RECENTLY PATENTED INVENTIONS.

Electrical Devices.

SOCKET FOR ELECTRIC LAMPS.—J. A. MEBANE, South Boston, Va. The object of the inventor is to provide an improved socket for incandescent lamps in which socket-screws are wholly dispensed with, the separate parts being adapted to be easily and quickly connected and disconnected and the electrical connections being made in such manner that the socket may be produced at much less cost than those of usual construction. The casing of the socket is likewise so constructed that its two parts are held together detachably by means of a spring-clamp without aid of screws.

REGULATOR FOR ALTERNATING CURRENTS.—E. L. HANEY, Nashville, Tenn. In the present patent the invention has reference to regulators for alternating currents; and the improvement consists, essentially, of a transformer of a special construction, together with means for automatically adjusting the transformer to suit the variations in the current.

Of Interest to Farmers.

HARVESTER-REEL.—C. O. WYMAN, Anoka, Minn. The primary object of the invention is to provide a reel which may be readily folded into compact form for shipment, and which may also be freely adjusted in all directions when in use for the double purpose of adapting the reel to the condition of the grain and lay of the land while operating, and for holding the reel closely against the body of the harvester when the same is being drawn to and from the field.

STOREHOUSE FOR GRAIN OR THE LIKE.—R. C. ROACH, Hutchinson, Kan. In this structure grain or like material may be stored or kept in a state of preservation for an indefinite length of time. The inventor provides simplified and effective means whereby grain may be elevated above and deposited within the structure and provides means whereby the delivery of grain from the storehouse may be readily effected in any quantity, for shipment or transfer thereof or for other purposes. The structure may be rapidly filled or emptied.

FRUIT-PICKER.—I. CARMAN, St. Remy, N. Y. This invention relates to a device intended especially for picking strawberries, and by its means a person may go through a field or garden and conveniently cut the stems of the berries which will thereupon fall into a receptacle provided for them, this receptacle forming part of the fruit-picker, and when the receptacle is full the berries may be dumped into a box for shipment.

COTTON-COMPRESSOR.—A. T. SNODGRASS, Patterson, La. The objects of this inventor are, first, to provide a compressor in which all strains are at or near the bottom; second, to so arrange all levers and toggle-joints in such a manner that all strains will be exerted directly in the direction which will develop the most power to the upward motion of the movable platen; third, to construct a compressor whose leverage is so arranged as to develop the required power (say two thousand tons) through the means of a comparatively small actuating-cylinder.

Of General Interest.

TRAP.—A. L. FUQUA, Durham, N. C. The present invention refers to a trap of such organization as will admit of contents being drained by an operation which, in addition to draining the trap, cuts off completely its connection with the sewer, so that the device may be used either as a trap or stop-cock. This arrangement dispenses at will with the usual stopper or stop-cock of basins, tubs, and the like, and empties the trap to prevent freezing of the water seal and without exposing the apartments to the danger and nuisance of gases escaping from the sewer.

TONGS.—J. G. WINGER, Grand Valley, Pa. The device comprises a handle on which two peculiarly-arranged jaws are mounted, the structure being such that upon operating the handle the jaws may be caused to move toward or from the object being gripped, and these jaws coacting with a gripper on the handle serve securely to hold the pipe, casing-collar, or other part against turning movements in either direction.

BRIDLE-BIT.—T. MILLIGAN, Fortuna, Cal. In the present patent the invention has reference to improvements in bridle-bits for horses, the inventor's object being the provision of a novel form of bit particularly adapted for controlling fractious horses with comparatively very little effort on the part of the driver.

WIRE-STRETCHING DEVICE.—W. D. MILLER, Saco, Mont. Mr. Miller's object in this invention is to provide novel details of construction for a wire-stretcher that are simple, practical, and inexpensive and that afford means for conveniently stretching and temporarily holding a fence-wire alongside of a post for its convenient attachment thereon.

NIGHT-LAMP.—R. P. GIBBS, New York, N. Y. The prime feature of the invention which relates particularly to a night lamp of that class which is adapted to contain oil which is burned through the medium of a wick floated on the surface of the oil, lies in the adaptation to such a lamp of the shell of a fish or other shell-bearing animal, such shell being made to contain oil, so that light is shed through the shell with the various colors thereof. This gives a very beautiful effect.

LEATHER-POLISHING ROLL.—W. H. GERRITY, New York, N. Y. The roll is formed of a number of disks secured side by side upon an axial shaft or other means, the disks being provided with spiral ribs, said disks being molded with a sunken portion inward from the peripheral portion, thus leaving out a relatively narrow belt to be ground away to fit the disks together, the disks being formed on a slight bevel, so that their meeting surfaces will lie diagonally of axis of the roller, and thus when roller is in operation its action covers any marks left by the meeting surfaces of disks, which marks might otherwise appear in case disks were placed on the shaft in true transverse plane.

TERRET-RING FOR HARNESS.—M. BRESNAHAN, Colby, and L. H. GAFFNEY, Greenbay, Wis. The object of this improvement is to provide means for positively controlling a horse or a team of horses, so that the animal or animals will be prevented from pulling forward upon the driving-reins beyond a predetermined limit and also to restrain them from tossing their heads upward or sidewise in attempts to bite each other while standing or in motion.

FILE-HOLDER.—C. ARMIJO, Lascruces, New Mex. In this instance the invention has reference to file-holders, the inventor's object being the provision of a device for holding files of various kinds, and especially those designed for filing away canceled checks which are to be kept for a short time only and are to be taken out at intervals.

Machines and Mechanical Devices.

HOISTING DEVICE.—R. MCGAHEY, Walla Walla, Wash. The inventor has for his object the provision of novel details of construction for a device that adapt it for the convenient service for the elevation of material of different kinds and that render it especially well adapted for the hoisting of grain in bags and the piling of such packages of material in tiers for compact stowage in a warehouse in an expeditious and safe manner and effect the lowering and transfer of such material to a wagon or car.

WASHING-MACHINE.—D. B. D. BLAKE and W. F. BLAKE, Chicago, Ill. This invention relates to washing-machines, and more particularly to that type in which the tub is sustained for oscillatory movement upon a suitable supporting structure. The principal object is to provide a simple, inexpensive, and durable machine in which improved devices are provided for automatically returning the tub to its normal position after each movement thereof.

MACHINE FOR FORMING WIRE LOOPS.—H. P. WILSON, New York, N. Y. Mr. Wilson's invention pertains to improvements in machines for forming loops or eyes on the ends of wires—such, for instance, as wire bale-ties—an object being to provide a machine of this character by means of which the loops on wire ends may be rapidly formed and having means for automatically stopping the machine after forming the loops on a predetermined number of wires to form a bundle.

APPARATUS FOR RAISING LIQUIDS.—O. H. STAKEMANN, Christiansted, St. Croix Island, Danish West Indies. The apparatus is especially designed for use in raising water from wells or other sources where ordinary pumps cannot be worked by windmills and other power not available at the particular point at which the wells are situated. It will be especially valuable where other power is already located at some distance from the source of water, as that can be used for compressing the air employed in this apparatus.

Prime Movers and Their Accessories.

ROTARY BOILER.—H. BROWN, 4 Herne Hill Mansions, Herne Hill, London, S. E., England. Mr. Brown's intention is to provide a boiler in which thorough circulation and agitation of water in the tubes is insured and burning or overheating of the tubes is prevented. The invention consists in mounting a tubulous boiler on trunnions and then rotating said boiler about its longitudinal axis over a furnace, the feed-water and the steam generated being led, respectively, to and from the boiler through a trunnion or trunnions.

PACKING.—C. G. HOLMBERG, Woonsocket, S. D. The object of the invention is to provide a packing, more especially designed for packing the pistons of engines—preferably such, for instance, as shown and described in the Letters Patent of the United States formerly granted to Mr. Holmberg—the packing being simple, easily applied, and arranged to yield in every direction to prevent leakage of the motive agent without creating undue friction.

Railways and Their Accessories.

REGISTER-ACTUATING MECHANISM.—W. W. JOHNSON, Memphis, Tenn. In this patent the invention refers to registers, and more particularly to the actuating mechanism thereof. The principal object is to provide an improved form of actuating-mechanism for registers used upon tram-cars and other public vehicles and also suitable for use in connection with all inclosures where it is desirable to register the entries of persons therein.

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 the 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. 6689.—For manufacturers of crates and boxes the size of "Octagon Soap" box.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 6690.—For manufacturers of lead pencils with name and address stamped on it for advertising purposes.

Perforated Metals, Harrington & King Perforating Co., Chicago.

Inquiry No. 6691.—Wanted, vapor bath cabinet with complete apparatus, and having outside heater.

Adding, multiplying and dividing machine, all in one. Felt & Tarrant Mfg. Co., Chicago.

Inquiry No. 6692.—For manufacturers of improved machinery for manufacture of peat.

Commercially pure nickel tube, manufactured by The Standard Welding Co., Cleveland, O.

Inquiry No. 6693.—Wanted, catalogue and information about broom manufacture, the materials, tools and machinery used; also address of manufacturers of broom-making machinery.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co.. Box 13, Montpelier, Vt.

Inquiry No. 6694.—For names of a few large manufacturers of park benches or settees.

Wanted.—Schemes to use in connection with cash grocery business. Farmers' Supply Co., Iona, Mich.

Inquiry No. 6695.—For manufacturers of atmospheric turbines used in boring artesian wells.

Valuable Patent Rights For Sale.—A fly and mosquito gun. Rasmus Petersen, R.F.D., Asbury Park, N. J.

Inquiry No. 6696.—Wanted, address of a cotton candy machine company.

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

Inquiry No. 6697.—For manufacturers of small clutch pulley that makes one revolution then stops.

Gut strings for Lawn Tennis, Musical Instruments, and other purposes made by P. F. Turner, 46th Street and Packers Avenue, Chicago, Ill.

Inquiry No. 6698.—For manufacturers of cement plaster machinery.

In buying or selling patents money may be saved and time gained by writing Chas. A. Scott, 719 Mutua Life Building, Buffalo, New York.

Inquiry No. 6699.—For manufacturers of small rubber device for tobacco bags called "Squeeze-it."

We Manufacture on Contract anything in light Hardware. Write us for estimates. Edmonds-Metzel Mfg. Co., 143-153 South Jefferson Street, Chicago.

Inquiry No. 6700.—For manufacturers making a machine that will gum paper in rolls.

We manufacture iron and steel forgings, from twenty pounds to twenty-five tons. Crank shafts of all varieties. Erie Forge Company, Erie, Pa.

Inquiry No. 6701.—For manufacturers of a darning needle with point ⅞ inch long and no eye.

Have you found a manufacturer for your invention? Write now and send samples. New York Die and Model Works, 508 Pearl Street, New York.

Inquiry No. 6702.—For manufacturers of bicycle bells or gears and castings for same.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc. Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 6703.—For manufacturers of small hand machines for combing horses' hair to be used in matresses.

The SCIENTIFIC AMERICAN SUPPLEMENT is publishing a practical series of illustrated articles on experimental electro-chemistry by N. Monroe Hopkins.

Inquiry No. 6704.—For manufacturers of isinglass, such as is used for stoves.

General Utilities Company, 299 Broadway, New York, offers unusual facilities for placing inventions and devices of merit before the public. Correspondence invited.

Inquiry No. 6705.—For manufacturers of "Pressure Tank" water works system.

WANTED.—Colonial silverware. Anyone wishing to sell any authentic silver made in this country during the eighteenth century, please communicate with C. A. M., Box 773, New York.

Inquiry No. 6706.—Wanted, information concerning cost of equipping a plant for electric lighting and power purposes, providing current enough for town of 25,000 or 30,000 inhabitants.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 6707.—For manufacturers of machines run by electricity or otherwise, for sand-papering floors laid in place in a building.

You can rent a well equipped private laboratory by day, week or month from Electrical Testing Laboratories. 548 East 80th Street, New York. Absolute privacy. Ask for terms and facilities.

Inquiry No. 6708.—For manufacturers of accordion plaiting machines.

Space with power, heat, light and machinery, if desired, in a large New England manufacturing concern, having more room than is necessary for their business. Address Box No. 407, Providence, R. I.

Inquiry No. 6709.—For manufacturer of article called "Squeeze it," marked patented November 23, 1903.

WANTED.—Representative to sell our spinning, weaving and batting machinery, by oldest firm in France and Germany. Grand prize awarded Paris Exposition. Address Steeg, 563 William Street, Buffalo.

Inquiry No. 6710.—Wanted, formula for making railroad torpedoes for placing on rail as a danger signal for approaching trains.

A Reliable Manufacturing Institution solicits the correspondence of parties desiring to sell patents of any *useful mechanical* article which could be manufactured and sold in conjunction with the Mill Supply and Belting business. F. Raniville Co., Pearl St., Grand Rapids, Mich.

Inquiry No. 6711.—For Eastern and Western manufacturers of barber's chairs, supplies and plate glass mirrors.

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.

(9598) A. W. asks: Please give the formula for estimating cost per hour for a 16-candle-power incandescent lamp on a 110-volt, 5-ampere circuit, rate 15 cents per kilowatt per month. A. A 16-candle-power lamp may be taken to use 55 watts per hour. Multiply this number by the number of hours it is in use per month and divide by 1,000, and you will have the kilowatts used in a month.

(9599) G. G. K. asks: Would be pleased to have you answer this question: I wish to protect a house from lightning; house is roofed with shingles. It has a metal ridge board on the peak made from galvanized sheet steel strips 4 feet long and 11 inches wide, each strip extending over the last strip a few inches and all nailed to the roof. By placing points on this metallic ridge board and giving a good ground connection at two places so as to make a complete circuit over the building, would this give good protection from lightning? Please answer in Notes and Queries. A. The sheet metal ridge of your roof will be a very good starting point for a lightning rod. We should advise that you use heavy galvanized telegraph wire for the ground lines and run them down the edges of the roof so as to have all edges provided with a wire. Then make a good earth connection and you will be as well protected as possible. Points may be put on the ridge also.

(9600) T. W. A. asks: I have been making a dry battery which when it is just finished shows from 22 to 26 amperes, but after standing a while, say from 5 to 7 days, will only show 5 or 6 amperes. What is the cause of it, and how can I remedy it? The cell is of the ordinary size, 22 x 6 inches, made of a zinc can lined with paper soaked in a solution of water, sulphuric acid, and bichromate of potash, carbon in the center of can surrounded by a mixture of coke dust, bichromate of potash, sal-ammoniac, graphite, sulphuric acid, and water, all packed in tight and sealed at the top with tar. Would you kindly tell me how, if possible, it can be made so it will not lose its strength so soon? A. The cell you describe is not a dry cell at all. It polarizes and cannot be sealed up and left to itself. The bichromate of potash and the sulphuric acid should be left out, and the cell made to conform to the instructions for making dry cells. The sulphuric acid will act continuously on the zinc whether the cell is in use or not. A dry cell is one which may be left on open circuit without deterioration. Yours cannot be left in that way. We can furnish you full and accurate directions for making dry cells in the SCIENTIFIC AMERICAN SUPPLEMENT Nos. 1363 and 1387, price ten cents each.

(9601) A. S. asks: If a cubic hole were dug in the center of our earth about 8 x 8 x 8 feet, and a man could be in the hole, how would he know whether his head were up or down, or he were lying down or standing upright? A. If a man were in a hole at the center of the earth he would not know which direction was up or down; there would be no such thing as direction. This would be the case, without reference to the size of the hole, even if it were thousands of miles across. If the earth were hollow, a body anywhere in the hollow would be equally attracted in all directions and would lose the sensation of weight or gravitation. All directions would be the same to him.

(9602) M. F. F. asks: 1. How can you lacquer brass, and what is the preparation used to lacquer with? A. Lacquer is prepared from a nice grade of shellac, better from seed lac, by dissolving it in alcohol and adding some other substance to color or harden it. The article must be perfectly clean and should be warmed. The lacquer is applied with a brush. Full and detailed instructions may be found in our "Scientific American Cyclopedia of Receipts," which we send for $5. 2. A friend works in a telegraph office and he says his relays are wound in the same direction on both magnets and a telegraph sounder is wound differently. I think the relay is wound in different directions. Who is right? A. The direction of winding the magnets of a relay is of no consequence. They must, however, be connected so that the current circulates in one direction on one spool and in the other di-

rection through the other spool, so that one pole is plus at the armature and the other is minus. The same is true of a sounder. 3. I made a wireless telegraph and it works very well except when the tapper should knock the filings apart, and this it will not do. Am I using too much current, or what is the matter? A. Perhaps your coherer needs to be tapped harder to knock the filings apart. Perhaps the ends of the plugs are too near together so that the filings are held too tight. You can easily find if less current will make it work better. 4. How many gallons of water will flow out of a pipe in one day with a pressure of 108 pounds and the hole in the pipe 1-16 inch in diameter? A. The theoretical solution gives about one gallon a minute for the flow from the hole in the water pipe you describe. So much depends upon the thickness of the pipe and the condition of the edges of the hole, etc., that this may be far from the real efflux. This can only be determined with correctness by experiment.

(9603) M. W. H. asks: 1. What is the philosophy of salt causing ice to freeze and unite in summer (as in case of making ice-cream), and causing ice and snow to melt in winter? A. Salt does not cause ice to freeze in summer and melt in winter. That is very loose thinking. The ice and salt in the freezer melt at any time of the year. The cream in the inner can freezes because the heat which melts the ice in the outer box is taken from the cream in the inner can. The ice cannot get heat to melt itself from the outer air because the box in which it is is of wood, which is a non-conductor of heat. The inner can is of metal and so is a conductor of heat. The cream furnishes heat to the ice and is cooled and frozen by the process. Ice and salt will melt in the open air by taking heat from the air at any temperature above 7 deg. F. below zero, Below that temperature they will not melt. 2. Why does frost penetrate solid ground so much deeper (in the same locality) than it does loose, porous ground? A. Solid ground freezes better than porous ground because the porous earth contains air. Air is one of the very best non-conductors of heat, and keeps the heat in the earth. 3. Why does frost penetrate a wall 12 inches thick (solid) sooner than the same thickness of wall with an open space in it, say, for instance, 6-inch wall, 3-inch space, then 6-inch wall, there being no way to moderate the temperature between the two 6-inch walls—or even a 12-inch wall with a 2-inch air space in it? A. The air space in a wall acts just as the air spaces in the porous ground do in the last question. It prevents heat from passing, and thus houses are built with air spaces in the walls to keep them cool in summer and warm in winter. Double windows are used in cold regions for the same purpose. 4. Would the explosion of a compressed-air tank be as dangerous to life and limb as other explosions, say, for instance, steam (outside of being scalded) or other explosives such as powder or dynamite? If there be a difference what is the nature of it? A. Air at the same pressure as dynamite will produce as destructive effects as dynamite. It is difficult to imagine any method by which this can be brought about. 5. As everything in nature has a cause, what causes the wind to blow (hard or easy); also what causes it to change sometimes half a dozen times a day, apparently in the same temperature (hot or cold)? A. Wind is produced by the heat of the sun, and always blows from a place of higher barometric pressure to one of lower pressure. This place may be in the next field in a summer day, and it may be hundreds of miles away. The wind rarely travels in a straight line for any considerable distance, but swerves and changes its direction as you state. 6. At what height in a heated room is the most stagnant air, consequently the most unhealthy and germ-bearing atmosphere? A. No height can be given for the worst air in a room unless it be at the ceiling above. Currents quickly diffuse the bad air to all parts of a room.

(9604) D. F. F. asks: I would like to know, through your query column, how the degrees on the scale of a Baume hydrometer are determined? On an ordinarily marked hydrometer the specific gravity of the liquid under examination may be read directly from the scale; but on a Baume hydrometer the degrees do not give, directly, the specific gravity of the liquid. Now, what I wish to know is, on what are the degrees of the scale based? In other words, what is the zero point, and what other point is used, and how is it found, for determining the length of a degree? A. There are two Baume hydrometers, one for light liquids and the other for heavy liquids. Each has its own scale and the degrees are not the same in both scales. The zero point of the one for heavy liquids is near the top of the tube, and is the point to which it sinks in pure water. It is then placed in a solution of 15 parts salt and 85 parts water; the point to which it sinks is called 15 degrees, and one degree is found from this. The rest of the scale is simply a scale of equal parts in terms of this degree. The hydrometer for light liquids is placed in pure water and marked, and then in a solution of 10 parts salt and 90 parts water, and one degree is found from this. The point to which it sinks in salt and water is zero. The rest of the scale is graduated from the bottom upward, in terms of this degree. The entire scale is arbitrary and has no relation to a specific gravity scale. It is only by means of a table that one scale can be converted into the other. Nor has a Baume degree the same significance in one part of the scale of the same instrument as it has in another part, due to the variable immersion of the instrument.

NEW BOOKS, ETC.

SPECIES AND VARIETIES. Their Origin by Mutation. Lectures delivered at the University of California by Hugo de Vries, Professor of Botany in the University of Amsterdam. Edited by Daniel Trembly MacDougal, Assistant Director of the New York Botanical Garden. Chicago: The Open Court Publishing Company. London: Kegan Paul, Trench, Trübner & Co., Ltd. Pp. xxiii; 830; 8vo., cloth, gilt top. Price, postpaid, $5.

Prof. De Vries may well be regarded as the foremost advocate of experimental evolution, the man, moreover, who gave us the mutation theory of organic evolution. The volume before us is a splendid scientific plea for the experimental study of organic life. Working hand in hand with such investigators as Johanssen, Overton, Wilson, Loeb, Delage, and Davenport, all of whom have experimented with life in some form or other. Prof. De Vries has confined himself to the study of those forms of plants that suddenly make their appearance from time to time. It was his good fortune to discover a wild plant (Lamarck's evening primrose) which may still be considered in a condition of mutability. At frequent intervals it is observed to produce an entirely new and permanent species, although the stock itself is not altered by the process, nor even noticeably diminished. This is, perhaps, the most striking instance of experimental mutation to which Prof. De Vries can point, an instance, moreover, which shows that sudden sports are the prevailing rule, and probably the exclusive manner of originating new varieties. Mutation, of course, cannot be assumed to be a special feature of evening primroses. They must occur elsewhere, and these must be sought. The œnothera was one of a lot of nearly one hundred species tested as to their constancy. It proved to be the only changeable form among them. By testing one hundred species of the same forms, it seems probable that one or two instances of mutability may be detected. The chief object of Prof. De Vries's inquiry has naturally been the study of the mutable strain itself. Some of its seeds yield new species, while others are more conservative. It is probable that the degree of mutability, or in other words, the yield of mutating seeds, is more or less dependent upon external life conditions.

THE ELEMENTS OF PLANE AND SOLID ANALYTICAL GEOMETRY. By Albert L. Candy, Ph.D. Boston: D. C. Heath & Co., 1904. 12mo.; pp. 247. Price, $1.50.

The author has recognized the interdependence of algebra, geometry, analytics, and calculus in mathematics, and the present work is prepared with this idea in mind, so that the student is led step by step up to the higher branches. It is a well-known fact that calculus proves a stumbling block to many students, because they have not been thoroughly trained in analytic geometry and shown its connection therewith. To avoid this, the present work is treated in an original manner, matter not ordinarily found in text books being introduced. The problems are dealt with in a very graphical manner and very freely explained.

HOMOPHONIC VOCABULARY IN TEN LANGUAGES. By Charles B. Waite, A.M. Chicago: C. V. Waite & Co., 1904. 8vo.; pp. 162. Price, $2.

In the preparation of this work, which is the result of more than three years' labor, Mr. Waite has taken the first step toward a universal language. Starting with ten languages, namely, English, French, Spanish, Portuguese, Italian, German, Dutch, Danish Norwegian, Swedish, and Russian, the author expected to find but a few hundred words which had similar sounds and significance in each tongue. He has finally been able, however, to find more than two thousand words, nearly all of them in common use. This list, which has been carefully revised and corrected, is intended to serve as a basis for common root words, upon which to found a common language for the Indo-Germanic family. The words are arranged in alphabetical order, in ten columns, occupying two pages each. An explanatory introductory article is printed in all ten languages, as is also the title page. A special feature of the volume is a complete family tree of the Indo-Germanic family of languages. The book is interesting as showing the possibilities in the way of a universal language.

BOILER-ROOM CHART. By George L. Fowler. New York: Norman W. Henley Publishing Company, 1904. Size 14 x 28 inches. Price, 25 cents.

This chart, which is intended to show at a glance any part of a boiler-room equipment, is a large drawing in isometric perspective, illustrating water-tube boilers, ordinary grates, and mechanical stokers, feed-water heaters, and pumps. The various parts of the different mechanisms are shown broken away,