Dec. 8, 1942. H. J. SMITH 2,304,484

VENDING MACHINE

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FIG. 2.

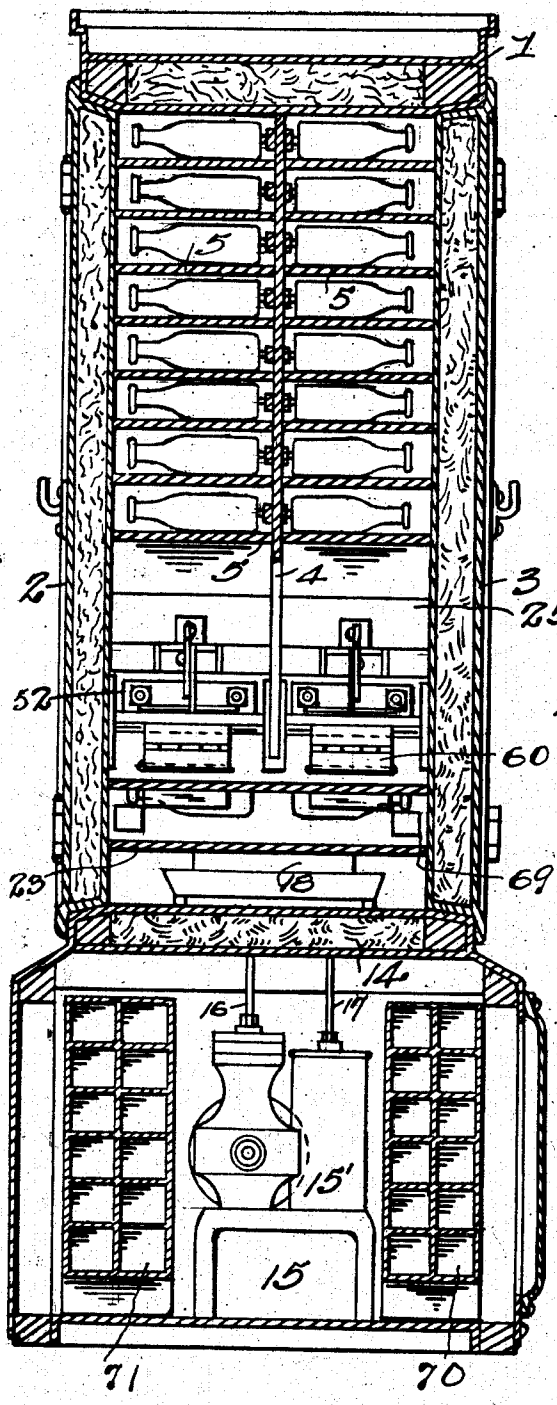
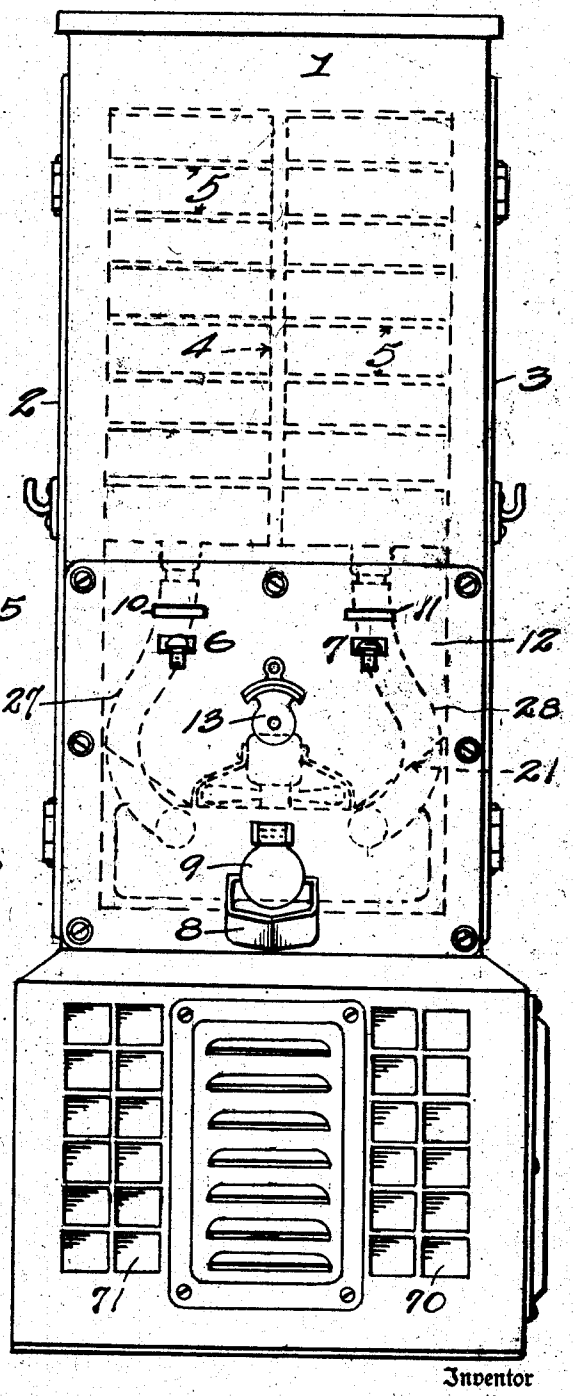


FIG. 1.



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VENDING MACHINE

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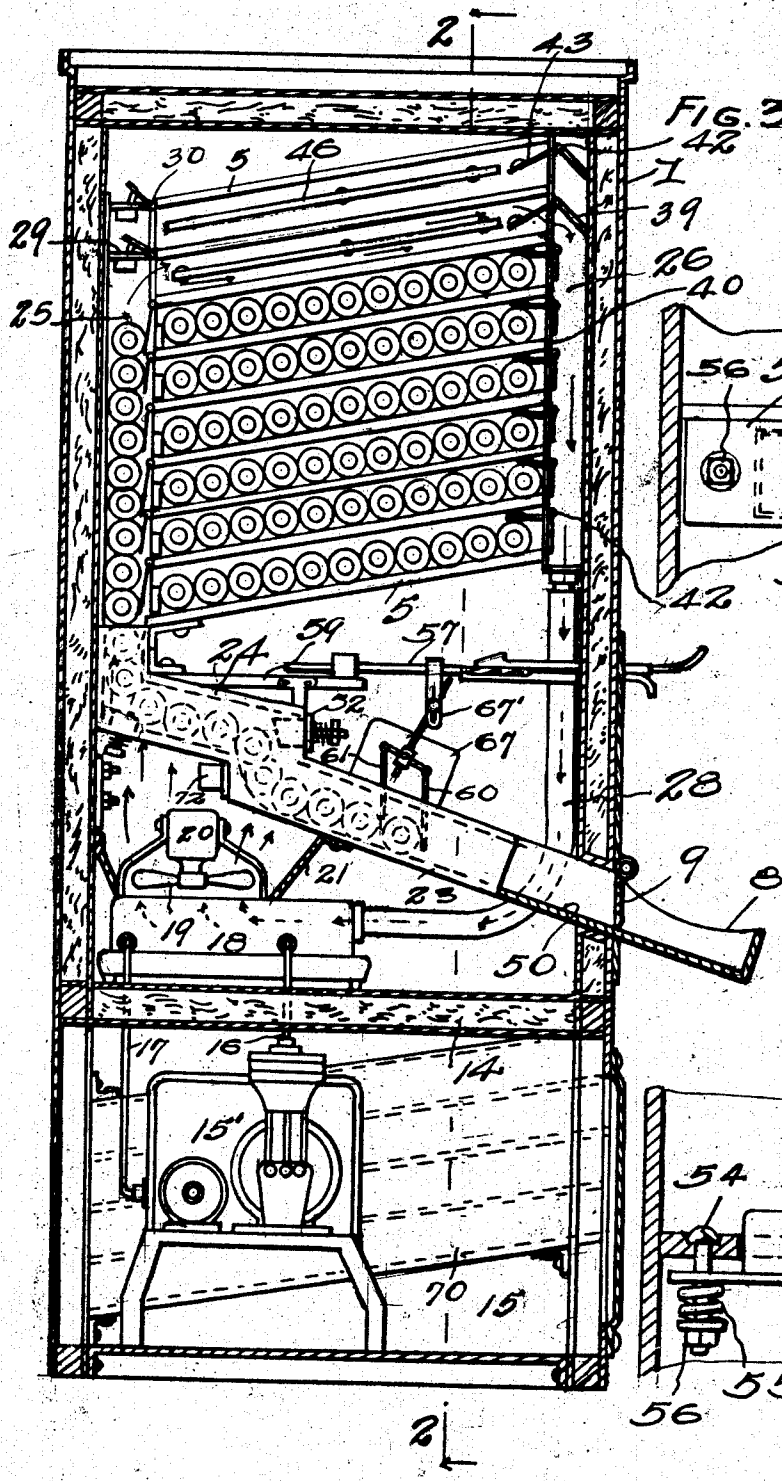


FIG. 3.

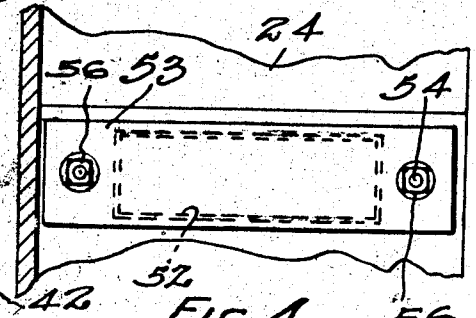
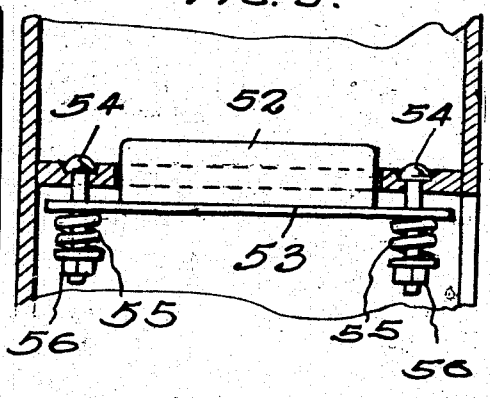


FIG. 4.

FIG. 5.



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VENDING MACHINE

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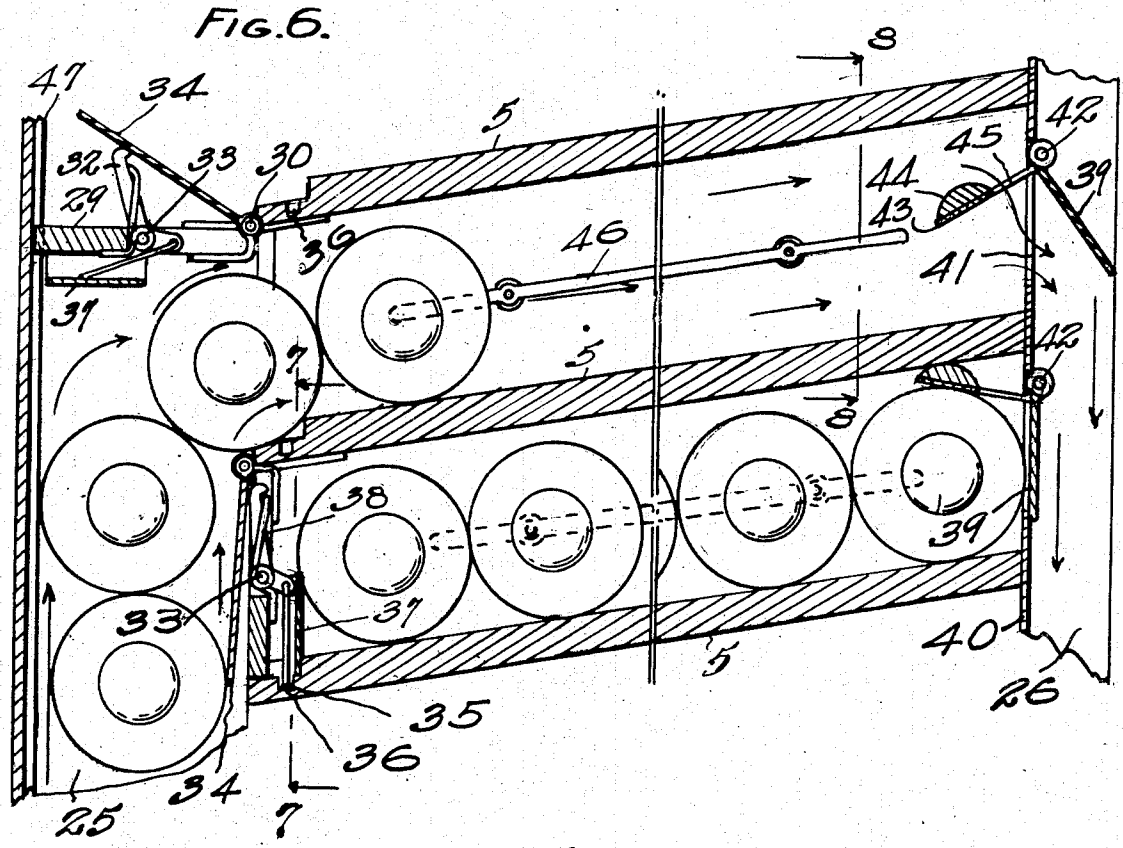
FIG. 6.



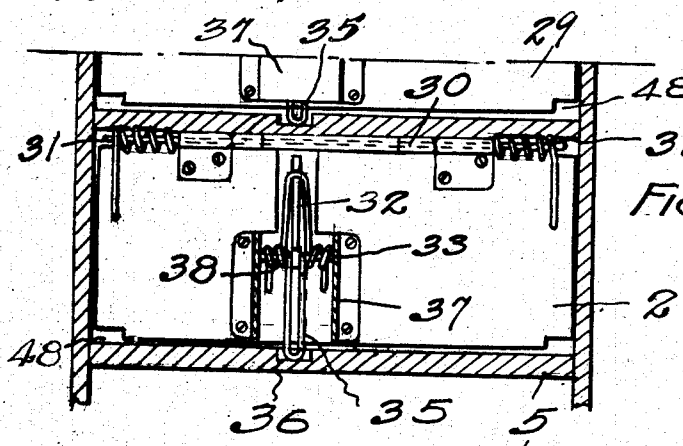


FIG. 7.

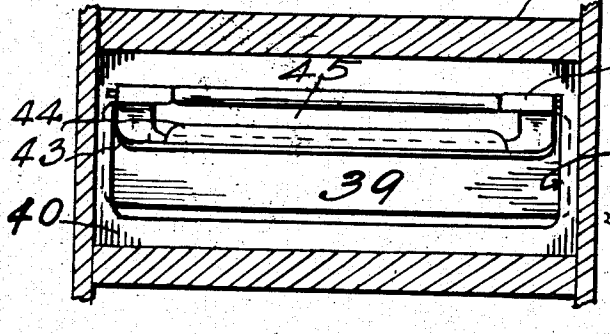


FIG. 8.

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FIG. 9.

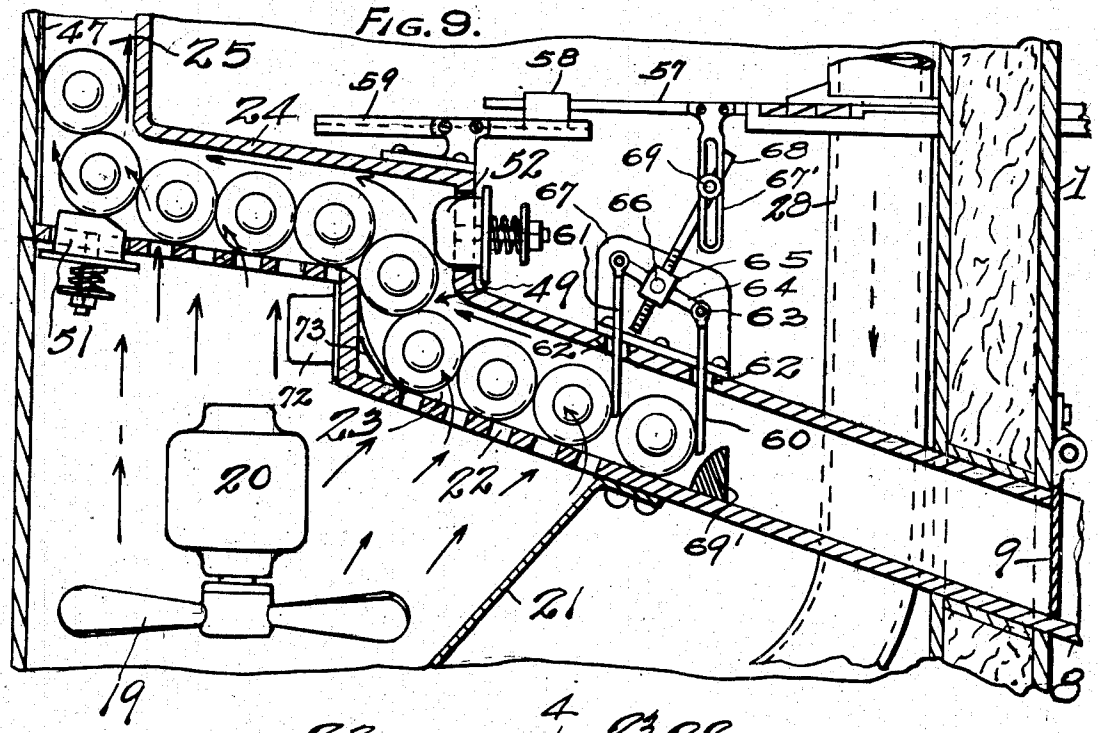
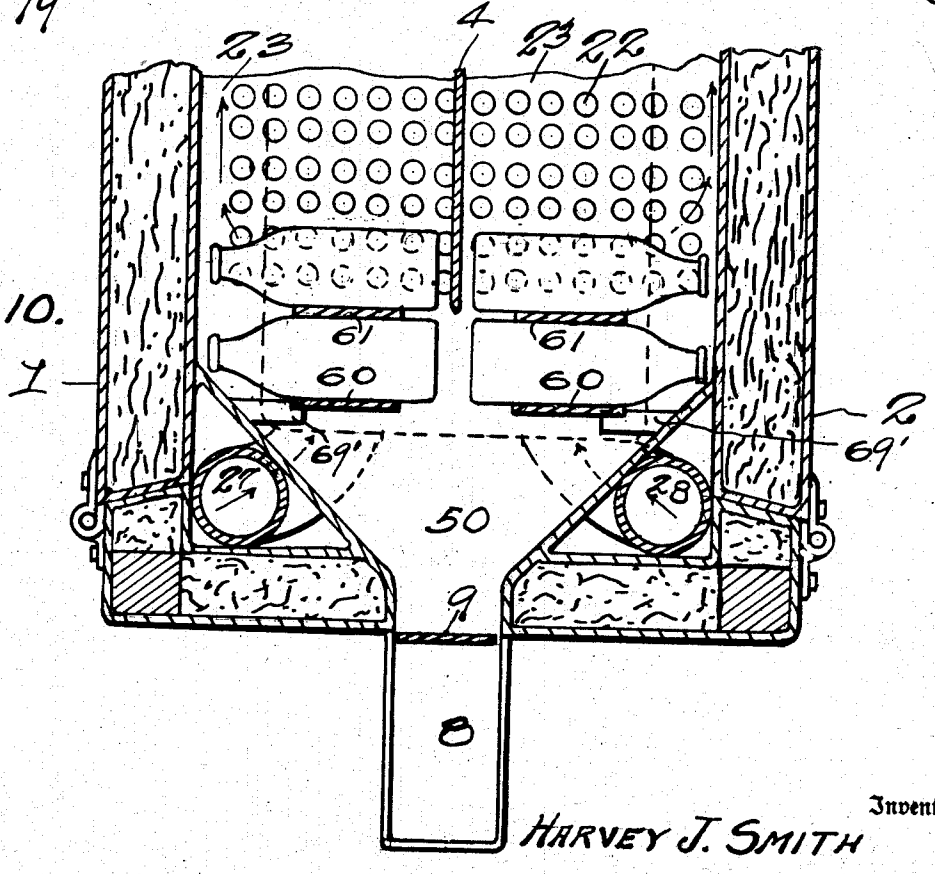


FIG. 10.



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Patented Dec. 8, 1942

2,304,484

UNITED STATES PATENT OFFICE

2,304,484

VENDING MACHINE

Harvey J. Smith, Danville, Va.

Application December 6, 1940, Serial No. 368,915

5 Claims. (Cl. 312—36)

My present invention relates to an improved vending machine of the coin controlled type, in which is also incorporated a refrigerating or cooling system for the bottled beverages stored within and dispensed from the machine. In the physical embodiment of my invention I preferably utilize a dual or two-section machine for vending or dispensing, singly, the bottled goods from the separated sections or dual machines, and a single, intermediate, delivery trough or tray is employed to receive the bottles as they are successively dispensed from the machine.

By the utilization of dual dispensing mechanisms, ample storage is provided for a large quantity of bottles, which bottles may be of two different sizes, or the two sets of bottles stored in the machine may contain different beverages, thus facilitating the sale of the bottled goods, and at the same time reducing the frequency with which the usual vending machine must be refilled.

The interior construction and arrangement of the machine involve means for controlling the movement of bottles from successive, inclined, storage chutes to a vertical gravity feed chute, thence to an arrester chute, and finally to the discharge chute and the delivery trough or tray; and in addition means are provided for controlling the movement of and dispensing a single bottle from the machine, after the proper coin has been deposited in the coin chute. The control means for the single bottle is a continuation in part of the invention set forth in my Patent No. 2,212,797 dated August 27, 1940.

The cooling system for the bottled beverages stored in the various chutes includes a refrigerating mechanism, and an electrically operated fan blower which circulates currents of cooled air upwardly through the vertical feed chutes and around the stored bottles of beverages. Automatic means are provided for limiting the circulation of cold air currents, only, to the spaces occupied by the bottles, and for shutting off the circulation of such cold air currents from the storage chutes and parts of the feed chutes from which the bottles have been dispensed. In this manner the circulation of cold air currents is restricted only to the spaces containing bottles of beverage requiring refrigeration, and as the bottles are dispensed from the machine and their quantity thereby diminished the quantity of refrigerated air currents in circulation is reduced accordingly. This reduction in the capacity of the refrigerating system permits a corresponding reduction in the cost of operating this system, and at the same time an ample circulation of cold air currents is maintained. Thus, the heat-exchange unit and the means for circulating the air currents refrigerated by the unit, may be controlled in any suitable manner in accord with the requirements demanded of these operating parts of the machine.

The invention consists in certain novel combinations and arrangements of parts as will hereinafter be more fully set forth and claimed. In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention in which the parts are combined and arranged according to one model I have thus far devised for the practical application of the principles of the invention. It will be understood that changes and alterations may be made in the exemplifying drawings, within the scope of my claims, without departing from the principles of my invention.

Figure 1 is a view in front elevation of the duplex, coin controlled vending machine or bottle dispensing machine of my invention, showing particularly the exterior devices, and also showing by dotted lines part of the arrangement of the interior cold-air circulating system.

Figure 2 is a transverse vertical sectional view, as at line 2—2 of Figure 3.

Figure 3 is a vertical sectional view of the vending machine with the near side-door removed to disclose the interior arrangement of the bottle-storing structure, the vending mechanism, the air circulating system, and other parts of my improved machine.

Figure 4 is a face view of one of the cushioned stops located at one end of an arrester chute; and Figure 5 is a detail sectional view of one of these resilient or cushioned stops.

Figure 6 is an enlarged, detail sectional view, broken away and showing parts of two of the storage chutes with one exit-gate and one valve-gate open, and also showing one exit gate and its complementary valve-gate closed.

Figure 7 is a sectional view at line 7—7 of Figure 6 showing the underside or inner side of one of the automatically-opening exit-gates and the spring latch for holding the gate closed.

Figure 8 is a sectional detail view at line 8—8 through a storage chute and transversely thereof, as in Figure 6, showing one of the valve-gates in closed position.

Figure 9 is an enlarged detail sectional view showing part of the gravity feed chute, the ar-

rester chute and delivery chute, with control means for the bottles, and also showing parts of the cold-air circulating system.

Figure 10 is a horizontal detail sectional view showing the two duplex arrester chutes merging into the delivery chute and dispensing tray, together with the bottle-control devices for the two arrester chutes.

In the preferred form of my invention I utilize a compactly arranged dual or duplex vending machine, from which two sizes of bottles may be dispensed, singly, or the duplex machine may be equipped to dispense two sets of bottles of the same size, singly, and containing the desired liquid beverages.

As shown in Figures 1 and 2 especially, the cabinet 1 is provided with two side doors 2 and 3 at opposite sides of the cabinet and these doors, when open give access, directly, to the open sides of the two storage spaces, which duplex spaces are centrally divided by means of an upright partition 4. This partition 4 forms part of the storage structure comprising spaced shelves 5 that decline from the front to the rear of the cabinet and form storage chutes for the bottles. The inner adjoining sides of these chutes are closed by the partition 4, but the outer sides of the chutes are closed by the respective doors 2 and 3. The storage structure is mounted in any suitable manner within the interior cooling chamber of the cabinet, and these storage chutes and other parts are filled with bottles when the doors are opened, it being understood of course that the insulated doors when closed seal the sides of the storage spaces against loss of the refrigeration air currents that are circulated through these spaces.

In the front elevation of the machine as shown in Figure 1 the coin-slots 6 and 7, the single bottle-discharging tray 8, the hinged closure-flap 9, and the two "empty" indicators 10 and 11 are mounted on or carried by the front plate or panel 12, and at 13 is indicated a device for removing the cap from the beverage bottle.

As shown in Figures 2 and 3, a horizontal partition 14 forms the insulated bottom of the cabinet and separates the upper storage chambers or spaces from a bottom-compartment 15 in which is located a refrigerant compressor 15' here shown in a conventional manner, and the two pipes 16 and 17 pass upwardly through the bottom partition 14 into the cooling chamber. These pipes as indicated are connected with a heat-exchange unit 18 mounted in the cooling chamber, and this heat exchange unit also includes an electric fan-blower 19 operated by the electric motor 20 or other suitable source of electrical supply.

As indicated in Figure 3 the cold air currents are directed upwardly from the coils or the heat-exchange unit 18 by the fan blower through a housing 21, thence through holes or perforations 22 in the bottom of the discharge flue 23 and also in the bottom of the arrester chute 24, thence through the upright gravity feed chute 25. From this upright chute, which is located at the rear of the declining storage chutes, the cold air currents pass through the storage chutes to a down-draft flue 26, which is located at the front of the cooling chamber and communicates with the upper ends of the declining storage chutes. This down-draft, or return flue 26 extends the full width of the duplex set of storage chutes, and at its lower end the flue is provided with a pair of air-hose 27, 28, (Fig. 1) that lead back to the heat exchange unit 18. Thus, the fan-blower and the heat-exchange unit provide for circulation of the refrigerated air currents through the storage spaces and back to the coils of the unit, for the purpose of cooling the contents of the bottles stored in the chutes. The quantity or volume of the refrigerated air currents and the distance traveled by these air currents are determined by the quantity of bottles in the storage chutes, and as indicated in Figure 3 the travel of air currnts is limited to the storage chutes containing bottles of the beverage.

In use, and with the two side doors open, the various chutes within the interior of the cabinet are filled, manually, with the bottled goods, as indicated in Figure 3, after which the doors are of course closed. Before the doors are closed however, the rear ends of the storage chutes are closed against movement of the row of bottles in each storage chute, by an exit-gate as 29, which is manually closed and latched. The exit gates are held in latched position by bottles in the vertical feed column standing in the vertical feed chute 25, and successive exit gates are unlatched beginning with the top gate, as the height of the feed column decreases. When the latch of a gate is freed, the gate is swung, automatically, upwardly and away from its storage chute into position (Figs. 3 and 6) to extend across the gravity feed chute 25 and close said chute against passage of cold air currents upwardly above the gate. Thus the gate 29 when latched forms a barrier to prevent rolling movement of a row of bottles from a storage chute to the vertical chute, and when unlatched, this barrier is swung across the feed chute in position to close the feed chute and to direct the cold air currents into and through the storage chute. Thus these exit gates are held in position to close the storage chutes by bottles in the feed column, and successive exit gates, beginning with the top gate are automatically opened as the height of the feed column diminishes. Each exit gate swings outwardly and upwardly across the vertical feed chute and closes this chute, as indicated. The exit gates are hinged at 30 and springs 31 swing them from vertical position to horizontal position in Figure 6. A two-arm latch lever 32 pivoted at 33 within a slot of an exit-gate has its long arm in contact with a presser plate 34, also hinged at 30, and the short arm of this latch-lever is provided with a detent 35 which fits into a notch or slot 36 near the front free edge of the shelf 5. This pivoted detent is enclosed within a housing 37 fastened on the inner face of the gate, and a spring 38 co-acts with the long arm of the lever to swing the presser plate 34 on its hinge 30. Thus, when a bottle, the top bottle in a column, passes out of contact with the exit-gate, say the lower one in Fig. 6, the load or resistance is released from the presser plate 34, and this release permits spring 38 to swing lever 32 on its pivot, thereby withdrawing detent 35 from socket 36. The exit gate is now free, and, due to the lateral load of the row of bottles and the actoin of the spring 31, the gate is swung across the vertical feed chute 25 to the position indicated by the upper gate in Figure 6.

At the front or upper end of each storage chute an automatically operated valve gate is provided which also performs the function of a barrier or deflector in the return or down draft flue 26 of each of the two sections of the duplex machine.

This gate 39 is employed in combination with

a plate 40 that is attached at the front end of the shelf-structure and provided with slots 41 which correspond in position with the several storage chutes of the duplex machine. The slotted plate forms one of the walls of the down draft or return flue 26, and the gates 39, hinged at 42 on this plate, are designed to close the slots 41 when a row of bottles is present in its storage chute. The gate 39 is fashioned with a frame 43 disposed at an angle to the gate and located within a storage chute, and a weight 44 is mounted on this frame for the purpose of swinging the hinged gate from the lower position in Figure 6 to the upper position in said figure. Thus, in the lower position the gate 39 is held clear of the flue 26 due to the presence of a row of bottles in the storage chute, the last bottle of the row being pushed up under the frame 43. When this row of bottles is released and the last bottle in the row rolls from under the frame 43, the weighted frame swings the gate 39 from the vertical position of the lower chute into the angular position of the upper chute. The gate 39 of the upper chute is in position to receive air currents passing through the storage chute and slot 41, and also through a slot 45 formed in the weight-frame 43 of the gate 39, and the gate deflects these air currents downwardly through the return flue 26 to the coils of the heat exchange unit.

In their gravity rolling movement down the inclined storage chutes, the bottles are guided and held in proper alinement by suitable guide rails 46 that extend longitudinally of each storage chute for contact with the butt-ends of the bottles, and these rails are mounted in suitable manner on the opposite sides of the center partition 4 of the shelf-structure. Rubber strips 47 may also be used in the vertical feed chute to cushion the feed column of bottles, and if necessary, the exit gates 29 may be notched, as at 48 Fig. 7 to accommodate these strips when the exit gates are swung horizontally across the feed chute. This feed chute is slightly wider than the diameter of the bottles forming the feed column therein, but the chute is not of sufficient width to permit jamming of the bottles in the feed column.

As indicated in Figures 3 and 9, for the purpose of decreasing the load of the feed column, and thereby preventing an excessive load on the control and discharge mechanism of the duplex machine, the arresting chute 24 at the lower end of the feed chute declines toward the discharge chute 23, and between these chutes I provide a port 49. This vertical port 49 between the chute sections 24 and 23 breaks up the declining row of bottles in each section of the vending machine thereby preventing excessive loads on the control and discharge means of the duplex machine. As best seen in Figure 10 the two discharge chutes 23, 23 of the duplex machine, merge into one triangular discharge end 50 and this discharge end terminates in the tray 8.

At the bottom of the feed chute 25 a resilient bumper 51 protrudes into the bottom of the chute to receive the impact from descending bottles as they successively reach the bottom of the feed column, and a similar bumper 52 is located in the slotted end of the arrester chute 24. As these devices are similar in construction and operation, a description of one will suffice for the four bumpers of the duplex machine, as seen in Figures 4 and 5.

The bumper 52 of rubber is mounted in a vertical wall of the chute, and the bumper is provided with a back-plate 53 outside the chute, while the front face of the bumper projects into the chute to receive the impact of bottles moving through the chutes. The back plate 53 is mounted by two bolts 54 in the wall of the chute, and springs 55 are interposed between nuts 56 on the threaded ends of the bolts, (as best seen in Fig. 5) and the back plate 53. The nuts 56 may be turned to increase or to decrease the tension of the springs and thus vary the resistance of the bumper offered to the row of bottles in the arresting chute. Thus the bumper 51 receives and softens the impact of the lowest bottle in the feed column, reduces noise of the descending bottles, and serves to hold the column against jamming. The bumper 52, together with the arresting chute and port 49, relieve the bottles in the discharge chute from the weight of the feed column of bottles, and the successive discharge of single bottles from the chute 23 is more readily controlled.

The dispensing of bottles, singly, from the discharge chute to the receiving trough or dispensing tray 8 as in Figures 3 and 9, is initiated by manipulating the coin controlled appliance which is conventionally shown as comprising a horizontal slide rod 57 and its block 58 which slides in a track 59 mounted in a fixed frame located below the storage chutes and above the arresting and discharge chutes within the cabinet. The sliding movement of the rod and block control the movement and position of a double discharge gate comprising vertically reciprocal plates 60 and 61 that move in slots 62 in the top or upper wall of the discharge chute 23. These double acting discharge gates are each pivoted at 63 to the ends of a rock-arm 64 having a central bearing head 65 journaled or pivoted at 66 on suitable supports as 67 mounted above the chute. As the arm is rocked one of the gates as 60 is moved up to release and discharge an end bottle, and the other gate is moved down in front of the following bottle to retain it against further rolling movement. The rocking of the arm is accomplished from the slide 57 of the coin controlled apparatus, which slide has a depending, slotted arm 67 that moves with the slide, and a screw bar 68, which is threaded in the head 65 for adjustment, is connected with the slide arm by a pin 69. It will be understood that the dual gates 60 and 61 are spaced apart a distance slightly greater than the diameter of the bottle, but the width of the two guide slots 62 for the gates permits them to spread slightly so that they will adjust themselves to the discharging bottle.

Thus in Figure 9, after a coin has been deposited in one of the coin slots, the slide device is pushed inwardly, and it will be seen that this slide movement swings the screw bar 68 over to the left, and the cross arm also swings, to raise the front gate 60 and lower the rear gate 61. The front gate thus frees a bottle to roll down the discharge chute, and upon automatic return (as by a spring) of the slide rod to the right, the gates again assume the position of Figure 9. In succession, the bottles are thus eventually discharged, one at a time, the storage chutes are successively emptied into the feed chute, the feed column of bottles gradually decreased in height, and the arresting chute and discharge chute are finally emptied.

The bottles are arranged transversely of the

chutes so that they may readily roll to the discharge chute, but after a discharged bottle has passed the front gate 60 it is swung around into a longitudinal position with relation to the discharge chute, in order that it may slide butt-end first into the dispensing tray. This swinging movement is imparted to a bottle as its neck portion encounters or contacts with a rubber stop or abutment 69', two of which are laterally spaced as indicated in Figure 10, and fixed to the floor of the triangular mouth into which the two chutes 23, 23, merge. These abutments are located in the path of the rolling bottles and they cause the bottles to swing around lengthwise so that they may enter the tray 8.

After a purchaser has consumed the contents of a dispensed bottle, the empty bottle may be slipped into a pigeon-hole or pocket forming part of two series of receptacles 70 and 71 located at opposite sides of the bottom compartment with their mouths open at the front of the cabinet. These pockets decline toward the rear of the compartment and they are of such area in cross section as to neatly accommodate the bottles in end to end positions.

At 72 in Figure 9 an electric switch is indicated, which is held open by a bottle, such as the last bottle of a row in the discharge chute. An open circuit maker is indicated at 73 with a bottle in contact therewith; when the last bottle in the row rolls from this open circuit maker it is automatically closed and the "empty" sign is displayed at 13 in Figure 1.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a vending machine, the combination with a pair of upright feed chutes for columns of transversely arranged bottles, a laterally extending arrester chute connected at the bottoms of each chute, and a single depressed discharge chute for the feed chutes and having a mouth, of a resilient buffer located at the bottom of each feed chute, a resilient bumper located at the bottom of the arrester chute, manually operated dispensing control mechanism including a rocking head mounted above the discharge chute, and pivotally supported gates on each end of the head extending into the chute whereby operation of the mechanism will lower one gate and raise the other to dispense a single bottle, and means between said dispensing means and the mouth for turning the bottle into longitudinal alignment with the discharge chute.

2. In a vending machine the combination with a pair of upright feed chutes for columns of bottles, a laterally extending arrester chute connected at the bottoms of each feed chute, and a single depressed discharge chute for the feed chutes having a mouth, of a resilient buffer located at the bottom of each feed chute, a resilient bumper located at the end of the arrester chute, dispensing control mechanism including a rocking head mounted above the discharge chute, slide bar having a depending arm, an adjustable link slidably connecting said head and arm, pivotally supported gates on each end of the head for opposed raising and lowering to dispense a bottle, and means between said dispensing means and the mouth for turning the bottle into alignment with the discharge chute.

3. In a vending machine, the combination with a pair of upright feed chutes for columns of transversely arranged bottles, a laterally extending arrester chute connected at the bottoms of each feed chute, and a single depressed discharge chute for the feed chutes and having a mouth, of a resilient buffer located at the bottom of each chute, a resilient bumper located at the end of the arrester chute, manually operated dispensing control mechanism including a rocking head mounted above the discharge chute, a slide bar having a depending slotted arm, and an adjustable link comprising a screw bar threaded in the head and having an enlarged-head pin for slidable co-action with the slot of the depending arm, pivotally supported gates on each end of the head extending into the chute whereby operation of the mechanism will lower one gate and raise the other to dispense a single bottle, and means between said dispensing means and the mouth for turning the bottle into longitudinal alignment with the discharge chute.

4. In a vending machine, the combination with a pair of upright feed chutes for columns of bottles in transverse relation to the machine, a laterally extending arrester chute connected at the bottoms of each feed chute, and a single depressed discharge chute for the feed chutes and having a mouth, of a resilient buffer located at the bottom of each feed chute, a resilient bumper located at the end of the arrester chute, dispensing means for discharging a single bottle from the discharge chute, and means between said dispensing means and the mouth for turning the dispensed bottle into longitudinal alignment with the discharge chute.

5. In a vending machine the combination with a pair of upright feed chutes for columns of bottles in transverse relation to the machine, a laterally extending arrester chute connected at the bottom of each feed chute, and a single depressed discharge chute for the feed chutes, of a resilient buffer located at the bottom of each feed chute, a resilient bumper located at the lower end of the arrester chute, dispensing means for discharging a single bottle from the discharge chute, and two spaced laterally extending abutments at the sides of the entrance to the discharge chute and adjacent the dispensing means for turning a dispensed bottle into longitudinal alinement with the discharge chute.

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