

Nov. 4, 1952

W. R. JONES
VENDING MACHINE

2,616,776

Filed April 6, 1948

4 Sheets-Sheet 1

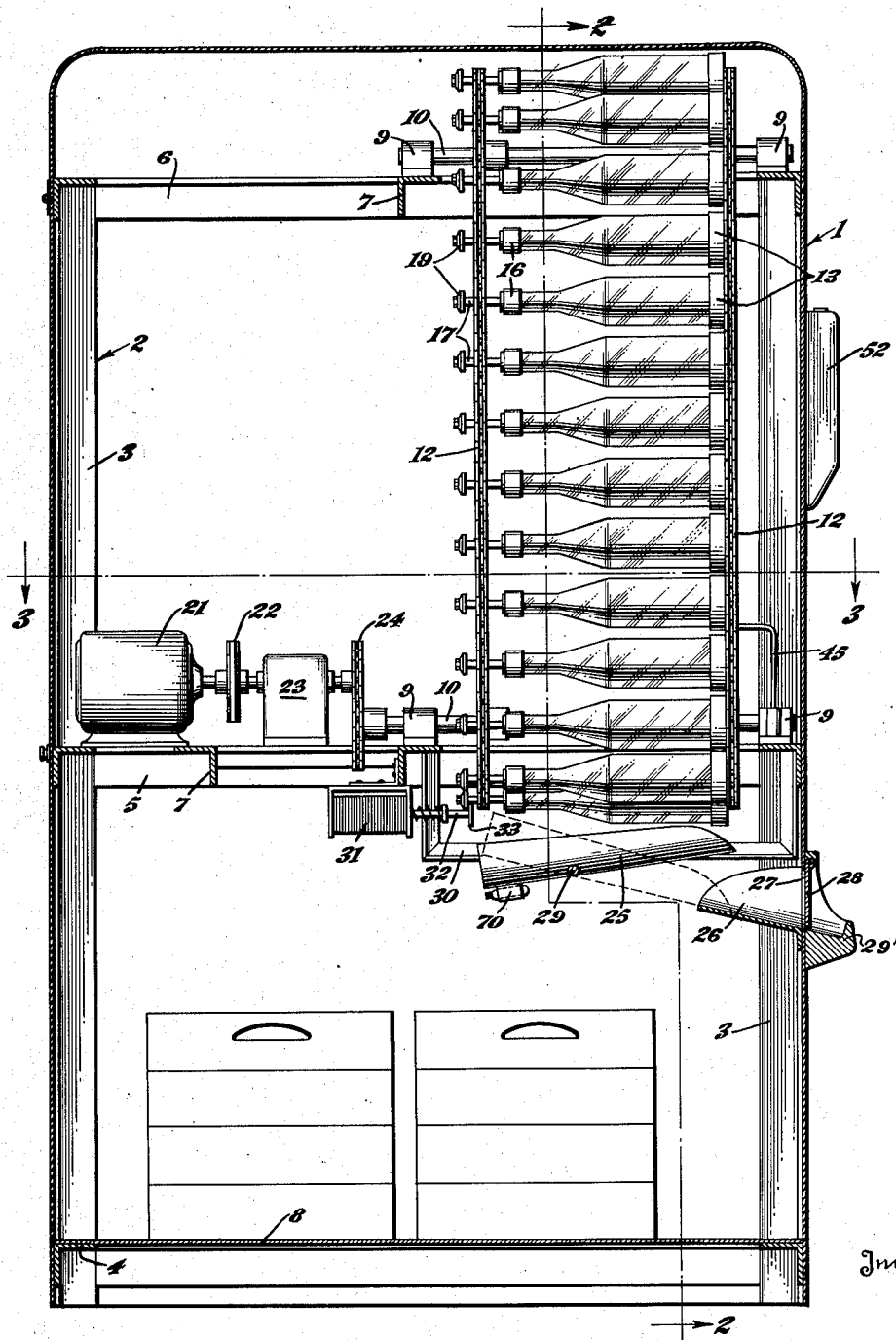


Fig. 1

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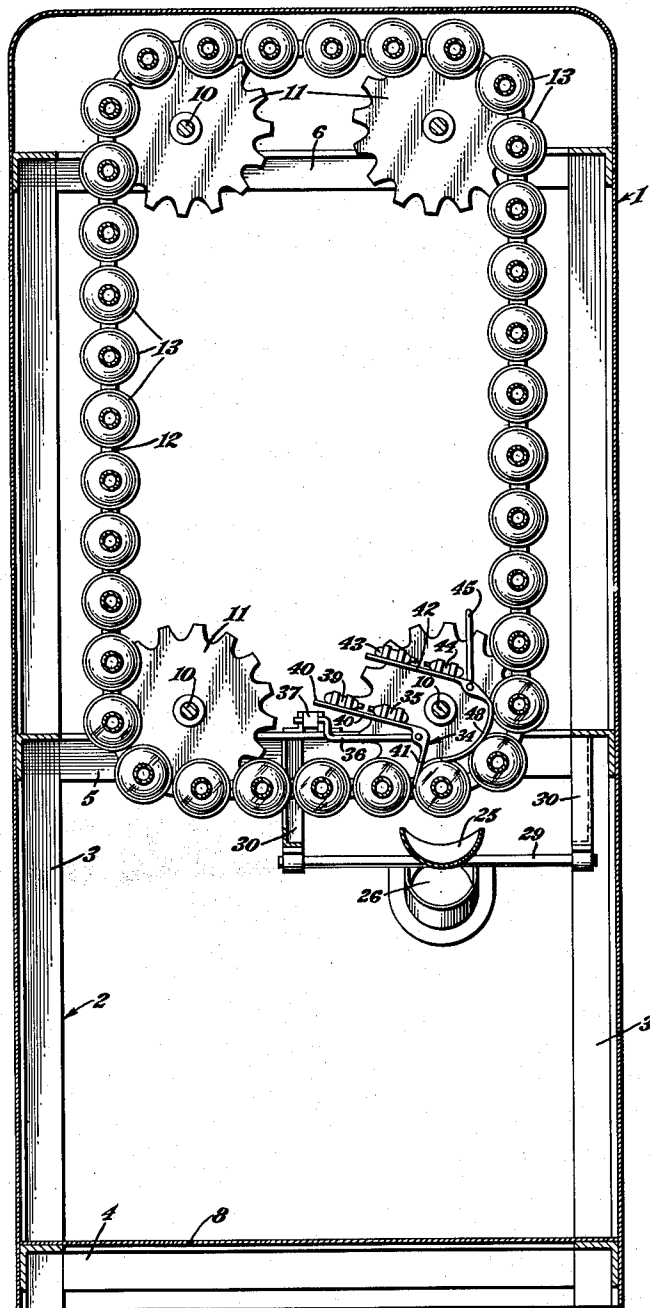
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4 Sheets-Sheet 2

Fig. 2



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4 Sheets-Sheet 3

Fig. 3

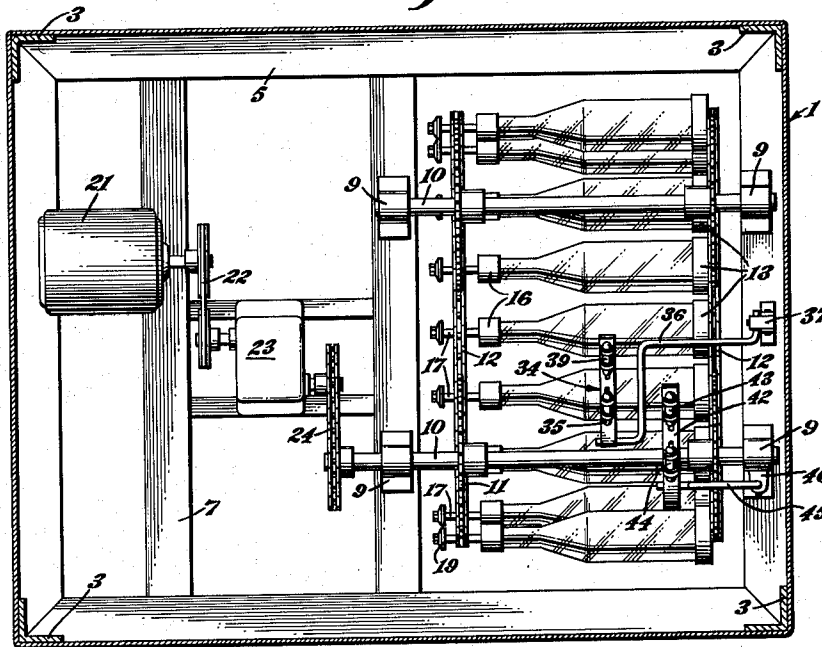
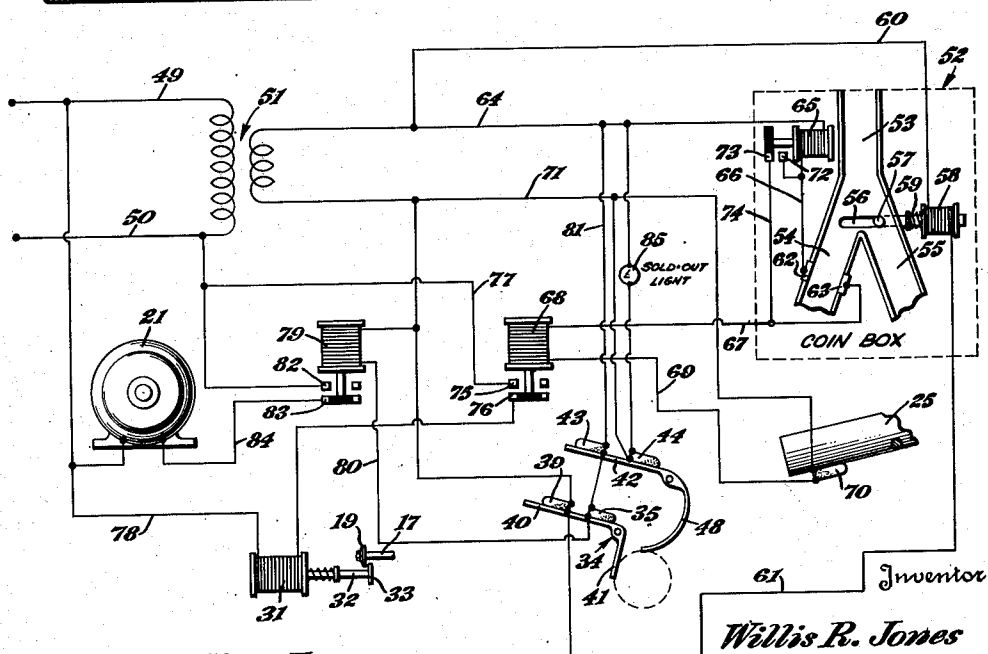


Fig. 7

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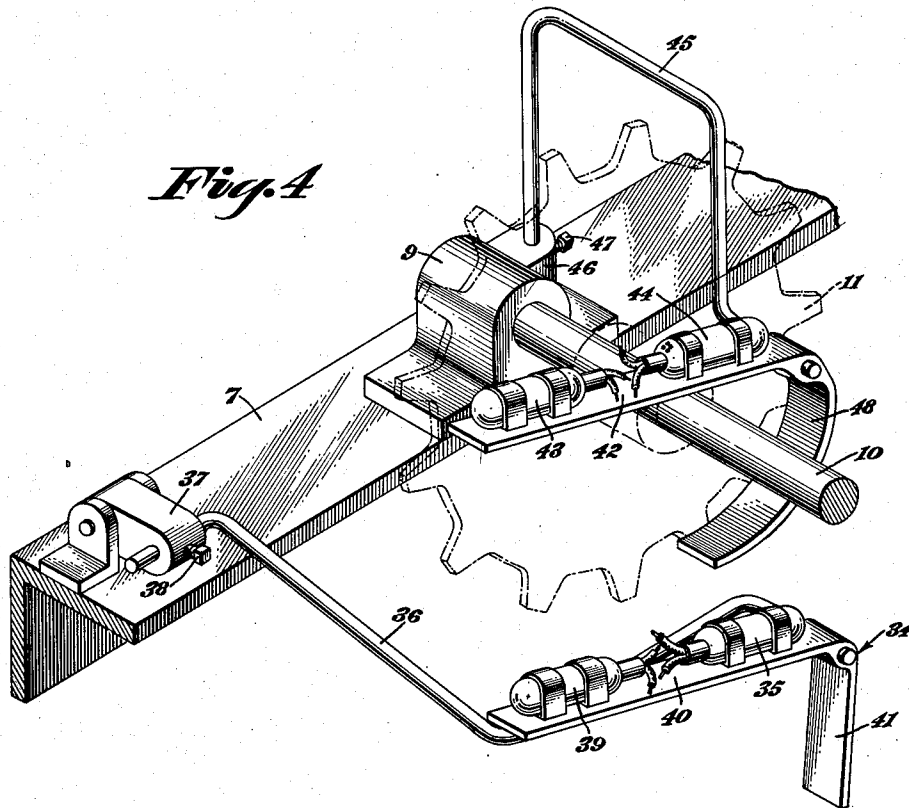
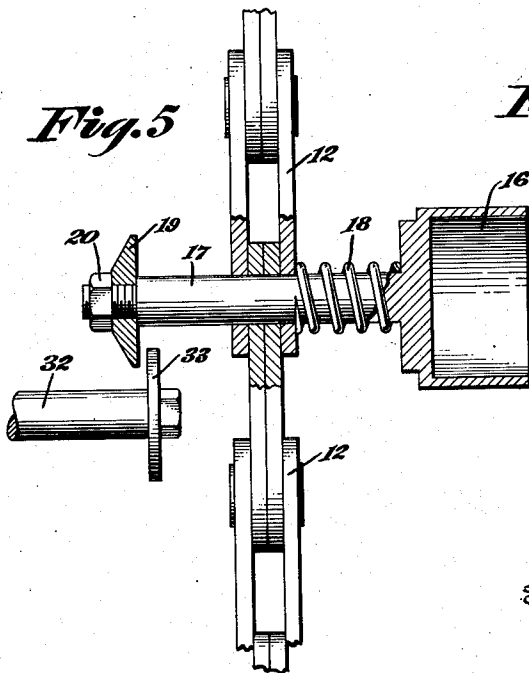
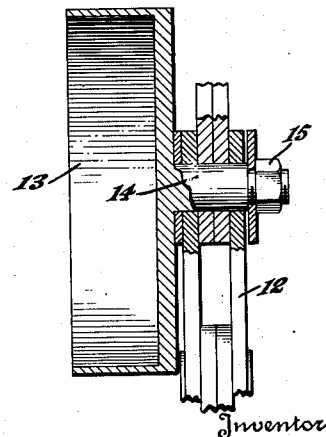
Nov. 4, 1952

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,616,776

VENDING MACHINE

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Application April 6, 1948, Serial No. 19,322

4 Claims. (Cl. 312-96)

1

This invention relates to vending machines, and more particularly to such machines wherein the articles to be dispensed are loaded onto a carrier and successively brought to a point of delivery.

The advantages of this type of machine have been recognized for some time, and many such machines are in use. These machines are particularly adapted to dispensing bottled goods, as the bottles are maintained out of contact with one another, and there is little chance for the bottles to become broken. However, certain features of this type of machine have been undesirable. The machines are somewhat complicated and, therefore, expensive to manufacture and expensive to maintain in repair. Another undesirable feature is the delay in the actual delivery of the bottle after a coin is inserted. The usual sequence of operation upon insertion of a coin has been: The starting of the motor which moves the carrier to position a bottle at the discharge point; releasing the bottle and permitting it to pass from the machine. Thus the customer has to wait while the machine goes through its entire cycle of operation before he receives the merchandise.

The object of the present invention is to provide a machine of this general type which is much simpler than those now in use, which will be much less expensive to build and maintain, and will result in more trouble-free operation.

Another object of the invention is the provision of such a machine having a cycle of operation which begins with the delivery of the merchandise and, after its delivery, continues by bringing the next article into delivery position.

Still another object of the invention is to provide a vending machine which will not fail to deliver an article upon the insertion of a coin, even though one of the article receptacles on the carrier is inadvertently left unfilled when the supply of articles is replenished, the machine being so constructed that the article carrier, when started, will remain in motion until an article is properly positioned at the discharge point.

A further object of the invention is the provision of a novel article receptacle for the carrier, and the release means by which the article is discharged.

Other objects will become apparent from the following description of one practical embodiment of the invention when taken in conjunction with the drawings which accompany and form a part of this specification.

In the drawings:

2

Figure 1 is a vertical, transverse, sectional view through the cabinet of a vending machine embodying the principles of the present invention, the operating mechanism being shown in elevation;

Figure 2 is a vertical section taken on the line 2-2 of Figure 1;

Figure 3 is a horizontal section taken on the line 3-3 of Figure 1;

Figure 4 is a perspective view of a portion of the cabinet frame structure and two of the control elements of the machine;

Figure 5 is a detail view of one member of the article holding means and the carrier chain to which it is attached;

Figure 6 is a detail view of the other member of the article holding means attached to its carrier chain; and

Figure 7 is a wiring diagram of the control circuits of the machine.

Referring to the drawings in detail, the machine is shown housed in a conventional cabinet 1. The cabinet may be of any desired design and plays no part in the present invention. The cabinet is secured to a supporting frame 2 which carries the mechanism of the machine. Frame 2 comprises four vertical legs, or corner-posts 3, attached to one another by means of three sets of horizontally positioned angle-irons 4, 5, and 6, the angle-irons 4 connecting the legs near their bottoms, angle-irons 5 near their mid-sections, and angle-irons 6 near their tops. The sets of angle-irons 5 and 6 are bridged by cross-braces 7 where needed to provide supporting surfaces for various parts of the mechanism, and angle-irons 4 support a floor 8.

Mounted upon the angle-irons 5 and 6 and cross-braces 7 are bearings 9, in which are journaled the ends of four horizontal shafts 10. Shafts 10 carry two sprockets 11 each, over which carrier chains 12 pass. Sprockets 11 on each shaft are spaced from one another so that the chains 12 are parallel and spaced apart a distance somewhat greater than the length of the articles to be dispensed.

Although the present invention is capable of dispensing articles of various types, shapes, sizes, etc., it is particularly adapted to be used in dispensing bottled goods, such as soft drinks, and for purposes of illustration is shown and described as a bottle dispenser.

To support an elongated article, such as a bottle, one chain 12 has attached to it a plurality of cup-like receptacles 13 to receive the bases of the bottles. These are shown as being circular and

having pins 14 projecting from the centers of their undersides. For convenience in mounting, pins 14 are inserted through the chain links in place of the usual link pins at spaced points along the chain, and held by means of nuts 15 being threaded on their ends. The tops of the bottles are supported in cups 16 of much smaller diameter than the receptacles 13, which are carried by the other chain 12. Cups 16 also have pins extending from their bottoms to be inserted through the links of the chain. These pins 17 are longer than pins 14, and are free to move axially through the chain links. Springs 18 are placed around pins 17 between cups 16 and their supporting chain to urge the cups inwardly. The outer ends of pins 17 are reduced in diameter and threaded. Washers 19 are placed on the reduced portions against the shoulders, and nuts 20 hold them in place. The pins are of such length that washers 19 are normally spaced from the chain.

In loading the chain, a cup 16 is drawn back compressing its spring 18 to increase the distance between the face of the cup and the receptacle 13 which is opposite to it upon the other chain. A bottle then has its base inserted in the receptacle 13 and the cup 16 is permitted to move into place over the top of the bottle. This positions the bottle horizontally and the pressure of spring 18 holds the cup 16 firmly against the top of the bottle to prevent it from falling from its supports.

The carrier mechanism is moved to advance the bottles by means of a motor 21. If the motor was directly connected to the carrier mechanism the speed of the chain would be entirely too fast for the short distances of travel involved. Therefore, motor 21 is connected by means of a chain 22 to the input shaft of a speed reducer 23. The output shaft of the speed reducer is connected by means of a chain 24 to one of the shafts 10.

When the carrier is advanced, one of the bottles is brought to a position directly above a transfer tray 25, which is tiltable, and when tilted has its outer end resting upon a discharge chute 26.

The discharge chute leads to a delivery opening 27 in the cabinet which is closed by a swinging door 28. A tray 29' may be fitted to the outside of the cabinet just below the door to catch the bottle. The transfer tray 25 is mounted upon a rotatable pivot rod 29 which has its ends journaled in brackets 30 depending from the frame members 5. The tray is pivoted to one side of its center of gravity so that it normally assumes a tilted position with its end out of contact with the discharge chute. When a bottle is released, as will be described later, the bottle falls upon the tray 25 with its bottom, or heavy end, upon the raised end of the tray. This causes the tray to tilt downward bringing its end into contact with the discharge chute, whereupon the bottle slides from the cabinet.

The bottles are released from the carrier by means of a solenoid 31. The solenoid is hung from one of the cross-braces 7 on the frame members 5 so that its armature 32 lies in the same vertical plane as the bottle in delivery position on the carrier just below pin 17 projecting from the cup 16 which supports the top of that bottle. An enlargement 33 on the end of armature 32 lies just behind the washer 19 carried by the pin 17. When the solenoid 31 is energized and draws back its armature, the enlargement 33 strikes washer 19 and moves pin 17 and cup 16 in an axial direction against the pressure of spring 18. This moves the cup from the top of

the bottle allowing the bottle to slip from the receptacle 13 and fall upon the transfer tray 25.

A lever 34 carrying a motor-control mercury switch 35 is pivotally hung just above the bottle in delivery position. The mounting for the lever consists in a bent rod 36 having one end rotatably mounted in a journal 37 mounted on the frame. The other end of the rod 36 swivelly carries the lever 34. Journal 37 is provided with a set screw 38 to hold the rod against movement when the lever is properly positioned. Lever 34 supports the motor switch 35 and also a mercury switch 39 for controlling the coin chute upon its horizontal arm 40. Vertical arm 41 of the lever hangs in the path of movement of the bottles on the carrier. As a bottle moves to discharge position, it will strike arm 41 of lever 34, moving it slightly, and causing arm 40 to rise tilting the switches it carries. When the bottle is released from the carrier, lever 34 will swing in the opposite direction causing operation of the mercury switches 35 and 39.

Close to the lever 34 there is a second lever 42, which carries another mercury switch 43 controlling the motor, and a mercury switch 44 in the circuit of a light which is illuminated when the supply of bottles on the carrier is exhausted. Lever 42 is also supported upon a bent rod 45 which is rotatable in a journal 46 on the frame. A set screw 47 holds the rod against turning when the lever 42 has been properly positioned. Lever 42 has a downwardly curving arm 48 which conforms roughly to the path of travel of the bottles on the carrier. When the receptacles on the carrier are filled, the arm 48 contacts several of the bottles adjacent the delivery position. This holds the switch-carrying portion of the lever elevated. When these receptacles are empty, the lever will swing, tilting the switches in the opposite direction. If one of the receptacles is inadvertently left empty, the contact of arm 48 with adjacent bottles will prevent the lever from swinging.

Switches 35, 39, 43 and 44 are included in electrical circuits which control the automatic operation of the machine after the operation has been initiated by the insertion of a coin. Referring to Figure 7, power for the circuits is taken in through the leads 49 and 50, which are connected to the primary of a step-down transformer 51. The line voltage supplied to the leads 49 and 50 is used to operate the motor and bottle-release solenoid, but the control elements are operated by lower voltage current taken from the secondary of the transformer 51. The coin control box used is conventional, and is indicated at 52. It may include a coin chute 53 which has branches 54 and 55, branch 54 leading to a coin box (not shown), and branch 55 returning the coin to the purchaser if the carrier is empty or no bottle is at the delivery position. The chute is provided with a slot 56 in the side where the chute forks, and a pin 57 passes through the slot and bridges the chute. Pin 57 is movable the length of the slot so that it may block either branch. The pin is moved by means of a solenoid 58 to block branch 55, and spring 59 moves the pin to block branch 54 when the solenoid is deenergized. Solenoid 58 is connected to the secondary of the transformer by line 60 and line 61 which includes mercury switch 39. Whenever a bottle is in delivery position, lever 34 is tilted so that switch 39 is in closed position and solenoid 58 is energized hold-

5

ing the branch chute 54 open so that a coin may pass to the coin box.

Branch chute 54 contains contacts 62 and 63 which are bridged by the coin as it passes down the chute. These contacts are part of a circuit which consists of wire 64 from the secondary of the transformer, the coil of relay 65, wire 66, contacts 62, 63, wire 67, relay 68, wire 69, mercury switch 70 which is carried by the transfer tray 25 and is closed when the tray is in inoperative position, and wire 71. Thus when a coin is dropped in the chute and passes down branch 54 bridging contacts 62, 63, relays 65 and 68 will be energized. As the closing of the contacts is but momentary, relay 65 is employed to close contacts 72, 73 in a bridge wire 74 across the contacts 62, 63 and hold the circuit after the coin has passed from between contacts 62, 63. Relay 68 serves to close a circuit through the release solenoid 31. The relay contacts 75, 76 are in a line 77, from the high voltage line to the solenoid. Wire 78 returns from the solenoid to the line. When the above circuits have been closed, solenoid 31 acts to release a bottle from the carrier. The bottle, dropping upon tray 25, will cause the tray to tilt, opening switch 70 which will break the circuit through relays 65 and 68. When relay 68 is deenergized, the circuit through the release solenoid will be broken.

As the bottle dropped from the carrier, it released lever 34, permitting it to swing tilting the switches 35 and 39. Switch 39, as described above, controls solenoid 58 and thereby the pin 57 in the coin chute. This solenoid is normally energized, holding the pin 57 in position to block branch chute 55 which is the coin return. When a bottle is released and lever 34 tilts, the circuit is broken and pin 57 moves under the influence of spring 59 to block branch chute 54 so that if a second coin is inserted before another bottle has been brought to the delivery point the coin will be returned. The solenoid 58 is normally energized and the coin return blocked so that in the event of a power failure the pin 57 will block the branch chute 54, so that any coins which are dropped into the machine will be returned.

The tilting of switch 35 when a bottle is released closes a circuit through relay 79, which circuit includes wire 80 from the secondary of the transformer, switches 35 and 43, and line 81 to the low voltage line. The closing of this circuit causes relay 79 to close contacts 82, 83 which are in a line 84 which includes motor 21. So when a bottle is released the coin chute branch 54 to the coin box is closed, and motor 21 is started to move the carrier to bring another bottle to the delivery position. As the bottle approaches delivery position it contacts arm 41 of lever 34 and tilts the lever reenergizing solenoid 58 to open branch chute 54, and opens switch 35 stopping the motor.

When the last bottle is delivered from the machine, lever 42 will be free to swing, tilting switches 43 and 44. This will break the motor circuit so that the tilting of lever 34 and switch 35 will have no effect. The tilting of switch 44 which is in circuit with an electric lamp 85 will cause the lamp to light as an indication that the merchandise has been sold out. When switch 39 tilts, of course, branch chute 54 will be blocked so that any coin inserted will be returned.

To reload the carrier, the top of the cabinet is raised, set screws 38 and 47 loosened, and levers 34 and 42 swung out from between the carrier chains. Each of the article holders is

6

then filled by inserting the base of a bottle into the receptacle 13, retracting the cup 16, and permitting the cup to seat over the top of the bottle under the influence of spring 18. When all of the holders are filled, levers 34 and 42 are swung back into place and set screws 38 and 47 tightened to hold them in position. The unit is now ready for use. Extra bottles may be stored in the bottom of the cabinet in cases as shown in Figure 1.

Although one practical embodiment has been described and illustrated herein, it will be obvious that changes may be made from the precise structure shown without departing from the scope of the appended claims.

What I claim is:

1. In dispensing mechanism, a pair of vertically positioned horizontally spaced parallel endless chains, means to advance said chains in unison, article holders spaced along said chains, each holder comprising a pair of companion members, one of said members being a cup-like receptacle secured to one of said chains and the other member being a cup-like receptacle slidably mounted in the other chain, the two members being mounted upon said chains in axial alignment and said slidable member being movable in an axial direction, a spring to urge said slidable member toward its companion member to engage an article, means to move said slidable member against the urge of said spring to release an article from said holder, means to start said chain advancing means upon the release of an article comprising, a pivoted member carrying a mercury control switch for said chain advancing means, said pivoted member having an arm lying in the path of movement of articles in said holders to move said arm to tilt said switch to open position when engaged by one of said articles and to permit said pivoted member to swing by gravity when said article is released from its holder to tilt said switch to closed position.

2. In dispensing mechanism, a pair of vertically positioned horizontally spaced parallel endless chains, means to advance said chains in unison, article holders spaced along said chains, each holder comprising a pair of companion members, one of said members being a cup-like receptacle secured to one of said chains and the other member being a cup-like receptacle slidably mounted in the other chain, the two members being mounted upon said chains in axial alignment and said slidable member being movable in an axial direction, a spring to urge said slidable member toward its companion member to engage an article, means to move said slidable member against the urge of said spring to release an article from said holder, and a control switch for said chain advancing means having a movable arm intersecting the path of travel of the axes of said cup-like receptacles and positioned intermediate the receptacles of the pairs, whereby the respective receptacles of each pair pass on opposite sides of said switch arm when said chains advance.

3. In dispensing mechanism, a pair of vertically positioned horizontally spaced parallel endless chains, means to advance said chains in unison, article holders spaced along said chains, each holder comprising a pair of companion members, one of said members being a cup-like receptacle secured to one of said chains and the other member being a cup-like receptacle slidably mounted in the other chain, the two members being mounted upon said chains in axial align-

ment and said slidable member being movable in an axial direction, a spring to urge said slidable member toward its companion member to engage an article, means to move said slidable member against the urge of said spring to release an article from said holder, and a control switch for said chain advancing means having a movable arm to contact articles carried between said cup-like receptacle pairs, said switch being held in closed position when said arm is in contact with said articles, said arm being of sufficient length in the direction of movement of said chain to span a space equal to at least the distance between the axes of alternate pairs of receptacles.

4. In dispensing mechanism, a pair of vertically positioned horizontally spaced parallel endless chains, means to advance said chains in unison, article holders spaced along said chains, each holder comprising a pair of companion members, one of said members being a cup-like receptacle secured to one of said chains and the other member being a cup-like receptacle slidably mounted in the other chain, the two members being mounted upon said chains in axial alignment and said slidable member being movable in an axial direction, a spring to urge said slidable member toward its companion member to engage an article, means to move said slidable member against the urge of said spring to release an article from said holder, a control switch for said chain advancing means and a movable arm intersecting the path of travel of the axes of said cup-like receptacles and positioned intermediate the receptacles of the pairs, whereby the

respective receptacles of each pair pass on opposite sides of said switch arm when said chain advances, and a second control switch for said chain advancing means having a movable arm to contact articles carried between said cup-like receptacle pairs, said second control switch being held in closed position when its said arm is in contact with said articles, the said arm of said second control switch being of sufficient length in the direction of movement of said chain to span a space equal to at least the distance between the axes of alternate pairs of receptacles.

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