RECENTLY PATENTED INVENTIONS.

Engineering.

TRAM ENGINE. — Walter De Sanno, Corry, Pa. In this engine a countershaft aligns horizontally with the axles, there being a sprocket wheel connection between the shaft and the axles, while two crank shafts are journaled above the countershaft and connected with it by gear mechanism, the crank shafts being operated by a suitable engine. The construction is such as to avoid all strain on the driving chains when the wheels drop into low places on the track, and the equalizing bars which support the engine are so arranged that the weight of the engine will be equally distributed on the driving wheels regardless of the condition of the track.

GAS ENGINE.—Isaac F. Allman, New York City. This engine has a vertical water-jacketed cylinder, open at its upper end and closed at its lower end by a head which extends partly into the cylinder. In the inner end of this head is a semi-spherical recess, while the piston reciprocating in the cylinder has a corresponding semi-spherical recess, so that when the piston is in its lowermost position the two recesses form a hollow sphere. The piston is pivotally connected with a pitman, connected with the crank arm on the main driving shaft, and the valve chamber and relief valve are arranged on the outside of the cylinder, where they can be readily taken off and replaced without disturbing the cylinder and its piston.

FEED WATER HEATER AND PURIFIER. —Hamilton A. Anderson and Charles C. McClaughry, Joliet, Ill. A lateral steam pipe is attached to a vertical heating chamber, above which is a condensing chamber connected with a water supply pipe, and a device conveys water from the condenser in graduated quantity to the water-heating chamber, while a series of oppositely inclined plates is arranged in series vertically on which the inducted water may flow and be heated by enveloping steam. It is designed that the calcareous matter and earthy impurities will thus be liberated from the hot water and deposited in grains or scales upon the plates, to be washed off by the flow of water into the lower part of the chamber, from which the eliminated impurities are discharged, the water passed to the boiler being heated nearly to the boiling point.

VALVE OPERATING GEAR. — Carl Gramm, Berlin, Germany. This invention relates to gas, petroleum, or other similar engines, providing therefor two adjacent closing devices, such as distributing or slide valves, which may be alternately operated, so that when one of the devices is opened the other will be closed, and *vice versa*. The valve-operating gear consists of a horizontally reciprocable block on which is a gravitating vertically rocking bell crank lever, there being a yielding trip or catch for the lever and a connection between the reciprocable block and the way shaft of the engine.

Railway Appliances.

ADJUSTABLE CAR STRAP.—Benjamin P. Johnson, New York City. This strap has its upper end secured to the longitudinal rod below the car roof and its opposite end formed into a loop, with a hook and eye for securing the loop to the body of the strap, the loop being adapted to engage a keeper, by which the strap may be looped up to suit the height of a tall person, the strap being readily adjustable to suit people of various heights.

TROLLEY FOR ELECTRIC RAILWAY.— John Sullivan, Washington, D. C. This invention provides a grooved trolley wheel for an overhead electrical conductor, the wheel having a thin-edged central circular contact portion and two laterally adjacent circular toothed portions separated from the contact portion by a narrow space. The wheel is designed to break up and dislodge a covering of ice or snow with which the conducting wire may become coated, and secure at all times a perfect mechanical and electrical contact, so that the current will be uninterruptedly transmitted to the motor.

Mechanical Appliances.

TENSION REGULATOR FOR BOBBINS. —Edwin E. Biederman, Brooklyn, N. Y. This device comprises supports for the bobbin, and a rod pivoted in the rear with a handle and projecting frame carrying a weight resting on the bobbin, with a spring-pressed revoluble eccentric having a chain connecting it with the handle. The object of the device is to regulate the tension in such a manner that it will be practically the same whether the ball of twine is wound from a full bobbin or from one which has but little twine on it.

PULLEY. — John T. Carmody, Cedar Rapids, Iowa. This invention provides a pulley designed to be strong and durable, and equally balanced, while it may be constructed as a solid pulley or as a split pulley. The spokes are clamped at their inner ends on the hub and connected at their outer ends to a spider ring supporting the pulley rim, the hub being made in two ring sections, one having the bore and an exterior annular flange, opposite which is a ring adapted to be fastened by bolts or other means to the flange.

CAN SOLDERING MACHINE. — Robert Loggie and Joseph Mazroll, Black Brook, Canada. This machine has a disk mounted to turn and rotate the can, in connection with a spider turning loosely and supporting the lower end of the can, a soldering iron held in contact with molten solder engaging the seam of the can, with means for imparting a sliding movement to the disk and at the same time swinging the spider. The machine is simple and durable in construction and designed to do its work quickly and well.

DITCHING MACHINE.—William T. McNeely, Reno, Ill. This is a machine especially designed for use in railroading, for ditching cuts, widening fills, or ditching the track outside of cuts, and is also adapted for carrying filling to places where sags are to be corrected. It has a vehicle body divided into compartments, over which is a laterally movable platform connected to actuating mechanism carried by the vehicle, while horizontally aligning turrets are carried by the platform, turn tables revolving in opposite directions in the turrets, derricks being secured to the turn tables, while a bucket-elevating mechanism is carried by the turn tables and connected with derricks.

PULP DIGESTER LINING.—William O. Comstock, New York City. Combined with a cylindrical shell and circular ledges riveted or bolted thereon are non-corrosive lining rings of metal or alloy softer than the shell and ledges, each ring supported on a ledge, while a joint covering ring is secured at its edges over the ledges and upon the edge portions of adjacent lining rings. The invention is designed to provide an acid proof sectional lining, by the use of a peculiar combination of metals, and supported within the shell in a novel manner, whereby increased efficiency is secured at a moderate cost.

PAPER COATING MACHINE.—John J. Newman, Elkhart, Ind. Combined with the calender rolls and reel are coating devices arranged between the rolls and reel, in connection with vertically adjustable guides or lifting devices arranged to straighten the paper on the coating devices. The machine is inexpensive, and designed to facilitate the waterproofing, waxing or coating of paper, reducing to a minimum the danger of breaking the paper treated.

Agricultural.

HARVESTER. — J. C. and George A. Cunningham, St. Mary's, Kansas. This is an improvement on a low binding machine for which several former patents have been issued to the same inventors, the main object of the present invention being to provide for the lifting and tilting of the frame. According to the improved construction, a lever may be operated to raise or lower the frame for cutting the grain at such a distance above the ground as may be required, while, when the machine is to be moved from place to place, the frame may be raised some distance above the ground by means of another lever.

STRAW STACKER.—John Oneill, Plainview, Ill. This is an implement adapted for attachment to and to be carried by thrashing machines or separators. A frame is pivoted to swing horizontally, and a vertically swinging conveyer is pivoted in the frame, in connection with a line shaft and means for operating conveyer belts. The implement is designed to be handled generally with less labor than stackers of the ordinary construction, and may be manipulated to build a stack at one side of a fence while the implement is on the other side.

MILK STRAINER. — Iris Heimbaugh, Montrose, Iowa. This device has a funnel piece flattened on one side and with its edge recurved to afford a fit on the side of a cylindrical pail, springs being adapted to engage the ears of the pail and hold the strainer on it, while there is a screen in the funnel piece and a throat ring on it holding a strainer cloth engaged by a sliding band. The device is simple and inexpensive, and adapted to be quickly and removably attached to a milk pail, to receive and thoroughly strain the contents.

Miscellaneous.

ORDNANCE SHIELD. — Patrick McMahon, Manchester, Mich. This is a structure mounted on a wheeled frame and designed to be moved in any direction upon the field of battle, to serve as a protection to the rank and file against the attack of infantry and cavalry. A series of arms extend forwardly and vertically from the axle, and these arms support two angularly arranged deflecting plates, the lower plate terminating within a few inches of the ground, while the upper plate is of convenient height to permit soldiers in its rear to fire over it. The tongue to which the team is attached for moving the shield extends rearwardly, and rear legs rest on the ground to hold the shield in proper position. Bullets striking the face of this shield will be deflected upwardly over the heads of the soldiers behind it, or will be deflected down to the ground. The shield is also provided with spear tops as a protection from advancing cavalry.

ICE MACHINE. — Thomas J. Lemon, New York City. In a tank having a removable cover are mounted suitable moulds inclosed by a skeleton cylinder having spiral walls, there being a gear mechanism connected with a crank handle for operating the cylinder. The moulds are filled with water to be frozen, and the tank is filled with chemicals forming a freezing mixture, when, by turning the crank handle, the cylinder is revolved, agitating the chemicals and causing them to act rapidly upon the water in the moulds. The machine is adapted for making ice on a small scale for family use.

DERRICK.—Foster Milliken, New York City. This invention provides an improvement in derricks designed to hoist heavy weights, and provides means whereby the mast and boom may be of tubular shape, while its construction is such that articles may be lifted and carried from place to place within the compass of the boom, in a simple, effective and expeditious manner. After the load has been removed the hoist rope may be readily drawn to receive another load, and the ropes are protected from undue frictional contact with the guides or supports.

CURTAIN FIXTURE. — John J. Newbaker, Steelton, Pa. This invention provides, as an improved article of manufacture, a bracket-supporting bar having parallel slots formed inward from and opening out of its ends, the parallelism of the slot serving to prevent the brackets from turning, and the bar being adapted to be cut off to fit the window. The bar is also preferably provided with end clasps or plates, to embrace and slide along portions of the bar, to which they are readily adjustable.

SUSPENDERS.—Henry N. Elliott and Edwin L. Bemis, Los Angeles, Cal. A hook plate with with a hook on its upper end has also a U-shaped plate formed on its lower end, between the arms of which pass the waistband, a rivet made in two parts passing through the plates to fasten the waistband in place on the plate, while a strip forms at one end a tongue for the hook, its lower end being formed into a hook to support the drawers.

BARREL TRUNDLER.—Ira Lutes, Cairo, Ill. Pivoted to a saddle board on the upper ends of standards carried by a truck is a pair of curved crossed limbs, the outer ends of each of which carry on a stud a loosely held disk, on the inner face of which balls are held in grooves, in such manner that the barrel may be clamped thereby. The barrel may be elevated from the ground by depressing the handle ends of the limbs, and then moved in this way, or it may be rolled upon its chine, the anti-friction disks allowing this to be done with but little friction, while affording perfect control of the moving barrel.

BARREL RACK. — John B. Duncan, Fayette, Mo. This invention combines a roller truck and barrel rack with an attached adjustable barrel-tilting device. It is designed more especially to facilitate the moving, handling and placing in position of heavy barrels, such as barrels of sirup, oils, etc., that have to be left on tap. The whole rack or stand may be cheaply made, mainly of wood, and is designed to enable one man to readily handle a heavy barrel.

TRAMWAY.—John F. Vinton, Spokane Falls, Washington. This invention provides a simple and inexpensive construction by means of which ores or other material may be conveyed by gravity. It is specially designed for carrying sacked ores, etc., from mines located high in the mountains, from which inclines may be obtainable by outlets in the valleys, to streams, railroads, or refining mills.

BICYCLE SUPPORT. — Frederick G. Taylor, Cranston, R. I. This is a brace or supporting rod, of simple construction, to be attached to a bicycle on either side or wheel, to prevent the bicycle from falling over when not in use or when the rider desires to rest. The brace is provided with a sleeve fastened to the bicycle frame, preferably in a vertical position, a rod sliding in the sleeve and having a handle in convenient reach of the operator, who, by turning the handle, with or without dismounting, causes the brace to be moved down to proper supporting position.

GAME COUNTER. — Gustave Deimel, Hancock, Mich. This is a base ball game register and indicator, in which dial wheels are revolubly supported to be manually rotated in a case. The wheels each have two circular rows of figures, each row in groups, one row on each wheel showing a numeral at a sight hole in the case, indicating the number of strikes made by a player, and the other row indicating the number of players put out. It is a simple and compact device whereby the score can be readily kept and conspicuously exhibited as the game progresses.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
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.

(3069) Miss M. S. asks: Is there any way for women to learn mechanism? I want to invent. Have had some good ideas, but do not know how to work them out. A. One good method of acquiring a practical knowledge of mechanism would be to visit places where machinery is used, watch its operation, and then make drawings thereof. You might begin with a single cylinder steam printing press. Examine it carefully when in motion, fix the form and movements of the various parts in your mind, and at your leisure make drawings. After that try other machines in the same manner. Perseverance in this practice will let you into the secrets of mechanism, and facilitate you in working out even difficult mechanical problems.

(3070) S. S. R. asks why it is that in the so-called anti-rust tinware rust is prevented on the inside by attaching a strip of zinc to the tin. It can hardly be a galvanic action, as it has no effect on the outside when the zinc is placed inside. A. It changes the galvanic action from the iron to the zinc. The zinc is gradually eaten away. If zinc was on the outside and the article placed in water, the effect would be the same.

(3071) H. H. D.—The cheapest railway we think of is that described in SCIENTIFIC AMERICAN for December 20, 1890. The rails are of wood. Cost for 1¼ miles of track, including engine, $700. The track cost $300, and the engine $400.

(3072) C. B. D. N.—If the nails are stained apply a little lemon juice. A little pumice stone in a very fine powder or a little putty powder may be used to polish the nails. This is frequently colored with a decoction of cochineal. Apply with a piece of chamois skin.

(3073) F. M. O.—Portland cement one part, clean white sand two parts, will make a light colored mortar, for a sidewalk or other purpose.

(3074) T. H. H. asks: How can silver be extracted from an alloy of tin, silver, and a trace of copper, amalgamated with mercury? The article is waste dental amalgam, which I wish to get the silver from. A. Fuse the amalgam in a crucible with enough carbonate and nitrate of soda to keep it well covered.

(3075) G. S. M.—It would be impossible to identify with certainty the finely comminuted herbs which you send. However, after a close examination with a lens, we venture to say that the greater part of the mixture is composed of senna leaves. We also detecta little dog grass and a few seeds of an umbelliferous plant, perhaps angelica.

(3076) H. B. P. writes: Will you kindly inform me what number German silver wire to use for resistance box on 110 volt current? I want from 20 to 30 ohms resistance without heating the wire beyond ordi-

nary limit. A. You should speak of a "110 volt circuit;" there is no such thing as a "110 volt current." The resistance must exceed the quotient obtained by dividing the resistance of a single lamp by the number of lamps on the leads in question. Otherwise the safety fuses will melt or the house wire become too hot. A 20 ohm resistance will pass 5·5 amperes, and hence should be placed upon at least a ten-lamp lead, or the safety fuses may melt. A German silver wire No. 7 will be of sufficient size for this current, and 3,000 feet will give the desired resistance. The "Arithmetic of Electricity" is now ready for delivery by us, $1 by mail.

(3077) A. R. L. asks whether chloride of silver can be changed to nitrate or metallic silver, and how to do it? A. Yes. Place it in dilute sulphuric acid with some metallic zinc. This will reduce it to metallic silver if enough zinc is added. This may then be washed and dissolved in nitric acid, evaporated to dryness and fused at very low heat to give pure nitrate of silver. The fusion may be dispensed with.

NEW BOOKS AND PUBLICATIONS.

THE ARITHMETIC OF ELECTRICITY. By T. O'Conor Sloane, Ph.D. Pp. 138. 12mo. Norman W. Henley & Co., New York. Price $1.

This little book is a manual of electrical calculations by arithmetical methods, and contains, first of all, an introductory chapter explaining some of the principles of electricity, giving the relations of absolute and practical units, and examples of the principal ones taken from actual objects. The second chapter treats of Ohm's law in a concise manner, giving six different versions of this fundamental theorem. There are chapters on resistance and conductance, with many rules and problems; on potential difference, containing much good information on leads and wiring for arc and incandescent systems; on the measurement of conductors by circular mills and on manyother topics; a chapteron thearrangement of battery cells, and general calculations for battery current, treats this subject in full detail. The electro-magnet, dynamos, and motors come in for their share of attention. All the calculations in the book are done arithmetically, algebra being left out entirely. The problems are stated in a series of rules accompanied by examples fully worked out. Each rule is generally followed with a formula embodying its statement, The simple system of calculating dynamos and motors deserves especial notice. The tables of equivalents, wire gauges, and other factors contained by the book are newly calculated and will be found very convenient. This little volume shows a great deal of careful work, and will prove of great value to both the professional and amateur electrician.

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