

March 13, 1945.

C. V. RICE ET AL

2,371,316

BOTTLE VENDING MACHINE

Filed July 5, 1941

3 Sheets-Sheet 1

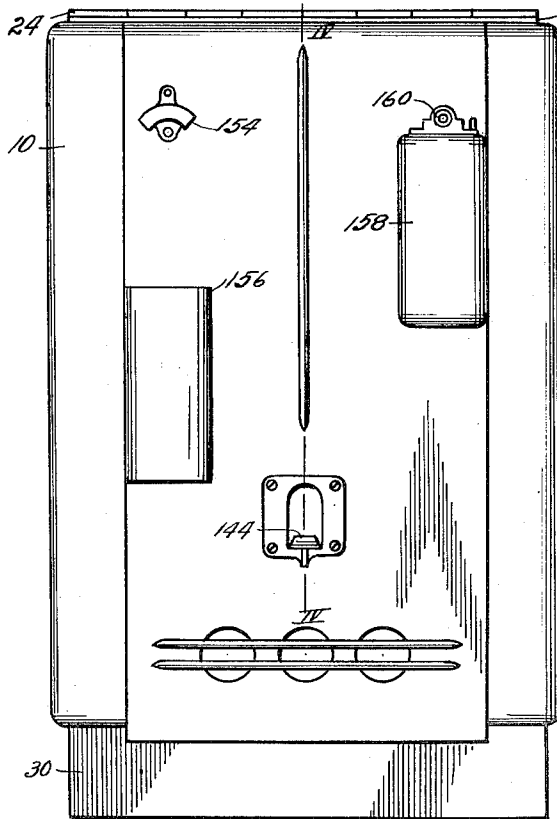


Fig. 1

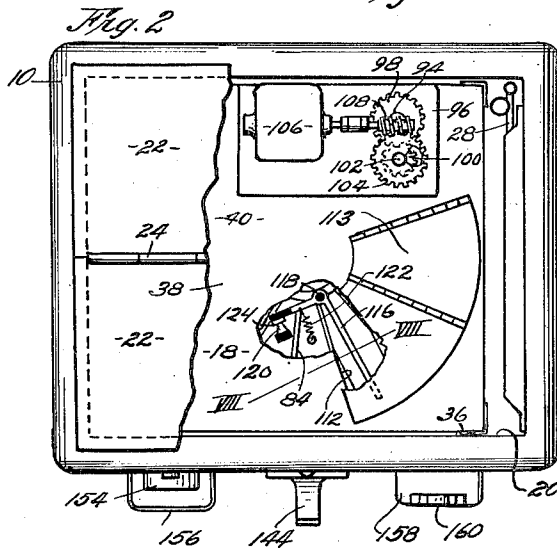


Fig. 2

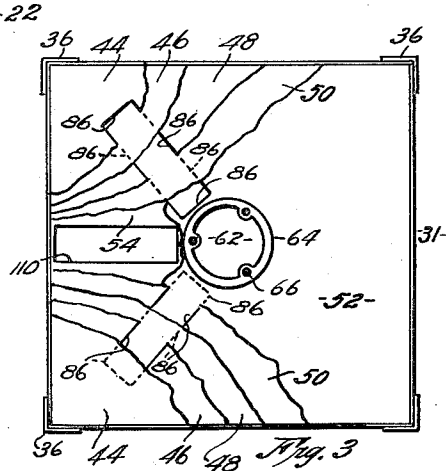


Fig. 3

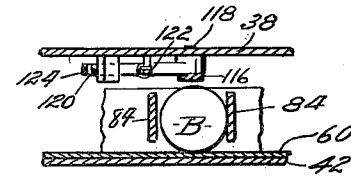


Fig. 8

Fig. 13

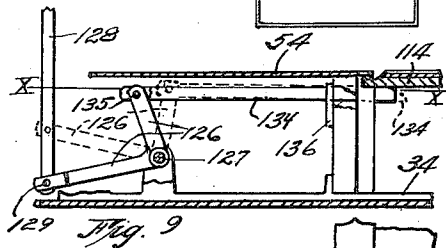
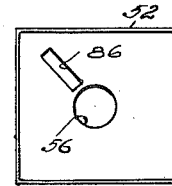


Fig. 9

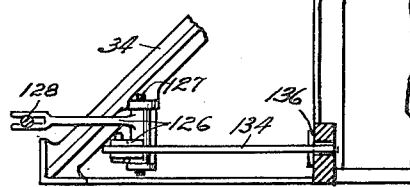


Fig. 10

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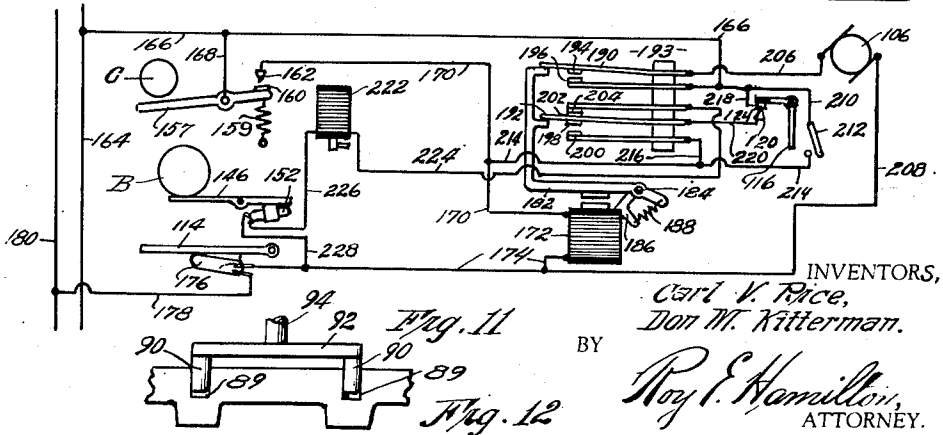
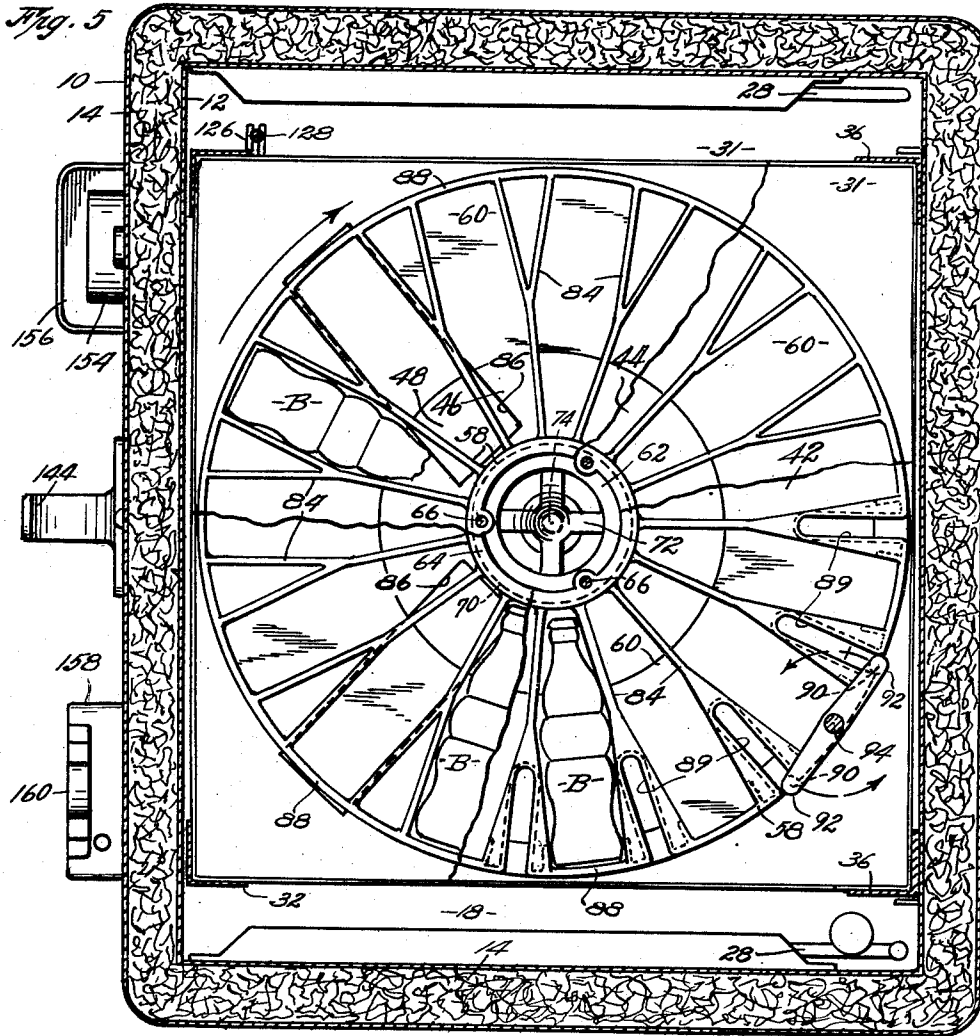
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,371,316

BOTTLE VENDING MACHINE

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Application July 5, 1941, Serial No. 401,088

1 Claim. (Cl. 312—97.1)

This invention relates to certain new and useful improvements in bottle vending machines.

The primary object of the invention is the provision of a bottle vending machine wherein the bottles are disposed in closely related position on vertically spaced apart supports, and intermittently moved by means of a Geneva drive to be successively delivered from said machine.

Another object of the present invention is the provision of a coin controlled dispensing refrigerator which will contain a maximum number of bottles, can be operated by a relatively small power unit, and is economically and sturdily built.

Further objects of the invention include the specific structural elements, the combination and novel manner of operation, all of which will appear during the course of the specification referring to the accompanying drawings wherein:

Figure 1 is a front elevation of a bottle vending machine embodying this invention.

Fig. 2 is a plan view of the vending machine with parts broken away.

Fig. 3 is a detached planar view of the bottle carrying platforms partly broken away.

Fig. 4 is an enlarged vertical section taken on line IV—IV of Fig. 1, with the back parts slightly offset.

Fig. 5 is a horizontal sectional view taken on line IV—IV of Fig. 4.

Fig. 6 is fragmentary plan view of the bottom portions showing the automatic switch for cutting off the electric current to the driving motor when the last bottle is delivered from the machine.

Fig. 7 is a sectional view taken on line VII—VII of Fig. 6.

Fig. 8 is an enlarged fragmentary sectional view taken on line VIII—VIII of Fig. 2.

Fig. 9 is a vertical sectional view showing the trap door securing device.

Fig. 10 is a section view taken on line X—X of Fig. 9.

Fig. 11 is a diagrammatic view of the electric circuit.

Fig. 12 is a fragmentary elevational view of the drive.

Fig. 13 is a reduced plan view of partition 52.

Throughout the several views like references refer to similar parts and the numeral 10 designates an outer casing which might be made of various forms, and is shown as rectangular in cross section with slightly rounded corners. An inner casing 12 is spaced apart from the outer casing 10 to form a pocket therebetween to receive a heat insulating material 14. A transversely disposed partition 16 forms a bottom for

the refrigerating compartment 18 which is open at 20 and provided with a cover 22 hinged at 24 adjacent its center line. A lower compartment 26 positioned below the refrigerating compartment is adapted to receive a mechanical refrigerating unit not shown from which a refrigerant is fed to the cooling coils 28 which are positioned in the refrigerating compartment, however the particular type of refrigeration employed is not material to the novel means of controlling and delivering the bottles. A suitable base 30 is provided to support the body of the machine.

The bottle carrying mechanism 31 comprises a substantially rectangular frame 32 having spider base member 34 vertically disposed angled corner members 36 and a top plate 38. The side portions intermediate the corner members are open to admit free access of the cooling air from the coils. Located between the cover 22 and top 38 is a chamber 40 which serves as a pre-cooling chamber for a number of bottles which may be set upright or otherwise positioned therein.

Horizontally disposed partitions 42, 44, 46, 48, 50, 52 and 54 carried by frame 32 are spaced apart a sufficient distance to receive a beverage bottle B for free movement therebetween. Each of said partitions is provided with a central circular opening 56, and these openings are axially disposed to receive a rotatable bottle propelling mechanism 58. A cushion pad 60 is provided on each of said partitions to support the bottles from the metal partitions and to prevent the production of too much noise as the bottles are moved during filling and dispensing operations. Furthermore, this cushion also prevents excessive wear of the bottles.

The bottle propelling mechanism 58 comprises a sectional drum member 62 formed of inter-engaging ring hub members 64 secured together by the vertically disposed tie bolts 66 with nuts 68. These ring members 64 are each annularly offset at 70 to receive the edge portion of the adjacent horizontal partition about its central opening 56.

The bottom end of the drum member is provided with a spider bracket 72 having a depending, axially disposed axle 74 which is mounted in bearing 76 carried by vertically disposed bracket 81. Top bearing bracket 80 which receives the trunnion 82 carried by the top plate 38 is in axial alignment with axle 74. Hub rings 64 have substantially radially disposed arms or spokes 84 which are spaced apart the proper distance to encompass beverage bottles as shown in Fig. 5, so that as the hubs and associated arms are rotated the beverage filled bottles will be

rolled through the arc of a circle and delivered, one at a time, to the opening 86 formed through each of the horizontal partition plates.

The outer ends of adjacent arms 84 are joined together by cross bar 88 which serves as an abutment for the bottom end of the bottle during the rolling operation, and the hub rings 64 serve to limit the inward movement of the bottle. It will be noted that the bottle propelling wheels are made to receive and drive a relatively large number of bottles disposed radially on said horizontal partitions.

The upper hub ring 64 is provided with the usual propelling arms 84 the connection between which is provided on its upper face with radially disposed grooves 89 extending inwardly from the outer edge thereof to receive the downwardly projecting lugs 90 of rotary driving member 92. This rotary driving member 92 is centrally mounted on a shaft 94 mounted in frame bearing 96 and having at its upper extremity a spur gear 98 which intermeshes with pinion 100 fixed on shaft 102 mounted for rotation in frame bearing 96. Shaft 102 also has a rigidly attached worm gear 104 which is directly driven by motor 106 through worm 108. This Geneva movement drive is so timed and controlled that it will cause the bottle propelling mechanism to move all the bottles forward through an arc equal to one bottle space and then stop with the lugs 90 in position to secure the bottle propelling mechanism against accidental movement.

Referring to Fig. 5, it will be noted that as the lugs 90 are rotated in the direction indicated by the arrow the movement of the bottle propelling means 58 will at first be very slow due to the relative angles of movements of the members, will accelerate and then slow down until it comes to a definite stop in the securing position shown in Fig. 5. When thus moved the bottles will not tend to over-ride due to their momentum, also the power required to start the movement will be at a minimum due to the great advantage of the small starting movement. When the Geneva is at rest the bottle driving mechanism cannot be moved from its secured position thereby eliminating the possibility of obtaining more than one bottle at each operation of the machine.

The openings 86 formed in the various horizontal partitions are so arranged that the openings in alternate partitions are in vertical alignment and the openings in adjacent partitions are spaced apart in such a manner that two series of openings are formed at opposite sides of the center delivery opening 110, as clearly shown in Fig. 3. These openings 86 are disposed radially and are adapted to be in alignment with the bottles in the bottle propelling mechanism 58 when said driving member is at rest, as described above.

During the filling operation, the filled bottles are deposited through the opening 112 in the top 38 as the bottle propelling mechanism is operated so that the bottles will be delivered step by step to the bottom partition 54. The double hinged closure 113 serves to normally close opening 112. After 54 has been completely filled, no more bottles can be delivered thereto so that the bottles in the compartment next thereabove will roll over the opening in partition 52 by contacting the filled bottle therebelow. This same operation will proceed upwardly until all compartments are filled.

During the filling operation the trap door 114

will be secured in the closed position, as herein-after described. Since the bottle propelling mechanism is rotated in but one direction it is evident that with the delivery openings 86 offset as described, the various compartments will first be partially filled and then beginning at the bottom each compartment will be successively filled to completely fill the container. The exact construction of the radial arms 84 forming the bottle engaging means is not material except that they should be so constructed as to maintain the layer of bottles in as closely related relation as possible to enhance the capacity of the machine.

It will be noted that when the bottles are properly positioned on the various transverse partitions they will extend substantially to the bottom side of the partition thereabove. Since during the filling operation the operator might not properly position the bottle, between arms 84, provision is made to automatically cut off the current to the driving motor 106 so as to stop the movement of the bottle propelling mechanism 58 until said bottle has been correctly positioned. This current breaking means comprises an arm 116 pivoted intermediate its ends at 118 to the top plate 38. This arm is pivoted for horizontal movement and is normally held in contact relation with a stationary contact point 120 by means of a spring 122. The outer end of arm 116 is positioned so as to be spaced slightly above the properly positioned bottles in the upper compartment so that when a bottle is positioned slightly above said correct position during the filling operation, it will strike arm 116 and move contact point 124 carried by the inner end of arm 116, away from contact point 120, thereby breaking the circuit and stopping the electric motor 106. This mechanism will avoid breaking of the driving mechanism during the filling operation.

During the filling operation, the trap door 114, is always secured in the closed position by the following mechanism, best shown in Figures 4, 9 and 10. A bell crank lever 126 pivoted at 127 to base member 34 is pivotally connected by one of its arms by pivot 129 to a vertically disposed bar 128 which extends upwardly to normally extend above the bottom of cover 22. The upper end of bar 128 extends through a stationary bracket 130 and is provided at its upper end with a push button 132. A compression spring 133 encompasses bar 128 and is positioned between button 132 and bracket 130 and is of sufficient strength to operate the securing bar 134 which is pivoted at point 135 to one arm of the bell crank lever 126 and is supported at its other end by a slotted plate 136. When the cover 22 is in the closed position, as shown in Fig. 4, spring 133 will be compressed and the bell crank lever moved to the position shown in solid lines shown in Fig. 9 to hold the securing bar 134 from beneath the trap door 114, however when cover 22 is raised the spring will force bar 128 upwardly and force the securing bar 134 to a position beneath the trap door 114.

The trap door 114 is pivoted to base member 34 at 138 and is provided with a counter bar weight 140 which normally maintains the trap door in the closed position, however when a filled bottle is rolled thereon said trap door will tilt to the position, shown in dotted lines in Fig. 4, to deliver the bottle B through the delivery chute 142 where it can be easily reached by the operator. This chute terminates in an angled bracket

144 which prevents the bottle from accidentally dropping from the chute.

When the last bottle has been delivered from the machine a suitable means is provided whereby the current to the electric motor will be cut off. This switch mechanism is best shown in Figs. 6 and 7, wherein an elongated bar 146 pivoted intermediate its ends at 148, is positioned in a slot 150 formed in the bottom partition 54 adjacent the delivery opening 110 so that the bottles being moved to said delivery opening will rest thereon to prevent tilting of the pivoted bar 146. That portion of the bar 146 removed from opening 110 is provided at its under side with a mercury switch 152 which is closed when the bar is in the horizontal position, as shown. When the bottle B is moved toward the delivery opening 110 and away from the bar 146, bar 146 will tilt in the direction indicated by the arrows to open the mercury switch.

A cap removing device 154 is secured adjacent the upper portion of the bottle vending machine and above a cap receiving compartment 156 which is positioned therebelow. A coin control switch mechanism 158 having a coin slot 160 is positioned conveniently on the front face of the cabinet.

A mercury switch 176 is rigidly secured to the underside of trap door 114 to rock therewith as the trap door is tilted during the bottle delivery operation. When the trap door is in the horizontal closed position the mercury switch is closed and when the door is tilted as shown in dotted lines in Fig. 4 the switch is open.

A diagrammatic showing of the salient parts of the coin control mechanism 158 will be shown and described in the diagrammatic view of the electric circuit, shown in Fig. 11. The coin C is adapted to fall on switch lever 157 which is normally held in the open position by means of spring 159. The weight of the coin will cause points 160 and 162 to contact thereby connecting the feed line 164 through wires 166 and 168, switch lever 157 and wire 170 with electromagnetic coil 172 thence by wire 174, mercury switch 176, wire 178 to the other power feed line 180.

An armature 182 pivoted at 184 to bracket 186 is thereby operated against the action of spring 188 to permit the flexing of spring bars 190 and 192 of the multiple switch 193. When so operated, point 194 contacts point 196 and point 198 contacts point 200. A contact point 202 normally contacts point 204, however when the electromagnet 172 is energized these points 202 and 204 are opened.

Wire 206 connects point 194 to one pole of the motor 106 while the other pole of the motor is connected by wire 208 to wire 174. Wire 210 connected with point 196 connects with one of the contacts of loading switch 212, the other contact of which is connected by wire 214 to wire 170. Point 200 is connected by wire 216 to wire 214. Switch point 124 is connected by wire 218 to wire 210 and point 120 of said switch is connected by wire 220 to points 202 and 198. Wire 166 from the feed wire 164 also connects with the wire 210 intermediate point 196 and wire 218. Point 204 connects with the kick-out solenoid 222 through wire 224. The other pole of solenoid 222 is connected with one pole of the mercury switch 152 by wire 226 and the other point of the mercury switch is connected by wire 228 to wire 174.

When magnetic coil 172 is energized by the

dropping of coin C, as described above and the armature is operated, an electric current will pass from feed wire 164 to wire 166, wire 210, points 196, 194, wire 206 to one pole of the motor 106, thence by wires 208 and 174 through closed mercury switch 176 and wire 178 to the other feed wire 180 thereby operating the Geneva drive and causing the bottles within the container to move forwardly one step.

This movement will cause the delivery of bottles through openings 86 to the partition next therebelow and will always deliver a bottle to the trap door 114 for delivery through the chute 142.

As long as electromagnetic coil 172 is energized the armature 182 will be held in the inactive position. The coil 172 is de-energized at the delivery of each bottle since as the delivery trap door 114 moves downwardly mercury switch 176 will open thereby definitely cutting off one of the feed lines of the circuit.

As soon as switch 176 is opened, armature 182 will return to its normal position and the motor cannot be started until another coin is delivered to the machine.

When the last bottle has been delivered from the carrier, bottle B, shown diagrammatically in Fig. 11, will move from the tilting member 146 and permit it to open mercury switch 152.

The opening of mercury switch 152 will de-energize the kick-out solenoid 222 so that the coin C will be delivered back to the customer, by standard means not shown.

When it is desired to load the machine, the operator closes switch 212 so that current from feed wire 164 passes through wire 166, wire 210, switch 212, wire 214, wire 170, through electromagnet 172, wire 174, closed mercury switch 176 and wire 178, to feed wire 180. This will energize electromagnetic coil 172 operating armature 182 and supplying current to the electric motor 106 in the manner described above.

After the motor 106 starts, switch 212 is opened but the circuit from 218, 124, 120, 198, 216, 214, 170 to solenoid 172 remains closed and when the bottle compartments are filled contact points 120 and 124 are opened to de-energize electromagnet 172 thereby causing the multiple switch 193 to operate to cut off the current to driving motor 106.

Since the trap door securing device automatically works to lock said trap door 114 in the closed position, when the cover 22 is raised it is apparent that during the filling operation no bottles can be delivered from the machine.

By making slight changes in the structure and without departing from the spirit of the invention the bottle propelling mechanism might be driven from a Geneva power unit positioned in the lower compartment 26 thereby providing more room for the storing of bottles in chamber 40.

It will be noted that the hub rings 64 form a tubular passageway extending entirely through the series of bottle supporting partitions whereby air will circulate therethrough to maintain a more even temperature throughout the box and eliminate much of the usual condensation.

Having thus described the invention what we claim as new and desire to be secured by Letters Patent is:

In a bottle vending machine of the character described, a case having a discharge opening and an open top, a closure for said open top, a series of apertured, vertically spaced partitions

adapted to carry a series of reclining bottles between adjacent partitions, rotatably mounted bottle driving mechanism operable to simultaneously move all of said bottles and successively deliver said bottles to said discharge opening, means operable by the bottle moving from the lower partition to said discharge opening to make inoperable said bottle driving mechanism, a

hinged closure for the aperture in the lower partition, and means operable as the closure for said open top is moved from the closed position to secure said hinged closure in the closed position to prevent the movement of bottles to said discharge opening.

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