Aug. 13, 1946. H. T. LARIMORE 2,405,891

VERTICAL VENDING MACHINE

Filed Oct. 16, 1941 2 Sheets-Sheet 1

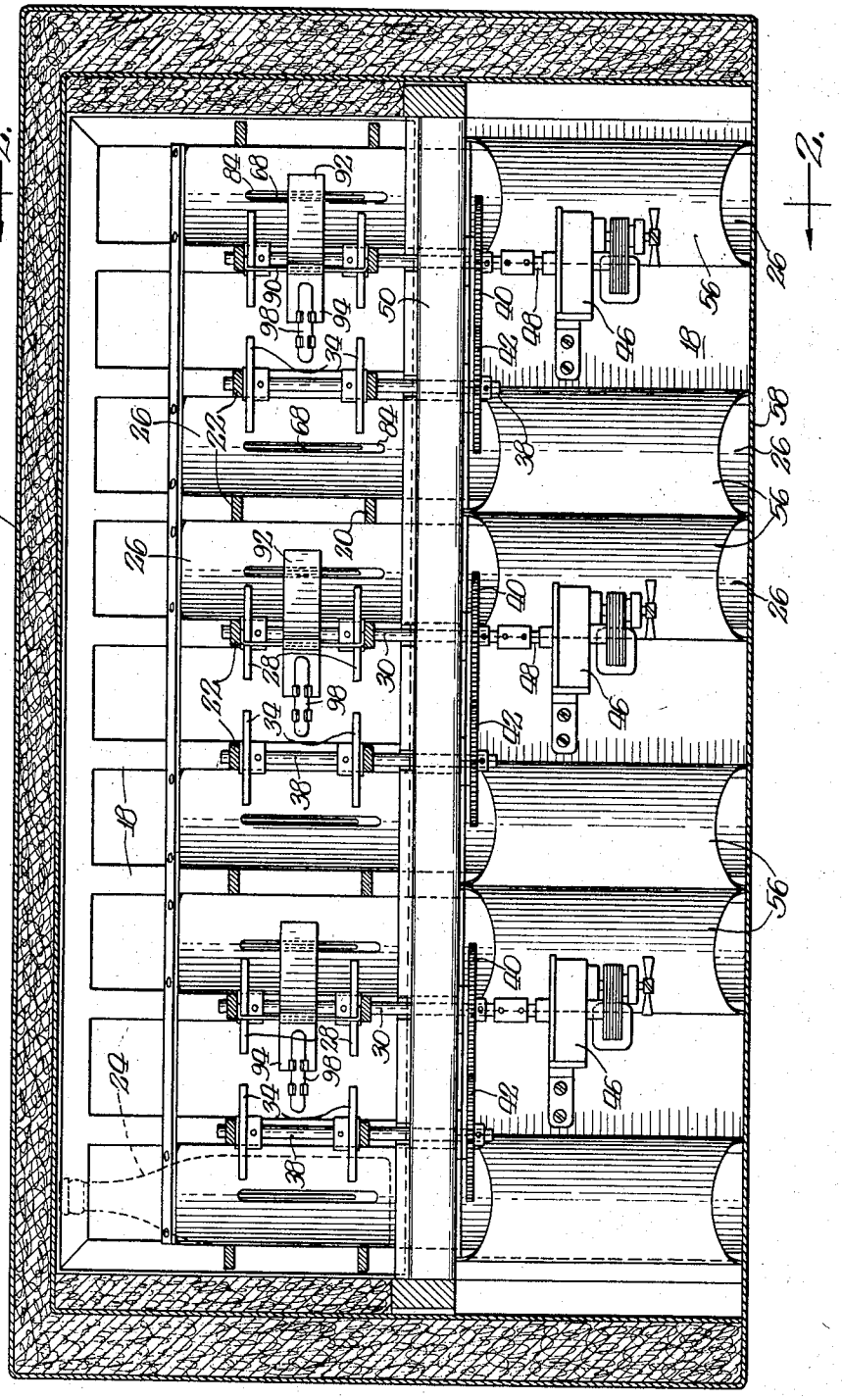


Fig. 1.

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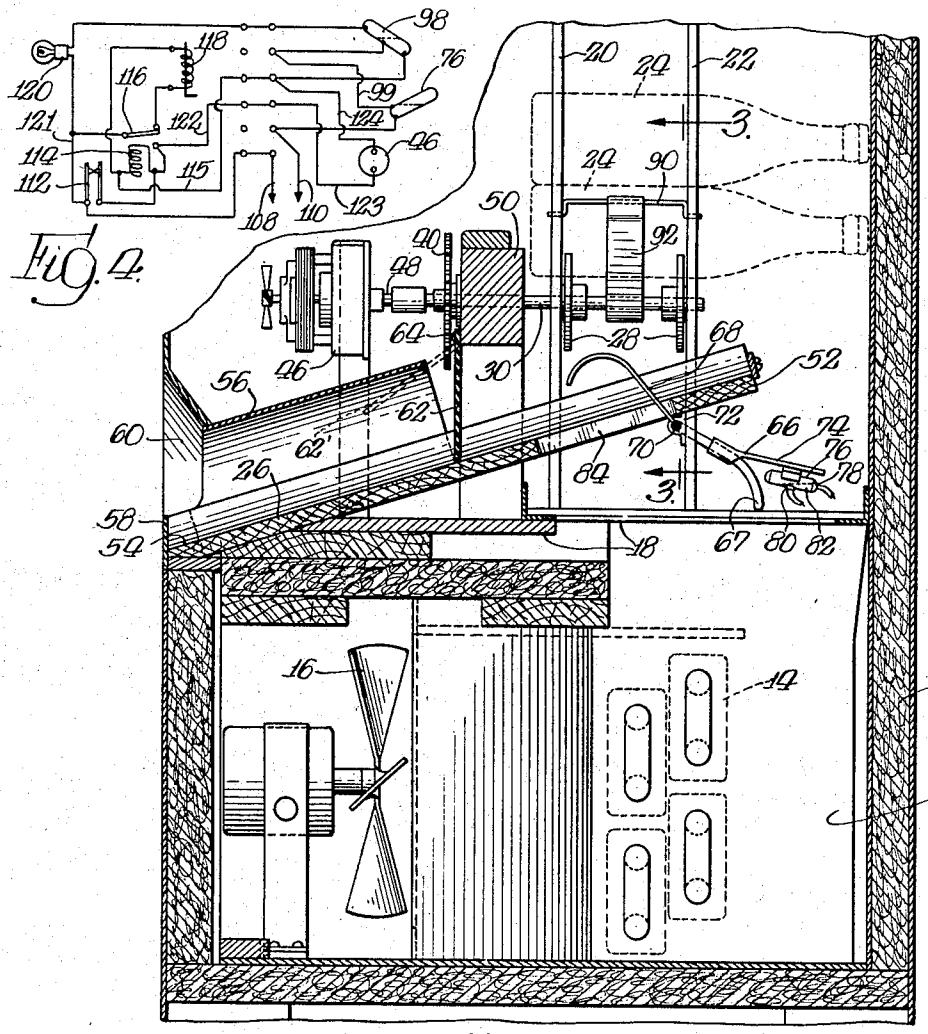


Fig. 2.

Fig. 4.

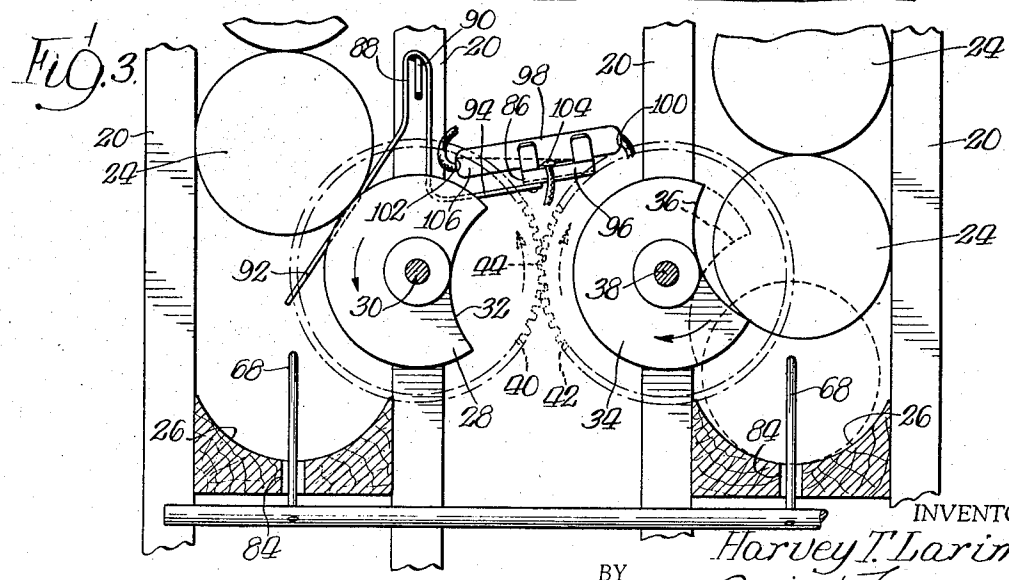


Fig. 3.

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VERTICAL VENDING MACHINE

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2 Claims. (Cl. 312—48)

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My invention relates to vending machines and particularly to machines designed to vend merchandise in packages or containers so that they may be deposited one at a time in a dispensing trough accessible to the operator. The invention as illustrated is designed to be coin-controlled so that one article will be vended or dispensed for each coin which is deposited.

Among the objects of my invention is to provide a new and improved vertical automatic vending machine wherein containers such as packages, cans or bottles are stacked one above the other in horizontal position and in which is provided a device at the bottom of the stack for removing the lowermost article individually, depositing it into a delivery chute and then shutting off operation of the device so that no further articles may be vended until another coin is deposited.

Another object of my invention is to provide a substantially gravity actuated vending machine for individual articles which is inter-connected with an auxiliary motor-operated release which actuates a delivery mechanism in such a manner as to permit gravity to force the article vended out of its position in a stack of such articles.

Still another object of my invention is to provide a new and improved vending device for articles such as bottle goods stored in stacks which is smooth in operation and which conveys the goods from the stack to a vending position with the least amount of shaking or agitation.

Another object still is to provide a vertical gravity fed vending machine device for dispensing articles one at a time alternately from two stacks of those articles positioned side by side wherein a braking effect exerted by frictional contact between the articles of one stack and a dispensing element is utilized in governing the dispensing of an article from the second stack in order to reduce the number of working parts, the amount of power consumed and facilitate release of the article to be vended.

A still further object is to provide a vending machine for stacks of articles having customarily a cylindrical form in which the dispensing mechanism is so constructed and positioned with relation to the stacks that it can be altered and changed to accommodate articles of various diameters.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth,

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pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a plurality of my devices arranged as units in a conventional refrigerated casing, shown partially in section.

Figure 2 is a side elevational view taken on the line 2—2 of Figure 1, partially in section showing the lower portion of one unit of my device.

Figure 3 is a rear view taken on the line 3—3 of Figure 2 partially in section showing the lower portion of one unit of my device.

Figure 4 is a wiring diagram including the electric elements used in operation of the machine.

In providing vending machines for articles and particularly cans and bottles which are sold for example for 5¢ and 10¢ it is desirable to have a very simply constructed inexpensive machine which can be carried readily from place to place and positioned in a store or restaurant where space is at a premium.

Furthermore, in the vending of bottled soft drinks, for example, it is frequently desirable to have a machine which is capable of delivering any one of a variety of flavors and since the number of such flavors varies greatly, a simple machine is of great advantage in that it can be made in any multiple number of units such as will suit the needs of a particular purchaser and may be housed in a single casing.

Furthermore, since the goods are customarily kept in a temperature controlled box, unit devices which can be quickly and easily installed make the construction of an insulated box to house them a relatively simple and inexpensive proceeding.

In addition, since such machines must be frequently serviced it becomes desirable to have the mechanical parts as simple as possible in their principle of operation and also positive acting so that the wearing parts are few, thereby substantially minimizing the amount of care and special servicing which may be necessary.

In the embodiment chosen to illustrate my device I have shown an insulated casing 10 in which is a compartment 12 located, in the particular embodiment selected, at the bottom of the casing. Compartment 12, as shown, is provided with refrigeration coils 14 and a fan 16 for circulating air over the coils and up into the upper portion of the cabinet. Likewise within the cabinet there is provided a frame 18 for supporting the various portions of my device which includes supporting members 20 and 22 for stacks of individual bottles 24. A delivery chute or trough 26 is provided at

the bottom of the stack and is designed to conduct bottles from the interior of the casing to a position outside where they may be taken from the machine by the purchaser.

As shown, the supporting members 20, for example, extend vertically on one side of each unit and are spaced apart a distance slightly greater than the diameter of the largest portion of the bottles. The supporting members 22 are similarly placed on the opposite side of each unit. These members are primarily to hold the bottles one on top of the other in a horizontal position and then guide them to a vending position at the bottom of the stack.

Between the units of each successive pair, and adjacent one unit, as viewed in Figures 2 and 3, there is a pair of ejecting members 28 on a shaft 30 rotatably mounted in adjacent supporting members 20—22. The ejecting members 28 are a pair of somewhat circular discs one adjacent each of the supporting members 20 and 22 and in each of the discs is a recess 32 having approximately the same curvature as the outside circumference of the bottle to be vended.

As will be found in Figure 3, the depth of the recess 32 is sufficient so that when it is opposite a bottle to be ejected, the bottom of the recess is spaced at a distance from the opposite supporting member 20 something in excess of the diameter of the bottle.

Likewise, as shown in Figures 2 and 3, there are similar ejecting members 34 comprising a pair of discs having similar recesses 36 to receive the bottles in the adjacent stack. This member is likewise similarly journalled on a shaft 38 in adjacent supporting members 20 and 22.

The shaft 30 is connected with a toothed wheel 40 meshing at 44 with a similar toothed wheel 42 on shaft 38.

An electric motor 46 has its shaft 48 connected directly to the shaft 30 so that shaft 30 is directly driven by the motor and shaft 38 indirectly driven by reason of the inter-meshing of the toothed wheels on the respective shafts.

A supporting stringer 50 is shown in Figure 2 providing an auxiliary support for the shafts 30 and 38.

The troughs 26 are shown in a sloping position so that the upper end 52 of each is adjacent the bottom of a stack of bottles and the lower end 54 of each has a position adjacent the front of the casing 10. The troughs have each a tubular portion 56 forming a top and a lip 58 at the front end to stop bottles as they slide down to a vended position.

An opening 60 is provided so that the purchaser may reach in and secure the bottle after it has been vended but there is provided a sealing trap door 62 hinged at the point 64 and movable outwardly to the dotted position 62' by the bottle as it slides from the upper end to the lower end of the trough. After the bottle passes the door the latter is returned by some suitable means, such as gravity or a spring, to a closed position shutting off the passage through the trough.

In order to operate the device certain electrically actuated members are provided which are inter-connected by a circuit separate for each unit. A cut-out switch 66 is provided in a position adjacent the bottom of each stack in each unit (Fig. 2). These switches each consist of an arm 68 which extends centerably beneath the stack of bottles. Each arm of the two provided for each unit is secured to a common shaft 70 journalled in brackets 72 on the rear supporting members. Connected to the shaft 70 and extending rearwardly as viewed in Figure 2, is a shelf 74 upon which is mounted a mercury switch 76 having terminals 78 and 80 connected together in normal position as shown by a slug of mercury 82. In normal position a foot 67 rests on the frame to determine the position at which the switch 76 comes to rest. An opening 84 is provided in the bottom of the trough to permit operation of the arm 68 when depressed by a bottle.

An empty switch device 86 is provided and one such is shown for the left hand stack of bottles in Figure 3. The empty switch consists of a U-shaped supporting strap 88 supported pivotally upon a rod 90 having a lever arm 92 extending outwardly into the space between the supporting members 22 so as to be normally engaged by the bottles when the stack is full. A shelf 94 is disposed angularly at the other end of the supporting strap and on this shelf is a clip 96 holding a mercury tube 98 having end connections 100 and 102 and a central connection 104. In the normal position shown a slug of mercury 106 closes contact between the end connection 102 and the central connection 104.

In the wiring diagram shown in Figure 4 the various parts of the device are shown diagrammatically. In this diagram current is supplied from the line wires 108 and 110.

In addition to the parts previously described, there is shown a coin switch 112, a relay 114, and its armature 116, a coin solenoid 118 and an empty light 120 inter-connected in a suitable manner as will appear in the description of the operation.

In operation a coin or a slug is deposited in a suitable device including the coin switch 112. Upon deposit of the coin the switch 112 is closed whereupon the circuit from the line wire 108 is closed through the switch 112, the relay 114 through the wire 115 to the empty switch 98 thence through the wire 99 to the cut-out switch 76 and thence to the other line wire 110. Upon closure of this circuit the relay is actuated so that the armature 116 is drawn downwardly by which action the coin solenoid 118, normally energized, becomes de-energized permitting its core to be released.

By a suitable connection between the core and a coin slot the coin is released by release of the core and the coin switch 112 is broken. However, the relay and its armature serve as portions of a holding circuit maintaining closed the circuit first described through the cut-out switch and empty switch during operation of the machine. The motor circuit consisting of the wires 108, 121, the armature 116, the wires 122 and 123 to the motor and the wire 124 from the motor through the empty switch, thence through the wire 99 and the cut-out switch to the line wire 110 becomes closed upon closure of the holding circuits causing the motor to start.

As the motor and its shaft 48 rotate the wheels 40 and 42 drive the ejecting member 34 which rotates in a clockwise direction as viewed in Figure 3 to a point such that the recesses 36 on the separate discs receive the lowermost bottle 24. As the ejecting disc continues to rotate, said lowermost bottle 24 descends by means of gravity until it rests in the upper end of the respective trough 26. Meanwhile the ejecting disc 28 is likewise rotating, in a counterclockwise direction, as shown in Figure 3, and frictionally engages the wall of the lowermost bottle in the left-hand stack.

This frictional engagement augmented by the weight of all the bottles above serves as a brake upon the action of the mechanical parts so that the weight of all the bottles in the right-hand stack bearing as they do upon the lower portion of the recess 36 will not spin the ejecting discs around too rapidly. As the number of bottles in each stack is decreased, the balance of weight against friction is maintained relatively the same.

As soon as the lowermost bottle in the right-hand stack is deposited in the trough, the arm 68 of the cut-out lever is lowered to its position within the opening 84. As the arm is lowered and the mercury tube 76 pivoted upward, the slug of mercury passes to the left-hand end of the tube breaking the connection between the contacts 80 and 78. By this action the motor circuit is broken, the motor stops running, and the relay 114 is de-energized, permitting the armature to return to its normal position shown in the wiring diagram of Figure 4. Meanwhile the bottle slides down the trough, opens the trap door 62 on its way down and eventually stops against the lip 58 where it can be reached by the purchaser. After the bottle has slid down from the upper end of the trough, the arm 68 swings back into position again closing the circuit through the mercury shut-off switch.

When the next coin is deposited closing the coin switch 112 again, the electric circuit operates in the same manner as just described. The mechanical portions of the machine, however, are so arranged that the ejecting member 28 operates alternately with member 34 to eject a bottle and member 28, when viewed in Figure 3, rotates in a counterclockwise direction. During such rotation, the recesses 32 thereon receive the lowermost bottle 24 in the left-hand stack and deposit it in the left-hand trough 26 in the same manner as described for the right-hand trough. Similarly, the lever arm 68 of the cut-off switch is actuated and again disconnects the motor, stopping operation of the machine, all as previously described. From this point on the operation is repeated first for the right-hand stack and then for the left.

When the last bottle from either stack has been dispensed, the arm 92 is released and the supporting strap 88 of the empty switch pivots in a direction clockwise, as shown in Figure 3. When this happens the slug of mercury 106 flows from the left-hand end of the tube to the right-hand end and by its action breaks the connection between the contacts 102 and 104 and simultaneously makes connection between the contacts 104 and 100.

As indicated by the wiring diagram, this operation closes the connection through the empty light 120, thereby indicating that the machine is empty and at the same time breaks the main circuit so that there will be no further operation of the machine until it is again filled with bottles.

There has thus been provided a simple positive acting vending machine for dispensing bottles one at a time, utilizing both gravity and an electric motor for ejecting bottles from within a temperature controlled space to a vended position where they may be secured by the purchaser.

Some changes may be made in the construction and arrangement of the parts of my device

without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

I claim as my invention:

1. In a vending machine for round surfaced articles, a frame including supporting members for positioning said articles in a pair of parallel vertical stacks, a delivery trough for each stack having the receiving ends respectively beneath the stacks and the dispensing ends extending beyond the stack to a dispensing location, and a holding and dispensing member for each stack comprising a shaft rotatably mounted on the supporting members at the bottom of the stack, a member thereon having a curved circumference extending into the stack beneath the lowermost article and normally providing a support therefor, said member having a recess on one side thereof complementary to the wall of said articles having a depth sufficient to permit passage of an article past said member, a toothed wheel on each said member coacting with a corresponding wheel on the other member for rotating one in response to the other, and power means for rotating said dispensing members through respective progressive ejecting movements, said recesses having respective positions relative to the stack into which each extends wherein when the recess on one of said members is directed toward its respective stack for receiving one said article and ejecting it to a delivered position, the recess on the other of said members is directed away from the other stack and the circumference of said other member is in moving frictional supporting engagement with the surface of the adjacent lowermost article in said other stack providing thereby a frictional braking effect during ejection of the article from said first stack.

2. In a vending machine for articles, a frame including supporting members for positioning said articles in a stack, one above the other, an elongated sloping delivery trough having its upper end beneath and in substantial vertical alignment with the stack and its lower end extending in substantial vertical alignment with and beyond the stack to a delivery station, a holding and dispensing member mounted rotatably on the frame above the upper end of the trough and adjacent the lower end of the stack, on an axis spaced laterally from the vertical plane of the center of the stack and from the path of travel of the article entering the trough, a recess of arcuate form and less than semi-circular in extent, formed in the outer surface of said member adatped to receive a portion of one of said articles but without any free dropping of the articles, and a motor having the shaft thereof in driving connection with the holding and dispensing member, said member having a progressive rotative position wherein the remaining circumference thereof is moved into supporting relationship with the lowermost article to retain said articles in the stack and a progressive rotational dispensing position whereby the lowermost article is separated from the stack and positioned separately within the recess and passed from the stack to the delivery trough.

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