

wheel and a chain of gearing it is adapted to rotate a shaft on which a governor is mounted to revolve therewith, the governor having a collar slidably mounted on the shaft which operates levers which draw tape wound on a drum secured to the indicator wheel shaft.

MIXING-MACHINE.—W. McRAE, Eastman, Ga. This invention relates to mixing-machines of the rotatable box type, and the improvements are designed more particularly for a machine for the mixing of guano or commercial fertilizer. The machine comprises a rectangular box mounted for rotation about one of its diagonals as an axis, and a series of stationary paddles mounted within the box on a shaft disposed on the diagonal.

APPARATUS FOR THE CONTROL AND THE REGISTRATION OF THE OPERATIONS PERFORMED BY DISTRIBUTING-MACHINES.—G. I. F. SOULAGE, 44 Rue de Chaussy, Paris, France. The present invention has reference to a device for use in controlling and registering the operations performed by distributing-machines of all kinds and more particularly to machines for distributing railway tickets. The object of the inventor is to add up the amounts of the individual sums borne by the tickets issued.

SYNCHRONIZING APPARATUS.—P. PIERINI, 224 Via Cavour, Rome, Italy. The object of this invention is to provide an electro-mechanical apparatus for synchronizing automatically the movement of a cinematograph with that of one or more talking machines. The talking machine is actuated by a source of power quite distinct from that which causes the rotation of the cinematograph, and preferably by the power derived from a clock-spring previously wound.

GLASS-MOULDING MACHINE.—W. J. MILLER, Coffeyville, Kan. In operation when the mold reaches the charging position, a gatherer places a charge in the mold, and starts the table operating mechanism. The table is at once partially rotated to bring the charge into position for pressing, and the pressing operation is continued a predetermined time according as the pointer is adjusted with reference to the scale. When the piston reaches the lower end of the cylinder of the timing device, it shifts the valve controlling the forming plunger cylinder, and this plunger is raised.

BAND-SAW WHEEL.—C. A. PUTNAM, Tupper Lake, N. Y. Details of construction are provided whereby the width of the faces of the pair of band-saw wheels may be decreased, to compensate for decrease in width of the saw, due to successive cutting away of the saw blade in sharpening the teeth, the saw teeth being thus projected beyond the sides of the wheels, and the band of the saw adapted for close contact with the faces of the wheels, that is essential for the rotatable movement of blade without slipping while in operation.

PULP-SHAPING MACHINE.—A. KOMP, New York, N. Y. Mr. Komp finds that he is enabled by his invention to overcome some former objections by using in the place of the rubber covering of the die, a thin resilient cover, preferably of sheet metal, which is detachable with the article produced. This cover gives a smooth finish, requiring no further work for its completion. Means provide for locking one of the dies successively closer to the other die after each movement of the latter, whereby the pulp may be subjected to repeated and increasing pressures.

Prime Movers and Their Accessories.

VALVE FOR ENGINES.—O. PEARSON, Worcester, Mass. The valve stem is mounted in a valve cage having openings for admission of gas, and outside this cage is mounted the spring for normally maintaining the valve in closed position. A rock shaft is mounted on the wall of the valve cage and one arm from this shaft engages the valve stem and the other arm is operatively connected with the spring. The spring, rock shaft and other supports are entirely outside of the valve cage and out of the path of the incoming air or gas.

Railways and Their Accessories.

COMBINED SIGNAL AND AIR-BRAKE.—A. M. JONES, Hagerstown, Md. The invention pertains to means for automatically operating the brakes and for sounding an alarm. An object is to provide devices by which the brakes may be automatically set and the alarm sounded, said devices being located alongside of the track upon which the train is running.

RAILROAD SWITCH.—G. D. WORLEY, Texarkana, Ark. In this instance the object is to provide novel details of construction for a railroad-switch, which co-operate with a fixed frog point and pivoted wing rails therefor, so as to enable the effective control of the switch and dispense with guard rails usually used in connection with a switch of the type indicated.

LOCOMOTIVE ASH-PAN.—T. W. ANDERSON, Fort Smith, Kan. The main purpose of this invention is to provide means whereby the pan may be dumped and in which the warping of the pan proper does not necessarily interfere with the workings of the dumping mechanism. The pan joints are protected from heat, thus reducing the danger of fire from glowing coals, which are dropped through open joints along a track.

CAR-FENDER.—J. J. KELLY, New York, N. Y. This invention pertains to car-fenders such

as are attached at the forward end of street or trolley cars for saving persons from being run over. The cradle is normally disposed in an inoperative position under the forward end of the car, but comprising a trip frame which when touched by the body, automatically releases the cradle so that it advances so as to present its forward edge under the body. The motorman can directly release the cradle.

AUTOMATIC SWITCH FOR RAILWAYS.—F. R. Y. TORRES and F. S. DE LA P. Y. MARTINEZ, Habana, Cuba. The switch co-operates with means carried by the car, which enables the operator of the car to throw the switch to open or closed position in advance of the car. In this way the car operator can advance the car on the main track or turn it into the siding or switch without leaving his platform.

Pertaining to Recreation.

ARTIFICIAL BAIT.—M. A. BURTHE, University, Va. The object here is to provide a bait, designed to resemble a small animal, such as a frog, cricket or grasshopper, and so constructed that the resistance of the bait as it is drawn through the water, will cause a movement of portions of the mechanism, resembling the movements of the members of the animal which the bait represents.

AMUSEMENT DEVICE.—R. H. ALEXANDER, Paterson, N. J. This device is of the rotary type and adapted to give simultaneously a reversing circular travel, a counter-whirling rotary motion, and a billowy rocking motion. It is adapted to give a variety of circular billowy motions, calculated to please the occupants.

OPTICAL-ILLUSION APPARATUS.—E. P. HOYT, New York, N. Y. A mirror is employed in this device and in connection therewith, an approximately horizontal screen, so positioned relatively to the mirror that it will serve to screen one's hand while writing or drawing on a sheet of paper or pad beneath the screen, the mirror being so positioned that the reflection of the hand and the writing or drawing will be seen.

SINKER.—G. W. TEASDALE, New York, N. Y. Mr. Teasdale's patent relates to sinkers admitting of general use, and particularly to the type used in connection with a line for purposes of fishing. The sinker comprises a body near the ends of which are slots for use in holding a cord, and a spring winding mounted on the body and provided with portions extending into the slots for the purpose of gripping the cord therein.

BASE-BALL-GAME APPARATUS.—J. W. E. DEAN, New York, N. Y. In this patent the inventor has reference to certain improvements in apparatus for playing a game closely analogous to the ordinary game of base-ball, but played by operating dummy players mounted on a suitable support representing the field and diamond.

SOUNDING TOY.—W. BARTHOLOMAE, New York, N. Y. This invention relates to a device for making a noise. More particularly stated, it comprehends a sounding body, a clapper for striking the same, and a star wheel for actuating the clapper, these parts being of approved construction so as to give the complete device a maximum of efficiency.

Pertaining to Vehicles.

MOTOR CYCLE.—J. E. ALLEN, Trenton, N. J. The inventor's intention is to provide improvements in motor cycles, whereby the main frame is spring-supported at both wheels, to reduce the shock and jar, incident to riding over rough places, to a minimum, the construction of the frame permitting the use of long and strong elliptical springs and bringing the rider's seat as low down as possible.

AUTOMOBILE-AXLE.—M. D. TINDAL, Columbia, S. C. More especially the improvements relate to axles used in automobiles and similar motor vehicles, which permit the turning of the wheels on vertical axes in response to the movements of the steering mechanism. The vertical turning axis may be located in the plane of the wheel itself instead of being outside of the plane as common in ordinary construction.

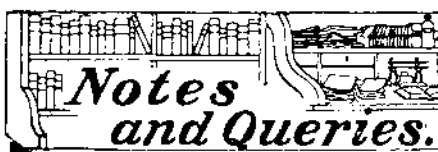
TRUCK.—C. J. INGARD, San Francisco, Cal. The object in this case is to provide a truck which may be used to store lumber on board ship and other places, the truck being so constructed that by lifting one end of the load and depressing the other end the truck with its load may be swung to the desired direction in which the load is to be moved.

WHEEL.—C. C. FOSS and C. L. WHITE, Quitman, Ga. These patentees have produced a wheel of the type in which metallic springs are arranged between the inner and outer rims. The invention resides in the special form of the springs which comprise heart-shaped bodies, the apex of which connect with one rim the other rim receiving a standard extending to the opposite end of the spring.

Designs.

DESIGN FOR A HAMMOCK.—D. W. SHOYER, New York, N. Y. The design in this case shows the hammock body ornamented by a series of grotesque images, faces, symbols, etc., which is very unique and effective.

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.



Kindly write queries on separate sheets when writing about other matters, such as patents, subscriptions, books, etc. This will facilitate answering your questions. Be sure and give full name and address on every sheet.

Full hints to correspondents were printed at the head of this column in the issue of March 13th or will be sent by mail on request.

(12152) E. A. L. says: Kindly explain why hot water freezes more quickly in winter time than cold water. The writer set out two pans of water last winter, one of boiling water and the other of hydrant water, and the boiling water froze more rapidly than the other. A. The only physical difference we know between water which has been boiled and water which has not been boiled is that the former has lost its dissolved air by boiling. For this reason it may cool and freeze more quickly.

(12153) C. K. asks: In what year does the first point of Aries (I mean by that the point where the ecliptic cuts the celestial equator in spring) enter the sign of Aquarius? A. We have no star map which definitely locates the eastern limit of the constellation Aquarius, so that its distance from the present location of the first point of Aries can be determined. This distance in degrees, divided by 50.2 sec., the constant of precession, will give you the time required before the first of Aries will enter the constellation Aquarius. The answer to your question as you ask it is that the first point of Aries will never enter the sign Aquarius. Each sign occupies two hours, or 30 deg., on the sky, and they are always in the same order, moving backward together, around the sky, carrying the pole of the heavens around the pole of the ecliptic. The astronomers at the Naval Observatory, Washington, D. C., will have the data you require.

(12154) S. F. says: Will you please let me know if a small wireless outfit will work satisfactorily from the top of an ordinary dwelling, say 60 feet from the sidewalk? About two blocks distant in one direction is a large building twelve stories high, and in the neighborhood a couple of other high buildings. A. A wireless telegraph station will work very well in the city situated as you describe. Many young men are working with their friends under these conditions. The station on the top of the Waldorf-Astoria is sending many messages a day far out to sea to friends on steamers.

(12155) J. H. T. asks: Will you please explain in your notes how mathematical instrument makers fill the graduations (on a circle for instance) with the black paint, and what is the black paint used? A. A very good paint for filling the graduations of a rule or a thermometer is made by rubbing lampblack into shellac till the proper consistency is obtained. It should be thicker than for use with a brush. It is then rubbed on and in with a cloth. After the shellac has set, the excess can be taken off with a cloth wet with turpentine.

(12156) G. E. H. says: The commercial dry cell which contains the two elements, a zinc rod and a carbon stick, consists of such ingredients as powdered manganese dioxide and gas carbon and ammonia chloride. Now, what I am anxious to know is this: What chemical reactions are involved when a dry cell is in operation? What ultimate chemical changes have taken place in each ingredient when the cell is exhausted? That is to say, what new compounds have been formed in the cell? A. The chemical reactions in a dry cell are the same as in any cell in which the same materials are used. The manganese dioxide is changed to manganic oxide by giving off oxygen to unite with hydrogen to form water. The ammonium chloride is decomposed, and the resulting products are quite complicated. The ammonia is absorbed by the water till it is saturated, zinc chloride is formed. Double salts of zinc and ammonium crystallize upon the zinc. An excellent chapter on dry cells is contained in Cooper's "Primary Batteries," which we can supply for \$4 postpaid.

(12157) R. P. D. says: Kindly give a process for preserving fruit for exhibition purposes. One that will not bleach, shrivel, or change the appearance is highly desired. I have tried an aqueous solution of salicylic acid and sterilized by heat, but the color was almost removed and the skins cracked. Some real estate agents want to show what can be raised in the way of fruits on irrigated lands. Would not petroleum benzine do the work? A. Try the following; fruit or vegetables are just dropped into it (cold of course) and sealed to bear transportation: Sulphurous (not sulphuric) acid, 1 part; alcohol, 1 part; water, 4 parts.

(12158) L. C. J. says: 1. Can an angle be trisected? If so, what is the rule? A. Some angles can be trisected, 90 deg. for example. All angles cannot be, and there is no rule for doing it. 2. If a horse is hitched close to the load, is it easier for him to pull than if he is hitched farther from it? If so, what is the cause? A. It is a common belief

that a horse can draw a load more easily when the trace is short. The only reason we can see for it is that the horse tends to lift the front of the load slightly when hitched near the cart, and thus makes it easier to overcome the inequalities of the road. These questions have been frequently answered in our Notes and Queries.

NEW BOOKS, ETC.

THE CONQUEST OF THE AIR. By Alphonse Berget. New York: G. P. Putnam's Sons, 1909. 8vo.; 295 pp.; 100 illustrations. Price, \$3.50.

This book is a popular work, which will serve to introduce the layman to the subject of aeronautics. It is divided into two parts, the first of which deals with dirigible balloons, and the second with aeroplanes and other forms of heavier-than-air flying machines. The book is interestingly written, and while it does not go into great detail, it gives the essential facts regarding airships and aeroplanes of the past and present. The first section of the book goes very thoroughly into the subject of the dirigible balloon and its history. Numerous fine half-tone cuts illustrate the work, and there are also nearly a score of diagrams for elucidating various principles.

AERIAL NAVIGATION OF TO-DAY. By Charles C. Turner. Philadelphia: J. B. Lippincott Company, 1910. 12mo.; 327 pp.; 70 illustrations and diagrams. Price, \$1.50.

This is another popular book upon aeronautics. Besides mentioning and describing various of the leading dirigibles and aeroplanes, the author goes into the history of ballooning and of aviation. The principles of mechanical flight and of aerostatics are discussed, and the usefulness of flying machines and dirigibles for war and commerce is thoroughly gone over. The author recognizes that a new industry has been born and discusses its effect upon society. There are chapters upon aerial law, charts and landmarks, long-distance flying, and lessons in flight. The sensations experienced during flight and the limitations that surround it, are also mentioned. The book contains an appendix of various useful tables giving the specific gravity of woods and of gases, and the weights and properties of some of these woods; the weights of various birds in proportion to their wing area; thermometer conversion tables, and Chanute's table of lift and drift. There is also a glossary of aeronautical words and a table of French aeronautical terms and their meanings. The book will be read with interest by the beginner in the new science of aviation.

MASTER PAINTERS OF BRITAIN. By Gleeson White. New York: John Lane Company, 1909. 4to.; 390 pp. Price, \$3, postage 35 cents.

The sumptuous volume before us is filled with excellent reproductions in half-tone of the best examples of the master painters of Britain. The selection is a most admirable one. British art has been both very bad and very good, and it is very easy to perpetuate the indifferent pieces. Among the notable engravings which are scattered through the book we note the following, which are particularly interesting: "The Death of the Earl of Chatham," by John S. Copley; "The Death of Nelson," by Benjamin West; "Stirling Castle," by Nasmyth; "The Inside of a Stable," by George Morland; "The Windmill," by John Crome; "The Hay Wain," by John Constable. Then follow reproductions of some of the works of Watts, Sir Noel Paton, Dante Gabriel Rossetti, and Sir John Millais. One of the works of the latter, entitled "Chill October," shows his first great landscape, which was received in 1871 with an outburst of popular appreciation and amazement that a figure painter should attempt pure landscape, for in those days the idea was very strong that a man should be a specialist, and not try to express himself in different branches of art. To give even the names of the other interesting pictures would be simply to give an index of the illustrations of the book. There is hardly a bad selection in the whole work. The engravings are admirably reproduced and the text is adequate.

TABLES OF THE PROPERTIES OF STEAM AND OTHER VAPORS, AND TEMPERATURE-ENTROPY TABLE. By Cecil H. Peabody. New York: John Wiley & Sons, 1909. 8vo.; 133 pp. Price, \$1 net.

These tables for the use of students of engineering and for engineers in general were published twenty-one years ago; and now that the properties of steam have been redetermined by new and refined methods, they have been entirely recomputed, and there has been added a temperature-entropy table especially adapted to steam-turbine calculations. The certainty and precision of the new determination of the properties of both saturated and superheated steam, and the concordance of computations with the experimental data, are such that the tables may be used with confidence, and may be expected to have permanence.

OUTLINES OF CHEMISTRY WITH PRACTICAL WORK. By Henry John Horstman Fenton. First Part. Cambridge, England: University Press. New York: G. P. Putnam Sons. 8vo.; 367 pp. Price, \$3.

Anything which emanates from the University Press is sure to be of the highest possible scientific value. The book before us is

intended for students who have considerable knowledge of chemistry already.

MODERN HOMES. Selected Examples of Dwelling Houses. Described and illustrated by T. Raffles Davison.

No one has seen more modern homes than Mr. Davison, and no one certainly knows better than he how to choose and present them to us.

NOTES ON PRACTICAL MECHANICAL DRAWING. Written for the Use of Students.

This book is a collection of notes intended to furnish the basis for a course in elementary mechanical drawing, so arranged, it is thought, that the teacher may have the widest latitude in his choice of sequence of subjects.

THE ROMANCE OF MODERN CHEMISTRY. By James C. Phillips, D.Sc., Ph.D.

This book contains a description in non-technical language of the diverse and wonderful ways in which chemical forces are at work, and of their manifold applications in modern life.

TABLES AND DIAGRAMS OF THE THERMAL PROPERTIES OF SATURATED AND SUPERHEATED STEAM.

The tables of the properties of saturated steam which have appeared up to the present time have all been based upon the classic investigations of Regnault, carried out more than sixty years ago.

been made of the relative values to be given to each in the region under consideration.

THE METALLURGY OF THE COMMON METALS. Gold, Silver, Iron, Copper, Lead, and Zinc.

This is a second revised and enlarged edition which is embellished by 195 illustrations.

ONE THOUSAND FORMULAS. By L. W. Marshall. Boston: The Spatula Publishing Company, 99 pp.

This compilation gives the practical working druggist full information about the making of the most common and salable preparations.

THE GARDEN CALENDAR FOR 1910. By Ellen P. Williams. Philadelphia: Franklin Printing Company, 1909. Price, \$1.

This is a wall calendar of 365 sheets, each one of which is embellished by an appropriate quotation or some practical hint for the garden.

RULES FOR RECOVERING COAL MINES AFTER EXPLOSIONS AND FIRES. By W. E. Garforth, Mem. Inst. C.E., F.G.S.

The subject is a most important one, and has attracted great attention in this country as well as in England.

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INDEX OF INVENTIONS
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