not have any harmful influence upon the proper equilibrium of the pot. The invention also provides means whereby independent inlets are obtained over the seine, one at each side of the heart, and a pocket in connection with each inlet, the pockets and inlets serving to direct fish through the heart and into the pot. By inclining the bottom of the pot and its supports from the rear upwardly and forwardly the pot and supports will ride the current and waves, and not tow under.

TEMPLE AND SPRING-CLAMP FOR LENSES OR THE LIKE.—E. L. LEMBEKE, New York, N. Y. The object of the present invention is to provide a new and better temple and spring-clamp for spectacles and eye-glasses which is simple and durable in construction, cheap to manufacture, and arranged for convenient, quick, and secure attachment to or removal from the lens without requiring apertures and bolts, pins, or similar fastening devices. The clamps on eye-glasses are fixed so that they take up little room at the sides of the lenses, and are not in the least unsightly or cumbersome.

TRUCK-WAGON.—E. H. TYLER, New York, N. Y. The improvement in this new contrivance relates to truck-wagons—that is, wagons used for hauling building materials, safes, barrels, boxes, freight, etc., and which are provided with depending trucks upon which materials are to be loaded. All objects which it is desired to handle practically on the ground, may be readily loaded into a truck, even when the wagon is at another place. As the trucks are flat and rest on the ground, goods can be loaded, practically on the ground. No skids or bridges are necessary, and no merchandise can be broken or injured while loading or unloading.

WATCH-PROTECTOR.—D. SUMMA, New York, N. Y. This contrivance relates to watch-protectors—that is, to devices for preventing the loss of a watch by theft or otherwise while worn upon the person. In using this invention, the chain is threaded through the ring and placed in the pocket in the usual manner. Should the chain be violently drawn by any means, the watch is lifted upward to a certain extent in the pocket, but remains therein because of the ring. The tension of the chain upon this ring causes the device to be raised slightly, and this movement imbeds the teeth in the cloth of the pocket. The harder the chain is pulled the more tightly will the teeth bite into the cloth, thereby drawing the owner's attention.

SKIRT AND WAIST HOLDER.—M. DISTELMAN, New York, N. Y. This patent refers to a skirt and waist holder for women's garments; and one object the inventor has in view is the provision of a simple and cheap article which is adapted to hold the lower portion of a dress-waist from pulling up and away from the dress-skirt and, further, the provision of an article which may be drawn and held tightly over the abdomen to secure the appearance or effect known as a "straight front," and a final object to provide means associated with the article for holding the skirt in proper place and against any tendency to drop at the rear portion.

TAILPIECE AND BRIDGE FOR ZITHERS.—F. REINHARD, Jersey City, N. J. The purpose of the inventor is to so construct a tailpiece for zithers and like musical instruments that the bridge may be combined with the tailpiece, and, further, to provide the tailpiece with tongues adapted to receive the loops of the strings, which tongues are in the same plane with the surface from which they are struck out, the material around the tongues being pressed inward in conical form. Thus the loops of the strings when placed upon the tongues are protected, and prevented from opening, pins are done away with, space is saved, and the tone of the instrument is improved.

CANOPY-SUPPORT.—J. MUEFUR, Aspen, Col. The improvement in this patent is on canopies for use on bedsteads, lounges, tables, or the like, or for application to vehicles, or on lawns. The canopy may be made of any suitable size, and can be used horizontally on lawns, beds, tables, carriages, or elsewhere, and when desired for shelter from the sun on lawns, it can be arranged vertically.

TALLY DEVICE.—L. L. FROST, Highland, Kan. This tally device is adapted for use in connection with check-books or with account-books, although it may be used generally in the addition or subtraction of figures. The object in view is the provision of a simple and efficient device by which the value of a given amount may be readily increased or diminished by the addition or subtraction of different amounts, such as constantly arise in commercial or business transactions. An increase in the value of the given amount can be quickly found by addition of a certain amount; but when a check is drawn against the bank account the device will indicate the amount charged against the account and the balance remaining to the credit of the depositor, thus denoting a decrease in the value of the original deposit.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

NEW BOOKS, ETC.

LABORATORY EXERCISES IN PHYSICS. By George R. TWISS, B.Sc. New York and London: Macmillan Company. 1902. Pp. xiii, 193. Price 80 cents.

The experiments are selected and the directions written with regard to three purposes—first, to secure the thorough enforcement of some of the fundamental principles of the science, together with a view of the kind of thinking and experimentation by means of which the facts and principles of physics have been established; second, to develop habits of precision in observation, thought, and expression; and third, to train the student in the acquisition of practical power and skill in the use of apparatus. It must be acknowledged that Mr. Twiss has arranged his chapters in an ideally simple form. Each exercise begins with a clear and concise statement of its purpose. In drawing his inferences and reaching his conclusions the student is aided by directions which clear the path for him to a certain extent.

UNTERSUCHUNGEN AUS DEM HYGIENISCHEN INSTITUT IN GRONINGEN. VERSUCH EINER NEUEN BAKTERIENLEHRE. Von Dr. A. P. FOKKER, Haag. 1902. Pp. 49.

THE FERN BULLETIN. A Quarterly Devoted to Ferns. By George E. DAVENPORT. Binghamton, N. Y. 1902. Pp. 97-128.

THE NEW INTERNATIONAL ENCYCLOPEDIA. Daniel Coyt Gilman, LL. D., Harry Thurston Peck, Ph.D., L.H.D., and Frank Moore Colby, M.A., Editors. Vols. I. to VI. New York: Dodd, Mead & Co. 1902.

In the exceedingly brief space of this review, it is manifestly impossible to discuss with any degree of fullness so ambitious an undertaking as the publication of a new encyclopedia. That such a work has long been needed by the man who is at all familiar with the scientific matter contained in the encyclopedias that are now placed at his disposal, is evident enough when it is considered that the encyclopedias which make any pretense at scientific discussion are antiquated. A new encyclopedia should therefore be particularly strong in its treatment of scientific subjects; for in science, both pure and applied, the world has made its greatest strides within the last quarter of a century. We have, therefore, confined our attention to an examination of those portions of the six volumes which lie before us which deal more particularly with science. If the article on chemistry is to be considered a fair example of what this new work has to offer us, it cannot be denied that it supplies much that is wanting in other encyclopedias. In the twenty-one pages comprising the article in question, there will be found a very systematic presentation of the subject both from its philosophical, as well as from its more practical standpoint. Probably a discussion of radioactive compounds is to be included in the article on physics; for in no other way can we account for their omission here. Not the least commendable feature of the International Encyclopedia's method of discussing scientific subjects is the annexation of an excellent bibliography to each important article. The list of books on chemistry, for example, contains what may well be considered leading works by leading authors. The mathematical portions of the Encyclopedia seem exceptionally complete. As examples we may mention the discussion of the differential and integral calculus and of co-ordinates. The treatment of analytical geometry and conic sections, although fairly adequate, might have been somewhat fuller. An examination of the articles on engineering subjects shows that the editors have seen to it that both in mechanical and civil engineering the International Encyclopedia has adequately considered modern improvements. The treatment of bridges is particularly full. The illustrations, moreover, have been aptly selected, including as they do the typical arch bridge over the Niagara River, the typical cantilever bridge at Poughkeepsie and the steel truss bridge over the Delaware River. A picture of a suspension bridge might well have been inserted. We are glad to note that illustrations of rolling lift bridges also find a place in the article, perhaps for the first time in any encyclopedia. The author of the article on calorific engines has done his work well. His discussion includes what may well be considered the best types of hot air engines and is strictly modern in its treatment. We are glad to note that electrical subjects have been treated with the thoroughness that they deserve. On dynamo-electric machinery a very full article appears, which is both accurate in its presentation and illustrated by well-known modern types of machines. The article on electricity is good. The many cross references indicate that the later features of the subject, such as wireless telegraphy and the like, have not been neglected. Even the newer forms of lamps, such as the Nernst lamp and the vacuum tubes of Tesla and Cooper Hewitt, find a place in the sixth volume. A word or two on the general appearance of the book may not be out of place. To the matter of typography and illustrations the publishers have given exceptional care. The diagrams are clear, and the half-tone plates uncommonly good.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry. **MUNN & CO.**

- Marine Iron Works. Chicago. Catalogue free.
- Inquiry No. 3748.**—For manufacturers of novelties for the mail order business.
- For logging engines. J. S. Mundy, Newark, N. J.
- Inquiry No. 3749.**—For makers of dock builders in the vicinity of Portland and Rockland, Me.
- "U. S." Metal Polish. Indianapolis. Samples free.
- Inquiry No. 3750.**—For makers of platinum sponge in large quantities.
- Coin-operated machines. Willard, 234 Clarkson St., Brooklyn.
- Inquiry No. 3751.**—For machinery for coloring and finishing lead pencils, also for embossing on same.
- Dies, stampings, specialties. L. B. Baker Mfg. Co., Racine, Wis.
- Inquiry No. 3752.**—For makers of small hot air engines.
- Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.
- Inquiry No. 3753.**—For makers of cheap Japanese music stands.
- Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.
- Inquiry No. 3754.**—For makers of invalids' hand-propelled tricycles.
- Manufacturers agricultural implements for export. Hobson & Co., 17 State Street, New York.
- Inquiry No. 3755.**—For a simple power to be used on a farm for cutting feed and pumping water.
- WANTED.**—Party to manufacture earthen railroad ties. Benj. H. Smith, Shippensburg, Pa.
- Inquiry No. 3756.**—For machinery for making boxes and packing cases.
- Let me sell your patent. I have buyers waiting. Charles A. Scott, Granite Building, Rochester, N. Y.
- Inquiry No. 3757.**—For parties engaged in boring artesian wells on a large scale.
- SAW MILLS.**—With variable friction feed. Send for Catalogue B. Geo. S. Comstock, Mechanicsburg, Pa.
- Inquiry No. 3758.**—For makers of water elevators for irrigating purposes, with steam power.
- Machinery designed and constructed. Gear cutting. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.
- Inquiry No. 3759.**—For information as to air compressing machinery.
- FOR SALE.**—Broaching or drawing press at a bargain. Pratt & Whitney make. Samuel Hall's Sons, 229 West 10th Street, New York.
- Inquiry No. 3760.**—For a pipe cutter and threader for cutting and threading from 1/4 inch to 6 inches.
- Manufacturers of patent articles, dies, stamping tools, light machinery. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.
- Inquiry No. 3761.**—For makers of long and short distance telephones.
- Manufacturers' Advertising Bureau, New York. Trade mediums a specialty. Lowest known rates. References. Correspondence solicited.
- Inquiry No. 3762.**—For makers of a machine for striping marbles.
- Crude oil burners for heating and cooking. Simple, efficient and cheap. Fully guaranteed. C. F. Jenkins Co., 1103 Harvard Street, Washington, D. C.
- Inquiry No. 3763.**—For machinery for making paper folding boxes.
- The largest manufacturer in the world of merry-go-rounds, shooting galleries and band organs. For prices and terms write to C. W. Parker, Abilene, Kan.
- Inquiry No. 3764.**—For manufacturers of steel name stamps.
- The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.
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