RECENTLY PATENTED INVENTIONS.

Railway Appliances.

METALLIC TIE.—Albert G. Budington, Austin, Texas. This is an inexpensive tie designed to be easily secured in a roadbed, and to which the rails may be readily and solidly fastened, it being also adapted for use in connection with wooden sleepers, being easily placed in position between such sleepers without tearing up the rails. It has movable chairs, with dovetailed recesses in their upper surfaces, with detachable tie bars to be secured to the rails and having recesses registering with the chair recesses, binding keys entering both recesses and clamping the flanges of the rails, with means for fastening the keys in place.

TRACK RAIL ALIGNING DEVICE.—Wallace E. Loughrey and Alonzo H. McGrew, Centreville, South Dakota. This invention consists of a frame in which a lever is mounted to turn and be adjustable, a plate connected with the lever being adapted to engage the rail, the frame in operation being placed transversely of the track near that part of the rail to be drawn into alignment. The device is strong and simple in construction, and adapted to do its work quickly and efficiently.

Mechanical.

ROCK DRILL.—Perley P. Belt, Waco, Texas. This invention provides a simple and efficient rock drill, in which the forward feeding and rotating of the drill are accomplished automatically. A tappet plate is placed loosely on the drill rod, a clutch mechanism connected with the plate engaging the rod, which is impelled by a spring, while a cam with conical ends lifts the tappet plate. The drill rod and drill bit are made tubular to render them self-clearing, air or water being forced through them to eject chips and dust.

SHOEMAKER'S LAST.—John B. Cass, Brooklyn, N. Y. The last stock has on it an instep block, a cap plate being held on the comb of the stock by wings on a socket tube, and pins passing through the stock and wings, while a latch dog pivoted between depending ears and in a slot in the cap plate is adapted to enter a recess in the top of the block, a plate spring secured by one end in a groove of the last stock pressing the heel of the latch dog. The construction forms a novel means of detachably connecting the instep block to the last stock, giving increased durability to the last and rendering it more convenient in use.

Agricultural.

WEED CUTTER.—Grosvenor S. Andrus, Walla Walla, Washington. This is a simple and convenient implement which can be readily managed by one man, one or more blades being carried by the axle. The cutter travels beneath the surface of the ground and cuts the roots of the weeds, the roots being cut without turning over the ground and placing it in condition for other weeds to grow. Means are provided whereby the cutter may be made to travel at greater or less depth beneath the surface, as desired.

FENCE FOR HAY STACKS.—Sven O. Thompson, McPherson, Kansas. This is a collapsible inclosing fence, adjustable in its parts while in complete form, so that its sides may be contracted and expanded to encompass a large or small stack of hay and allow the live stock to feed from it as the hay is consumed and the size of the stack diminished. The structure, when in position encompassing a stack of hay, is simply seated upon the ground whereon it is erected, and permits the free feeding of cattle, horses and sheep from the stack, while preventing waste.

Miscellaneous.

NOZZLE HOLDER.—Arthur Cuthbert, London, England. This is a device to automatically direct a jet of water so that every part of the area within range of the jet will receive an equal amount of water. The holder comprises a frame in an opening in which is a hose coupling, a horizontal revoluble wheel being mounted on the frame and a nozzle-holding deflector pivoted to the wheel, with means for swinging the deflector on its pivot as the wheel is revolved. The construction is such that the parts can be cast so as to require little machinery and fitting, though in this case gun metal would be preferable to iron in making the device, to prevent rusting, or iron may be used and galvanized.

CARTRIDGE RELOADER.—Fremont B. Chesbrough, Emerson, Mich. This is a simple instrument, to be operated by a screw in the same manner as a vise, and by which a shell may be easily loaded and the shell and bullet properly shaped. In one of two oppositely arranged jaws is held a tapering tube, shaped to fit a cartridge, a screw extending transversely through the jaws, and one of the jaws carrying a pivoted nut to receive the screw, a hook pivoted on one of the jaws being adapted to engage the flange of the cartridge.

GAS GENERATOR.—John J. Kirkham, Terre Haute, Ind. This is a generator for the manufacture of fuel and illuminating gas, and for enriching air and natural gas, in which generator oil is exclusively used for heating the generator and supplying the carbonaceous ingredients of the gas. It consists of a series of vertical chambers each containing a body of checker work and each having independent oil injectors and separate air inlets, a central retort or outlet flue opening at its lower end into the lowest chamber and passing out through the top of the generator, while a connected conduit pipe has one branch leading to a hydraulic seal and another branch provided with a valve and a suction apparatus.

CALCULATOR.—Charles H. Clarridge, Libertyville, Iowa. The operative parts of this calculator are preferably made of sheet metal, for economy of construction, the object of the invention being to provide a simple and low cost machine which may be quickly and accurately operated to perform addition, subtraction, multiplication, and division. The machine has numbered keys adapted to operate numbered wheels geared together to turn in opposite directions, automatically carrying the tens, and the construction embraces various novel features whereby the machine may be cheaply built and rapidly operated.

VENDING MACHINE.—Gustavus A. Weller, La Salle, Ill. A wheel in this machine engages the article to be sold, and a sliding spring-pressed bar carries a pawl engaging a ratchet wheel on the former wheel, while a coin-holding lever fulcrumed on the bar has at its front end a spoon to receive the coin, a locking arm pivotally connected with the rear end of the lever engaging the bar to lock it in place. But few parts comprise the apparatus; so it is not liable to easily get out of order, while it is very accurate and automatic in operation, and is more especially designed for selling envelopes, postage stamps, and similar articles.

CHANGE RECEIVER.—Celestin Bergeron, New York City. This is a device for use in ticket offices, cashiers' desks, etc., to enable a person to conveniently and rapidly gather the change. The change table has in its top an opening in which fits a pivoted chute, a spring holding the chute flush with the table, but permitting it to be depressed by a finger piece. The change to be paid out is placed on the pivoted end of the chute, where the receiver can see and count it, when, by pressing on the finger piece, the front end of the chute opens into the palm of the hand.

PRESERVING THE COLOR OF BRICKS.—Jacob D. Graybill, Shreveport, La. A compound for preventing the discoloration of pressed or other finishing bricks, when laid in the walls of buildings, is provided by this invention. The preparation fills the pores of the bricks with an oily mucilaginous substance which, when dry, is hard and waterproof, preserving the brilliunt red color of pressed bricks as when first laid up, there being in the compound a small quantity of Venetian red.

SCAFFOLD BRACKET.—Charles Ragsdale, Purdy, Mo. This is designed to be a cheap and safe bracket for use by builders to support a staging, and one which may be quickly and readily applied to a building and supported from the studding without any outside bracing, while it may be folded compactly when not in use. The bracket is of an essentially triangular form, having horizontal bearer bars, an upright which in use rests against the side of the building, and a brace connecting the outer ends of the bearer bars with notches low down in the upright.

FIELD RANGE.—John Marcee, of the U. S. Army. This is an apparatus especially adapted for the use of troops in the field or for parties camping out, being readily set up and arranged for cooking, while it may be packed in compact form when not in use. The oven comprises a series of pan-like sections sliding one within the other, an extension cover being also formed of sliding sections, while a series of pans is nested within the oven for the cooking of several kinds of food at the same time.

BRIDLE BIT.—Oliver M. Sloat, Brooklyn, N. Y. This is an improvement on a former patented invention of the same inventor, providing an adjustable bit which may be used as an ordinary bit, but which, when the horse begins to pull, will serve as a curb bit, the force of the leverage being increased with the pulling strain applied to the bit. According to the improvement, the check pieces are so constructed that they will project only beneath the mouth bar, while the spring of the rein eyes is so concealed that it will be almost always out of sight, and cannot hurt the horse's mouth.

FEED BAG ATTACHMENT. — Fred S. Kerr, New York City. This is a rope or strap device, provided with a take-up, capable of attachment to any feed bag and any convenient portion of a harness, by the aid of which a horse may feed in a manner similar to feeding in a stall, as the feed will be at all times in reach of its mouth. In feeding, also, the head may be ventilated to bring the mouth some distance from the feed and near the upper portion of the bag, and this without spilling any of the feed.

SPRING DRAUGHT ATTACHMENT.—John F. Tiner, Lavernia, Texas. This invention does away with the ordinary doubletree and provides a simple spring attachment, especially adapted for a two-horse vehicle, as it prevents the horses from pulling against one another and prevents the pole from swaying sidewise, also enabling the vehicle to run easily and without jerks. Oppositely extending arms are pivoted on the vehicle pole, singletrees being pivoted on the outer ends of the arms, and swinging open frames pivoted to a support in the rear of the singletrees, while spring repressed drawbars mounted in the frames are connected with the singletrees and arms.

TRANSOM LIFTER.—James M. Maddox, Birmingham, Ala. This is a device by means of which a person standing on the floor may easily raise and lower the transom and fasten it at any desired height. Guide pins project from the ends of the pivoted transom and work in ways in the frame in which the transom is pivoted, and the arrangement is such that the transom cannot be operated except from the side of the door on which the hand hold is located, while it may be opened slightly to give ventilation without fear of being further opened by outsiders intending to force an entrance to a room.

WINDOW SCREEN.—Willard E. Cobb, Portland, Me. This is an improvement in screens provided with springs to hold the screens at any desired height in a window. The screen frame has in one side edge a vertical groove from which extends transverse recesses, plate springs in the groove extending within the recesses, within which are spiral springs engaging the inwardly bent ends of the plate springs, the spiral springs forcing the plate springs outward at all times.

CLOTHES PIN. — Allan Watt, Rocky Mount, N. C. This is a device preferably formed of spring wire and permanently secured to the clothes line. Its body is bent into the form of a letter W, the central portion of which has at its apex a partial eye or loop embracing the line, while the upper extremities of the side limbs have eyes in which is loosely jointed a wire loop extending downward around the line.

WALLET.—George K. Morton, St. Thomas, Canada. A light, neat, and inexpensively made wallet is provided by this invention, one suitable for carrying papers, bank bills, etc., and permitting of the ready removal or inspection of its contents. It is closed at the bottom and ends and open at the top, the sides being flexible and free from flaps, and provided with fastening devices of a novel character.

HAT CASE. — Nellie F. Hurdel, New York City. This case comprises two similar parts hinged together, a vertical frame being arranged within the case and extending around its walls, while vertically adjustable hat supporting arms have hat hangers at their inner ends. The case may be quickly and easily adjusted to receive hats of different sizes, or for either men's or women's hats, while a quantity of hats may be packed in it and carried in such a way that they cannot be injured.

TRAY.—Max S. Rosenzweig, New York City. A tray arranged to prevent glasses and other articles carried upon it from tipping over or sliding off is provided by this invention. It has flanges extending inwardly pivoted to its sides, and adapted to engage the stems of the glasses or one side of the bases of the articles held on the tray.

CANE CUTTER. — Frederick B. Alexander, Brooklyn, N. Y. This invention relates to cutters for shaping cane, rattan, or similar material, for use in the manufacture of furniture, carriages, etc., shaping the strands so that when one is split longitudinally it will afford two workable strands. The die stock has an attaching shank and a cut away or reduced portion embraced by a knife with cconcave cutting edge forming an oval passage, and imparting a half oval form to the flat side of the cane, which is fed by rollers in the usual way.

TOY.—George W. Snaman, Jr., Allegheny, Pa. This is a novel device for the amusement and instruction of children, and consists of a small cabinet holding pictures which are spring-pressed upwardly, each slide being held depressed by sets of rods that extend to letters on a forward alphabet board. When the rods which restrain a picture slide are properly operated to spell the name of the picture, the slide is released and moved upwardly to show the picture.

DESIGN FOR A SPOON.—James N. Van Slyke, Madison, Wis. The handle of a spoon is, according to this design, ornamented with the figure of an eagle, the design embracing features commemorative of the eagle "Old Abe," which accompanied a Wisconsin regiment through the war of the rebellion.

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Notes & Queries

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References to former articles or answers should give date of paper and page or number of question.

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INDEX OF NOTES AND QUERIES.

(4483) H. J. W. writes: Kindly tell me which is the strongest, a piece of solid ¾ steel of any length, or a piece of the same steel, of the same diameter and length, with a ¼ inch hole bored entirely through it, and also why is it the strongest? A. The solid rod would be the stronger of the two because it contains more material.

(4484) G. H. S. writes: 1. I have a small electric fan motor wound for four volts and requiring three amperes to run it, also a small electric lighting plant run by a storage battery. I find if I connect all the cells, 50 volts, with the motor, through a resistance, it requires 3 amperes, and if I connect the motor with only 2 cells and no resistance, it requires 3 amperes also, giving me about the same speed in each case. How does the first method compare with the second in economy, or how much do I lose by the first method compared with the second? A. The entire question is one of resistance and electromotive force. The current is controlled by Ohm's law. Probably there is no appreciable difference between the two methods of running the motor. 2. If I used the first method, would the whole battery become exhausted as quickly as the two cells would in the second method? A. No. 3. If I used the second method, when the two cells were exhausted I would have to recharge in order to bring the voltage up to run the lamps; now would it take as long to recharge the battery in series, until the two cells were charged as much as the remainder, as it would if all the cells had been exhausted, as much as the two that were running the motor? A. It will take as much time to charge the two cells separately as will be required to charge the whole series. It is not advisable to use a portion of a storage battery, allowing the remainder to stand unused, as it is extremely difficult afterward to charge them so that they will all have the same electromotive force.

(4485) C. C. and G. W. say: Please explain the objects and purposes of fly wheels on mechanical devices. Are they intended to give certain velocity of speed, or are they only intended to control velocity? A. Fly wheels are mainly regulators of speed during a revolution by absorbing the power in momentum during the high pressure part of the stroke and giving out power by its momentum during the expansion period and the passage of the centers in power engines. In other applications, as in punching, shearing and pressing machines, it becomes an accumulator of power, by which a small constant power is made to do a vastly larger instantaneous work by the momentum of a fly wheel under continuous motion. In general terms the fly wheel is a regulator of speed during a revolution, but does not control the number of revolutions per minute, as this is due to the relation of the power to the work. In this sense it acts as an accumulator and transmitter of power through the momentum of a heavy weight revolving with a variable velocity.

(4486) W. W. S. says: A party says a level is a surface or line every part of which is equally distant from the earth's center. Second party says it is not, holding that as you descend or ascend from the surface of the ocean, you do not then have a true level. Is a mechanical level or a scientific level, used for engineering or other purposes, a curved line? All leveling in engineering and surveying is done by straight lines. There are no instrumental curves. A geodetic level is a curved line following the earth's surface at the mean level of the sea as a datum. In engineering surveys of a long line, the series of levels are straight lines, which are reduced by computation to form a polygonal figure corresponding with the curvature of the earth.

(4487) G. B. B. asks whether there is any instrument made to determine altitude. Or, describe the general plan of determining heights above sea level. A. The barometer (aneroid) is the usual instrument for determining elevations above the sea. The temperature of boiling water is also used. Triangulation and leveling from tide water is the most accurate, when the distance is not too great, yet very accurate work may be done in this way, even across the continent. You will find the details in works on surveying. The United States geodetic survey is progressing on the method of triangulation.

(4488) J. N. R. writes: Please let me know how many gravity cells (Crowfoot) are needed to run a fan about 5 inches in diameter. How should I charge them, how much bluestone, how often, when fan is run 5 hours a day? A. The number of cells required to run the fan depends upon its resistance and the velocity of the fan. You will be obliged to use a sufficient number of cells to overcome the resistance, and then you will have to add cells in parallel until you get the power you need. Gravity batteries when first charged should be filled one-third full of crystals of copper sulphate; the cells should then be filled to a point just above the zinc with a weak solution of sulphate of zinc or Glauber's salt. It should then stand on a closed circuit for a few hours, the circuit to include resistance a little greater than the total resistance of the battery cells.

(4489) H. H. R. asks: How can I prevent the zincs from corroding in a battery composed of sulphuric acid and water in the glass jar and a solution of common salt and water in the porous cup? A. To prevent the rapid corrosion of your zincs you should thoroughly amalgamate them. This you can accomplish by dipping them in dilute sulphuric acid, sprinkling them with a few small drops of mercury and rubbing them on the surface plate until the plate is perfectly covered.

(4490) J. L. M. writes: Every man owning a horse should know how a horse should be shod; instructing a smith how you want it done as a general thing will not do. One must stand by and see it done properly. A smith should never be allowed to cut the frog under any circumstances. If it is diseased and requires cutting it should be done by a competent farrier. The outside of the hoof should not be rasped, not even under the nail clinch. Shoes that confine the edges of the hoof are extremely injurious. Also in regard to erysipelas, he writes that he has found painting the affected spot with tincture of iodine and then covering it with collodion effects a cure.

(4491) J. H. asks: 1. How are the copper strips of the commutator brushes joined in the motor, SUPPLEMENT, No. 641? A. The copper strips are joined by soft solder at the outer ends. 2. Where could I get description of a battery that would run the motor, and what kind would be the best? A. You will find a description of such a battery as you require in SUPPLEMENT, No. 792.

(4492) H. H. writes: Why in winding an armature do you always say cut and afterward solder to commutator the outside end of coil to inside end of next coil, etc.? Why not make a loop instead of cutting the wire, and cut the insulation, and solder the wire at end of loop. A. It would be difficult to form a loop of exactly the right length. There is no objection to the loop, but it does not appear to have any advantage.

(4493) A. H. asks: Will it hurt a shunt motor to run it empty any length of time? A. A shunt motor will not be injured by running idle, as no current of any amount is generated unless the external circuit is closed.

(4494) W. R., Zurich, asks: Can you through the Notes and Queries column of your valuable paper tell me the flashing point of naphtha which has a specific gravity of 0·68? Can you tell me if naphtha of 0·68 can light itself in tropical heat if exposed to sunshine in an open basin? A. Naphtha as light as you state cannot be trusted at any temperature above congelation which is below 0° Fah. Its vapor is the most inflammable of all the hydrocarbons. It will flash at all atmospheric temperatures. It will not flash under the direct rays of the sun, tropical or otherwise, but will evaporate very fast under the action of the sun in open vessels.

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