RECENTLY PATENTED INVENTIONS.

Pertaining to Apparel.

SKIRT STAY AND FASTENER.—W. H. REGNER, York, Neb. The device will prevent the skirt from sagging down behind or becoming unfastened, and allows of stooping, sitting or other bodily movements without discomfort owing to its flexibility and lightness. It can be used in connection with the lightest fabrics on account of dividing the strain on the goods. The fastener can also be adjusted to suit different sized persons, and taken apart to enable it to be conveniently sewed into the skirt or unhooked in the case of a very large person, thus permitting the skirt to be easily applied.

TAILOR'S MEASURING APPARATUS.—J. BARNETT, New York, N. Y. This apparatus is intended to be used especially in taking the measurements at the upper part of the body and particularly at the shoulders. While the invention is intended primarily to provide means for taking accurate measurements at the shoulders, it affords means for taking measurements at other points.

Electrical Devices.

INSULATOR-PIN. — L. STEINBERGER, New York, N. Y. This invention produces a supporting member of great strength with a mimimum of material. Renders the supporting stem as near immune as possible from effects of moisture. Makes the stem in parts one encircling the other and firmly anchored thereto. Covers the thread with electrose or other suitable insulating material in order to increase the insulation, and also to enable the thread to be made more exact as to form. Envelops all metallic parts completely with insulating material.

SPIRAL-CORE INSULATOR. — L. STEINBERGER, New York, N. Y. In this patent the invention relates to insulators, Mr. Steinberger's more particular object being to produce a type of insulator suitable for use in various general relations and of peculiar value for leading in cables. Among many other objects one is to provide a type of tubular insulator in which a minimum quantity of material is employed in its construction. This inventor prefers to employ the substance commercially known as "electrose" for the dielectric members.

HIGH-POTENTIAL INSULATOR.—L. STEINBERGER, New York, N. Y. This insulator possesscs numerous advantages among which is to provide a hood upon its inner face with a surface of such conformity as to facilitate the dripping of moisture therefrom very rapidly, thereby reducing surface leakage to a minimum. To provide an insulator hood on its under surface with numerous drip points, airspaces and barriers, in order to further prevent surface leakage and danger of arcing and to increase the general di-electric properties of the insulator. The insulating material employed is preferably the kind known in this art as "electrose." The inventor does not limit himself to the use in every instance of a cement for securing the separate hood to its support.

INSULATOR-PIN.—W. S. LEE, JR., Charlotte, N. C. The inventor's object is to so construct the pin that it will comprise the minimum number of parts so combined as to secure ample strength and durability, and facilitate and expedite line repairs by the ease with which injured or defective insulators may be replaced, and also to secure an economy of cost of such replacing of insulators by reducing in size or amount the part of the pin which has to be discarded.

TELEPHONE-SWITCHBOARD.—J. M. DOSBAUGH, Cedar Vale, Kan. An operator is apprised of a call by the push rod of the station making the calls, this rod springing outward, and that during the time the connection is made between two stations a busy lamp is burning. When a pawl engages a certain tooth and the magnet is energized, this tooth is released and the rod springs back, the point of the pawl engaging a second tooth. The magnet immediately is deënergized, the pawl springs up so that the point releases the second tooth, but a third is immediately engaged so that it cannot get past the pawl until the magnet is again energized.

Of Interest to Farmers.

FURROW PLOW AND ROLLER.—C. E. HOLBROOK, Carson City, Nev. This invention relates to improvements in furrowing or ditching plows and rollers, for irrigation, the object being to provide a device of this character, that will be comparatively light to draw over the ground to form the ditches and to smooth the banks, sides and bottom of the ditches.

Household Utilities.

TRANSOM-LIFTER.—L. C. SMITH, New Orleans, La. The invention pertains to transom lifters such as are used in dwellings and similar places, for controlling the positions of transoms for windows. The object of the invention is to produce a device which can be quickly operated to hold the transom in an open, closed or intermediate position.

SANITARY CUSPIDOR. — A. FISHMANN, New York, N. Y. In this case the principal objects are to provide means whereby an antiseptic liquid can be automatically forced into the interior of a cuspidor, after it has been used, to provide for conveniently cleaning it and to improve it in several other particulars. All parts are easily removable.

Of General Interest.

PAPER-HANGER'S TRIMMER. — E. E. GOBIE, Brattleboro, Vt. A cutter on a table is adapted to be reciprocated in the trimming operation, said table being inlaid at one edge adjacent to the cutter with strips of wood of different color, and provided with a scale in order that the paper may be readily gaged before it is cut. The cutting means, which is provided with a device for insuring a clean cut of the paper, may be removed from the table top and the table folded up in a small compass, making it convenient to carry about.

POST-FORMING DEVICE.—W. E. SNYDER, Lagrange, Ind. Mr. Snyder's invention has reference to improvements in devices for making cementitious fence posts, and has for its object to produce a simple, cheap and efficient device by which cement posts used for fences, mail-boxes, hitching horses, etc., may be quickly and cheaply made.

PROCESS OF MANUFACTURING YEAST. —J. BLUMER, Peekskill, N. Y. The invention pertains to methods of manufacturing yeast in general, and the main object is to supply the yeast plant in process of propagation with a cheap nutriment which is exceedingly rich in soluble nitrogenous substances, thereby enabling the manufacture of a yeast of great leavening power, and also producing a larger yield of yeast.

ATTACHMENT FOR ROLL-PAPER CUTTERS.—F. H. MAASS, Clinton, Iowa. The invention relates to an attachment for cutters such as used in connection with rolls of wrapping paper for cutting small quantities of sheets therefrom. The object is to produce an attachment which may be readily mounted on a roll paper cutter of common construction, the general purpose being to produce an arrangement which will facilitate the drawing out of the paper when a portion of the same is to be detached. While the attachment is for a knife of common form, it will be possible to construct the complete device as one structure, so that the improved device could be shipped in its finished form from the factory.

CARPENTER'S SQUARE.—J. A. MCCLOSKEY, Mount Vernon, N. Y. In this patent for an improved carpenter's square, the inventor has for his object the provision of a means adapted to enable a builder to readily determine from a given pitch the length of common and hip rafters, and the cut of the ends of said rafters.

REINFORCED CONCRETE CONSTRUCTION FOR BUILDINGS AND OTHER STRUCTURES.—G. GEORGENSON and J. E. HENNEN, Fond Du Lac, Wis. An object of the invention is to produce a structure which will sustain to a high degree all kinds of strains or stresses, particularly those incident to unequal settling or heaving, without cracking or dismemberment. It is believed that a building constructed as specified may be raised at one or both ends or sides without injurious consequences, and will retain its shape in all positions.

DUMPING-BODY.—W. R. GOIT, Oklahoma, Oklahoma Ter. The invention is an improvement in dumping bodies such as are in use on dumping wagons, dumping cars and bins. In operation the dumping of the body sections may be so regulated as to distribute the load to the center, to the outside or evenly between the two as may be desired. The invention in its broad features need not be limited to specific features for readjusting the sections to position to receive the load or to the particular means for breaking the props when it is desired to dump.

FURNACE.—A. DUCCO, 36 Via Pio Quinto, Turin, Italy. According to the invention the rotary furnace is provided with a charging device arranged on the roasting chamber itself, and which, at each revolution of the furnace, raises but just the quantity of ore corresponding to the speed of the combustion. With this charging device, air cannot enter into the furnace while charging, nor can the combustion gases developed in the furnace escape.

EMBROIDERY IN DIVERS CORDS.—FRANCIA BAUDENON, Vorey, Haute-Loire, France. This invention relates to a mode of support for the applications of embroideries in divers cords, known in France as "*plumetis-express.*" To carry out the purpose, the application is pasted onto a sheet of paper and the sheet is perforated, or partially, or wholly, cut away on a line along the inner contours of the design. Thus, the application is firmly held in shape, for it is connected by the whole of its outer contour to a sheet of paper to keep its shape; furthermore, difficulty of tearing the paper away along inner contours is done away with. Tearing of the paper away along outer contours may again be facilitated by previous perforations.

Machines and Mechanical Devices.

EARTH-SCRAPING MACHINE.—W. RANDALL and J. RANDALL, Marysville, Wash. The improvement refers to earth scraping and dredging machines in which the cutting or scraping edge is automatically removed or raised from the ground when the scraper is filled, and in which the material may be automatically ejected from the scraper when it reaches the point at which it is desired to dump the material. The scraper is provided with novel steering means.

WAVE-MOTOR.—J. W. NEAL, Kealia, Ter. of Hawaii. In this case the invention relates to improvements in wave motors, the object being to provide a wave motor of comparatively simple construction, that will respond quickly and with even motion to any degree of wave movement, and providing power for machinery on land.

MEASURING-PUMP. — T. HENTGEN, New York, N. Y. The invention relates to soda fountains and particularly to pumps for faucets designed to discharge from a receiver syrups used in soda water, and has for its objects to provide means adapted to enable a reciprocating pump to retain the liquid that has once passed therein, and to measure and discharge a pre-determined quantity of syrup from a receptacle at each stroke of the pump.

STAMP-MILL.—G. COON, Mount Vernon, Wash. It is intended that the invention should be used especially in the preparation of concentrates from gold ores, and its use contemplates the employment of the wet process. The object is to produce a mill which will consume little power but which will be efficient in operation. Further to construct parts in section, which may be readily transported through mountainous regions by pack-mules or similar means, and there assembled or erected for operation.

LOOSE-LEAF BINDER.—F. H. CRUMP, Los Angeles, Cal. The object of the inventor is to provide means for securing the two backs to be easily and quickly separated for the insertion of new leaves or removal of leaves, while the book remains open on the desk, and without the use of a key.

SEWING-MACHINE GAGE.—D. DANTZIG, New York, N. Y., and J. BONOWITZ, Philadelphia, Pa. The invention refers to sewing machine attachments, and one purpose of the invention is to provide a gage particularly adapted for accurately indicating the required space between double rows of stitching on coats, for example, insuring the rows of stitching being the same distance apart on each garment until the gage is otherwise set.

CAN-SEAMING MACHINE.—E. P. DATOW, New Orleans, La. The machine is adapted for use in connection with any type of pierced cylindrical tin-ware, as for example it is designed to seam on the ends of coffee, baking-powder, fruit, fish, meat and all other cylindrical cans, dippers, pails, pots and all manner of cylindrical pieced vessels, as well as any cylindrical utensils or package made from one or more than one piece of sheet metal.

ECCENTRIC.—R. M. CLARK, Webb City, Mo. The invention pertains to improvements in eccentrics, and more particularly to means whereby the eccentric may be placed from its bearings, or removing any pulley or wheel already secured to the shaft. The object is to provide means whereby the eccentric may be separated into a plurality of parts and these rigidly secured together after having been separately applied to the shaft.

Prime Movers and Their Accessories.

INJECTOR.—W. H. WINKS, Baltimore, Md. In the operation of supplying water to a boiler by means of an injector and in the "break" in the passage of the water from the tank to the boiler there are disadvantages, which the present inventor obviates by providing a tank connected with an overflow pipe of the injector, the tank being arranged on the foot board of the locomotive, although the tank might be arranged at any other convenient point.

AUTOMATIC STOP FOR PISTONS.—E. C. THORSCHMIDT, New York, N. Y. The invention has reference to improvements in automatic stops for pistons actuated by steam or water pressure, the invention being particularly adapted for use in connection with power hammers; the object being to provide a simple means to cushion a piston when near the end of its stroke.

INTERNAL-COMBUSTION ENGINE. — F. MOREY, Scrafford, W. Va. This invention is an internal combustion engine of the type in which the reciprocation of a piston or pistons is converted into the rotation of a shaft by means of a drum having a continuous encircling cam groove, and a roller journaled upon a pin attached to the piston and engaging the groove. A pair of co-axial two cycle cylinders act upon a piston or connected piston heads so that two impulses are imparted at each revolution.

Railways and Their Accessories.

RAILROAD-TIE.—R. L. BOWER, Blandburg, Pa. In this patent the improvement relates to metallic ties, and its object is to provide a new and improved railroad tie which is simple, durable and strong in construction, practically indestructible, and sufficiently elastic to slightly yield according to the load.

Pertaining to Vehicles.

STAND FOR MOTOR-CYCLES, ETC.—J. J. HANSEL, Muskegon, Mich. The rear axle of the cycle is backed into the opening of a casting and a lever swung rearwardly and downwardly, thereby forcing the upper end of the lifting rod upwardly against the steps of the cycle, thus raising the rear wheel of same off the floor, allowing a pawl to engage the rack. The cycle will be held off the floor, whereupon it may be tested, repaired, etc.

SLED-PROPELLER.—J. J. HANSEL, Muskegon, Mich. This invention may be characterized as an attachment to automobiles, employing front and rear sets of sled runners, with a suitable frame connecting the front and rear sled runner, through means of supporting springs, and further, as employing peculiar propeller wheels, adapted to be driven by the automobile or other engine, or by manual means obvious to the skilled in the art.

DUMPING DEVICE FOR VEHICLES.—M. I. TUTTLE, Fort Morgan, Col. One object of the invention is to provide a device which is tilted into position to allow the load upon the vehicle to slide from the same, by weight of the loaded vehicle, while the weight of the unloaded returns the tilting platform to its normal position through the change of position of the center of gravity of the vehicle when loaded and unloaded.

DRAFT ATTACHMENT FOR VEHICLES.—J. M. SUDDUTH, Manhattan, Kan. The invention pertains to a draft device especially adapted for use where a team of horses is employed, and the purpose is to provide an economic arrangement that will draw equally from each side of the center of the axle, and which will effectually prevent the tongue or pole from having a whipping action, and which will also render the draft exceedingly easy.

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.

Notes and 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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(10555) P. E. J. asks: When the elements cæsium and rubidium are placed in water they decompose it with the liberation of H, which takes fire, but does Cs give the flame a blue color, or Rb a red? In nearly all books on chemistry I find that the element erbium has never been isolated. On looking through Merck's Index, 1896, a catalogue of nearly every chemical known, I find it thus: "Erbium (E) metal, dark gray powder." Also tell me if this element is not like didymium, which has been split into different elements? A. Cæsium was named from the blue lines which its flame gives in the spectrum, of which there are two. The word cæsium means skyblue. Rubidium in a similar way gives two dark red lines. The word rubidium means dark red. Both are from the Latin.—With reference to erbium, Remsen's "College Chemistry" says: "A final statement cannot be made as yet. It is even questionable whether it is an element."

(10556) J. D. asks: Will you kindly tell me how and what preparation is used in sticking pictures on glass so that it will not blister? Most of the art stores have for sale pictures that they call "medallions," which appear to be a piece of glass pasted over the front of a picture. I have endeavored to do this, and have wet my picture and coated the glass with a thin coating of thin white glue and also paste, and also with library paste. It looks very well while it is moist, especially after I have rubbed all the air bubbles out, but after it dries it appears flaky in places, as if the picture did not stick to the glass. I have also tried putting the picture on under water, thinking by this means to keep the air from getting between the picture and the glass. A. According to the Werkstatt, clean the inner hollow side of the glass thoroughly, pour on gelatine dissolved in boiling water, lay the picture on and pour on gelatine again, so that everything swims. Then neatly remove what is superfluous, so that no blisters result, and allow to dry. The following recipe is said to be still better: Gelatine, 16 parts (weight); glycerine, 1 part (weight); water, 32 parts (weight); methylic alcohol, 12 parts (weight). The mixture is prepared by causing the gelatine to swell in water, then dissolving it with the use of moderate heat, adding the glycerine, stirring thoroughly, and pouring the whole in a thin stream into the alcohol.

(10557) The I. L. & S. Co. ask: Can you furnish us the formula for a dry powder chemical fire extinguisher, such as is used to throw on fire to extinguish? A. 1. Alum 24 per cent, ammonium sulphate 52 per cent, fer-

rous sulphate 4 per cent. 2. Common salt 60 per cent, sal-ammoniac 60 per cent, sodium bicarbonate 80 per cent. 3. Sal-ammoniac 100 per cent, sodium sulphate 60 per cent, sodium bicarbonate 40 per cent.

(10558) J. H. writes: Will you please inform me who manufactures the gas ignition pellet for sale? Also what the ingredients are, and in what proportion they are mixed, and how fastened to the mantles which render them self-igniting mantles? A. There is only one substance within our knowledge which can be heated by a stream of gas striking it, so that it will ignite the gas. That substance is spongy platinum. It is used in the Döbereiner lamp, where a stream of hydrogen impinges on a platinum sponge. Platinum in this form is capable of absorbing 800 times its volume of oxygen, which does not enter into combination with it, but is simply condensed into its pores, and is available for combination with other bodies.

(10559) M. H. N. asks: If a raceway measures 2 feet 6 inches deep and 5 feet 8 inches wide, and water flows at the rate of 60 feet per minute, what is the flow per hour, and what is the probable amount of horse-power obtainable from a head of 18 feet? A. A flow of water 2 feet 6 inches deep by 5 feet 8 inches wide at the rate of 60 feet per minute, at a head of 18 feet, is, theoretically, equal to 28.9 horse-power. About 75 or 80 per cent of this could be utilized commercially by a turbine, if the flow of water and head remain constant.

(10560) J. N. R. says: You will do me quite a favor if you will solve the following problem for me: Supposing we have a vessel with a hole in the bottom into which fits a hollow tube closed at both ends and six inches long. We will say this tube fits the hole so that no water could leak through, yet works with perfect ease. Now say we should put into this vessel four inches of water; what would the result be if the tube weighed one-fifth the weight of the water? Would the tube rise, or would it go through, or would it remain stationary? Have submitted this problem to several very "learned" men in this city, but none of them seem to "have time" to work it. They all say they *could* do it if they just had time. By solving the above for me and explaining why, you will confer a great favor. A. If the hole in the bottom of your vessel is round and smooth, and the hollow tube fits it perfectly and without friction, as you say, the tube will fall through the hole, whether there is water in the vessel or not, and it will take just the same force to hold it up when the vessel is full of water as when it is empty. The reason for this is that water exerts a buoyant effect on bodies which are immersed in it, causing an upward pressure on the bottom of them. If your tube is so protected by the hole in the bottom of the vessel that the water cannot get underneath, it can have no buoyant effect. If you fill your vessel sufficiently full of water to have the water cover the upper end of the tube, the water will exert a downward pressure on the top of the tube, which should be added to the weight of the tube, in order to get the total force with which it tends to slide through the hole.

(10561) J. W. H. says: Will you kindly tell me how to rid a house of cockroaches? A. Some years ago we had a cockroach powder analyzed and found it to consist of powdered borax 90 per cent; corn starch 10 per cent, and a little coloring matter. We think this will answer your purpose.

(10562) W. F. N. writes: I wish to elevate 125 miner's inches of water 18 feet, and have a waste flume 30 feet long, 6 feet wide, 12 inches of water deep, running 20 feet in 4 seconds. What is the best way to do this? There is no fall at end of flume, and I wish to utilize the power the water gives. Would it be best to put in an undershot wheel with lifting buckets in each side, or an undershot wheel and work a centrifugal pump or any other kind of pump that is best adapted to the work? A. The flow of waste water in your flume, at the rate of 20 feet in four seconds, corresponds to only about 3-100 of one horse-power. This would lift only about 8-10 of one cubic foot of water to a height of 18 feet per minute, if it could all be utilized. The amount of power available is so small that we do not consider it at all practicable to attempt to use it. A gas engine and a centrifugal pump would probably be your most feasible plan.

(10563) J. N. P. says: Please answer the following questions: 1. How is the horse-power of a river estimated, when the depth, breadth, and fall per mile are known? A. The horse-power of a river is estimated by first finding the number of cubic feet of water that flow per minute when the river is at its lowest. This may be obtained by multiplying by the average velocity of the water per minute. This velocity may be determined approximately by timing rods loaded at one end as they float down stream. It is next necessary to ascertain what head or fall is available for a waterwheel, in case the river is dammed or canals built. The horse-power equals the number of cubic feet per minute multiplied by 62.4, multiplied by the available fall in feet and this product divided by 33,000. 2. How is the horse-power of a pipe estimated when the size of the pipe and the quantity of water delivered per minute are known? A. The horse-power of the pipe is estimated by multiplying the number of cubic feet of water per minute in the pipe by 62.4, multiplying this by the head in feet, and dividing this product by 33,000.

(10564) A. P. says: Will you kindly inform me which is the best way to can sweet corn for further use so it will not spoil, such as the canning factories do? A. Among fruits, etc., green corn is one of the most difficult to preserve by canning. The following is the method in use by many of the large canning establishments: The corn, after removing from the cob, is filled into the clean cans so as to leave no air spaces. These are placed in a large oven or other air-tight vessel, and subjected to hot steam under pressure. The harder the corn, the longer the exposure required to cure it; it is said that in some cases as much as eight hours is requisite, but usually much less than this. A large vessel of boiling water, in which the cans are immersed, may be used instead of the steam oven, but is not so effective. On removal from the oven or water bath, as the case may be, each can (they must be filled to the cover with fruit) has the cap with a very small hole tapped in its center immediately soldered on. As soon thereafter as the can stops blowing, as the escape of steam and air through the vent is termed, the hole is quickly soldered. This must be done before the air begins to enter. Other fruit is cured and canned in like manner; tomatoes rarely require longer than fifteen to twenty minutes steam curing. Where the pits are left in fruit, a longer time is requisite to completely destroy all fermentative germs.

(10565) A. V. B. says: 1. Theoretically what are the most favorable conditions for obtaining the greatest efficiency compound steam engines? A. Theoretically, the highest efficiency with a compound steam engine can be obtained with the highest possible boiler pressure and the most perfect vacuum attainable, and the cut-off in both cylinders arranged so that the steam in each case expands down to the back pressure line. Practical considerations, however, and the influence of the condensation of the steam in the cylinders, materially alter the last half of this statement in practice, and the steam is seldom expanded more than from two to three or three and a half times its original volume in each cylinder of the compound engine. 2. For given stroke, what should be proportionate diameter of cylinders? A. There is no fixed rule governing the proportioning of the diameters of the cylinders of either simple or compound engines. Practice and the judgment of engineers differ widely on this point. You can get a good idea of the proportions that are used in common practice by going over the files of any of the leading power journals and noting the comparative sizes of the cylinders given for the different engines that are described. By making a calculation of such figures from them, you obtain the best rule for cylinder proportions which it is possible to formulate with the present state of our knowledge. 3. Is there any rule for proportioning stroke and diameters of cylinders for given rate of piston speed. A. The piston speed does not materially influence the cylinder proportions, other things being equal, and high piston speed is favorable to good economy, and the best engines have a piston speed varying according to their size and design from 600 feet per minute to 700 or 750 per minute 4. Which do you consider the best type of compound engine now operating on the different railways? A. The experience with compound locomotives has been too short for engineers to decide definitely which is the best type. With stationary engines, the cross compound Corliss engine is conceded to be the most economical. 5. What are the difficulties to be overcome in adapting the compound engine to the locomotive? These answers to be based on the performance of a two-cylinder compound or one high and one low pressure cylinder. Any information along these lines not covered by questions asked will be appreciated. Please give comparative performance of simple and compound engines, same power working under same conditions, relative to cost of performance, consumption of fuel, etc. A. The difficulties that have to be overcome with the compound locomotive are: First, the difficulty in starting on grade or under heavy load. Second, equalizing the work on the two sides of the engine under all conditions of load. Third, the balancing of the reciprocating parts. Fourth, the difficulty of simultaneously varying the cut-off in the two cylinders in such a way as to get the same effect as is obtained by shortening the cut-off in the simple cylinder. Fifth, the increased danger of breakdowns, due to the more complicated mechanism and the difficulty of getting engineers who can intelligently operate and care for the compound engine. With stationary engines a gain of nearly 40 to 50 per cent may be obtained by compounding. With locomotives the decreased fuel consumption is not quite so great, 35 per cent being perhaps an average figure.

(10566) H. E. C. writes: I am seeking information concerning wagons. I feel quite sure that some experiments have been made relative to the size of wheels, size of axle skein proper, location of load, etc., but I am unable to find such matter in published form. I need the information in preparation of an article for an agricultural paper upon farm wagons. Can you help me out in any way? A. Theoretically, the larger the wheel and the smaller the axle the less the friction. Practical considerations of strength and convenience therefore govern the determining of the sizes of wheels and axles used. As a rule, larger wheels are used on the rear axles of wagons. Therefore, a load can be drawn more easily if it is placed near or over the rear axles. The wagon also steers more readily if the load on the front axle is small. These are the only points governing the location of the load. In Vol. XIV., page 1014, of the Transactions of the American Society of Mechanical Engineers, you will find an article by Thomas H. Brigg on the haulage of horses, which may interest you.

NEW BOOKS, ETC.

THE FOOD AND DRUGS ACT. June 30, 1906. A Study with Text of the Act, Annotated, the Rules and Regulations for the Enforcement of the Act, Food Inspection Decisions, and Official Food Standards. By Arthur P. Greeley. Washington, D. C.: John Byrne & Co. 8vo.; cloth; 176 pages. Price, $1.50.

No act has had such a far-reaching effect as the "Food and Drugs Act," and of no other act has the interpretation been so often sought. This volume fills the need for a work embodying a discussion of the law and a description of its provisions. Chapter I contains a treatment of the "General Purposes and Scope of the Act"; Chapter II. "Procedure under the Act," and Chapter III. "Articles to which the Act Applies." Chapter IV. deals with "Adulteration," and Chapter V. with "Mishandling," Chapter VI. discusses "The Guaranty" in its different phases. The last chapter, Chapter VII., consists of miscellaneous notes on the enforcement of the act; stock in hand; labels and similar subjects. The Appendix gives the Standards of Purity for Food Products, as well as much valuable information. The style of the book is clear and the arrangement of the topics convenient.

THE HANDY WORLD ATLAS AND GAZETTEER. New York: Frederick Warne Co. 16mo.; cloth; 160 pages, 120 maps. Price, 45 cents postpaid.

A small and convenient atlas consisting of a collection of remarkably clear maps, and an alphabetical list of geographical names with their locations.

THE DESIGN OF WALLS, BINS, AND GRAIN ELEVATORS. By Milo S. Ketchum. New York: The Engineering News Publishing Company. 8vo.; cloth; 393 pages, 260 illustrations in the text, and two folding plates. Price, $4.

With the improved methods of handling grain and other granular materials, it has become necessary to design bins on economical lines. While the problem of bin design differs from the design of retaining walls in many ways, a thorough knowledge of the theory of the retaining wall is necessary to a correct understanding of the problem. Probably no subject with which the civil engineer has to deal has evoked so much discussion as the design of retaining walls. One class of writers has evolved elaborate mathematical theories, while another class has approached the subject from the empirical side. Many of the mathematical enthusiasts have failed to appreciate actual conditions of the wall and filling; while most of the "rule of thumb" writers show an entire lack of knowledge of the fundamental theories underlying a theoretical discussion of the subject. Mr. Ketchum has based his discussion on "Rankine's Theory" in which the filling is assumed to consist of an incompressible, homogeneous, granular mass, without cohesion, in which the particles are held together by friction. Although by no means perfect, this theory gives a working basis on which a system of design can be raised which is quite as scientific as most of those followed in engineering. The discussion is given in three parts: Part I. The Design of Retaining Walls. Part II. The Design of Coal Bins, Ore Bins, etc. Part III. The Design of Grain Bins and Elevators.

THE ENGINEERING INDEX FOR 1906. Compiled from The Engineering Index published monthly in the Engineering Magazine during 1906. New York: The Engineering Magazine, 1907. 8vo.; pp. 395. Price, $2.

The present volume follows closely upon the appearance of Volume IV., recently reviewed in these columns, and practically brings the Index down one year closer to date, as it contains entries which appeared in the monthly installment published in the Engineering Magazine down to the beginning of 1907. This "Annual" retains the classification used in the magazine for the benefit of the specialist who desires to see current literature on this subject assembled in a limited space. While the annual issue does not, of necessity, preclude the publication five years hence of any quinquennial volume on the same model as the others, it is hoped by the publishers that it may prove to be a more serviceable arrangement to the majority of readers. Further, its prompt appearance year by year, while the literature it records is still fresh and timely, may make it superior to the larger volume in serving the interests both of its readers and of the publishers of the technical journals indexed. The Index covers 250 technical and engineering journals in six different languages, about one-quarter of the periodicals indexed being in languages other than English. In every case a brief abstract is given, showing the scope and purport of the article, and in many instances this is sufficient for the purpose of the investigator without further reference.

BIRDCRAFT. A Field Book of Two Hundred Song, Game, and Water Birds. By Mabel Osgood Wright. With 80 full-page plates by Louis Agassiz Fuertes. New York: The Macmillan Company. 12mo.; cloth; 317 pages. Price, $2.

The study of birds is a charming amusement which is within the possibility of everyone, live where he may. Scarcely a spot is to be found in which there is no bird life, or which is not within easy distance of a locality in which bird life abounds. Our great cities, with their parks and museums, afford quite as great opportunities as the country for carrying on this pursuit.

"Birdcraft" contains the very information that all but the most technical students desire. It presents in very attractive form the habits of all the birds of this region, as well, of course, as their names and descriptions. The volume is attractively bound and conveniently assembled.

OUTLINES OF INDUSTRIAL CHEMISTRY. A Text-book for Students. By Frank Hall Thorp, Ph.D. Second Edition. Revised and Enlarged and Including a Chapter on Metallurgy by Charles D. Demond, S.B. New York: The Macmillan Company, 1907. 12mo.; 602 pages, 116 cuts; cloth, $3.75.

This book furnishes an elementary course in industrial chemistry which may serve as a groundwork for an extended study of the subject. It describes the more important chemical processes, but with somewhat less detail than would be fitting in a larger work. In spite of the number of excellent works on metallurgy already in existence, this subject has been given a place, owing to the needs of certain colleges and technical schools. The subject of the coal-tar colors, however, has been condensed to the briefest outline, since it is always included in courses on organic chemistry. The treatment of the various subjects is clear and concise and the ground covered very extensive. An excellent idea of how chemical industries are carried on can be gained from this book, even by the layman.

INDEX OF INVENTIONS

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AND EACH BEARING THAT DATE

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

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Aerial vessels, sustaining device for, I. Gruber 855,945
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