

Oct. 2, 1951

C. L. GRAU
VENDING MACHINE

2,569,988

Filed May 7, 1946

3 Sheets-Sheet 1

Fig. 1

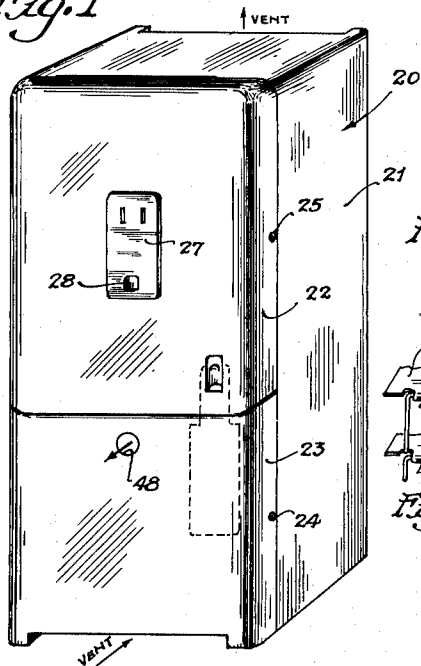


Fig. 3

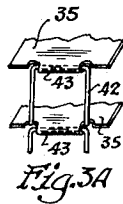
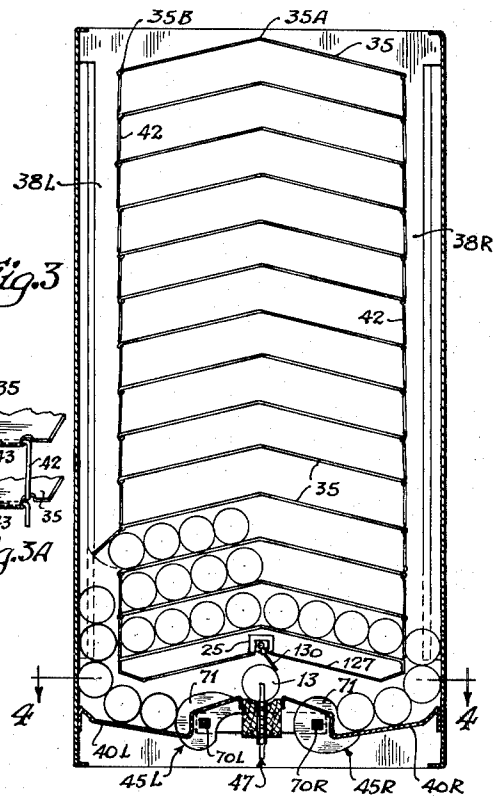


Fig. 2

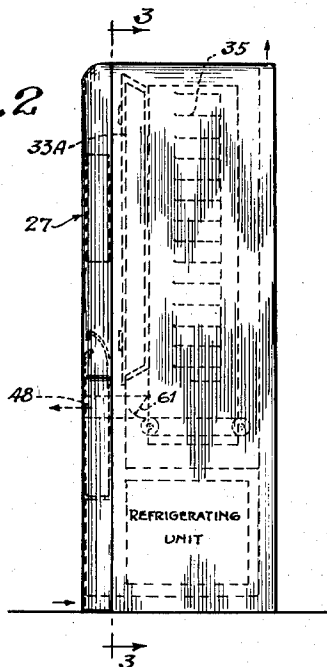
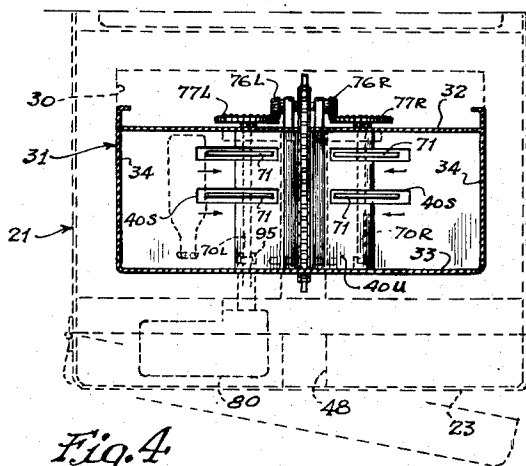


Fig. 4

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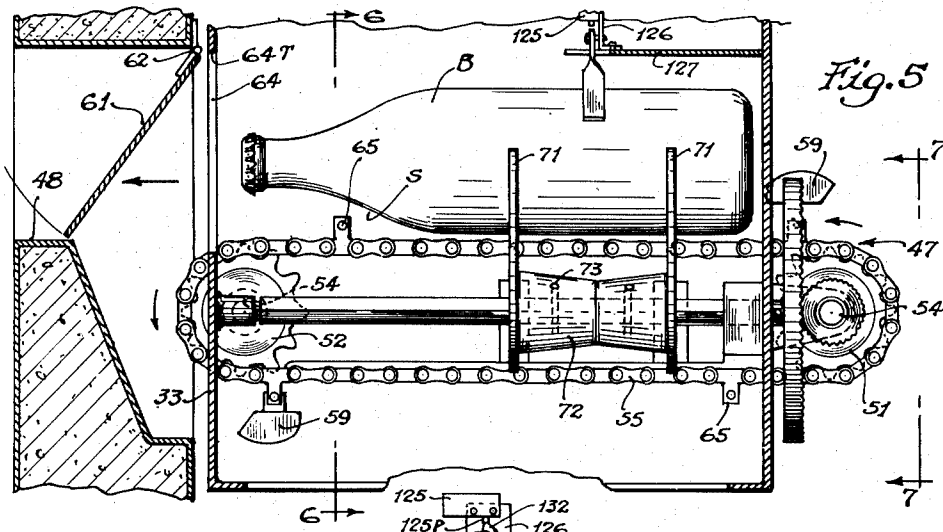
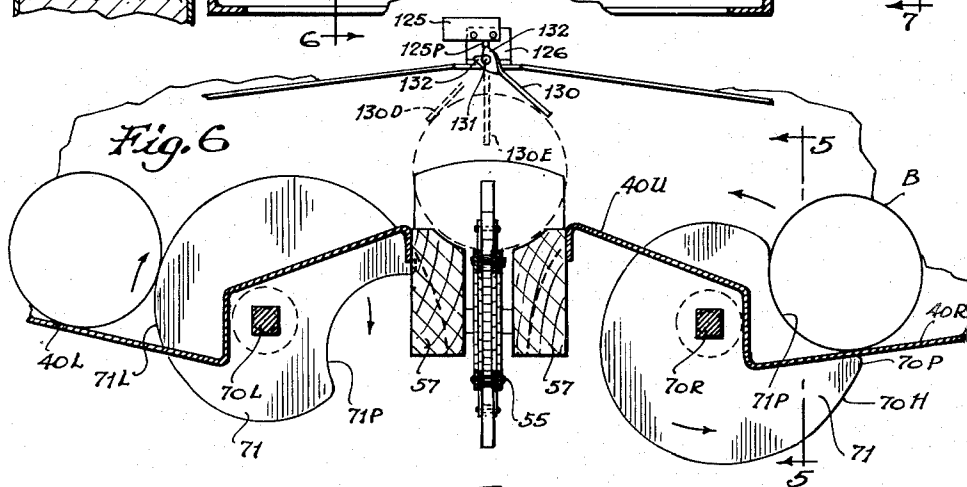
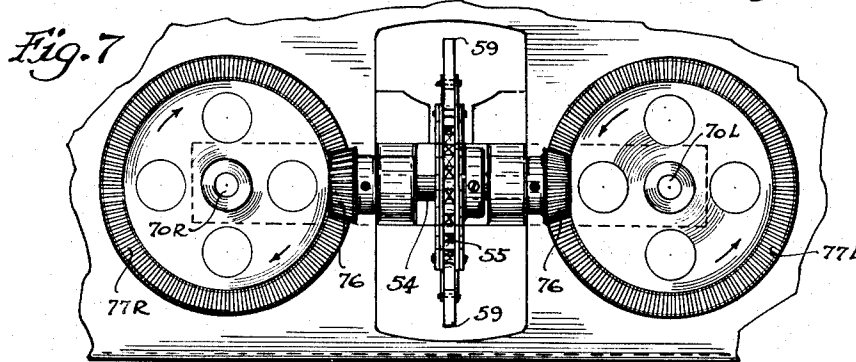
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3 Sheets-Sheet 2



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Fig. 8

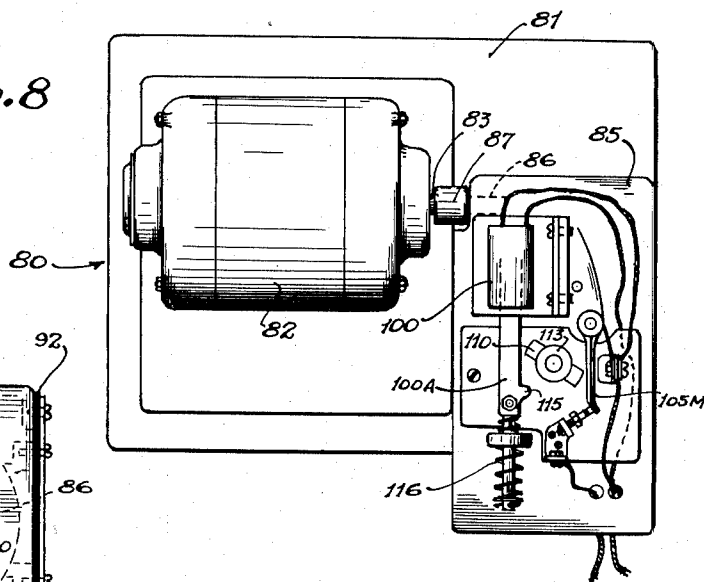


Fig. 9

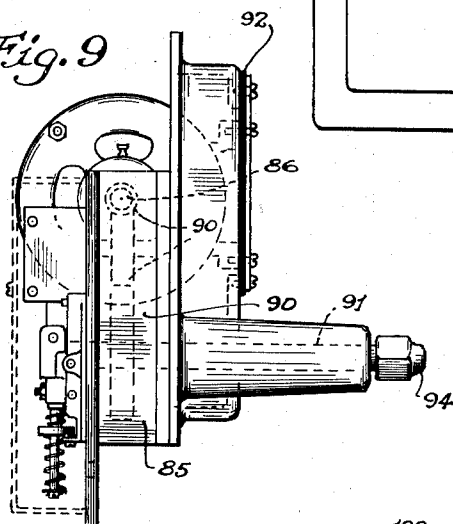


Fig. 10

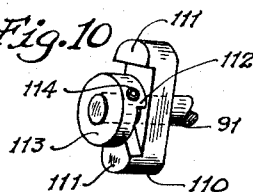
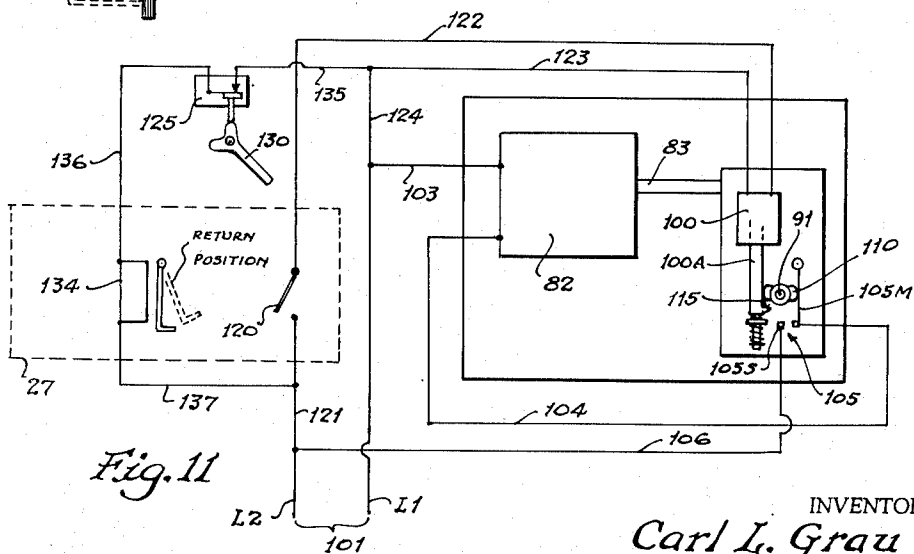


Fig. 11

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UNITED STATES PATENT OFFICE

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VENDING MACHINE

Carl L. Grau, Streator, Ill.

Application May 7, 1946, Serial No. 667,917

1 Claim. (Cl. 312-46)

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This invention relates to vending apparatus of the coin-controlled type, and particularly to such vending apparatus that is adapted to vend bottled merchandise such as soft drinks.

In vending machines of the character to which the present invention relates, it is essential that the apparatus have a relatively short vending cycle, because in the places where devices of this character are employed, the sales must take place within a relatively short period of time, and to enable this to be accomplished in a simple and effective manner is an important object of the present invention. Another and related object is to enable such a vending machine to operate rapidly through its vending cycle while at the same time moving the bottles in a slow and gradual manner so as to avoid damage to such bottles. A further object is to enable a machine of the aforesaid character to be conditioned at all times for delivery of a bottle, and to accomplish this in such a way that the bottle is delivered to the user in a position where the bottle may be readily grasped and removed from the machine.

Vending machines of the aforesaid character are often subjected to attempts to obtain merchandise therefrom without deposit of a coin to pay for such merchandise, and to enable such theft of such merchandise to be prevented in a simple and effective manner is a further object of the present invention.

In the use of vending machines of the character to which this invention relates, it is important that the machine operate in such a manner that it will not require the excessive or frequent service of an attendant, and one of the most frequent reasons for requiring such services arises where a user deposits a coin in the machine and it develops that the machine is empty. It is therefore a further object of the present invention to enable coins to be rejected from the coin slot mechanism of such a vending machine whenever the machine is empty, and an object related to the foregoing is to enable the coin slot mechanism of such vending machine to be disabled during a part of each vending cycle, thereby to afford an indication as to whether the machine still contains merchandise for each cycle of operation of the coin slot mechanism, or in other words, for each coin that is inserted in the coin slot mechanism.

Where a bottled merchandise such as soft

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drinks is being vended, as for example in a manufacturing plant, or in offices, it is essential that this bottled merchandise be properly refrigerated, and because of such refrigeration, many problems are introduced with respect to dampness and corrosion of the operating parts of the mechanism. It is therefore a further object of the present invention to enable such a vending mechanism to be so constructed and arranged that the control mechanism that is of a delicate character may be located outside of the refrigerated portion of the apparatus, and a related object is to enable the motor that drives the vending mechanism to be located in a protected relation where it will not be subjected to dampness and corrosion that normally result from the presence of the refrigerated air within the cabinet.

A further object of the present invention is to afford a simple delivery and storage mechanism for the bottled merchandise, and to supply such merchandise to the final delivery mechanism of the machine along two different paths so as to thereby reduce the speed of movement that is required for the articles of merchandise. A related and more specific object is to store the merchandise on shelves within the cabinet of the machine so that the bottles are withdrawn in a rolling movement from the shelves in succession. More specifically, it is an object of the present invention to afford two delivery paths disposed on opposite sides of a horizontal final delivery path, and to move the bottles alternately from the two initial paths onto the final path, from which the bottles are then discharged so as to be available to the user of the machine.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claim.

In the drawings:

Fig. 1 is a perspective view of a vending ma-

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chine embodying the features of the invention;
Fig. 2 is a side elevational view of the vending machine;

Fig. 3 is a vertical sectional view of the bottle magazine and delivery mechanism of the machine taken substantially along the line 3—3 of Fig. 2;

Fig. 3A is a perspective view of the gate mechanism that controls delivery of the bottles from the storage shelves;

Fig. 4 is a plan section taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged vertical view with certain parts omitted, the view being taken substantially along the line 5—5 of Fig. 6;

Fig. 6 is a vertical sectional view taken substantially along the line 6—6 of Fig. 5;

Fig. 7 is a rear elevational view taken from the line 7—7 in Fig. 5;

Fig. 8 is a front elevational view of the driving and control unit of the machine;

Fig. 9 is an end elevational view of the driving and control unit as viewed from the right in Fig. 8;

Fig. 10 is a perspective view of a control cam that is included in the driving and control unit; and

Fig. 11 is a schematic wiring diagram illustrating the manner in which the vending apparatus of the present invention is controlled.

For purposes of disclosure, the invention has been illustrated herein as embodied in a vending machine 20 that comprises a sectional insulated cabinet 21 having upper and lower doors 22 and 23 disposed on the forward side of the cabinet, and adapted to be secured in closed positions by locks 24 and 25 respectively as will be evident in Figs. 1 and 2. The doors 22 and 23 are relatively thick, and are in the nature of false walls within which space is afforded forwardly of the front insulated wall of the cabinet for mounting of various elements of the machine. Thus, the upper door 22 has coin slot mechanism 27 of a conventional type mounted therein so that coins may be inserted into the slot or slots thereof, and a return slot 28 is afforded in a conventional manner so that when a coin is rejected, either as being spurious or because the machine is empty, the coin will be discharged into the return slot 28 so as to be within the reach of the person who has inserted the coin.

The cabinet 21 has relatively thick insulated walls, as will be evident in Figs. 2, 3, and 4, and these walls define an internal chamber 30 into which a bottle storage and delivery mechanism 31 may be inserted. This delivery and storage mechanism 31 is formed primarily from sheet metal so as to afford a back wall 32, a front wall 33, and side walls 34, and the rear wall 32 serves as a support for a plurality of shelves 35 that are also made from sheet metal so as to extend forwardly from the rear wall 32. The internal chamber 30 has a forward door 33A, Fig. 2, whereby access may be had to the chamber 30 when the outer doors 22 and 23 are open. The shelves 35 are arranged to slope laterally from a high central point 35A, as will be evident in Fig. 3, and the shelves terminate in ends 35B that are spaced from the side walls 34 in such an amount as to afford vertical delivery channels 38L and 38R along which the bottles B may move downwardly after they have been discharged from the ends of the shelves 35. Such bottles move downwardly along the vertical delivery channels 35L and 35R until they reach sloping bottom walls

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40L and 40R, and these walls serve to direct and allow rolling movement of the bottles toward a delivery mechanism that is mounted in the unit 31 near the bottom portion thereof.

Within the vertical delivery channels 38L and 38R, the bottles rest one upon the other so that when the machine is full, the vertical channels 38L and 38R will be completely filled to the top thereof, and all of the shelves 35 will have bottles loaded thereon, four bottles being disposed on each shelf 35 on each side of the high point 35A as herein shown in Fig. 3. The movement of the bottles off of the shelves 35 and into the vertical delivery channels 38L and 38R, is in the present mechanism controlled in a simple and effective manner which causes the shelves to be progressively emptied from the top down to the bottom of the machine. Thus as will be evident in Figs. 3 and 3A, each of the shelves 35 has a gate 42 pivotally associated therewith so as to extend downwardly therefrom. Thus the gate 42 from the top shelf 35 will normally extend downwardly so as to close the outer end of the channel that is formed above the second shelf. The gates 42 are simple in construction, and are formed from wire so as to be U-shaped in form. The cross member of the U-shaped member is encircled by a lip 43 formed on the end of the shelf 35, thereby to afford the desired horizontal pivot, and the ends of the wires extend downwardly so as to normally bear against the end of the next lower shelf. Now, so long as there is a bottle in the adjacent vertical channel, the weight of the bottles upon a particular shelf 35 will be ineffective to pivot the gate 42 in an outward direction, but as soon as the downward movement in the vertical channel has caused the bottle opposite a particular gate 42 and in the vertical channel to be moved downwardly out of the path of the gate 42, the weight of the bottles within the space above the shelf 35 will be applied to the gate 42 so as to pivot the same outwardly and upwardly as is shown with respect to one of the gates in Fig. 3. Thus the bottles on a particular shelf will move at once into the adjacent vertical channel as soon as space is available within such vertical channel, and the relationship is such that the bottles move with a smooth action that is controlled at all times and hence there is no possibility of breaking or other injury to the bottles in this operation.

When the bottles have moved downwardly through the vertical channels and onto the sloping bottom walls 40, the leading bottle in each instance moves into contact with a delivery cam mechanism 45, one of which is afforded on each side of the vertical center line of the storage cabinet. Such delivery mechanism is effective to deliver bottles alternately from the opposite sides of the machine and onto a final delivery mechanism 47 that serves to advance the bottles endwise and neck-end first so as to project the neck of the bottle forwardly through a delivery opening 48 that extends through the forward face of the cabinet 21 of the machine. In the present instance, this delivery opening 48 extends through the upper portion of the lower door 23 as will be evident in Figs. 1, 2 and 5.

The final delivery mechanism 47 is in the form of a conveyer upon which the bottles may rest and in a final delivery position and may be moved endwise and in a forward direction through the discharge or delivery passage 48. Thus as will be evident in Figs. 3, 4 and 5, the final delivery mechanism includes a pair of sprockets 51 and 52

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mounted on parallel horizontal shafts 54, and these shafts are in turn supported on brackets mounted on the cabinet 31. An endless conveyor chain 55 extends around the two sprockets 51 and 52 so that the upper run of the chain is disposed within the delivery chamber 31 and directly under the center line of the shelves 35. When a bottle B is positioned on the upper run of the chain 55, it is maintained in position on the delivery chain by a pair of guide bars 57 that are preferably made from a resilient or non-metallic material such, for example, as wood. The guide bars 57 are stationarily mounted on opposite sides of the upper run of the chain 55, and when the chain 55 is operated by the sprocket 51, the bottle B that is in position on the chain 55 may be moved forwardly and projected from the delivery opening 48. For this purpose, a driving abutment 59 is mounted on the chain 55 so as to be disposed rearwardly of the bottle B that is in position on the delivery chain. In the present instance, two such abutments 59 are afforded on the chain so as to minimize the amount of movement of the chain that is required in the delivery operation.

When the bottle is thus in delivery position on the upper run of the chain 55, it is impossible for anyone to remove the bottle without first inserting a coin so as to cause proper and authorized operation of the delivery mechanism. Thus as will be evident in Fig. 5 of the drawing, the delivery opening 48 is normally closed by a gate 61 that is pivoted at 62 at its upper edge, this gate being afforded primarily to prevent entrance of warm air into the refrigerated compartment of the apparatus, and when this gate is lifted, the neck end of the bottle B is within view and is readily accessible so that it can be reached by a person who seeks to improperly remove such a bottle from the machine. However, just forwardly of the neck end of the bottle, the bottle must move through an opening 64 that is formed in the forward wall 33 of the cabinet 31, and when a person endeavors to withdraw a bottle through the opening 64, this bottle is caused to wedge in the opening 64. Thus as will be evident in Fig. 5 of the drawings, an abutment 65 is provided on the chain 55 in forwardly spaced relation with respect to each abutment 59 so that whenever a bottle is delivered to the chain 55, there will be an abutment 65 disposed just forwardly of the sloping neck surface S of the bottle, as shown in Fig. 5. Thus where the neck of the bottle is grasped so as to withdraw the bottle in a forward direction, the neck surface S will ride upwardly on the abutment 65 and will cause the upper portion of the bottle B to engage the upper edge 64T of the opening 64. Hence, it will be impossible for an unauthorized person to withdraw a bottle from the cabinet without first causing proper operation of the coin slot mechanism and the bottle delivery mechanism.

As hereinbefore pointed out, the bottles B are delivered to the delivery position on the upper run of the chain 55 alternately from the opposite vertical delivery channels 38L and 38R, and this is accomplished by the delivery cam mechanism 45. As will be evident in Figs. 3 to 7, the delivery cam mechanisms 45L and 45R are generally similar constructions and for this purpose, such delivery mechanisms have horizontal shafts 70L and 70R, respectively that are rotatably supported on the frame of the cabinet 31, so as to be disposed beneath the elevated portions 40U of the walls 40, and on each of the shafts 70L and

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70R a pair of delivery cams 71 is secured. The delivery cams 71 are in the present instance each formed with a hub 72 adapted to be slipped into position on the supporting shaft 70 and secured in position by pins 73. The cams 71 extend upwardly through slots 40S in the walls 40 so that the exposed upper portions of the cams may operate upon the bottles B. The delivery cams 71 are so spaced on their mounting shaft 70 as to engage the body portion of the bottles, and in the course of a full revolution of one of the shafts 70, the associated cams 71 are effective to lift the leading bottle from the related wall 40L or 40R and place such bottle in delivery position on the upper run of the delivery chain 55. Thus, as will be evident in Figs. 3 and 6, the leading one of the bottles from the delivery channel 38L is in effect rolled downwardly along the sloping wall 40L by the weight of all of the bottles in the channel 38L, and this causes the leading bottle to be held against a leading cam surface 71L of the cam. As this cam moves in a clock-wise direction, the cam surface 71 will recede gradually so that when the shaft 70 has operated through 180 degrees, the bottle will have advanced with a slow and gradual movement into a pocket 71P of the cam. With respect to the right hand delivery channel 38R, leading bottle B is illustrated in Figs. 3 and 6 as being disposed within the pocket 71P of the delivery cam, and it will be evident that in the next half revolution of the right hand cam 71, this bottle will be lifted and then rolled onto and advanced along an upwardly sloping portion 40U of the wall 40R until it is projected into delivery position on the upper run of the chain 55. As such movement of a particular bottle progresses, the next bottle will come into contact with a portion 70H of the cam surface, this constituting the high point of the cam, and this next bottle will therefore move along from this high point 70H and along the receding surface 71L so as to gradually lower all of the bottles in the related vertical delivery channel. The extreme point 70P of the cam 71 serves of course to impart a final pushing movement to a bottle on the wall 40U so as to cause this bottle to roll into delivery position on the upper run of the delivery chain 55. It will be understood of course that prior to the time when this final movement is applied to a bottle, the bottle that was in delivery position on the delivery chain at the start of the cycle will have been projected forwardly into the delivery passage 48 so as to be out of the path of the newly advanced bottle.

The desired timed relation between the operations of the feed chain 55 and the delivery cams 71 is attained in the present instance in a simple and effective manner. Thus, as will be evident in Figs. 3 to 5, the sprocket shaft 54 has bevel gears 76L and 76R fixed on the opposite ends thereof, and the desired drive for the various elements of the delivery mechanism is applied thereto by connection with the lefthand cam shaft 70L. The shaft 70L therefore has a relatively large bevel gear 77 at its rear end that is meshed with the lefthand gear 76L, and the righthand gear 76R is meshed with a relatively large gear 77R that is fixed on the rear end of the righthand shaft 70R. The gears 76 and 77 are so related that the cams 71 are displaced 180 degrees from each other and rotate in opposite directions, and by reason of this relationship, the cams are caused to deliver bottles alternately from opposite sides of the machine to

the delivery position on the upper run of the delivery chain 55.

In accordance with the present invention, the delivery mechanism is driven by means that are located outside of the refrigerated portion of the machine, and for this purpose, the drive is applied to the forward end of the left hand cam shaft 70L. The drive is applied by means including a drive and control unit 80 that is shown in detail in Figs. 8 to 11, and which is related to the delivery mechanism in the manner illustrated in Figs. 2 and 4 of the drawings. The unit 80 is shown and claimed in my divisional application, Serial No. 789,882, filed December 5, 1947, and now issued as Patent No. 2,464,389, patented March 15, 1949. Thus as shown in Figs. 8 and 9, the delivery and control unit embodies a mounting base 81 on the forward face of which a driving motor 82 is mounted with its drive shaft 83 disposed in a horizontal position. A reduction gear box 85 is also secured on the forward face of the mounting plate 81, as will be evident in Figs. 8 and 9, and the power input shaft 86 of the reduction gearing is aligned with the motor shaft 83 and is coupled thereto by a coupling 87. Within the reduction gear box 85, any suitable gearing arrangement may be employed and in the present instance, this gearing includes a plurality of gears 90, the final one of which is fixed within the gear box upon a horizontal and rearwardly projecting output shaft 91. When the mounting and control unit 80 is to be put in place in the vending apparatus, it is disposed outside of the forward insulated wall of the cabinet 21 and rearwardly of the inner face of the door 23 so as to be housed in a convenient position within the clearance space afforded in the hollow lower door 23, as shown in Fig. 4, and such mounting may be accomplished through the use of a vibration absorbing means 92 that is illustrated generally in Fig. 9 of the drawings. As the unit 80 is put in place, the rearwardly projecting end of the shaft 91 is moved endwise toward the forward end of the cam shaft 70L, and a driving coupling 94 on the rear end of the shaft 91 is moved into driving engagement with a complementary element 95 on the forward end of the cam shaft 70L. Thus, when the motor 82 is energized, the cam shafts and the delivery chain 55 will be operated.

The desired control for the operation of the motor 82 and the delivery mechanism that is operated thereby is under the present invention accomplished in a simple and expeditious manner that avoids the use of relays and other mechanism that may tend to get out of order in the use of the machine. Thus, under the present invention, the energizing circuit for the motor 82 is closed through the operation of the solenoid 100, and is opened under control of the rotative movement of the final drive shaft 91 of the unit. Thus, as will be evident in Figs. 8 and 11, the motor circuit is afforded from a conventional power source 101 that includes line wires L1 and L2. A wire 103 as extended from the line wire L1, to one terminal of the motor 82 while a wire 104 is extended from the other terminal of the motor 82 to the movable contact 105M of a normally closed switch 105. The stationary contact 105S of this switch is connected by a wire 106 to the other line wire L2 so that upon closure of the switch 105, the motor 82 is energized. The switch 105 is arranged to be opened and closed under control of

a cam 110 that is mounted on the forwardly projected end of the final drive shaft 91 and to enable this to be accomplished the cam 110 has a limited lost-motion connection with the shaft 91 so as to enable limited rocking movement of the cam 110 with respect to the shaft 91. Thus the cam 110 is in the form of a lever that is loosely mounted on the shaft 91 so that the ends thereof project radially in opposite direction from the shaft 91, and teeth 111 are extended forwardly from the opposite ends of the cam 110 so that these teeth may be engaged by driving teeth 112 formed on a collar 113 that is fixed by a pin or set screw 114 on the forward end of the shaft 91. The relation of the teeth 111 and 112 is such that the cam 110 may rock through a limited angular stroke with respect to the shaft 91. The switch 105 is so mounted and disposed with relation to the forward end of the shaft 91 that when the cam 110 is rotated by the shaft 91, one of the ends of the cam 110 will eventually engage and move the switch element 105M to its open position of Fig. 11. Such rotative movement of the cam 110 is of course imparted thereto in the course of movement of the shaft 91 because the tooth 112 will engage with the tooth 111 of the cam to effect such drive. Thus, the switch 105 will be opened when the cam reaches a position such as that shown in Fig. 11, and the operation of the mechanism will be stopped. When the mechanism is to be operated through another vending cycle, it is only necessary to rock the cam 110 in an advancing direction with respect to the shaft 91, and this may be of course accomplished because of the aforesaid lost-motion connection. In the course of such rocking movement of the cam 110, the switch 105 is allowed to close and the cycle of operation will therefore be properly initiated. As such cycle progresses, the lost-motion between the cam and the shaft 91 will of course be taken up, and the cam 110 will again be driven by the shaft 91 so as to properly engage and move the switch element 105M to its open position when the cam shafts 70L and 70R have been moved through 180 degrees.

The desired shifting the cam 110 so as to effect the closing of the switch 105 is caused by operation of the solenoid 100, the armature 110A of which is urged downwardly by its spring 116, and at the end of a vending cycle, the tooth 115 is disposed beneath the left hand of the cam 110 in the relationship shown in Fig. 11 of the drawings. When the solenoid 100 is energized, the armature 100A thereof is moved upwardly so as to shift or rock the cam 110 through its lost-motion movement to the position shown in Fig. 8, and this allows the switch 105 to close. The solenoid 100 may then be deenergized so as to allow the same to return to the relationship shown in Fig. 8, and the cycle of operation of the mechanism will progress and will be terminated by the switch opening action of the cam 110 with the parts in the position as shown in Fig. 11.

The solenoid 100 is under control of the coin slot mechanism 27, Figs. 1 and 11, and this coin slot mechanism includes a normally open switch 120 that is momentarily closed each time a coin passes through the normal or proper coin receiving channel of the coin slot mechanism. The switch 120 has one contact thereof connected by a wire 121 to the line wire L2, while a wire 122 extends from the other contact of the switch 120 to one terminal of the solenoid 100. The other terminal of the solenoid 100 is connected by wires

123 and 124 to the line wire L1 so that when the switch 120 is closed, by passage of a coin, the solenoid 100 will be momentarily energized in the manner hereinbefore described.

It has been mentioned hereinbefore that safety means are provided to prevent insertion and retention of a coin when the machine is empty, and for this purpose sensing means are provided to sense the presence or absence of a bottle B at the delivery position on the conveyor 55. Thus as will be evident in Figs. 3, 5, 6 and 11, a normally closed micro-switch 125 is mounted directly over the delivery position by means including a bracket 126 and a horizontal supporting wall 127, and means are provided for operating this switch 125 in response to the presence or absence of a bottle in the delivery position. Thus the bracket 126 has a switch operating member 130 in the form of a lever pivoted at 131 on the bracket 126. The switch operating arm 130 tends normally to assume the depending vertical position indicated at 130E in Fig. 6, and when a bottle is moved laterally from one side or the other into the discharge or delivery position, the arm 130 is moved either to the full line position shown in Fig. 6, or to the dotted line in position indicated at 130D in this figure. The switch operating arm 130 has a pair of spaced cam lugs or projections 132 formed at its upper end so that when the lever 130 is in either of its laterally projecting positions due to the presence of a bottle in the delivery position, one or the other of the projects 132 will engage and operate the plunger 125P of the switch 125. The switch 125 is of a normally open type, and is closed by the action of either of the cam projections 132. When, however, the lever 130 is in its vertical position indicated at 130E, the plunger 125P is released and the switch 125 is allowed to open. Such operation of the switch 125 is arranged to afford an indication as to whether or not the machine is empty, and in the present instance, this is accomplished through the use of a reject solenoid 134 of the coin slot mechanism 27. This solenoid 134 forms a conventional part of the coin slot mechanism, and when the solenoid 134 is energized, the coin slot mechanism 27 is conditioned for reception of a coin, and is conditioned for proper operation and closure of the switch 120 by the coin. The solenoid 134 is thus utilized by connecting one contact of the switch 125 to the wire 124 by a wire 135, a wire 136 being extended from the other contact of the switch 125 to one terminal of the solenoid 134. The other terminal of the solenoid 134 is connected by a wire 137 to the line wire L2 so that when the switch 125 is closed due to the presence of the bottle B of the delivery position, the coin slot mechanism 27 will be conditioned for proper or normal operation. In accordance with the present invention it will be observed that the switch operating or sensing lever 130 not only returns to its vertical position to indicate that the machine is empty, but also, this sensing lever 130 moves to this vertical position each time the machine moves through a delivery cycle, and thus the machine, by rejection of any coins by the coin slot mechanism 27, affords an indication in each cycle of machine operation as to whether or not it is empty.

From the foregoing descriptions it will be evident that the present invention enables bottle vending machines to operate extremely rapidly and this is accomplished in such a manner that the bottles advance with a slow and gradual

movement so as to avoid damage to such bottles. It will also be evident that under the present invention the bottles are delivered to the user in a convenient way so that the bottle may be readily grasped and removed from the machine by the user. The arrangement that is afforded in the invention herein disclosed also prevents theft of merchandise from the machine, and this is accomplished in a simple and economical manner.

Under the present invention the machine, by rejection of the next coin, affords an indication as to whether or not the machine is empty in each cycle of machine operation, and there is little possibility that the user will insert a coin into the machine without receiving a return of the coin in the event that the machine is empty.

The bottle vending machine in the present invention is also of particular utility in that the driving and control mechanism are located outside of the refrigerated portion of the cabinet and this is accomplished in a simple manner that enables the mechanism to be easily inspected or removed. The mechanism whereby the present machine is controlled is simple since it avoids the use of relays and accomplishes the control function through the use of a simple and inexpensive solenoid. The bottle storage mechanism of the vending machine of the present invention is extremely simple in character, and the mechanism is such that the bottles are withdrawn from the storage shelves in a predetermined order, and without possibility of damage to the bottles. It will be evident that the present invention enables bottle vending machines to be made more reliable in operation and this may be done in a simple and economical manner.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claim:

I claim:

In a vending machine, means affording a cabinet, means for storing a plurality of bottles in said cabinet, means including a downwardly extended feed channel for directing bottles from said storage means in a downward direction, means affording a terminal chamber into which bottles are moved in succession from said downwardly extended feed channel, means defining a horizontal delivery station adjacent said terminal chamber and into which a bottle may be moved from said terminal chamber into a horizontal position at said delivery station, a feed chain disposed at said delivery station for moving such a bottle endwise out of said delivery station, means defining a delivery passage into which such a bottle is moved endwise by said chain, into an accessible vended position, means affording an abutment arranged to engage such a bottle and prevent movement thereof into said delivery passage when said bottle is in an improper lateral position, means on said delivery chain for shifting such a bottle laterally when such bottle is moved endwise while the chain remains stationary, and means operated in timed relation to said chain for advancing the leading bottle from said terminal chamber into said delivery station after the preceding bottle has been discharged endwise from said station.

CARL L. GRAU.

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1,718,102	Bauer	June 18, 1929

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Number	Name	Date
1,902,612	Blossom et al.	Mar. 21, 1933
2,002,753	Parks et al.	May 28, 1935
2,106,042	Stark	Jan. 18, 1938
2,108,522	Bergman	Feb. 15, 1938
2,189,740	Mills	Feb. 6, 1940
2,363,724	Ford	Nov. 28, 1944
2,397,944	Bureau	Apr. 9, 1946
2,405,891	Larimore	Aug. 13, 1946
2,408,380	Dennis	Oct. 1, 1946
2,416,728	Albrecht	Mar. 4, 1947