July 11, 1950 W. M. STEWART 2,514,681

VENDING MACHINE

Filed June 18, 1945 3 Sheets-Sheet 1

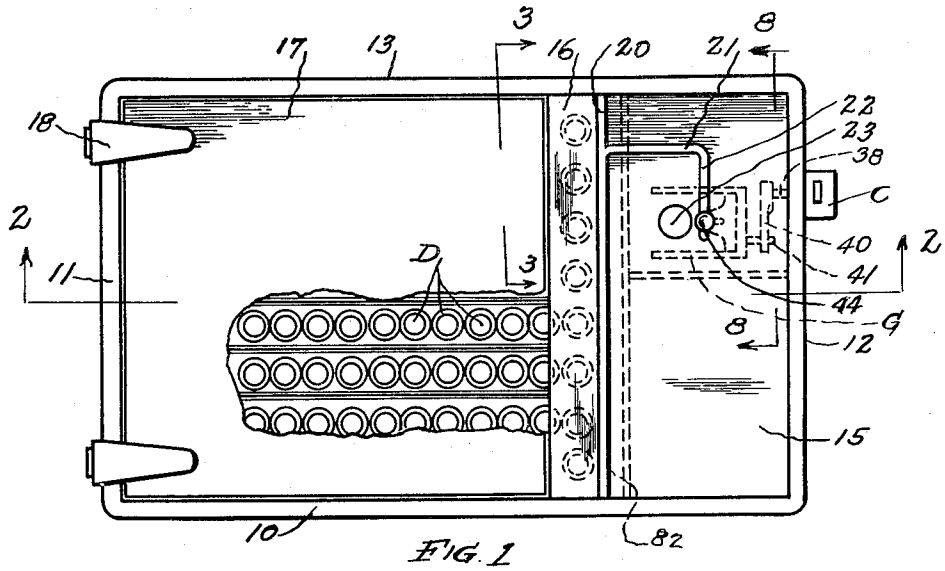


FIG. 1

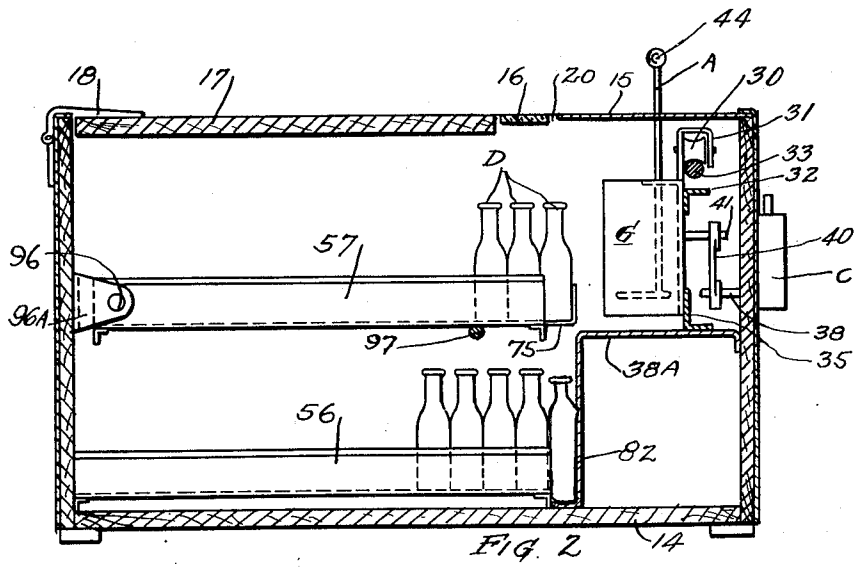


FIG. 2

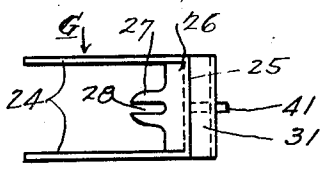


FIG. 12.

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VENDING MACHINE

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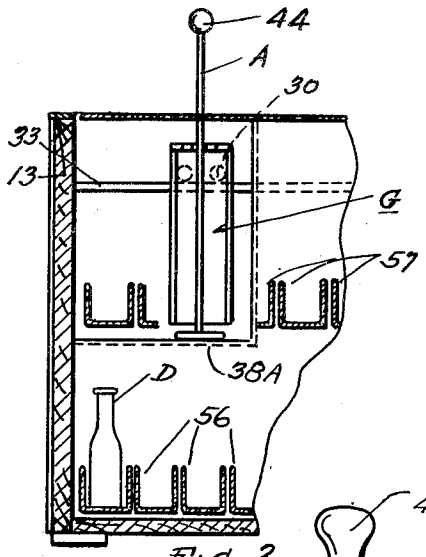


FIG. 3

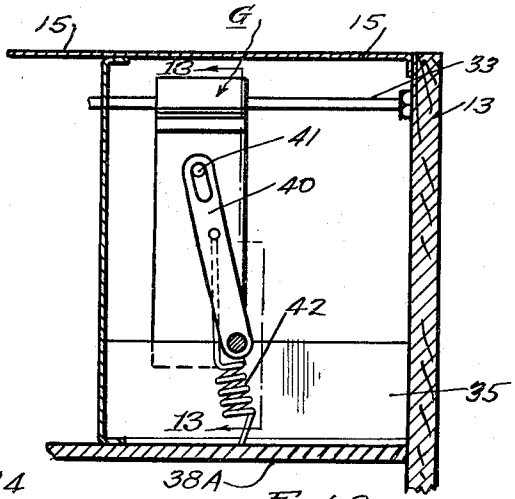


FIG. 8

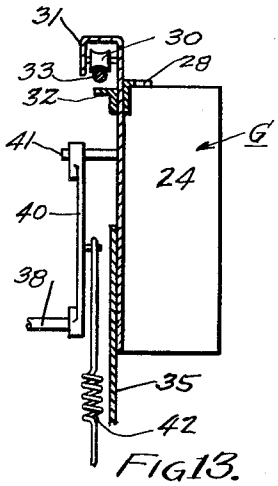


FIG13.

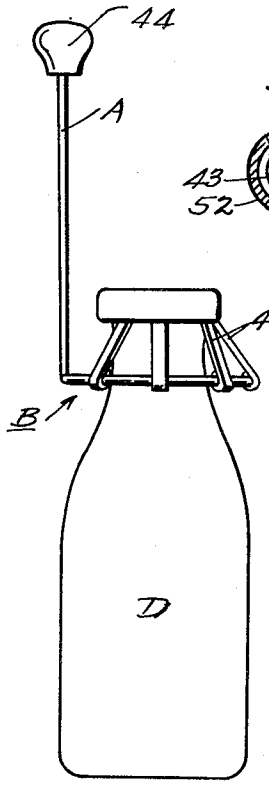


FIG. 9

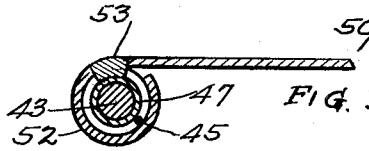


FIG. 11

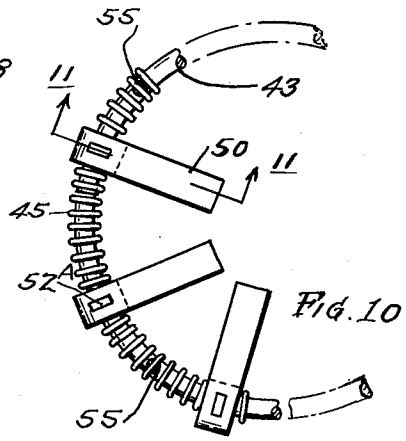


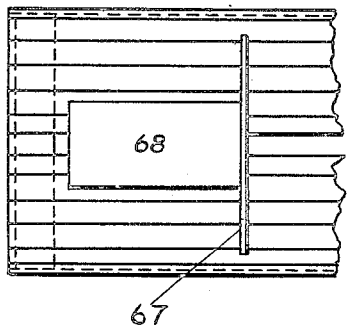
FIG. 10

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VENDING MACHINE

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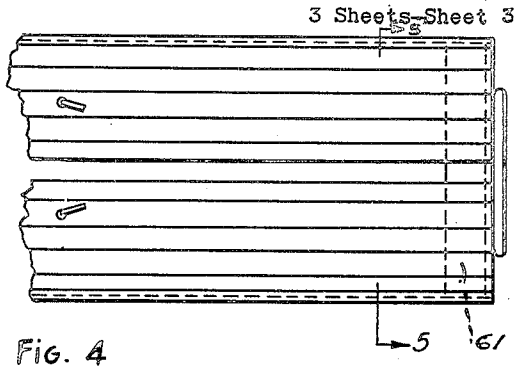


Fig. 4

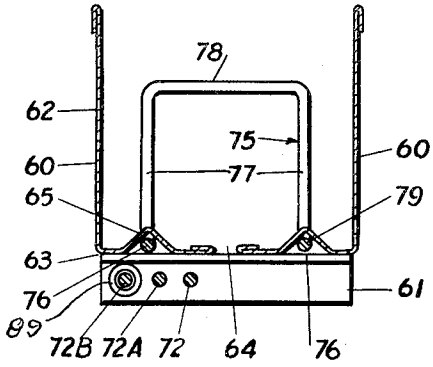


Fig. 5

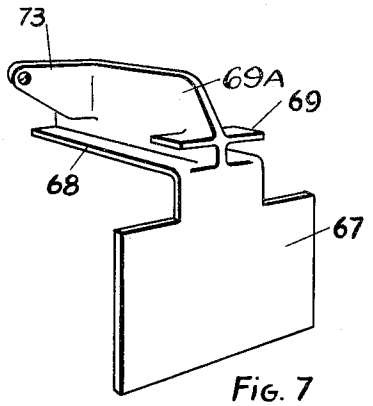


Fig. 7

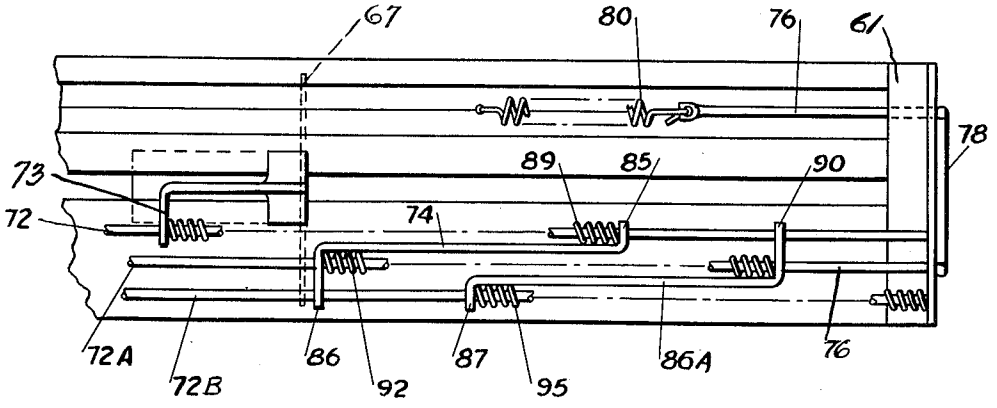


Fig. 6

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Patented July 11, 1950 2,514,681

UNITED STATES PATENT OFFICE

2,514,681

VENDING MACHINE

Wilson Marks Stewart, Ottawa, Ontario, Canada

Application June 18, 1945, Serial No. 600,082

1 Claim. (Cl. 312—87)

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This invention relates to coin-controlled vending machines.

More particularly, the machine of the present invention is adapted to vend bottled wares, such as soft drinks, milk, cream, and others.

In my American Patent No. 2,284,931, granted June 2, 1942, there is shown a coin-controlled vending machine which enables one to select a particular bottle out of a plurality of bottles stored in the machine. The present invention is an improvement on the machine disclosed in my said patent, primarily in that it is so designed as to appreciably increase the storing or effective capacity of such machine, and the operation of selecting and removing a bottle is simplified and requires less time and effort.

A specific object of the invention is to provide a vending machine wherein the bottled wares to be vended are stored in the machine in superposed parallel upper and lower trays, the bottles in an upper tray being removed first before the bottles in the corresponding lower tray are removed.

Another specific object of the invention is to cause the bottles to be shifted automatically toward one end of the machine, say the front end, where they may be picked up one by one, successively, by a lifting device, to be removed out of the machine.

In the drawings, wherein like numerals of reference indicate corresponding parts in the various figures,

Figure 1 is a plan view of a coin-controlled vending machine made in accordance with my invention, the machine shown being adapted to vend wares in bottles, the lid of the machine being in part broken away;

Figure 2 is a longitudinal section of the machine, as on line 2—2 in Figure 1;

Figure 3 is a fragmentary, transverse section of the machine, as on line 3—3 in Figure 1;

Figure 4 is a fragmentary plan view of one of the upper bottle-supporting slides or trays;

Figure 5 is a section on line 5—5 in Figure 4;

Figure 6 is a fragmentary bottom plan view of Figure 4;

Figure 7 is an inverted, isometric view of the bottle-pusher member;

Figure 8 is a fragmentary, transverse section as on line 8—8 in Figure 1;

Figure 9 is a fragmentary side elevation of the bottle-lifting device;

Figure 10 is a fragmentary enlarged view of part of the bottle-lifting device;

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Figure 11 is an enlarged section as on line 11—11 in Figure 10;

Figure 12 is a top plan view of the gate; and

Figure 13 is a section on line 13—13 in Figure 8.

According to the invention, the bottles to be vended are stored in the machine, in parallel, superposed rows being supported in parallel, longitudinal lower trays, and in parallel, longitudinal upper trays. In servicing the machine, the lower trays are first loaded, and the upper trays then loaded. The bottles in the upper trays are exposed to view. A bottle lifting device, when freed by a coin-controlled device, is shifted to a position where the selected bottle may be grasped and lifted, and the bottle is then carried to a position from which the bottle may be withdrawn out of the machine. The bottle lifting device is now locked, and it is not released again until another coin has been dropped into the coin-controlled device. As the bottle selected is removed from the tray, another bottle in the same tray is shifted automatically to take the place of the bottle previously selected. When a particular upper tray is emptied of all bottles, the tray automatically operates to allow access to be gained to a bottle in the lower tray underneath this now-empty upper tray.

Referring now by numerals to the drawings, 10 is a casing, preferably insulated, including rear wall 11, front wall 12, side walls 13, and bottom 14. The top wall of the casing is formed by a plate 15, preferably of metal, extending rearwardly from the front wall, a glass panel 16, and a lid 17 hinged to the rear wall 11 as by suitable hinges 18. The forward edge of the glass panel 16 is spaced from the adjacent rearward edge of the metal plate 15 to form or define an elongated and narrow slot 20 extending transversely of the casing 10. The plate 15 is formed with a lengthwise narrow slot 21 communicating at one end with or opening into the transverse slot 20 and communicating at the other end with a transverse slot 22 preferably parallel with the slot 20. Between the slots 20 and 22, the plate 15 is provided with an ejection opening 23 through which the bottles may be removed one at a time.

Slidably mounted to move back and forth parallelly with the slot 22, is a bottle-receiving device or gate G. This device may be made as shown and described in my said Patent No. 2,284,931. Thus, it comprises a substantially U-shaped member presenting two parallel vertical side walls 24, a connecting wall 25, and a narrow top wall or member 26 formed with a lug or extension 27 recessed inwardly as at 28 to

receive the stem A of the bottle lifting device B to be described later. The gate is so mounted relatively to the slot portion 22, and the lug 27 is so sized that the lug will preferably extend rearwardly beyond or underlie the slot 22, so that the stem A will move with or be moved by the gate G when the stem is engaged in the recess 22.

The gate G may be slidably supported by suitable rollers 30 journalled in a bracket 31 rising from the gate, and riding on a transverse rod 33. An angle member 32 is preferably secured to the front wall 25, to lie under the rod 33. The gate will thus be securely suspended from the rod 33. To retain the gate in a vertical position, a transverse plate or member 35 is secured in a vertical position parallel with the rod 33, to be slidably engaged by the gate as it is moved back and forth on the rod 33.

The operation of the gate G, from a bottle-receiving (or stem-receiving) position, to a bottle-delivering position, and vice versa, is controlled by a suitable coin-controlled device, usually known as a coin slide. Such a coin-controlled device, shown as C, adapted for the purposes of this invention, is one known as Model 500, manufactured by A. B. T. Mfg. Co., of Chicago, Illinois. In such a model, there is a coin-controlled, main shaft 38 journalled in the box of the device C. For my purposes, this shaft is extended to project into the casing 10. To the outer or projecting end of the shaft is fixed a lever 40. The free end of the lever is longitudinally slotted to slidably receive a pin 41 fixed to and projecting horizontally from the wall 25 of the gate G. Thus, the movement of the gate on its supporting rod 33 is controlled by the rotation of the shaft 38 of the coin-controlled device C. The shaft 38 has a limited rotary movement, and accordingly, the gate also has a limited movement, thus determining the two extreme positions of the gate, namely, its bottle-receiving (or stem-receiving) position, and its bottle-delivering position, as shown in Figure 1. When in its bottle-receiving position, the gate is in alignment with the axis of the slot 21, that is, the recess 28 is in the axis of the slot 21, ready to receive the stem A of the bottle lifting device B, and the walls 24 of the gate are equally spaced from the axis of the slot 21, ready to receive the bottle therebetween; on the other hand, when the gate is in its other, or bottle-delivering or ejecting position, the bottle suspended by or from the bottle lifting device B is under the ejection opening 23, where the bottle can now be withdrawn or removed through the opening by lifting the bottle upwardly by the lifting device B, as will be explained later. A coil spring 42 tensioned between the lever 40, above the shaft 38, and a wall 38A, is arranged to releasably hold the gate in either of its two extreme positions.

The bottle lifting device B may be made as shown in Figures 9, 10, and 11 (which is also shown in prior U. S. Patent No. 2,284,931, June 2, 1942). The device is such that it can be lowered over a bottle, to grasp its neck, under the head, and lift and carry the bottle to its ejection position under the ejection opening 23. The stem A will be guided by the slots 20, 21 and 22 to such position. The device is also such that the bottle can be raised or withdrawn out of the machine. As shown, the device comprises a ring 43 from which extends the stem A having a suitable knob 44. Encircling the ring is a coil spring 45 the ends of which are secured to the stem A as by soldering (not shown). Free to turn on the ring 43, and lying between the ring and the spring, are a plurality of bushings 47. Fixed to the spring and to the bushings, are lifting fingers 48 (not shown in Figure 2 for the sake of clarity). Each of the fingers may comprise a finger proper 50 extending from a curved or looped portion 52 encircling the spring. The fingers are fixed to the bushings and to the spring by providing slots 52A in the looped portions and dropping solder, as at 53, into the slots, so that solder adheres not only to the bushings but to the spring, and becomes lodged in the slots. The spring is secured to the ring at spaced intervals with solder as at 55. The spring will thus be held against rotation at spaced intervals, and the fingers will thus be free to turn to a limited extent. As will be readily seen, the bottle-lifting device is capable of handling or lifting bottles of different neck diameters, within a fairly large range. Such a device also operates to lift soft drink bottles, the ends of the fingers engaging the edge defined by the skirt of the usual metal cap. In removing a bottle, the device is lifted until the neck of the bottle projects through the opening 23, whereupon the neck is grasped by one hand and lifted upwardly, the fingers swinging outwardly to allow the body of the bottle to slip through and between the fingers.

The bottles D, to be vended, are held in an upright position on elongated trays or slides arranged in parallel and superposed rows, disposed longitudinally of the machine, the trays serving as supports and guides. Thus, 56 are parallel, lower trays, and 57 are parallel, upper trays. If preferred, though not shown, the trays may be slanted downwardly from rear to front of the machine. The tray may be made as shown in Figures 4 to 7, comprising two complementary, side-by-side, sections 60 held in rigid assembled relationship by crosswise angles 61 soldered to the opposite ends of the sections. Each section includes a side wall 62 and a bottom wall 63. The sections are so secured as by the angles 61, to space them slightly apart and thus define a longitudinal, central slot 64. The wall 63 is formed with a raised portion or ridge 65, so that two such ridges will be presented to the bottom of the bottle upon which it will slide easily longitudinally of the tray. The bottles are urged lengthwise of the tray as by a spring-urged push member 67 slidably mounted on the tray. To so mount the push member, the member may include a horizontal plate 68 riding on the tray and lugs 69 extending laterally from a web 69A depending from the plate 68, the web extending through the slot 64 and the lugs engaging the underside of the tray. The push member may be urged forwardly as by springs, to be referred to presently, arranged as best shown in Figure 6. 72, 72A and 72B are three rods anchored at opposite ends in the angles 61. Sliding on the rod 72 is a lug 73 extending laterally from the web 69A of the push member 67. 74 is a Z-shaped member having a lug 85 slidable on the rod 72 and its opposite lug or leg 86 slidable on the rods 72A and 72B. 86A is a second Z-shaped member having one leg or lug 87 slidable on the rods 72B and its other leg 90 slidable on the rods 72 and 72A. Anchored at opposite ends to the lug 73 of the push member 67 and the lug 85 of the member 74 is a spring 89 encircling the rod 72. Anchored at its ends to the lugs 86 and 90 of the members 74 and 86A and encircling the rod 72A, is a spring 92. Anchored at opposite ends to the lug 87 of the member 86A and the front angle 61 of the tray and en-

circling the rod 72B, is a spring 95. The tension in each spring is such that the push member will be brought to the front end of the tray, and this arrangement is such that substantially the same tension will be stored in all three springs when the push member is brought to the rear of the tray as when the tray is filled with bottles. Moreover, each of the springs will stretch a distance less than the distance travelled by the pusher member away from the outer end of the tray.

The upper tray 57 has the same form as the lower tray 56, just described, except that it includes an additional member 75, in the form of a bent U comprising two parallel legs 76, and two vertical legs 77 connected at the top to a transverse member 78. The legs 76 are adapted to slide longitudinally in the grooves 79 formed under the ridges 65, and the legs 77 and member 78 define a member adapted to be engaged by the bottle lying forwardmost in the tray, for which it provides a stop in effect closing off that end of the tray. This stop is normally urged rearwardly to engage the forward end of the tray, as by coil springs 80 tensioned between the adjacent ends of the legs 76 and the tray.

The forwardmost bottle in the row defined by the lower tray will find support upon the floor of the machine, its forward movement being determined by its engagement with a transverse vertical wall or member 82, whereas the forwardmost bottle in the row defined by the upper tray will find support upon the additional member 75, which also serves to determine the forwardmost position of the forwardmost bottle.

The lower trays 56 may be fixed to the floor. The upper trays 57 are hinged as at 96 to a U-shaped bracket 96A fixed to the rear wall of the casing and are supported in their lowered or operative position, as shown, as by a crosswise bar 97 secured at its ends to the side walls 13 of the casing. Thus, the upper trays can be swung upwardly to expose the lower fixed trays 56 when these trays have to be serviced. After the lower trays have been serviced, the upper trays are lowered, and serviced in turn.

Operation.—If one desires to purchase a bottle, a coin is dropped into the coin-controlled device C. This releases the shaft 33, whereupon the gate G, with the stem A of the bottle lifting device B locked to the gate (that is, confined in the recess 28 and in the slot 22), is free to be moved parallel of the slot 22 until the recess 28 is in alignment with the slot 21. The stem A is now free to be moved away from the gate, into the slot 21, and thence, into the slot 20. When the stem A is in the slot 20, the device B is moved until it is opposite the bottle selected by the purchaser. The device is then manipulated to grasp and lift the bottle so selected, and the device is moved along the slot 20 in to the slot 21 to insert the stem A into the recess 28, and the device now moved along the slot 22, moving the gate therewith. When the device is opposite the opening 23, the gate will become locked. The bottle is removed by lifting the device bodily by the stem. As a bottle is removed from its particular tray, the succeeding bottles will all be moved in the tray to present a bottle at the forward end of the tray, in a position to be lifted by the device B. When an upper tray is completely emptied of bottles, the bottle stop 75 automatically slides rearwardly against the front of the tray, to expose the forwardmost bottle in the tray below and to allow a clearance through which the device B may be lowered to grasp such last mentioned bottle. The bottles in the lower trays will similarly slide forwardly as the forwardmost bottle is removed.

I claim:

In a vending machine, a casing, a coin-controlled device for lifting wares and for moving the same to a position to be dispensed out of said casing, upper and lower guides for supporting the wares in two superposed rows, means for urging the wares toward said device, a member having a portion thereof positioned in spaced relationship with one end of said upper tray and forming therewith a passage through which said device may be lowered to reach a ware on said lower tray ultimately to raise the same to be dispensed, an extension associated with said upper guide ware-operated to an extended position to block the passage, and means automatically moving said extension from its extended position to its retracted position when empty of wares to open the passage to said device.

WILSON MARKS STEWART.

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