

RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

BEAN-CLEANER.—CHARLES W., JAMES J., and WION P. THOMAS, Sawyer, N. Y. The purpose of the invention is to provide a means for screening and cleaning beans. For this purpose a screening-mill combined with a brush is employed, by which brush the beans are polished and discharged from the machine. To the brush a feed-pipe is attached, projecting up through the top of the casing into proximity with a spout extending from the screening device. The feed-pipe is of greater diameter than the spout, to insure the feeding of the material from the shaking spout to the feed-pipe.

CANE-FEEDING DEVICE.—JOSÉ ELIGIO TALLET, Matanzas, Cuba. The device comprises an elevated track or frame on which a car is mounted, the bottom of which is composed of cross-bars upwardly-extending, dividing members carried by the cross-bars. Cane-receiving bars are fixedly supported by one end and extend transversely over the cross-bars when the car is at one end of its travel. The cane is dumped upon the car, while the car is beneath the cane-bars. The car being then slowly moved outward, the cane is gradually and regularly dumped upon an endless conveyer in regular quantities to the crushing machinery.

CORN-PLANTER.—MARCUS R. YATES, FRANK P. LIGHT, and ELLIOTT HEIMBAUGH, Pendleton, Ore. The invention is an attachment to a sulky corn-planter, for check-sowing or dropping the corn directly opposite each hill in the adjoining rows. The planter can be operated without the aid of a check wire or rope to drop the seed perfectly and at the same time mark so that the operator, without leaving his position on the seat of the planter, can readily determine if the machine is operating correctly.

Mechanical Devices.

DEEP-WELL PUMP.—SIDNEY M. and JOHN POLSON, Laclede, Mo. The object of the inventors has been to construct a pump which could pass within a comparatively-small casing, though of large capacity. With this object in view, two pistons are used, placed in tandem and arranged so that one operates while the pump-rod is moving in one direction and the other while the pump-rod is moving in the other direction.

JACK.—CHARLES W. DOANE, West Lake, La. The jack is especially designed for handling timbers in bridge-work. It can be clamped to the side of the timber, whether round or square, and used for lifting another timber alongside; or it can be supported on any convenient base and clamped to a timber in order to lift that timber. The jack can be used in a vertical, horizontal or inclined position.

DEFIBRATING-MACHINE.—MANUEL A. TORRE, Merida, Yucatan, Mexico. The machine is designed to clean vegetable fibers and particularly to scutch leaves. It is exceedingly simple in construction, inasmuch as a single conveying-wheel is employed. The leaf is thoroughly scutched, for the reason that it is alternately seized at its opposite ends, the raising action of a central chain (constituting one of three endless, flexible connections engaging the conveying-wheel) insuring the engagement of a lowermost chain with the proper end portion of the leaf.

HOIST.—ERHÉGE B. ACHÉE, Labadieville, La. This invention provides a dumping-boist designed particularly for use on sugar plantations to carry the cane from the farm-wagons to the tramcar in which the cane is conveyed to the mills. The apparatus considerably facilitates the work by the employment of two dumping-carriers of special construction, which can be worked alternately, so that when one is dumping, the other is loading.

WEIGHING-MACHINE.—EDWARD W. COLLINS, Coalville, Iowa. The purpose of this invention is to provide means for controlling the feed of granular material to a weighing machine—a purpose which is attained by a novel valve mechanism, comprising a main and an auxiliary valve hung on and actuated by the scale-beam. The auxiliary valve serves to cut off the major portion of the material to be weighed; and the main valve serves subsequently to cut off completely the supply of the material. By this arrangement of main and auxiliary valves, a simple device is provided for regulating the supply to the scale-beam.

FRUIT-PARING MACHINE.—HAVEN M. HAFF, Ludington, Mich. On the framework of the machine a paring-disk is mounted and a fruit-holder is pivoted. A pulley and band connect the fruit-holder with a driving-shaft, whereby when the frame is moved backward and forward, the fruit being pared is respectively removed from or pressed against the paring-disk, thus enabling the operator to regulate the pressure against the paring-disk to correspond with the firmness or softness of the fruit.

REVOLVER.—CHRISTOPHER D. McDONALD, Vance, Colo. In a former patent the inventor described and claimed a revolver in which the handle portion is provided with rigidly-attached upper and lower extensions including the cylinder-space, and the barrel is vertically hinged between the forward ends of the rigid extensions and bears the revolving cylinder, which swings out when the barrel is deflected about the joint at the two forward extensions of the handle. The present invention is based on the same principle, but provides an improved means of articulation, so that the weapon can be readily broken, the shell ejected, and the chamber reloaded.

MOLDING-MACHINE.—MATTHEW F. ALLEN, Nashville, Tenn. The invention provides a device which can produce castings for "metal hollow ware" more rapidly than by present methods, and which can be moved about over the foundry floor, so that the sand can be shoveled directly from the floor into the machine and the finished molds deposited upon the floor back of the machine, thus obviating the necessity of transporting the sand to the machine and the molds from the machine to the floor. With this apparatus it is possible to mold and pour continuously.

RAG-ENGINE.—EDWARD A. JONES, Pittsfield, Mass. This engine is arranged to relieve the beating drums of unnecessary pressure of the entering pulp, thus saving power in driving the engine and insuring a thorough mixing and agitating of the pulp and a rapid circulation to

avoid streaks. The inventor employs a backfall having its face adjacent to the beating-drums provided with spaced-apart sets of ribs for mixing the pulp after leaving the drum.

AUTOMATIC AIR-PUMP.—CICERO M. HOBBY, San Diego, Cal. The construction devised can be used as well for exhausting as for compressing air. The novel features of the invention are to be found in a receptacle closed to the atmosphere and having a liquid-inlet, a valved air-inlet and a valved air-outlet, a siphon connected with the receptacle, and a valved connection between the arch of the siphon and the air-outlet. The use of a closed receptacle very radically affects the usual action of the siphon.

Railway Appliances.

AUTOMATIC CAR-AXLE LUBRICATOR.—PIERPONT T. LANGDON, Audubon, Minn. The lubricator comprises a trough in the axle-box, having two flanges extending up at the sides of the axle-journal. On one end of each flange is a hook, and on the free end of the axle journal is a cap-plate, radially projected and provided with a circular edge. The hooks on the side flanges of the trough engage with the edge. A scraper blade is mounted on the end of each side flange below the hook. These blades come in contact with the cap-plate to scrape the lubricant therefrom into the trough.

STOCK-CAR.—HARRY C. CARSON, Virden, Ill. This invention is an improvement for changing stock-cars from single-deck to double-deck and vice versa. The car has vertical side studs or uprights and aligned blocks, both of like thickness and width. The blocks are separated from the studs by narrow spaces which receive cross-bars. Floor-sections which have parallel cross-crests on the under side, and side notches are adapted to receive the previously-mentioned studs and blocks, so that the section may slide up and down thereon. Supporting-posts are connected with the cross-bars and are adapted to enter sockets therein and in the floor of the car. The cleats are separated to accommodate the cross-bars between them as required when the floor is elevated, and are arranged in pairs separated to receive a bar and post between them as required when the floor is lowered.

JOURNAL-BOX AND LID.—JOHN D. MURRAY, Albany, N. Y. The journal-box has a recess in its top and a hinged lid. A plate-spring is fastened to the inner face of the lid, the upper free end of the spring being curved in to pass under the upper rim of the box opening into the recess. The spring constantly pulls the lid uniformly against the seat when the lid is closed, to render the box dust-proof.

Miscellaneous Inventions.

NOZZLE.—VICTOR C. SWANSON, Salem, S. D. The nozzle is so constructed that it can be turned to different angular positions with respect to the head of the hose, and for that reason is particularly serviceable in cleaning boilers provided with small handholes not of sufficient size to enable a workman to insert both hands in the boiler.

BUCKLE.—EMANUEL REYHING, Manhattan, New York city. This buckle has two interlocking members, each comprising a metal shell containing a wooden block in which an eye is secured projecting beyond the shell to engage a keeper. The front faces of the two members are perfectly flat and can be readily ornamented to enhance the appearance of the buckle. If desired, a simple ornament can be applied to one of the members, so as to give the buckle the appearance of being one piece. The construction of the buckle is far stronger than that ordinarily employed.

PROCESS OF MANUFACTURING LIME AND CARBONIC ACID.—GUSTAF M. WESTMAN, Manhattan, New York city. By this process, both lime and carbon dioxide are produced for the market. In the apparatus a mixture of highly-heated carbon dioxide and steam passes into and up through a column of limestone, converting the latter into calcium oxide. The expelled carbon dioxide is then charged with water, which causes the heat of the gas to convert the water into steam, thereby reducing the temperature. A portion of the cooled gas charged with steam is then conducted into a regenerator and highly heated therein, and used in turn for expelling carbon dioxide from the lime. Finally, the calcium oxide is drawn from the base of the column.

SMOKER'S PIPE.—CHARLES E. ANGELL, Salt Lake City, Utah. A passage in the mouthpiece of this pipe is turned upward at its discharge end and opens at the side. A distributor-plate bound rigidly to the mouthpiece is located over the discharge end of the passage and deflects the smoke. By these means the fumes are evenly distributed in the smoker's mouth, not concentrating upon the point of the tongue as in the ordinary form. This construction prevents liquid charged with nicotine from entering the mouth.

WRITING-TABLET.—ELISHA D. HURLBUT, JR., Brooklyn, and DWIGHT TERRY, Manhattan, New York city. This device keeps double-sheet writing paper in convenient pad form for writing and for blotting the writing without danger of soiling the paper. It consists of a back of stiff material, a series of folded sheets of paper superimposed on the back, each half of each double sheet being free at its top, bottom, and outer edges from the other half of the same sheet, thus enabling the halves to be turned over successively. There are also provided a detachable connecting medium at the creases of the sheet, a blotter at the opposite edge of the back, and flexible connections between the near edges of the back on one hand and the cover and blotter on the other, the width of the connections being about equal to the thickness of the pad formed by the superimposed leaves.

GLOVE.—HENRY SINCLAIR DELAMERE, Ferndale, Cal. The slitted wrist portion of this glove has devices for fastening the sides of the slit together. A hand portion with short open-ended finger portions has a slit extending from the outer edge of the little finger portion along the outer edge of the hand portion to the beginning of the wrist portion. A lacing on the slitted edge connects the outer and the inner hand portions with each other along the slit, and holds a band-dressing in place on the hand of the wearer. The wrist-fastenings serve to hold the glove in position on the hand to prevent accidental displacement of the glove and the hand-dressing. The glove can be worn by oarsmen, golfers, and others.

BUTTON-DISPLAYING DEVICE.—MEYER HARBEBERG, St. Paul, Minn. Collar and cuff-buttons and similar articles which need attractive display can be quickly inserted and removed in this device, which consists of a plate, having rows of tongues, each tongue with an upper narrow neck attached to its upper end to the base, and a lower, wider body fixed at its lower end to the same. The plate is adapted to receive the base of a collar or similar button beneath the lower, wider portion of the two tongues of adjacent rows. The plate is preferably made of thin metal, although pasteboard, celluloid, or other material can be used.

NIPPLE-HOLDER.—CHRISTIAN W. MEINECKE, Jersey City, N. J. The nipple-holder is a decided improvement upon a similar device previously patented, in so far as the holder is rendered more effective than heretofore and is stronger and less liable to disarrangement. The construction is simple; the few parts required can be readily assembled.

VEHICLE-TIRE.—HENRY H. GERHARDT, Nashville, Tenn. Around the rim, a sectional tire is disposed, each section consisting of a series of disks secured to the rim, and one or more of the sections consisting of a smaller number of disks than the other and serving as a key or keys to fill the space between the ends of the longer sections. The short section or sections are independently secured to the rim. A very durable tire is produced by the use of leather strips held together by nails or a suitable binding substance.

BLOTTING-PAD.—ANTON D. GLUECK, Newark, N. J. This simple device is a small pad held on the small finger during writing, by means of an elastic band. The pad acts both as a support for the hand and as a blotter. Actual tests of the pad have proven that it is very useful in such work as posting books, when the amount of each entry is small and the writer desires to turn the page to post another entry.

WATCH-WHEEL GAGE.—ROBERT L. MARSHALL, Elizabethtown, Ky. The device accurately determines whether all points on the periphery of a balance-wheel are equidistant from the center and whether the wheel is exactly true or coincident with the plane in which it is adapted to move. The invention consists of a base on which are mounted means for holding the pivot of a balance-wheel or the like and a graduated plate with a sensitive pointer or indicator arranged to be held at different places on the base, so as to bring the bent end of the pointer in contact with the side and periphery of the wheel.

PACK-SADDLE.—EDGAR F. BLISS, Providence, Arizona Territory. This inventor has devised a simple and highly efficient pack-saddle, the parts of which can be variously arranged and assembled, so as to be adapted for carrying loose and sacked ore, cord-wood, baled hay, and other bulky material. The saddle is very durable, for the reason that no ropes are employed in its construction.

STOVE.—WELLESLEY R. HAMPDEN, Spokane, Wash. It is the purpose of the invention to provide a stove in which the combustion of the fuel will be rendered more complete than has heretofore been possible. The purpose has been attained by causing the draft from the firebox to pass circuitously through various portions of the stove, thus not only superheating the fuel, but facilitating the combustion of the inflammable gases which pass from the fire-box.

PERPETUAL CALENDAR.—EMIN G. TASSO, Rue Racine 23, Paris, France. The calendar is in the form of a cylinder or polygonal tube, which bears numbers and dates. By means of this calendar it is possible to ascertain on what day of the week any given date in past or future years fell or will fall. In form, the calendar is exceedingly compact; in operation, very effective.

PHOTOGRAPHIC VIGNETTER.—CHARLES W. CHRISTMAN, Waterville, Minn. The vignetter consists of a rigid, elongated frame, placed beneath the camera and carrying at its outer end a screen which can be adjusted in any manner to enable the operator to obtain almost any effect desired.

STAMP.—MARTIN R. DRISCOLL, Frisco, Utah. The invention provides a means for attaching the stamp, so that the hitherto troublesome necessity of dressing the end of the stem to fit a socket in the head or boss is avoided. The liability of the stem to breakage is greatly reduced. Should the stem break, the fracture will be comparatively small and may be quickly drifted out from the stamp head or boss.

APPAREL-COAT.—MARK L. KELLEY, Manhattan, New York city. The coat is of the raglan style and is effectively stiffened at the shoulders, so as to retain its shape, and yet, so as to enable it to be altered to form a coat of the ordinary pattern, should the wearer so desire.

FIREPROOF STRUCTURE.—JOHN STREIFLER, Manhattan, New York city. The purpose of the invention is to provide a fireproof construction for dumb-waiters, elevator-shafts, and partitions, utilizing metal tongues to hold the parts of the structure together, which tongues are completely concealed within the structure. The sections of the fireproof structure are so attached to one another and to the tie-plates or tongues, that an ample and slightly cement connection can be made. The abutting ends of slabs or blocks used in the construction of small dumb-waiter shafts can be quickly and perfectly tied together, especially when each face of the shaft is built up of single slabs or blocks.

LUBRICATING APPARATUS.—HANK DANGLER, Cleburne, Tex. The apparatus embodies means whereby locomotive-bearings can be lubricated, either when the locomotive is moving or when it is standing still. The apparatus acts automatically to supply the journal and spreads the lubricant over the entire surface engaged. The operation is automatic as long as oil is in the supply tank.

FLY-BRUSH FOR DOORS.—CHARLES H. and ARTHUR R. ANDERSON, Buda, Ill. This device for brushing away flies and preventing them from entering a doorway when opening or closing the door is composed of a brush-shaft mounted in the upper part of the casing between the jambs. The shaft has one end reduced and formed with a spiral groove, on which end a rope is wound. A coiled spring has one end secured to the rope and its other end to the jamb of the casing to which the door is hinged. A second rope winds in an opposite di-

rection to the first rope on the other end of the brush-shaft and is secured to the free edge of the door.

METHOD OF CONDENSING FLUE-DUST.—RUDOLF RUETSCHI, Perth Amboy, N. J. The fumes escaping from metallurgical establishments are cooled in narrow channels under exclusion of air by an external cooling medium, to precipitate a portion of the solid matter in the fumes; then the more or less cooled fumes are mingled to equalize their temperatures. A second cooling of the fumes under the exclusion of air now follows; whereupon the fumes are compressed and mixed with air. The mixture, after having been divided and expanded, is given a whirling motion in closed receptacles at the same time cooling the mixture in order to precipitate the remaining solid matter.

DESK ATTACHMENT.—CHARLES F. NESSE, Elko, Nev. The attachment comprises a plate having a top and bottom member by which it is clamped to the desk. A retaining-surface on the top member of the plate is adapted to be engaged by the arm of the writer. The attachment is designed to prevent the arm of the writer from sliding along the smooth surface of the desk, and to indicate at a glance whether the arm is in proper position.

LENS ATTACHMENT FOR LAMPS.—JOHN C. MOLLOY, Cincinnati, Ohio. To increase the illuminating power of a lamp, a lens is securely held on the chimney. When the burner is lighted, the rays of light are refracted by the lens into the room.

WRITING-TABLET.—ETHELMEER E. MAGEE, Waynesville, N. C.—The ordinary school copy-books necessitate the use of the entire page for the reproduction of a single copy. The present writing-tablet enables the pupil to use the same sheet of paper for several copies and thus prevents the wasting of paper. The device also provides means for concealing the work already done by the pupil, so that only the perfect copy is reproduced and not the mistakes previously made.

HEATING-DRUM.—ROBERT L. HOLLINGSWORTH, Atlanta, Ga. The drum is applied to an ordinary heating-stove or kitchen-range and is designed for heating and baking and for warming dishes and the like. The drum comprises a shell having an inlet near the top of its front end and an outlet at the rear end. An oven extends from one side to the other of the shell. The top of the oven is below the inlet and the rear end is spaced from the rear end of the shell. A transverse partition below the bottom of the oven terminates short of the front end of the shell and has an opening in its rear portion. A damper above the outlet of the shell is adapted to close the opening in the partition. A cleaning-door gives access to the space below the partition.

Designs.

BELT.—LOUIS SANDERS, Brooklyn, New York city. The belt has a diamond-shaped central portion, upper and lower continuous cords following the contour of the body of the belt, and a cord having a skeleton diamond formation at the central portion of the belt.

NOTE.—Copies of any of these patents can 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.

A HAND BOOK OF TESTING MATERIALS FOR THE CONSTRUCTOR. Text by Prof. Adolf Martens. Translated and edited by Gus C. Henning, M. E. New York: John Wiley & Sons, 1899. 8vo. 2 vols. Pp. 622. Price \$7.50.

There are two volumes, one of text and one of illustrations. The author is Director of the Royal Testing Laboratories at Berlin and at Charlottenburg. To the description of the customary methods of testing, the author has added a presentation and discussion of the most important types of testing machines and auxiliary apparatus. The editor has done well in selecting such an authoritative book for translation. It is certain to take a prominent place upon the book shelves of the engineer, for there cannot be too many books of this kind.

ANNUAL ANALYTICAL CYCLOPEDIA OF PRACTICAL MEDICINE. By Charles De M. Sajous, M. D., and one hundred Associate Editors. Vol. V. Philadelphia: F. A. Davis Company, 1900. 8vo. Pp. 662.

This volume which is the fifth of a series is up to the high standard which has been maintained through all the volumes of the series. It takes in subjects from M "Methyl Blue" to R "Rabies." The illustrations and plates are excellent and the typography, presswork and binding are of the best. Diseases are treated separately under the proper heading, and are divided in sections such as "Etiology," "Bacteriology," "Morbid Anatomy," "Treatment," etc.

THE STUDY OF BREEDS IN AMERICAN CATTLE, SHEEP AND SWINE. By Thomas Shaw. New York and Chicago: Orange Judd Company, 1900. Pp. 371. Price \$1.50.

The book has been written, so the author tells us in his preface, for the purpose of discussing all the pedigreed breeds of cattle, sheep and swine at present existing in America, as well as the more important sub-breeds. From its general style we should judge that Prof. Shaw's study will be of considerable service to students of agricultural colleges. Fairly good illustrations accompany the text.

HELIOCENTRIC ASTROLOGY AND SOLAR MENTALITY. By Yarmo Vedra. Philadelphia: David McKay, 1899. 8vo. Pp. 266. Price \$1.50.

OUR NEW PROSPERITY. By Ray Stannard Baker. New York: Doubleday & McClure Company, 1900. Pp. 272. Price \$1.25.

The profoundly important readjustments which have taken place in our relations to other countries and in the attitude of the various parts of our country to one another, have been indicated in this book by grouping the significant facts of the present era of prosperity in such a manner as to show the general tendency of American

financial, commercial, industrial, and, to some extent, political affairs. Although not a complete review of the conditions in every branch of industry the book contains all the important facts and statistics in most departments of activity.

TOTAL ECLIPSE OF THE SUN. By Mabel Loomis Todd. New and Revised Edition. With Introduction by David P. Todd. Illustrated. Boston: Little, Brown & Company. 1900. Pp. 273. 16mo. Price \$1.

The recent eclipse has aroused popular interest in the sun. A new edition of Mabel Todd's work having become necessary, the opportunity has been seized of incorporating an account of the eclipses of 1896 and 1898, so successfully observed in Nova Zembla and India, and of that of May 28, 1900.

LESSONS IN ELEMENTARY PHYSIOLOGY. By Thomas Huxley. Edited by Frederic S. Lee, Ph.D. New York: Macmillan Company. 1900. Octavo. Pp. 577. 177 illustrations. Price \$1.40.

Thomas Huxley's "Lessons" are too well known to require any extended notice here. The new edition which lies before us has been carefully revised and brought up to date by Prof. Lee, of Columbia University, so that it now forms a complete modern, elementary text book on physiology admirably adapted for school and college use.

FOGNATURA DOMESTICA. By Attilio Cerutti. Milan: U. Hoepli. 1900. 16mo. Pp. 421. 200 illustrations. Price \$1.

An excellent little book on plumbing in the "Manuali Hoepli," of which series 600 volumes have been issued. It is to be hoped that at some time we may have in English a technical series which will compare with this one. The Weale series was an excellent one, but the volumes became superseded.

LE COSTRUZIONI IN CALCESTRUZZO ED IN CEMENTO ARMATO. By Giuseppe Vacchelli. Milan: U. Hoepli. 1900. 16mo. Price \$1.

The author has prepared a valuable technical book on concrete and cement construction. It is one of the best treatises we have ever seen in any language upon the subject. It is profusely illustrated by 210 engravings.

INTRODUCTION TO SCIENCE. By Alexander Hill, M.D. New York: Macmillan Co. 1900. 16mo. Pp. 140. Price 40 cents.

One of the admirable little volumes of "Temple Primers." This little book aims at giving an account in popular language of the scientific problems which are most prominent at the present time, and attempts to portray the attitude of the mind of those engaged in solving them.

L'INCANDESCENZA A GAS. By Dr. Luigi Castellani. Milan: U. Hoepli. 1900. 16mo. Pp. 144. Price 50 cents.

We have never before seen a work on the manufacture of mantles for incandescent burners. The little volume before us is a thoroughly practical treatise on the subject, and our only regret is that it is in the Italian language and, therefore, cannot be of much use to those who do not read Italian.

HEMP. A Practical Treatise on the Culture of Hemp for Seed and Fiber, with a Sketch of the History and Nature of the Hemp Plant. By S. S. Boyce. New York: The Orange Judd Co. 1900. 12mo. Pp. 192. Price 50 cents.

Few plants adapt themselves as readily to cultivation and in as varying climates as does hemp. It was one of the first plants introduced into America by the Colonists, and there seems to be no reason why it should not again take its proper place among our national industries. The author has given great attention to the study of the hemp and his book is a most excellent one.

KELLY'S DIRECTORY OF MERCHANTS, MANUFACTURERS AND SHIPPERS AND GUIDE TO THE EXPORT AND IMPORT SHIPPING AND MANUFACTURING INDUSTRIES OF THE WORLD. London: Kelly's Directories, Limited. 1900. 14th edition. 8vo. Pp. 3,488. Price \$10.

The portly volume before us is about the most satisfactory work of this kind that we have ever seen. Its index of trades is most exhaustive, and the large list of cities and towns is most comprehensive. As an example of that way in which the work is compiled, take Holland: First comes general information relative that country, then follow particulars as to the extent of commerce and imports to Great Britain; a long list of the various cities, principal manufacturers and merchants in each city, custom tariffs of all nations, a section devoted to trade marks, a large business directory of London, and a business directory of England, Scotland, Wales and Ireland. We notice a most amusing letter in the preface relative to Her Majesty's Secretary of State for Foreign Affairs. This letter is on a par with many of the British consular reports, and affords a painful contrast to our remarkably efficient Consular Service of the United States, our consuls not being deterred from making searching inquiries in regard to trade in foreign countries.

SOME STRANGE CORNERS OF OUR COUNTRY—THE WONDERLAND OF THE SOUTHWEST. By Charles F. Lummis. New York: Century Company. 1898. 12mo. Pp. 207. Price \$1.50.

The book is handsomely illustrated, many of the cuts being wood engravings. The author deals with such subjects as "Grandest Gorge in the World," "The Forest of Agate," "The American Sahara," "Montezuma's Well," "Montezuma's Castle," "The Greatest Natural Bridge on Earth," "Stone Autograph Album," "The Navajo Blanket," and others equally interesting. The author tells his stories in a most pleasing style.

Business and Personal.

Marine Iron Works. Chicago. Catalogue free.
For hoisting engines. J. S. Mundy, Newark, N. J.
"U. S." Metal Polish. Indianapolis. Samples free.

Yankee Notions. Waterbury Button Co., Waterbury, Ct.
Write Baker Mfg. Co., Racine, Wis., about pushing any new article. Facilities excellent.

Most durable, convenient Metal Workers' Crayon is made by D. M. Steward Mfg. Co., Chattanooga, Tenn.

Ferracute Machine Co., Bridgeton, N. J., U. S. A. Full line of Presses, Dies, and other Sheet Metal Machinery.

Inventions developed and perfected. Designing and machine work. Garvin Machine Co., 141 Varick St., N. Y.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

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.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

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

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Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(7909) F. L. asks: 1. What causes the humming in electric street railway motors? They are noiseless when new, but after about six months or a year, they begin to hum. A. If this statement is true, we are not able to give a reason for it. There is no electrical cause which after this or any other period will develop a humming noise, nor any mechanical cause for such a universal effect. We suggest a broader investigation to see if all motors hum at the end of six months. 2. In cast-welding rail joints do they allow for any expansion or contraction? If so, how? A. No. If the joint is made stronger than the force of contraction, the rail will not break. If the rail is held down more rigidly than the force of expansion, it cannot break away from its fastenings. Hence, it will stay in its place both in winter and in summer. This is the theory. 3. Is there any direct incorporation of the metal, in the rail and in the cast? I have heard some claim there is not, while others claim that the rail is fused at one or two points, generally about the size of a half dollar, where there is a direct union of the two metals. A. There is firm adhesion. We do not know whether there is incorporation or not of the two metals. 4. We have made a box-kite, with 2 cells, 16 inches long, and 15 inches square, with about 10 inches clear between them. When we try to set it up it will dive down, after going up about 25 or 30 feet, sometimes hitting the ground and breaking some of the sticks. A. We advise you to apply to the Weather Bureau at Washington, D. C., for the plans and construction of a box-kite.

(7910) J. B. P. asks: 1. Will you please advise me of some compound, or chemical, that will clean scales from a boiler, while boiler is in use, without any risk of burning the boiler, by water foaming? A. For keeping a boiler clear of incrustation there is nothing so easily managed as caustic soda or potash lye. Dissolve about a quarter pound of the soda or lye for each horse power of the boiler in a barrel or tub of water and connect it with the suction of the feed water pump. Use the boiler for a day with the soda in. Then blow out from the boiler after the fires are drawn or banked or when the engine stops, to the level of the lower gage cock or bottom of water gage and pump up with fresh water to high water mark. Use the boiler next day as usual and at night after fires are drawn and walls cooled below the temperature of injury to the boiler, blow out all the water and clean out the boiler. This may be repeated according to the condition of the boiler, once or twice a month. See Davis' book on "Boiler Incrustation," \$1.50 by mail. 2. Can I charge a set of storage shells by connecting them in series, in main circuit, batteries having the same capacity in amperes and voltage, as the circuit, and will the batteries cause the lamps to burn dim? Would an ammeter connected in the circuit answer to tell when the batteries were fully charged? A. Connect the cells in series and to the line through the ammeter and a rheostat by which the amount of current can be adjusted. A good charging rate is 2 1/2 amperes per square foot of positive plates, reckoning both surfaces. The final voltage should be 2 1/2 volts per cell. This you must determine by a voltmeter in shunt with the cells. Stop the charging when this is reached. As you must put the cells in shunt with the lamps on the circuit, the charging of the cells cannot affect the light if the dynamo has capacity enough to charge the cells and light the lamps at the same time. A good book for one having charge of a storage battery is Treadwell's, price \$1.75 by mail.

(7911) E. L. C. writes: Kindly inform me how to copper plate—a good heavy plate. I wish to plate some steel and iron wire, 2 feet long and about 12 gage. I would also like to plate some wood a good heavy copper plate. I have tried a receipt from some book, but with little or no success, as the plate will not

stay on the iron or steel when I rub or try to polish it, and some will not take at all. A. Your trouble probably is not due to the defects of the description in the book which you have followed, but to your own inexperience. The only way to become an electroplater is to learn the trade from some one who understands it practically. No description can prevent you from making mistakes, or tell you how to recognize the proper working of the process and the proper condition of the bath and the article to be plated. Had yours been all right, the coating would have formed properly and adhered. Such points must be learned by actual experience in actual work. We are not electroplaters and cannot teach electroplating. We recommend Watt's book, price \$1.

(7912) G. A. H. asks: Can you give a description of a sketching camera that reflects direct from the photograph and not from a transparency or negative, and how to arrange the reflectors and lens in a lantern to do the same? A. We think you will find what you want in a "sketching camera" in Hopkins' "Experimental Science," price \$4 by mail. He theredescribes a camera for projecting opaque objects, so as to project them upon a screen, as slides are projected by an ordinary lantern. If you place the screen where you wish the picture to fall as you sketch it, you will have a sketching camera for the direct use of a photograph, or any opaque object.

(7913) W. S. D. writes: I wish to make a storage battery large enough to light two 16-C. P. incandescent lights for a few months, several hours a day. I would kindly ask you to please give me your opinion as to which book to get for the construction of such a battery, and if you could give me some information, I would be very thankful to you? A. We can supply you with the following books on the storage battery, "Salomon's Accumulators," price \$1.50; "Treadwell's Storage Battery," price \$1.75. Prices are by mail. We do not, however, advise amateurs to attempt the construction of a storage battery for real work. It is well enough to make a few cells for experimental purposes. Amateurs cannot expect to make cells which will have much endurance or efficiency, as compared with the cells made in a properly equipped factory, and by experienced workmen. In your case you wish to light 16-candle power lamps. These are rarely made for less than 50 volts. You will then need twenty-five cells with five or seven plates each. The cost will be very much greater than for the same amount of light obtained in some other way. The labor of making so large a number of cells is a great deal. You need as many cells as if you had a greater number of lamps. If you really must have electric lights from a storage battery, we would say buy the battery.

(7914) P. G. writes: 1. My boy is desirous of constructing a telephone line between two country houses about five hundred feet apart. Will you kindly answer in the SCIENTIFIC AMERICAN whether there is any danger from lightning? A. If your house is so situated that the line can be run along the eaves of the houses, there is little danger from lightning on the telephone line your son wishes to run in the city. It were safer to use lightning arresters as is usually done. 2. Is the bright light in the western sky early in the evening during the last month a star or an electric light sent "up in a balloon" from Edison's workshops at Menlo Park? I maintain that it is a star, but my friends have scoffed at me so much that I do not know where "I am at." I have tried to demonstrate by crude trigonometry that it must be a star, but they refuse to be convinced. Therefore I seek an answer from one whose authority will be unquestioned. May I hope that you will help me out? A. The light is doubtless the planet Venus. It would be impossible to raise a balloon high enough to have the light so far above the horizon. This is a frequent question, but has little reason under it. Mr. Edison has done many wonders, but is hardly wizard enough to raise a light which could compete with a planet in brightness. Mr. Edison's laboratory was removed from Menlo Park years ago to Orange.

(7915) J. L. C. asks: 1. Can you give details of construction of an acetylene search light that will project a narrow beam of light? A. An acetylene search light presents no peculiar conditions. Place the light in the focus of the reflector. Have the reflector adjustable so that it can be brought nearer or slid farther from the burner. You can adjust for best projection of the beam as may be required. 2. How would be the best way to reinforce the above light, to increase the size of the burner, or to add individual burners? A. You cannot obtain all sizes of burner for acetylene. To increase the illumination you must add to the number of burners. They are usually placed tandem, and not abreast, when used for projection.

(7916) J. E. P. asks: 1. How to remove the elements from a Hercules battery cell after the salts have crystallized, forming a solid mass of zinc, carbon and jar. I have about a dozen cells in this condition, and it is impossible to get the elements out of the jars. A. We would suggest that you soak your cells in water, thus dissolving the crystals which have formed. This will be a slow operation. It will hasten matters to dig out all the crystals which can be got at with any sharp-pointed tool. Sulphuric acid will dissolve the substance more rapidly, but it will also consume the zinc, which you are probably desirous of saving. In this case prevention is better than cure. 2. Can satisfactory results be got from compressed air in an ordinary steam cylinder, and how high a pressure is necessary per rated horse power of engine to get best results? A. The best steam engine is also the best for compressed air. Only a very little higher pressure or longer cut off is needed to give the same results for air as with steam for power.

(7917) L. A. S. asks: 1. What per cent of electricity, going out through the trolley wire, gets back to the dynamo through the rails or ground? A. All the current returns to the dynamo in one way or another. 2. Would it be possible under existing conditions of insulation, to send the current out through the rails and back to the dynamo through the trolley wire, and if so, would the electrical efficiency be the same? A. The trolley wire is made plus, not as you seem to think, because the current might not go out properly if sent out by the rails, but to protect metals, water and gas pipes, etc., from corrosion at much as possible. It

makes no difference to the electrical efficiency which wire is attached to the trolley, the plus or the minus. If, however, the current flows from the trolley wire to the ground on its way back to the station, it will not act by electrolysis so much upon the metal which it traverses, as if it flowed in the opposite direction. Iron and lead are positive, and tend to attach themselves to the negative pole of the circuit. If then the rails, and water and gas pipes are in the direction of the flow of the circuit, they are not reduced by electrolysis as they should be if the current were flowing the other way, from the rail to the trolley wire.

(7918) L. H. R. asks: 1. Does a static electric machine depend for its volume of electricity on the superficial size of plate or velocity, and will a sufficient series of plates at a greater speed give off very much electricity at a high speed on one large disk, at 200 or 300 revolutions? Please answer an old reader in query column next issue, to satisfy a difference of opinion. A. The discharge of a static machine depends upon several conditions, size of plates, swiftness of rotation, dryness of plates, absence of dust, etc. The spark cannot much exceed the radius of the plates in length, since it will find the distance less between the combs if the balls are separated more than half the diameter of the plates, and will pass between the combs taking the axle of the machine on its way across. This is the reason for using as large plates as convenient. Glass is the best substance for the plates. Since there is a limit to the safe speed for glass, hard rubber is now used a great deal. This can be run at any speed desired, and a very strong spark can be produced. It is better to use several smaller plates than one large one, because of compactness and neatness of appearance. A well-made machine with two 18-inch plates of hard rubber, driven by a quarter horse power motor, gives a steady stream of sparks at 1,800 revolutions per minute. It may also be driven by hand, though no one can maintain that speed very long. 2. Are mica plates superior to glass? A. Mica differs very little from glass in its inductive capacity, and would serve equally well for the plates of a static machine, if pieces of sufficient size could be had at a moderate cost.

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