

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

**ELECTRIC SIGNAL.**—J. E. FELLER, Brooklyn, N. Y. In this case the invention relates to electric signals suitable for general use, and more particularly to a type of instrument in which the person signaled may indicate to the person signaling if the signal is properly received. It may be used in various relations, for instance, to advantage in hotels and in connection with block-signals of railways.

Household Utilities.

**BED OR CUSHION.**—B. T. MILLIKEN, Epiphany, Ky. The invention relates to sectional beds and cushions to be made up by uniting and combining independent sections. One object is to provide an article so constructed as to allow its parts to be readily united or separated, thereby facilitating handling, repairing, and cleaning, as well as providing for extension or contraction in respect to length as different conditions of use may require. Improved ventilation is secured.

**PLATE-LIFTER.**—G. S. SOLOMON, Bisbee, Arizona Ter. In carrying out this invention, Mr. Solomon has in view the provision of a device exceedingly simple and durable in its construction and very positive in its operation, the device being so made that when the pan is grasped by the lifter such pan cannot turn or fall from the gripping-jaws and thereby spill the contents thereof. It may be adjusted to utensils of various dimensions or size.

Machines and Mechanical Devices.

**TYPE-WRITING MACHINE.**—F. S. ROSE, Newark, N. J. In this patent the invention refers to improvements in type-writers, in which is sought the production of a construction of the support or carriage for the type-platen or cylindrical roller which enables the same to be folded into compact relation to the keyboard, thus making provision for ready and convenient transportation of the instrument. Means are provided for shifting the platen relatively to the point of impact of the type-faces on the type-levers.

**WOOL BURREING AND PICKING MACHINE.**—G. PROUVOR, Roubaix, Department of Nord, France. This mechanism cleans locks of wool from vegetable burrs, dirt, and other refuse which may be entangled therewith. It combs the locks of wool in order to loosen the fibers or filaments and to bring them into parallel relation, thus opening the locks and spreading out and loosening the fibers, so that they are thoroughly cleaned without unnecessary straining or tearing.

Metallurgical Improvements.

**ROASTING-FURNACE.**—S. D. CRAIG, G. E. KELLY, and W. TURNER, LaHarpe, Kan. In this instance the invention has reference to improvements in ore-roasting furnaces or kilns, and the object of the inventors is to provide a furnace in which ores may be rapidly and thoroughly roasted while being agitated by an automatically controlled device.

Of General Interest.

**COMBINED SWING AND FAN.**—D. W. BASH, Buda, Ill. The invention relates to a class of swings that are adapted to actuate a fan, and has for its object to provide a device of the class mentioned with novel details of construction which adapt the fan-blade to blow directly upon the occupants of the swing while the latter is in motion. It may be placed indoors for winter use, but more generally employed for exercise and amusement during summer on a lawn for adults and children.

**MONKEY-WRENCH.**—E. A. RENOUF, Wellsville, Ohio. In the present invention the improvement is in monkey-wrenches, and Mr. Renouf has for an object the provision of novel constructions for securing the movable jaw and for use in adjusting or moving the said jaw along the toothed wrench-bar. The device is simple and easily applied to use.

**ENVELOP.**—P. DAVALOS, Havana, Cuba. The purpose of this improvement is to provide means for facilitating opening envelopes, wrappers, etc., particularly those covers which are used on mail matters. This end Mr. Davalos attains by forming a tearing strip of the material of which the envelop itself is formed, thus not only cheapening the production of the self-opening envelop in cost of material, but also in labor necessary in constructing it.

**NECKWEAR.**—C. BABSON, Gloucester, Mass. The object in this instance is to provide a tip for necktie neckbands which will automatically lock itself in adjusted position, dispensing entirely with the ordinary retaining-pin, and to so construct such a tip that it will be not only simple, durable, and economic, but which may be threaded through the tie in the usual manner, expanding to retain its position the moment it is released in adjustment.

**OPTOMETER.**—W. J. LAUGHLIN, Waunakee, Wis. The object of this invention is to provide an improved optometer arranged to enable the optician to readily adjust the lenses to any desired power, for conveniently and quickly determining the visual powers and the pupillary distance of the eyes of the patient, for the

selection of proper eyeglasses, and for obtaining the height and inclination of the bridge.

**MEAT-PRESS.**—G. FREYSLER, San Diego, Cal. In this patent the invention relates to meat-presses; and it consists in providing a press of this character with hinged sides and ends, detachable corners, and compressing means, all of simple and novel construction. It enjoys special advantage in the facility with which means are adapted, affording free access to the compressed meat.

**FASTENING AND SUSPENSION DEVICE.**—E. M. LEWIS, Mountsville, W. Va. Heretofore when a person desiring to use letters, figures, emblems, shields, etc., they had to be made for the occasion. This invention obviates such difficulties by providing a device which may be suitably secured to various articles made of paper, cardboard, cloth, metal, wood, china, glass, celluloid, candy, etc., or from a combination of any of these whereby they may be quickly attached to and removed from various objects, principally for decorative purposes.

**CRACKER-CASE.**—W. T. MAGNESS, Spartanburg, S. C. By this improvement the inventor provides in a case a framing provided with guides in which slide the shelves for supporting cracker-boxes, so the shelves can be adjusted out of the frame to permit access to the boxes and can be adjusted back in their guides to carry the cracker-boxes into the frame when storing the same. In connection with the sliding box-supporting shelves, lock devices secure the shelves in position and jointed links connect the outer ends of the sliding shelves with the casing to aid in guiding the movements of the shelves and to support the same when adjusted to their outer positions.

**POWDER-CONTAINER.**—JEANIE MCC. MCINTYRE, Jersey City, N. J. In this device the required quantity of powder is automatically, mechanically, and accurately measured from the container through an orifice in the container into a drawer movable in the container's exterior, in such a manner as to prevent contact of the drawer or any exterior portion of the device with the powder inside of the container. The powder always closes the orifice through which it passes by its own gravity into the exterior movable drawer, thus sealing the interior of the container from all exterior influences and preserving the flavor, fragrance, and freshness of the tooth or similar powder.

**PIPE-COVERING.**—M. SULLIVAN, New York, N. Y. The covering is intended to be applied particularly to joints between pipes which themselves have a non-conducting covering, and comprises a sectional frame arranged to be clamped on the pipe-sections and to inclose the joint or connection, this frame supporting a gauze or perforated shield which itself carries the asbestos or other compound forming the non-conducting covering.

**SHIRT-WAIST HOLDER AND SKIRT-SUPPORTER.**—A. WILTSEY, New York, N. Y. The purpose in this case is to provide a device adapted to hold a shirt-waist or a dress-waist down and to simultaneously hold the skirt from sagging at the back portion of the waist-band and to so construct the device that it will be capable of convenient and expeditious application and worn without discomfort. The invention improves upon the construction of a similar device for which application for patent was made in a former serial and allowed to Mr. Wiltsey.

**DOOR-SECURER.**—F. E. WIESNER, Washington, D. C. The invention has for an object the provision of a construction which can be easily applied and readily folded when not in use into compact form for carrying in the pocket. The device consists of a shank, with teeth formed thereon, which when the door is closed are forced into the jamb of the door. A cross bar can be slipped through a slot in this shank against the face of the door, thus locking it.

**PARCEL-ATTACHING DEVICE.**—H. F. ROLL, St. Louis, Mo. One of the principal objects of this invention is to devise a retaining means attachable to the person or some part of the clothing and to which device an article, such as an umbrella, is secured, so that if it should happen that the user of the retainer should attempt to leave a car without picking up the parcel he or she would be reminded by a slight jerk or pull from the retainer. It is useful for old and young for holding napkins, scissors, etc., controlling suspenders, and many other operations, but is especially for use by ladies when they go shopping or when riding in street and other cars.

**CLOTHES-LINE HOLDER.**—G. H. DE VINE and A. BAUMANN, Jersey City, N. J. The purpose of the inventors is the provision of a holder capable of being readily placed in position for use and of being operated from the interior of the room when the clothes are placed on the line or are removed therefrom. After clothes have been placed upon the line the device and that portion of the line supported thereby can be swung out from the room and will be held in outer position by the weight of clothes on the line.

**MINER'S TOOL.**—A. V. DES MOINEAUX, Silverplume, Col. This invention relates to a tool for use by miners in preparing a blasting-fuse for service; and the subject-matter of this application is in part a division of a prior one filed by Mr. Des Moineaux. The object is to provide a tool with means for splitting the end of a fuse and with a guide by which the

fuse may be presented properly to the slitting devices and also held firmly in place during the slitting operation.

**WOVEN PILE FABRIC.**—H. SARAFIAN, Yonkers, N. Y. In this case the purpose is to provide a fabric in which the pile is exceedingly close, to give a fine appearance to the finished product, to produce an exceedingly strong and durable weave in which the piles are not liable to become loose or pull out when using the fabric as a rug, for instance, the fabric practically not showing weft or ground warp on either face, but only the pile on the face and the pile-loops on the back.

**HELMET.**—J. J. CURTIS, Jersey City, N. J. As is well known, the helmets ordinarily worn by policemen, firemen, and similar officials are objectionable, especially in warm weather, on account of the weight, and difficulty in ventilating to attain coolness and comfort. Mr. Curtis overcomes these difficulties. He gains an especial advantage in stiffening the brim with aluminium in that the helmet may be made of straw or any light flimsy material, a thing heretofore impossible, on account of the difficulty of stiffening the brim sufficiently.

**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.

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. 5285.**—For a machine to pick sponges in small pieces without cutting them.
- AUTOS.**—Duryea Power Co., Reading, Pa.
- Inquiry No. 5286.**—For manufacturers of cheap toys and games.
- "U. S." Metal Polish, Indianapolis. Samples free.
- Inquiry No. 5287.**—For makers of castings for gasoline engines  $\frac{1}{4}$  to 1 h. p., suitable for amateurs' use.
- Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.
- Inquiry No. 5288.**—For a heavy spring motor with governor to run a light machine.
- Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.
- Inquiry No. 5289.**—For makers of machinery to make stove pipe.
- Send for new and complete catalogue of Scientific and other books for sale by Munn & Co., 361 Broadway New York. Free on application.
- Inquiry No. 5290.**—For machines for preparing cotton for surgical dressing.
- Fine machine work of all kinds. Electrical instruments a specialty. Models built to order. Page Machine Co., 512 Greenwich Street, New York.
- Inquiry No. 5291.**—For machines for making pens and pen holders.
- We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.
- Inquiry No. 5292.**—For information regarding cost, etc., of small ice-making machinery, capacity of plant 500 pounds in 5 hours' run.
- The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.
- Inquiry No. 5293.**—For parties engaged in the manufacture and installation of electric light plants.
- The celebrated "Hornsey-Akroyd" Patent Safety Oil Engine built by the De La Vergne Refrigerating Machine Company, Foot of East 138th Street, New York.
- Inquiry No. 5294.**—For quotations on water motors.
- Holtzappel, screw cutting lathe, plain and complex turning; unequalled inventory of costly apparatus, chucks and tools. F. N. Massa, 54 Warren St., New York.
- Inquiry No. 5295.**—For makers of steel tanks to hold 25 cubic feet of steam at 400 pounds' test and high pressure pumps to pump 500 pounds.
- Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 15 South Canal Street, Chicago.
- Inquiry No. 5296.**—For manufacturers of elevators.
- Inquiry No. 5297.**—Wanted, smooth, bright tin plate for plating purposes, in lots of one to twenty cases at the time direct from an independent mill.
- Inquiry No. 5298.**—For machinery for separating the outer hulls from the bean of the castor oil plant.
- Inquiry No. 5299.**—For manufacturers of smoke consumers.
- Inquiry No. 5300.**—For manufacturers of buckram wire used in manufacturing hat frames.
- Inquiry No. 5301.**—For makers of gasoline or hot air engines of about  $\frac{1}{2}$  h. p.
- Inquiry No. 5302.**—For makers of small steam engine cylinders of the slide valve type of about 1 $\frac{1}{2}$  inches stroke and  $\frac{1}{4}$ -inch bore, either metal or brass.
- Inquiry No. 5303.**—For a machine for printing on lead pencils.
- Inquiry No. 5304.**—For a Taylor calculating machine.
- Inquiry No. 5305.**—For makers of level glasses.
- Inquiry No. 5306.**—For makers of lathes, planers, drill presses, gasoline engine castings and automobile parts.
- Inquiry No. 5307.**—For a machine for imparting power to churn dashers, washing machines, also makers of corn-busking machines operated by hand.
- Inquiry No. 5308.**—For makers of dish-washing machines.
- Inquiry No. 5309.**—For makers of typewriters ranging in prices from \$35 to \$60.
- Inquiry No. 5310.**—For makers of handles for rakes, forks, etc.
- Inquiry No. 5311.**—For a covered automobile carrying 12 to 14 persons.
- Inquiry No. 5312.**—For broom-making machinery.
- Inquiry No. 5313.**—For a small model  $\frac{1}{4}$  h. p. steam engine boiler for demonstrating purposes.
- Inquiry No. 5314.**—For makers of papier maché toys.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(9331) F. S. says: Could you give us a remedy for our gas-engine igniter points? Sometimes we try and start our engine as many as ten times before we get an explosion, and all at once it goes off and everything is all right. We blame it on the igniter points; they miss the spark quite often. The make of our engine is a C— gas engine with electric spark. There seems to be a grease film over the points, and they get black, and then they will not spark; they are nothing but brass points. In order to get a spark again we have to take off the igniter plate and file the points. The batteries are all new. We have tried platinum points, but they break off every time. Sometimes during the day the engine stops itself because we do not get a spark. So if there is a remedy that will keep these points clean, we would like to know. We use gasoline to start our engine, which may be what causes the grease to form, but it won't start with gas. We thought that if we would make two points about  $\frac{1}{4}$  inch thick at one end, and about 3-16 inch at the other, they would make a bigger spark. Our points at present are the same thickness, about  $\frac{1}{8}$  inch thick. A. Gas engine troubles seem to be a frequent cause of complaint of late; principally due to want of knowledge of the true cause of the electric shortcoming by electric short-circuiting, of which absence of cleanliness of insulation and excess of explosive fuel are the main features of the trouble. It is not the cleaning or the filing of the points alone that is the true remedy for these troubles, but rather the thorough cleaning of the insulating surface of the ignition plug, which is the proper place to make the remedy. Grease and carbon from defective combustion deposit on the stationary insulated pole of the plug, and sometimes cause this to become short-circuited. In the event of this happening from the employment of too much lubricating oil or of a bad mixture, the igniter will not work at all until it has been removed and the insulated pole thoroughly cleaned. From your description of the trouble you experience, it would seem, however, as if the trouble were entirely due to the use of improper points. These should be neither of brass nor of platinum, but of the hard platinum-iridium alloy that is specially compounded for the purpose. If the points are properly brazed on, there should be no trouble from their falling off.

(9332) J. G. asks: 1. When applied to a slide valve, what is meant by the term lead, and what is accomplished by same? A. The amount of opening for the admission of steam at the beginning of the stroke is called steam lead, and the opening for release at the end of the stroke is exhaust lead. The amount of the opening at dead crank center varies in ordinary engines from 1-64 to  $\frac{1}{8}$  inch valve lead, and may be as much as  $\frac{1}{4}$  to  $\frac{3}{8}$  inch in special designs of valve movement. The effect is a steam compression equal to the boiler pressure at the moment of change of motion of the piston. It neutralizes the strains and effects a smoother running of the engine. 2. What is meant by the term lap, and what is accomplished by same? A. The outside lap, called the steam lap, is the distance the steam edge of the valve extends beyond the edge of the port when the valve is in its central position. The inside lap, called the exhaust lap, is the distance the valve extends or laps over the exhaust port when the valve is in its central position. The effect of outside lap is a later admission and an earlier cut-off with longer expansion. The effect of inside lap is to make the exhaust occur later and to close earlier with a longer compression. The effect of all the lead and lap combinations is for the smooth running of a steam engine. Its freedom from shock or strain, and for the greatest economy in the use of steam for power. 3. What is meant by cutting off steam before piston has traveled its full stroke, and what is accomplished by same? A. The cut-off in a steam engine is the technical expression as to the point in the stroke at which the steam inlet is closed and expansion commences. By this means the power of a given volume of steam is largely increased by utilizing the decreasing pressure due to its expansion during the remainder of the stroke from the point of cut-

off, so that from the most economical points of cut-off, which for an ordinary engine may be from 15 to 30 per cent of the stroke, a saving of from 25 to 50 per cent of the power value of the steam may be made.

(9333) A. C. A. writes: In regard to note 9316, A. F. S., page 164, I think a reason why lightning is so seldom seen in winter is because the condensation is never so rapid as in summer. His own observation shows that the harder the shower, the greater display of lightning. Now to my mind the electricity is produced in the cloud in the same manner as the rain-drop, by cohesion of electrical particles in the warm air that was carried up into the colder upper air, where the condensation takes place. Now, if the rain-drop was formed by cohesion of water particles until it becomes heavy enough to fall by gravitation to the earth, why not the other? There is rain without lightning, but never lightning without rain, thus showing that lightning is the result of rapid condensation, and rain not the result of lightning, as if the electric discharge started from the top of the cloud at the same time as a drop of water, it would reach the earth first, as it travels faster. The greatest display of lightning I have ever seen was in June, 1889, when nearly ten inches of rain fell from 1.40 to 2.20 P. M., forty minutes. This was a local shower, did not rain over two miles away from my point of observation in any direction, and I think I was in the center of it. There was no wind. The cloud did not move away, but just rained down until there was only a haze left. Even this remained full five hours after the rain ceased. This cloud could not have been electrified by induction from any other, for there was none other; clear sky all about. I observed the cloud at 11.30 A. M. directly overhead, and at 12.30 P. M. it had got quite black and was larger than when first noticed. At 1 o'clock my man and I went to work in a field, half a mile from house. I told the man we were going to get wet from that cloud overhead, and we did. There were about twenty flashes of lightning before any rain reached the ground, and they were close, not over ten seconds apart. When the rain began we started for shelter, but lost all sense of direction, as the rain was so thick we could not see, and but for the lightning flashes it would have been dark as night, but the flashes were almost continuous. The rain fell straight down, no wind to drive it. I do not take any stock in the idea of electric generation by friction between two clouds, nor by friction between cloud and air currents, because the clouds do not rub each other, any more than the exhaust steam from one locomotive rubs with that of another; they mingle and become one, the instant the two engines are side by side. The cloud goes with the current of air; is not steered like a ship, in some other direction. I have never seen any one who held the same idea as myself in regard to the formation of the electricity in the clouds, and I have asked many. Also have asked people to tell me as nearly as they could the size of a streak of lightning. I saw one strike a stump at least 30 inches in diameter, and the bright streak was broader than the stump. I was about 100 feet away, and looking at the stump at the time. Another time I saw one hit a barn a mile away, and the streak was as broad as a chimney on the house beside the barn, and the chimney was 26 inches wide. I could see the streak and chimney both at the same time; the barn showed fire in half a minute. I saw one streak hit my wood pile, and it looked as large as a 3/4-inch rod, and snapped like a gun cap, while there was a big crash on the opposite side of the house from me half a second later. This was a sliver from the main discharge, as I have frequently seen a flash divide into several small ones, and one when not over 100 feet from the ground, and the parts went away horizontally, while the main body was vertical. I have always watched the lightning whenever I could, and have seen some queer antics of it. A. The theory of our esteemed correspondent does not reach to the point of explaining the origin of the electricity of the atmosphere. It begins with electricity already present in the atmosphere. There is no difficulty in accounting for the rise of intensity of electrification in the thunder storm. The fact that the air is always in fair and stormy weather alike charged with electricity is more difficult to account for. We cannot follow him in the measure of the diameter of a flash of lightning. The great enlargement of a bright line of light in comparison with its real size by irradiation prevents the testimony of the eye from having much value in the case. The account of the cloudburst, as such heavy showers are commonly but erroneously called, is very interesting.

(9334) W. A. H. and others ask: Please tell me the difference between non-luminous radium and radium (luminous). I refer to the article in your paper of January 2, namely: "A Home-Made Spinharscope." Also, how can purple stains be removed from type-keys? A. Non-luminous radium is radium of so low a potency or purity as to give no light of itself, which can be perceived even after long effort in the deepest darkness. When a mixture of such radium and pulverized willenite is examined in the dark, it is found to be luminous. The willenite is caused to glow by the radium, which does not of itself glow. This is what is meant by the home-made sphin-

tharscope. Prices quoted on chemicals a few weeks ago cannot be relied upon now, since these substances are rising very rapidly in market value. Purple stains can be removed from type-keys with alcohol if the stains are aniline.

NEW BOOKS, ETC.

CASSELL'S POPULAR SCIENCE. Vol. I. Edited by Alexander S. Galt. Illustrated. London, Paris, New York, and Melbourne. 1903. Square 8vo.

The book which lies before us comprises a series of articles well illustrated, and for the most part excellently written, describing in simple, terse language the scientific causes of the phenomena which play an important part in our daily lives. "How the Camera Works," "Meteors," "The Wizard Electricity," "A Piece of Sponge," "How and Why a Stone Falls," "Time Told by the Sun," "What is Radium?" are a few of the more suggestive titles of these articles. Since this is but the first volume, it is hardly fair to call attention to several topics which, in our opinion, should have been discussed, since they may find a place in subsequent volumes. Among these topics we may, however, be permitted to suggest those of "Bessemer Steel," "Aerial Navigation," "the Telephone," and the "Steam Engine." The subjects which are treated in this volume, however, cover a very wide range. They include astronomy, natural history, chemistry, electricity, anatomy, and geology. Each article, so far as we have been able to judge, gives a very comprehensive view of the particular subject which it discusses. The book shows what can be done in the way of treating science popularly and yet accurately.

GENERAL ZOOLOGY. Practical, Systematic, and Comparative. Being a Revision and Rearrangement of Orton's Comparative Zoology. New York: American Book Company. N. D. 12mo. Pp. 512. Price \$1.80.

The present textbook is suited to the needs of the general student, who wishes to learn the principal facts and theories of zoology, and thus to obtain a fairly comprehensive idea of the science. To this end it has seemed desirable to arrange a course of study, so that the student may gain by personal observation a concrete knowledge of the structure and activities of animals, and by so doing acquire some familiarity with the method of zoological investigation, so that he may also obtain a knowledge of the relationships of animals as expressed in an accepted scheme of classification. The laboratory exercises are well arranged, and the book is illustrated by 379 engravings, many of which are from life. We note particularly an excellent photograph of a beaver at work.

DIAGRAMMES ET SURFACES THERMODYNAMIQUES. Par J. W. Gibbs. Traduction de M. G. Roy, Chef des Travaux de Physique à l'Université de Dijon. Avec une introduction de M. B. Brunhes, Professeur à l'Université de Clermont. Série Physico-Mathématique Scientia. Paris: C. Naud, éditeur. 1903. Pp. 100.

The influence exercised on contemporaneous chemistry by the ideas of Prof. Gibbs has constantly increased; and yet, even in its original English form, his work on thermodynamics remains comparatively inaccessible. The monograph before us is a French translation of two treatises on the geometrical representation of thermodynamic phenomena by means of diagrams and surfaces. The ideas of Prof. Gibbs have inspired many an interesting experiment for detecting the reactions which occur in thermic motors, by means of diagrams other than the exact figures of Claperyon. The present work will doubtless find in France fully as welcome a reception as the original met with in English-speaking countries.

TABLES AND OTHER DATA FOR ENGINEERS AND BUSINESS MEN. Compiled by F. E. Ferris, D.S. Nashville, Tenn.: University Press. 24mo. Pp. 152. Price 50 cents.

An excellent little pocketbook adapted for the vest pocket. The tables are unusually well selected.

AMERICAN HANDBOOK OF THE BREWING, MALTING, AND AUXILIARY TRADES. A Book of Ready Reference for Persons Connected with the Brewing, Maltng, and Auxiliary Trades. Together with Tables, Formulas, Calculations, Bibliography, and Dictionary of Technical Terms. By Robert Wahl, Ph.D., and Max Henius, Ph.D. Second Edition. Chicago: W. C. Keener & Co. 1902. 16mo. Pp. 1,266. Price \$10.

If ever a reference book represented original work, this does. Its editors had no precedent whatever to guide them. To be sure, there are books on bottom fermentation brewing as practised on the continent of Europe; but these are in German. There are books on top fermentation brewing as practised in Great Britain. But even if all these books were available to the American brewer, they would not fulfill his requirements, for the reason that he employs neither of the two systems mentioned, exclusively. The American brewing industry is a thing apart. It was for the purpose of fulfilling American requirements that the present handbook was written. From an examination

of its contents we are convinced that the work is all that its authors desired it to be. They have been decidedly successful in preparing a book of ready reference which the brewing, malting, and auxiliary trades will find useful.

MANUAL OF SCREW CUTTING. By William Simpson. Wollaston, Mass.: Published by the Author. 18mo. Pp. 72. Price 40 cents.

This little manual deals with screws, screw cutting, and other mechanical powers. It will prove useful to all mechanics.

GRAPHIC STATICS. With Applications to Trusses, Beams, and Arches. By Jerome Sondericker, B.S., C.E. New York: John Wiley & Sons. 1903. 8vo. Pp. 137, three folding plates. Price \$2.

This book is the outgrowth of an extended experience in teaching graphic statics at the Massachusetts Institute of Technology. While it deals specifically with problems encountered in building construction, it should be found serviceable to engineers and engineering students generally. As a preparation the reader should have a knowledge of statics and the strength of materials, including beam stresses and deflections, as these subjects are commonly presented. The whole matter of graphic statics is a most important one in view of our modern system of building construction, and the book before us is a most thorough and excellent treatise on the subject.

WATER SUPPLY. A Student's Handbook on the Conditions Governing the Selection of Sources and the Distribution of Water. By Reginald E. Middleton. London: Charles Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Company. 1903. 8vo. Pp. 168.

This is an excellent book for engineering students, as it sets forth in a compact manner the general scientific principles on which the subject is based, and serving as an introduction to larger and more technical works. Special prominence has, therefore, been given to such questions as the quality of the water, the interpretation of analyses, the stability of masonry dams, flow of water through the pipes, and the general application of mathematics to the subject. The book will prove of interest to those for whom it was written, even though some of the practice may be at variance with that of our own country. The formulas and diagrams are particularly to be commended.

THE SUGAR CANE IN EGYPT. By Walter Tiemann. Altrincham, near Manchester, England: International Sugar Journal. 1903. 16mo. Pp. 75, 16 plates. Price \$2.

The British occupation of Egypt, which dates from 1882, has been followed by remarkable progress, as the wonderful development of the agricultural interests bear witness. While the technical and mechanical conditions in the factories of the colonial sugar industry have made great strides in progress, the *materia prima*, the sugar cane itself, has in most countries remained subject to the old primitive methods of culture. The object of the present work is to outline the present methods, and to show how improvements can be made. The book contains some interesting field experiments.

THE LOCALIZATION OF FAULTS IN ELECTRIC LIGHT AND POWER MAINS. By F. Charles Raphael. London: The Electrician Printing and Publishing Company, Ltd. New York: D. Van Nostrand Company. N. D. 8vo. Pp. 205. Price \$3 net.

The subject of the localization of faults in electric mains is a most important one, and it appears to have been a rather neglected part of electrical engineering. Methods are constantly changing, and the very latest are described in this second and revised edition. The author justly says that since the publication of the first edition, considerable progress has been made in the art of cable making and cable laying, and increased practice and experience have led to a nearer approach to perfection. This book should be in the hands of all practical electrical engineers.

ACETYLENE GAS. How to Make and Use It. By Cyril N. Turner. London: Percival Marshall & Co. N. D. 18mo. Pp. 62. Price 20 cents.

The author states that the inventor of the process was either an American, Willson, or Henri Moissan, the celebrated French chemist. We have never heard Mr. Willson's claim to the invention disputed. He certainly has everything very tangible in the patent line. This little book will prove of interest to amateurs.

GENERAL DATA ON THOMSON RECORDING WATTMETERS. Schenectady, N. Y.: General Electric Company. 1903. 16mo. Pp. 217.

All who are interested in selling current will be glad of the present volume. It is filled with tables and diagrams.

THE TECHNOLOGY OF SUGAR. By John Geddes McIntosh. London: Scott, Greenwood & Co. New York: D. Van Nostrand Company. 1903. 8vo. Pp. 408. Price \$4.50.

The British and Colonial sugar industry has been on the wane. Obsolete machinery and methods contributed much to the decadence of

the industry. It has, therefore, been the aim of the author to show the most modern methods employed in this industry. There are a large number of books on sugar making, but there is ample room for the present book, which deals with the classification of sugar, beet sugar, cane sugar, sugar refining, and the selection of sugars. All who are in any way identified with the sugar industry should have a copy of this book.

THE HOME MECHANIC. By John Wright. New York: E. P. Dutton & Co. 1903. 8vo. Pp. 435. Price \$3.50 net.

The present work deals with carpentry, metal work, repairs, steam engines, and similar subjects. The practice is English, but for that reason it would prove more useful to American readers. Still, however, it is thoroughly practical, and will prove to be a very useful book in the amateur's library.

A QUARTERLY ISSUE OF SMITHSONIAN MISCELLANEOUS COLLECTIONS.

The Smithsonian Institution has commenced the publication of a Quarterly Issue of its Miscellaneous Collections, "designed chiefly to afford a medium for the early publication of the results of researches conducted by the Smithsonian Institution and its bureaus, and especially for the publication of reports of a preliminary nature." The first number of the Quarterly Issue is a double one, and contains seventeen articles, ranging in size from 1 page to 73 pages, in addition to interesting and timely notes on the activities of the Institution, its collections, etc., the whole accompanied with fifty-six plates and numerous text figures.

The scope of the journal is broad, the first issue embodying articles on Mammalogy, Astrophysics, Paleontology, Archeology, Geology, Ornithology, Ichthyology, Ethnology, etc., thus covering a considerable range of scientific subjects.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending March 15, 1904.

AND EACH BEARING THAT DATE

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

Table listing inventions with patent numbers and dates. Includes items like Adding-machine, W. H. Clark; Adjustable wrench, Bordowisch & Wovries; Air-braking systems, audible alarm for, J. H. Clark; Air-heater, J. Waterhouse; Air or other gaseous bodies, compressor for, H. C. Sergeant; Aluminum sulfate, making, H. Spence; Ammonium nitrate, making, W. Mills; Amusement apparatus, W. S. Reed; Antiseptic telephone-mouthpiece, English & Ten Broeck; Apparel, wearing, L. S. Altheimer; Automobile lifting-truck, W. S. Kessler; Back-rest, folding, B. B. Billmeyer; Bag-holder, Madden & Thompson; Bale or package cover, I. Schlichter; Baling-press, T. P. Ormond; Baling-press door-closer, E. Davis; Band-fastener, F. Sedlmair; Barrel, E. E. Gage; Battery, see galvanic battery; Battery tray, storage, T. A. Edison; Beans, securing strips of wood, etc., to iron, S. Davis; Bearing, ball, T. H. Duncombe; Bearing, conical roller, J. P. Cowing; Bedclothes-holder, H. Crocker; Bedstead attachment, A. B. Shane; Beet-blocking machine, A. R. Mundt; Belt-fastener, I. Jackson; Bib or faucet, C. Peck; Bicycle, C. N. Stilson; Bicycle-gearing, H. F. Maynes; Bicycle-gearing, Thompson & Maynes; Binder and file for pamphlets, books, ledgers, etc., F. B. Whitney; Binder, loose-leaf, J. L. Hanson; Binder, temporary, J. P. Mentzer; Bird-cage, J. A. Quelch; Blasting charges, machine for preparing, F. J. Travasac; Boll-weevil catcher, S. W. Ivey; Bolt, see Expansion bolt; Bolting-sieve cleaner, C. A. Shultz; Bottle-filling apparatus, J. Anderson; Bottle-filling machine, E. H. Parker; Bottle-stopper, non-refillable, J. G. Reddick; Bottles, stopper for preventing refilling, G. B. Okey; Bowling-alley, portable, F. Eary; Brake-beam, A. Lipschutz; Brake-shoe, J. D. Gallagher; Brake-shoe and producing same, C. G. Ette; Brake-shoe holder, A. M. Pennock; Branding implement, oil-burning, G. Fuller; Breastpin safety-catch, J. C. Nordt; Bridge and tailpiece, combination, E. Reach; Bridle-bit, H. S. Anderson; Broom-moistener, W. S. Reynolds; Buckle, A. Addington; Building, etc., blocks, apparatus for making, J. Brower; Building, etc., blocks, making, J. Brower; Burglar-alarm, N. A. Lyle; Bushing, G. & J. Strehl; Butter-separator, J. Mervick, Jr.; Button and tie, collar, H. L. Blais; Cabinet, kitchen, C. E. Kade; Cable-clip, J. McFarlane; Cake-trimming machine, layer, C. F. Dietz; Calculating and recording machine, C. D. Baird; Calendars and similar sheets, machine for bordering, J. F. Ross; Can-fluxing apparatus, J. G. & M. O. Rehffuss; Can-making machine, J. G. & M. O. Rehffuss; Can tops and bottoms from forming-dies, pneumatic means for removing, J. G. & M. O. Rehffuss; Cans, machine for putting tops and bottoms on, J. G. & M. O. Rehffuss; Cans preparatory to being fluxed and soldered, apparatus for heating, J. G. & M. O. Rehffuss; Car-brake, H. E. & M. L. Brown; Car-brake, emergency, S. A. Duvall; Car-brake-operating mechanism, J. L. Peacock; Car brake, passenger, M. Tolzt; Car-coupling, W. E. Richards; Car-counting attachment, railway, W. Thornburgh; Car discharging device, dump, Sauer & Hulett; Car, dump, O. W. Meissner.

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