

May 11, 1954

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2,678,251

COIN-CONTROLLED VENDING MACHINE

Filed Nov. 9, 1950

3 Sheets-Sheet 2

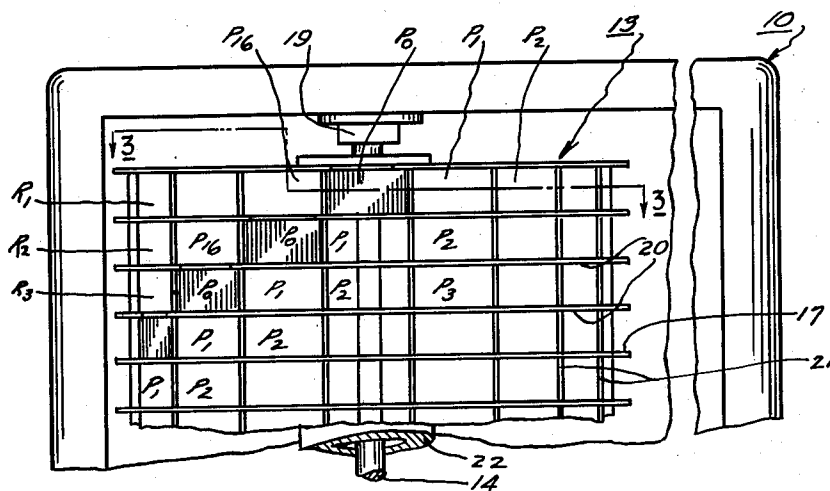


Fig. 2

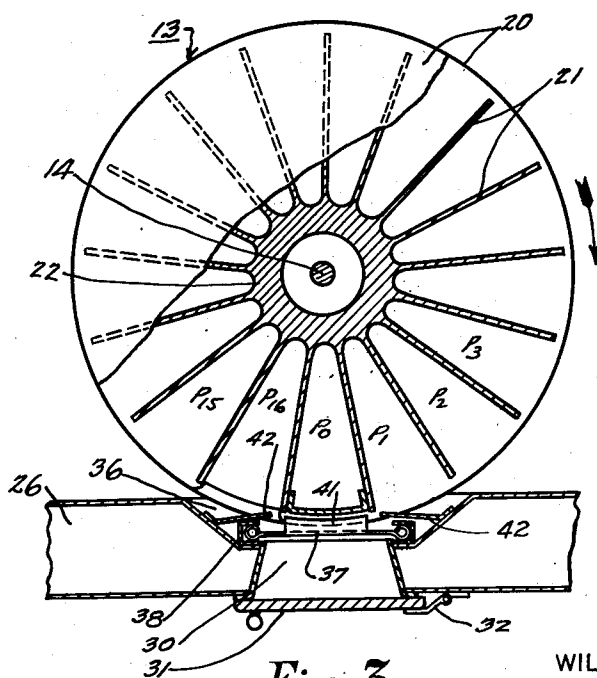


Fig. 3

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3 Sheets-Sheet 3

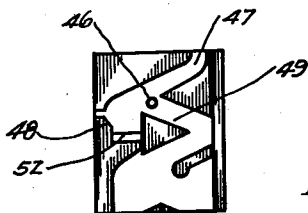


Fig. 7

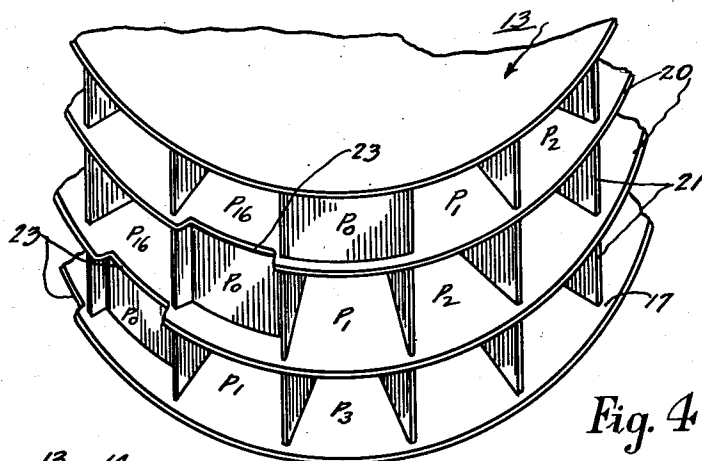


Fig. 4

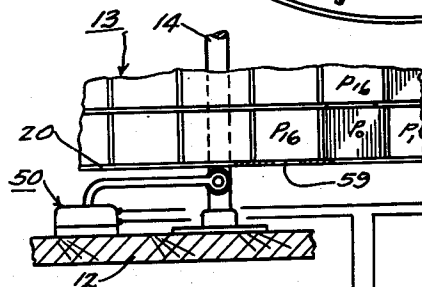


Fig. 8

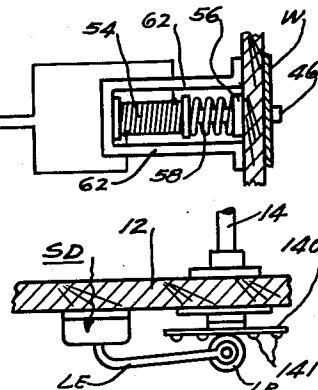


Fig. 6

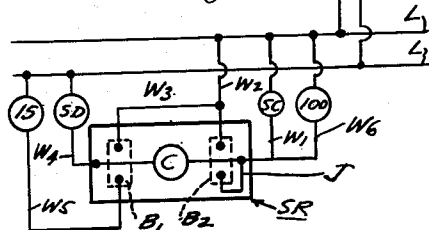


Fig. 5

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COIN-CONTROLLED VENDING MACHINE

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3 Claims. (Cl. 312—97.1)

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My invention relates to a coin-controlled vending machine.

The principal object of the invention is to provide a coin-controlled, refrigerated vending machine designed to give the maximum storage capacity for a chosen over-all size of machine.

While the machine has been designed to vend bottled wares such as soft drinks—the liquid contents being in a sealed bottle—the machine may serve for the purpose of vending other commodities such as packaged wares.

In the preferred form of a machine made according to the invention, a drum formed with superposed tiers or trays of radially-directed open-mouthed compartments or pockets for the wares is rotated on a vertical axis successively to bring the wares in one row, and successively to bring the wares in the lower rows, successively, into register with a window the effective opening of which increases from time to time, through which access is gained to the ware then presented to the opening for manual removal thereof from the drum.

In the drawings, wherein like numerals of reference indicate corresponding parts in the various figures,

Figure 1 is a front elevation of a vending machine made according to this invention, partly broken away;

Figure 2 is a fragmentary view of Figure 1, on an enlarged scale, with the front door removed;

Figure 3 is a part-plan, part-sectional view of the drum, as on line 3—3 in Figure 2;

Figure 4 is a more or less diagrammatic and isometric, fragmentary view of the drum;

Figure 5 shows the wiring diagram of the electrical circuit used for starting and stopping the motor actuating the drum;

Figure 6 is a more or less diagrammatic view of the drum-controlled switch;

Figure 7 is a more or less diagrammatic view of the coin chute; and,

Figure 8 is a more or less diagrammatic view of the switch arrangement for returning a coin when the drum is empty.

Referring now by numerals to the drawings, 10 shows a cabinet or casing suitably insulated, and refrigerated as by suitable apparatus generally designated by the numeral 11, part of which may be below a horizontal transverse partition 12.

13 shows the drum, which is supported by a vertically disposed shaft 14 rotated by an electric motor 15. The diameter of the lower por-

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tion of the shaft may be reduced to form a shoulder bearing upon suitable roller bearings in a housing 16 supported by the horizontal partition 12. The shaft is operatively connected to the motor through suitable reduction gearing. The upper end of the shaft is journaled in a suitable bearing 19 secured to the top of the cabinet.

As already stated, the drum 13 is formed to provide a plurality of superposed tiers or layers of radially-directed, open-mouthed compartments. The number of compartments in each tier is, of course, a matter of choice, such number being dictated by the vending or storing capacity required of the machine.

As best shown in Figures 2 and 3, the drum comprises a plurality of horizontal walls or shelves 20, in the form of discs; radially-directed, equally-angularly spaced vertical partitions or walls 21; and a vertical hollow cylindrical portion 22 in effect forming a hub from which the vertical walls radiate. The shelves 20, the partitions 21, and the cylindrical portion 22 define the several compartments, the cylindrical portion 22 defining the inner end or bottom of the several compartments. Bottles thus may be inserted lengthwise into the respective compartments, the bottles being exposed at the periphery of the drum.

The compartments are indicated by the numerals P0, P1, P2 . . . P16, being disposed in superposed horizontal rows R1, R2 . . . One such compartment in each row, designated as P0, is closed or sealed at the periphery of the drum, as by a wall 40, to prevent the entry of a bottle therein or otherwise to render such compartment ineffective to receive a bottle. The closed compartments P0 in the superposed rows, successively, are in staggered relationship, that is, relatively-angularly spaced in the rows, successively, to the extent of one compartment. In other words, the compartment P0 in any one row is angularly spaced relatively to the compartment P0 of the immediately-higher row, a distance equal to the width of one compartment, such lower compartment being displaced relatively to the upper one in the direction of rotation of the drum. For instance, if the drum rotates clockwise, or from right to left as seen in Figure 2, the compartment P0 of the third row R3 from the top will be to the left of the compartment P0 of the second row, and the compartment P0 of the second row will be to the left of the compartment P0 of the top row.

The horizontal shelves 20 of the drum, more

particularly, the shelves, respectively, defining the roofs or tops of the rows of compartments, respectively, extend beyond the outer ends of the vertical partitions 21, in effect to provide an annular surface 17 on each shelf 20 outwardly of the compartments (see particularly Figures 3 and 4). Each such horizontal shelf, however, except the top and bottom shelves, is notched in or recessed inwardly as at 23, the recess extending over an arc equal to the width of one compartment, as measured at its outer end, that is, between the two vertical partitions defining such compartment. The recesses, respectively, in their successive upper shelves, respectively, say from top to bottom, are also in staggered relationship, such recesses being made in the top walls, respectively, of the compartments P0, respectively, of all the rows except the top and bottom rows. For a better understanding of the relative position of the compartment P0 and of the recesses 23, reference may be made to Figure 4.

The front of the cabinet is provided with a main door 26 hinged as at 27 to the cabinet. The cabinet forms with the door, when closed, a casing in which the drum is enclosed. The door is locked closed by a suitable lock 28. The main door 26 is formed with a vertical elongated window or opening 30 which is closed by a door 31 supported on one side and normally urged to closed position by spring hinges 32. The opening is so positioned that its vertical medial or longer axis is in alignment with the axis of the shaft 14, that is, both the axis of the shaft and that of the opening 30 are in a common plane directed at right angles to the plane of the main door 26 when closed. Access to the drum is thus gained through the smaller door 31, which conveniently may be opened by a knob 33.

Slidably mounted on the door 26, rearwardly of the window 30, to rise and lower, is a door or closure 37. Conveniently, the door slides in vertical guides or channels 38. Preferably, as shown (See Figure 3), the main door 26 is recessed in from the inside to define a recess or space 36 in which part of the periphery of the drum is received, so that the door 37 may be mounted to rise and lower close to the drum.

Preferably, as shown only in Figure 3, vertical baffles 42 are secured to the inside of the main door adjacent each side of the opening 30. The baffles are slotted horizontally to define slots (not shown) receiving the horizontal shelves 20 of the drum when the main door is closed, the baffles extending a distance just short of the outer end or edge of any of the vertical partitions 21 of the drum. These baffles will serve effectively to seal the compartments lying on either side of the compartments then presented to the window or opening 30.

The door 37 is formed at the top with a horizontal ledge or lip 41 (see Figure 3) which is adapted, when the main door is closed, to ride on and be supported by one of the horizontal shelves 20 of the drum, more particularly, on the annular surface 17 aforesaid, but is of such length that it will pass through any of the recesses 23 and thus will allow the door 37 to drop by gravity. As the door 37 lowers, it increases the effective area (the effective length) of the opening 30. If, for instance, the door is supported by the roof 20 of the row R2, it will drop a distance equal to the depth of one row to become supported by the roof 20 of the row R3 when the drum has rotated sufficiently to bring the pocket P0 of row R2 in reg-

ister with the opening 30 (the lip 41 passing through the recess 23). When the drum has again been rotated to bring the pocket P0 of row R3 in register with the opening, the door will drop a distance of one row to become supported by the roof of row R4; and so on.

Where the drum is rotated by an electric motor (the machine has been designed to be electrically, and not manually operated), the circuit to the motor is controlled by a conventional coin-operated switch. The motor is intermittently operated each time a coin is dropped into the coin box, to rotate the drum through an angle equal to 360° divided by the number of pockets, say, N degrees. When the drum has rotated N degrees, the circuit is broken and the motor, which is a conventional, self-braking motor, comes to a stop, stopping the drum in a position such that one vertical row of pockets is in register with the longer axis of the opening 30 as aforesaid.

Any suitable circuit may be used to start and stop the motor 15. By way of illustration only, the circuit now used is shown in Figure 5.

The coil C of a conventional relay switch SR is connected across the line L—L as by wires W1 and W2. In series with the switch SR is a conventional coin-operated switch SC, that is, a normally-open switch which is momentarily closed by the passage therethrough of a coin. Such a switch is used in coin-controlled vending machines. In series also with the switch SR is a switch SD (to be referred to later) which is controlled by the drum 13. The switch SD is normally closed but is periodically opened by the drum. When the switch SC is momentarily closed, an impulse is sent through the coil C of the relay switch, closing the relay switch SR. The bridge member B2 of the relay switch, now electrically connected to a jumper J, connects the coil C across the line through W2, the jumper J, coil C, W4 and the switch SD. The coil C now becomes a holding coil, and the switch SR remains closed even after the switch SC opens following the passage therethrough of a coin. While the switch SR is closed, the motor 15 is connected across the line through W2, W3, the bridge member B1 of the relay switch, and W5. The motor now starts and the drum rotates until the switch SD is opened by the drum. The circuit through the coil is now broken, and the relay switch returns to its normally open position. The motor can only be started again by another coin.

The switch SD and the operating mechanism therefor may be as shown in Figure 6. Any suitable switch device which is normally closed is opened by a lever LE disposed adjacent the shaft 14 mounting the drum so as to present the end of the lever (more particularly, a roller LR) in the path of a cam (rotating with the shaft 14) in the form of a disc 140 having equally angularly spaced rounded projections 141, one for each pocket of the drum (17 in number in the present instance). Thus, the roller LR of the lever LE will be instantaneously engaged and moved (lowered) to break the circuit to the motor as each of the successive projections 141 rides by the roller. The lever will again rise so soon as the roller is free of the projection. The motor will stop as often as a compartment in each row is in register with the opening or window 30. The motor will start again as soon as the switch SC is momentarily closed by a coin.

A normally open manually-operated switch 100 is preferably provided to rotate the drum as desired, the switch being connected across one side

of the line and one side of the relay switch as by a wire W6.

Preferably, suitable means are provided by which a coin will be rejected or returned when the machine is empty of all bottles, that is, after the bottle in the last pocket P16 (of the lowermost row) to be presented to the window has been removed.

By way of example only, there is shown in Figure 8, more or less diagrammatically, a device adapted to accomplish this purpose. As shown, a suitable switch, shown in its entirety as 50, controls an electromagnet-operated plunger or armature 46 associated with the slug rejector. The rejector, of conventional design, as already stated, includes a coin channel 47 which leads or directs the coin to impinge on a rebounding edge 48. If the coin be a legal one, that is, not counterfeit or a so-called "slug," it bounces back away from the edge to fall into a channel 49 and thence into the coin receptacle. On the other hand, if the coin be counterfeit, it more or less slides off the edge 48 and falls upon a bevelled edge 52, to be directed thereby into a reject slot. The electromagnet-controlled plunger 46 is normally clear of the channel 49, but is operated by the action of the switch 50 to enter or project into and block the coin passage 49, thereby causing the coin rebounding from the edge 48 to drop back upon the edge 52 and fall into the reject slot.

The switch, 50, which may be of the same kind as the switch SD aforesaid, and connected across the line, operates to energize and de-energize a coil 54 in which the plunger (or armature) 46 is movable. The coil is held in a suitable bracket 62 secured to a wall W of the coin-rejecting mechanism of the coin chute aforesaid. The plunger includes a rigid collar 56. A coil spring 53, tensioned between the collar 56 and the coil serves to move the plunger away from the coil (from left to right as seen in Figure 8) to cause the plunger to be projected into the channel 49 when the coil is de-energized. Thus, when the switch is operated to break the circuit through the coil, the plunger is moved by the spring 53 to cause the rejection of a coin. On the other hand, when the coil is energized, the plunger is withdrawn from the channel.

To operate the switch by the drum 13, to reject a coin when the drum is empty, the switch is positioned so that the roller LR of the lever LE rides on the underface of the drum, the lever being under tension and the switch being closed. A slot 59 (see Figure 8) is formed through the lower wall or disc 20 constituting the floor of the lowermost tier of pockets, being positioned under the pocket adjacent the closed pocket P0, namely, the pocket P16. When the drum has rotated to bring the pocket P16 in register with the window, to vend the last bottle in the drum, the roller will rise in the slot 59 and open the switch.

Operation

To load the machine, the main door 26 is unlocked and opened. The pockets readily accessible are filled with bottles, the bottles being inserted lengthwise and lying on their sides. The motor is then started by turning on the manually-operated switch 100 and the drum allowed to rotate to render other empty pockets readily accessible, and the motor is stopped; and so on until all the pockets have been filled. The motor is once more operated, if need be, to bring the blank or sealed pocket P0 of the uppermost row R1 to the front, that is, in a position such that it

would be in register with the window were the main door closed. This is the initial vending position of the drum after it has been completely filled as aforesaid. The door 37 is now lifted upwardly to slightly above the roof of the second uppermost row R2 as with, say, the right hand, and the main door closed, conveniently with the other hand, and locked. The ledge or lip 41 is now supported by the roof 20 of the row R2. Should the door 31 be opened, no bottle will be exposed to view, since a closed pocket P0 is now presented to the window above the door 37. To purchase a bottle, a coin is dropped into the coin chute, momentarily causing the switch SC to energize the coil C and operate the relay switch SR to close the circuit W2, W3, the bridge contact B1 and W5, and therefore start the motor. The switch will remain closed because of the holding circuit now established. As the drum about completes its angular movement of N degrees, the roller LR at the end of the lever LE of the switch SD is slightly, instantaneously lowered to cut off the holding circuit, and therefore break the circuit to the motor, the motor coming to a stop.

To purchase the second bottle, a second coin is inserted. The drum will rotate N degrees to bring the succeeding pocket P2 of the top row opposite the window above the door 37; and so on until the bottle in the (last) pocket P16 has been vended, whereupon the door 37 drops the equivalent of one row, the lip 41 now resting upon the roof of the third row, below the pocket P0 of the second row. With the door in that position, no bottle is exposed. To purchase the first bottle of the second row R2, a coin is inserted, the drum rotating N degrees to present the pocket P1 to the window. The operation continues, the door dropping from an upper to a lower row after the bottles in such upper row have all been vended. After the last bottle in the lowermost row has been vended and the drum is empty, the switch 50 operates to return any coin which may be inserted into the coin chute.

What I claim is:

1. In a coin-controlled vending machine, in combination; a casing; a generally drum shaped member mounted within said casing for rotation on a vertical axis, said member being formed with a series of similar compartments open to the periphery thereof and disposed in a plurality of superposed horizontal rows with said compartments being in vertically aligned columns; a door in said casing of substantially the height of said member and of a width corresponding to that of one of said columns of compartments; a vertically slidable shield mounted within said casing and arranged when in an upper position to mask the opening presented by said door to limit access therethrough to all but the top row of said horizontal rows of compartments; circular tracks extending around said generally drum-shaped member clear of the open ends of said compartments and corresponding to each said horizontal rows of compartments, at least all of said tracks, except the lowermost, being formed with an interruption; means on said shield for riding upon one of said circular tracks to support said shield, said means being arranged, upon encountering one of said interruptions, to permit said shield to drop vertically until the shield is supported by said means riding upon the next lower of said tracks to permit exposure of a further row of said compartments to said door, said interruption in each of said tracks being the width of one compartment in advance, in

the direction of rotation of said drum-shaped member; of the interruption in the track next above; and coin-controlled means for rotating said drum-shaped member progressively to present successive compartments behind said door to permit access therethrough to a fresh compartment each time correct coinage is deposited therein.

2. The combination defined in claim 1 in which the lowermost track is also formed with an interruption and means for rendering the vending machine inoperative are disposed beneath said shield in position for actuation by downward movement thereof when said means for riding upon said tracks encounters the interruption in said lowermost track.

3. In a vending machine, the combination of a casing, a member mounted for rotation within said casing on a vertical axis and having circular shelves mounted therein in a horizontal plane in tiered relation one to another so as to form spaces between adjacent shelves said spaces being divided into a series of compartments in vertical alignment for the wares to be vended, a window in said casing for gaining access to said member, means for intermittently rotating said member a predetermined amount to present

peripheral portions of said shelves successively to said window, and a movable closure for said window having an inwardly-directed flange arranged for resting engagement upon the upper surface of one of said shelves; each of said shelves having a cutaway portion in the periphery thereof of a size sufficient to allow said flange to drop therethrough; each of said cutaway portions being spaced from the cutaway portion in the shelf immediately therebelow a horizontal distance substantially equal to the distance a point on the periphery of said member will move during said predetermined amount of said intermittent rotation in the direction of said rotation.

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