Nov. 9, 1948. W. M. STEWART 2,453,280

COIN CONTROLLED VENDING MACHINE

Filed Sept. 4, 1944 4 Sheets-Sheet 1

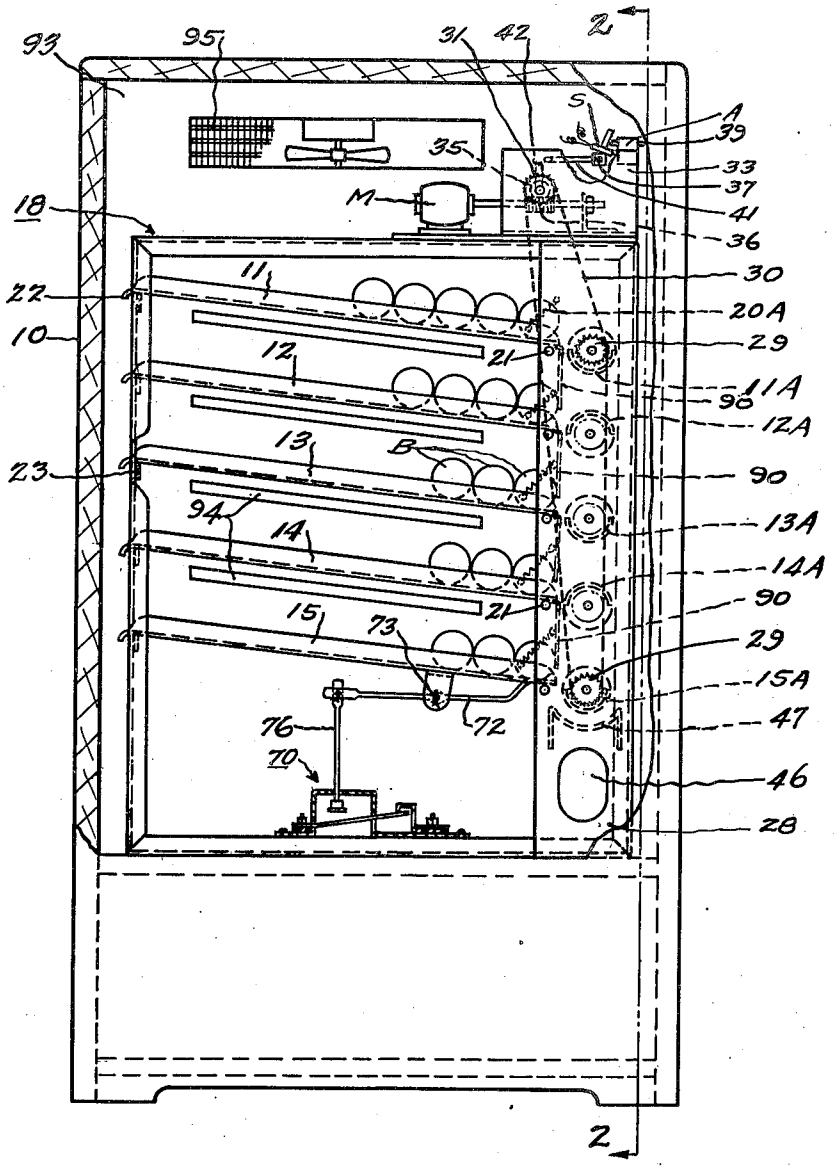


FIG. 1

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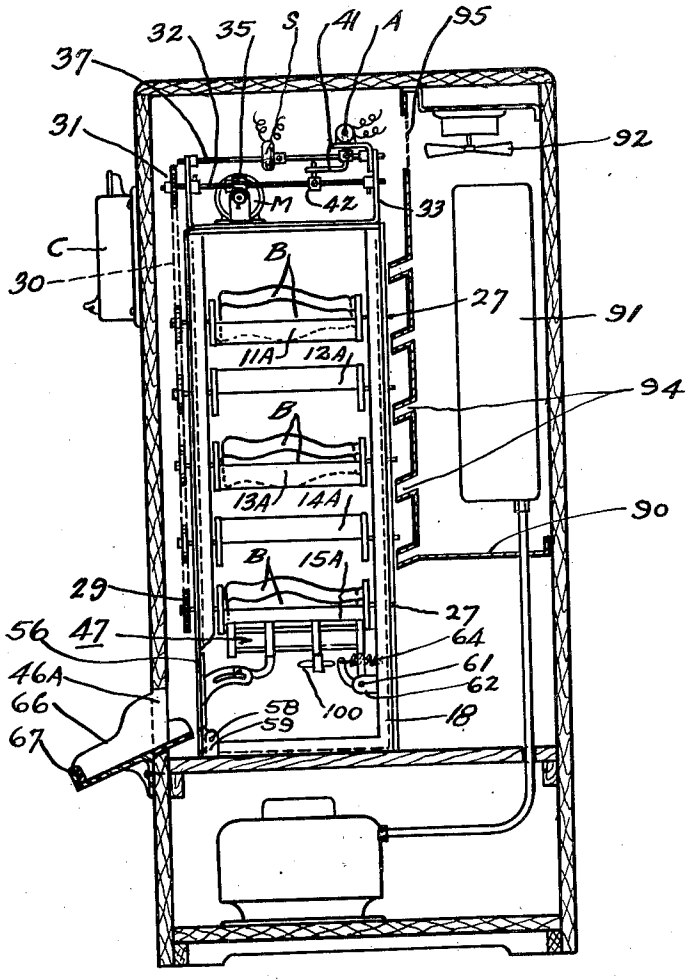


Fig. 2

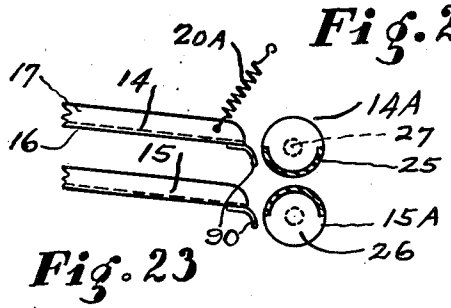


Fig. 23

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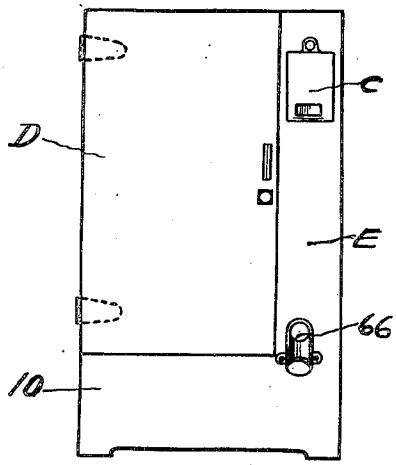


FIG. 3

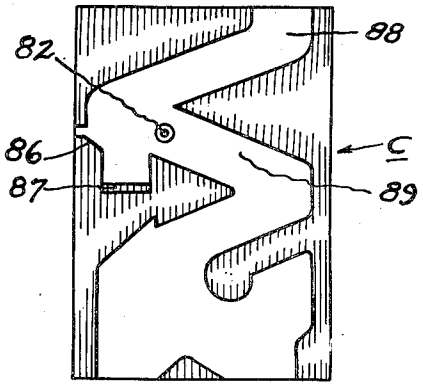


FIG. 4

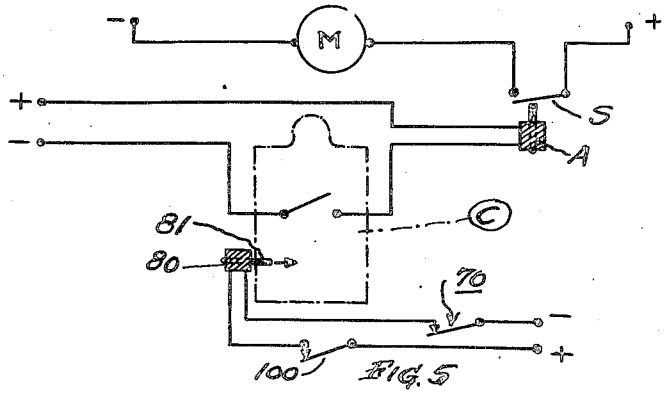


FIG. 5

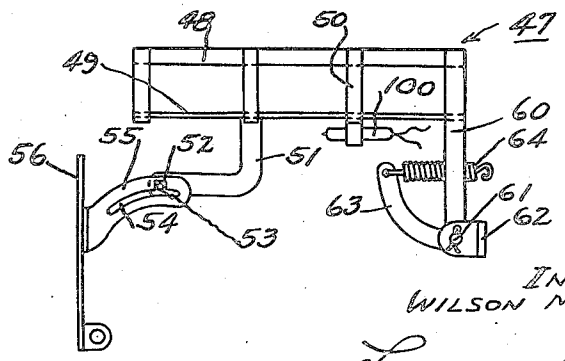


FIG. 6

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COIN CONTROLLED VENDING MACHINE

Filed Sept. 4, 1944 4 Sheets-Sheet 4

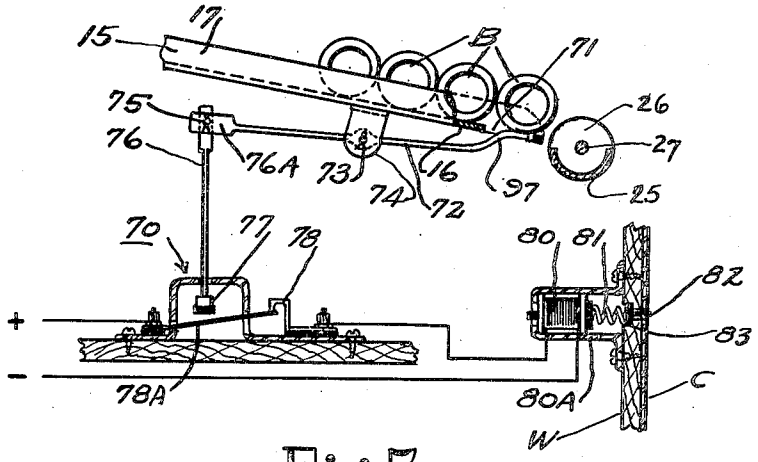


Fig. 7

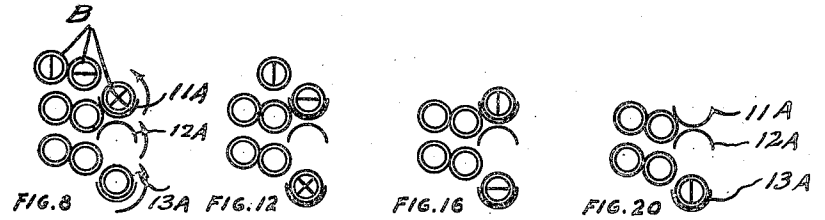


FIG. 8 FIG. 12 FIG. 16 FIG. 20

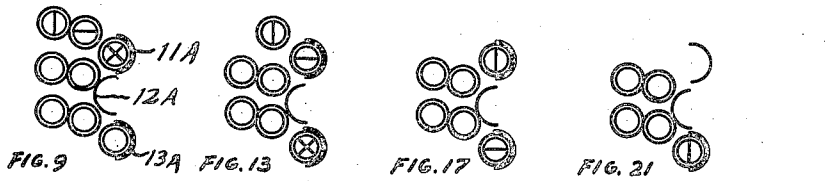


FIG. 9 FIG. 13 FIG. 17 FIG. 21

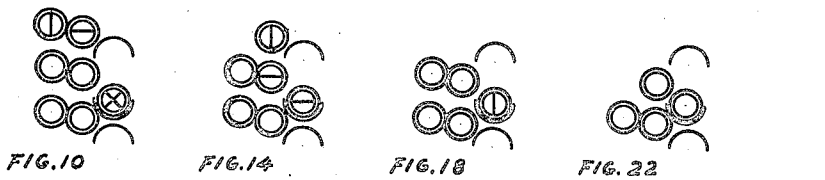


FIG. 10 FIG. 14 FIG. 18 FIG. 22

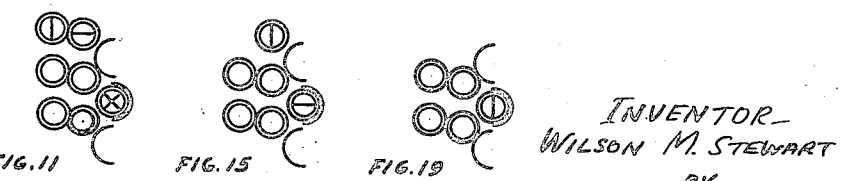


FIG. 11 FIG. 15 FIG. 19

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UNITED STATES PATENT OFFICE

2,453,280

COIN CONTROLLED VENDING MACHINE

Wilson Marks Stewart, Ottawa, Ontario, Canada

Application September 4, 1944, Serial No. 552,701
In Canada May 6, 1944

9 Claims. (Cl. 312—48)

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My invention relates to coin-controlled vending machines.

The machine of the present invention is designed to vend bottled liquids, for instance, so-called soft drinks.

The machine operates automatically to dispense a bottle upon dropping of the prescribed coin into a suitable coin slot device. A machine of this kind may be termed for convenience, a single purpose machine.

A feature of the machine of the present invention is that it is so designed as to provide maximum storing capacity for a given overall size. This is primarily accomplished by providing means, in the form of parallel inclined trays or supports, upon which the bottles are laid transversely on their sides and upon which they gradually roll or move downwardly toward the delivery end of the machine, to be dispensed by a novel bottle-ejecting device. Thus, the bottles are stored in compact formation and little space is wasted.

Another feature of the machine of the present invention is that a bottle exerts little pressure or an adjacent bottle and this facilitates the movement of the bottles toward the delivery end of the machine.

Another feature of the machine of the present invention is that the upper slide is first emptied of its bottles, then the next lower slide is emptied of its bottles, and so on. This has been found to be a very desirable feature.

The preferred form of the machine of the present invention is illustrated in the accompanying drawings in which

Figure 1 is a front view, with the case partly broken away;

Figure 2 is a transverse section taken on line 2—2 in Figure 1;

Figure 3 is a front view of the machine;

Figure 4 is a fragmentary view of a well-known selective coin slot device but slightly modified to serve the purposes of the present invention;

Figure 5 is the wiring diagram;

Figure 6 is a side elevation of the pivoted bottle receiving chute and ejecting slot gate;

Figure 7 is a fragmentary view showing bottle-controlled switch controlling circuit to electro magnet-operated plunger of the coin slot device;

Figures 8 to 22 are diagrammatic views of the bottle-ejecting device in a sequence of rotary positions graphically illustrating the operation thereof.

Figure 23 is a fragmentary view of the machine.

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Referring now by numerals to the drawings, wherein like numerals of reference indicate corresponding parts in the various figures, 10 is the casing, which is suitably insulated in a manner not shown. In the casing are a plurality of inclined slides or bottle supports of which five are shown (although their number may be increased to increase the capacity of the machine) as 11, 12, 13, 14 and 15. Such slides may be of channel cross section comprising floor 16, and low side walls 17 to properly guide the bottles B in their downward movement toward the delivery end of the machine.

Preferably, the slides are supported in a rigid frame or structure 18, adapted to be inserted into and removed as a unit from the casing 10. Forming part of the frame are rigid, upright plates 20 supporting transverse rods 21, which in turn act as supports for the slides adjacent to the delivery end of the machine. The slides at the end opposite to the delivery end of the machine, conveniently may be formed with hook-shaped portions 22 adapted to bend down over horizontal flat bars 23 forming part of the frame 18. The slides will thus be supported at one end by the rods 21 and at the opposite end by the bars 23, the hook-shaped portions 22 holding the slides against a downwardly sliding movement.

Co-operating with the lower end of the slides are bottle-receiving members 11A, 12A, 13A, 14A and 15A, respectively, substantially in the form of hollow half cylinders or hollow semi-circular members. Conveniently, each bottle-receiving member may comprise (see Figure 7) a semi-circular wall 25 and end discs 26, suitable pivots 27, rigid with the discs, extending outwardly in an axis defining the centre of each disc and forming journals rotating in the plates 28 forming part of the frame 18 at the delivery end of the machine.

Rigid with one pivot of each of the bottle-receiving members is a sprocket 29, the sprockets lying on the outer face or side of the adjacent frame plate 28. The bottle-receiving members are rotated together in the same direction—anti-clockwise as seen in Figure 1—by means of an endless sprocket chain 30 driven by a motor actuated sprocket 31 and engaging one side only of each of the sprockets 29. The shaft 32 rigidly mounting the driving sprocket 31, which may be journalled in plates 33 secured to the frame 18, has rigid thereon a worm gear 35 meshing with a worm screw 36 rigid on the shaft of an electric motor M so that suitable speed reduction can be effected.

The motor is energized from a suitable source

(not shown) and the circuit to the motor is controlled (preferably) by a suitable mercury switch S mounted on a shaft 37 journalled in the plates 33. The shaft 37 is rocked in an anti-clockwise direction—as seen in Figure 1—to tilt the mercury switch to "on" position and thereby close the circuit to the motor, by means of a suitable solenoid A, the armature of which is adapted to engage a finger 39 rigidly mounted on the shaft 37, when the solenoid is energized. The circuit to the coil of the solenoid is controlled by a suitable coin operated switch (not shown) forming part of a suitable coin chute C so that as a coin drops through the chute the coil is momentarily energized and the armature moves to throw the switch to its "on" position. The switch, and the armature of the solenoid, are returned to their inoperative or "off" position, to thereby turn off the motor M, by means of a finger 42, rigid on the shaft 32, engaging a finger 41 rigid on the rocking shaft 37.

As previously stated, the machine operates to first empty the top slide 11 of its bottles, then to empty the next lower slide 12 of its bottles, and so on. Accordingly, the bottle-receiving members are disposed in opposite relationship, consecutively. That is to say, when the uppermost member 11A is facing upwardly as shown in Figure 2, capable of receiving or having received a bottle from its associated slide 11, the second member 12A will be facing downwardly empty of any bottle, the third member 13A will be facing upwardly, holding a bottle, and so on. On the other hand, when the members are rotated 180 degrees from the position shown in Figure 2, the uppermost member 11A will be empty of any bottle, the second member 12A will have and hold a bottle, which it has received from the member 11A, the third member 13A will be empty of any bottle, and so on.

The action of the bottle-receiving members may be best understood by reference to Figures 8 to 22, which, for the sake of simplicity, show the three upper members only and show only two bottles on each of the three slides shown. Figures 8 to 12 successively, illustrate one complete cycle or revolution of the members, the members being at rest in Figure 8 (prior to the dropping of a coin into the coin device) and having come to a stop after making one revolution (Figure 12). Figures 12 to 16 illustrate the second cycle or revolution of the members, the members being at rest in Figure 16. The third cycle is illustrated in Figures 16 to 20, again the members being at rest in Figure 20.

As will be seen by reference to Figure 12, the bottle which was in the member 11A when in the position shown in Figure 8, is now in the member 13A, as shown in Figure 12. When the members are in the position shown in Figure 16, the slide 11 is now empty of all bottles. When the members are in the position shown in Figure 22, only one bottle remains on slide 12.

In order to insure smooth running of the bottle-receiving members, and more particularly to prevent the bottles in the bottle-receiving members from rubbing against the adjacent bottles on the adjacent slides, as for instance when the members are rotating and have reached such positions as are shown in Figures 9, 11, 13, 15, 17, 19 and 21, means are preferably provided for holding the bottles lying on the slides a short distance away from the bottles in the bottle-receiving members. In the form shown in Figure 23, this means consists in a downwardly curved lip 90 rigid with the

underside of each of the slides, other than the lowermost, the lip being adapted to provide a stop for the adjacent bottle.

Coil springs 20A are suspended from the frame 18 of the machine and are attached at their lower ends to the slides (excepting the lowermost slide), and these springs are tensioned to slightly raise the lower ends of the slides, that is the ends adjacent the bottle-receiving members, when the slides are empty of any bottles. Thus, as one slide, say for example slide 11, is raised under the action of the springs, the lip 90 attached to that particular slide will rise above the adjacent bottle to clear the same, so that such bottle and the succeeding bottles will successively be free to fall into the bottle-receiving member associated with such slide.

In order that the machine may reject a coin when empty of all bottles, that is when the last bottle on the slide 15 (the lowermost) has been vended, I provide a bottle-controlled switch, shown in its entirety as 70, which in turn controls an electro-magnet-operated plunger 82 associated with the coin device C. As previously stated, the coin device may be any known suitable cash box. Such a device includes a coin channel 88, which leads or directs a coin to impinge on a rebounding edge 86. If the coin is a legal one, that is not counterfeit or a so-called slug, it bounces back away from the edge 86 to fall into a channel 89 and thence into the coin box. On the other hand, if the coin is counterfeit, it more or less rolls or slides off the edge 86 and falls upon a bevelled edge 87 and is directed thereby into a reject slot (not shown). The electro-magnet-controlled plunger 82 is normally clear of the channel 89, but is operated by the action of the switch 70 to enter or project into and block the coin passage 89, to thereby cause the coin rebounding from the edge 86 to drop back upon the edge 87 and thereby reject it.

As shown in Figure 7, the switch 70 may comprise a rod 72 hinged as at 73 in a bracket 74 secured to the lowermost slide, 15. The forward end of the rod is curved upwardly as at 97 to pass through a longitudinal slot 71, made in the bottom wall of the slide, adjacent the lower end thereof. The rearward end of the rod includes a weighted fork portion 76A apertured to receive a pin 75. Pivotally suspended by the pin is a rod 76, the lower end of which has an insulated pad 77. Positioned to be engaged by the pad 77 of the rod 76 when the slide 15 is empty of all bottles, is a spring contact 78A which is flexed by the weight of the rod 76 and portion 76A to disengage a contact 78. The contacts 78A and 78, which are normally in engagement, are connected in series with the coil of an electromagnet 80 held in a suitable bracket 80A secured to one wall W of the casing to which the coin device C is secured; and also in series with the coil is a suitable mercury switch 100 secured to the basket 47 (Figure 6, to be referred to later). The plunger 82 aforesaid may conveniently be formed by extending the armature of the magnet 80, and it includes a rigid collar 83, preferably of insulation material. A coil spring 84, interposed between the coil and the collar 83, is tensioned to move the armature (and therefore the plunger 82) away from the magnet (from the left to right as seen in Figure 7) to cause the plunger to be projected into the coin device when the coil of the magnet is deenergized. Thus, when the switch 70 is operated (as when the slide 15 is empty of all bottles) to break the circuit through the coil of the magnet, the plunger

is moved away from the coil by the action of the spring 81, to cause the plunger to be moved into the coin passage 89. The plunger will similarly operate when the basket 47 is tilted as by the weight of a bottle. When a bottle lies on the slide 15 and thereby tilts the rod 72 to cause the rod 76 to clear the contact 78, the circuit through the coil is again made and the plunger 82 is moved away from the coin passage to clear the same.

As a bottle is delivered or dropped by the lowermost bottle-receiving member 15A, it falls into a member or basket 47 which tilts under the weight of the bottle, to cause the same to slide in the basket and to be delivered out of the machine through an ejection opening 46A made in the wall of the casing 10. The bottle so ejected slides into a chute 66 and comes to rest against a rubber pad 67. The bottle is then removed by hand. As best shown in Figure 6, the member 47 may comprise longitudinal bars 48 and 49 connected together by semi-circular straps 50. The basket may include a member 60 pivotally supported on pin 61 journalled in bracket 62 secured to the frame 18. The basket is normally held in a raised or operative, substantially horizontal position by means of a spring 64 tensioned between the frame 18 and an arm 63 rigid with the member 60.

In order to prevent tampering with the machine, or more particularly to prevent one from attempting to reach into the inside of the machine through the ejection opening 46A and bottle opening 46 in the plate 28 of the frame 18, a gate 56 is preferably provided, being operable to normally close the bottle opening 46. The gate is pivotally supported at the bottom by means of a pin 58 journalled in brackets 59 secured to the inside of the plate 28. Rigid with the gate is a bracket 55 having a curved slot 54 adapted to slidably receive a pin 53 carried by an arm 51 rigid with the basket 47. The slot is so designed that, as the basket swings downwardly under the weight of a bottle, the sliding movement of the pin 52 in the slot will cause the gate to open inwardly. The gate is so proportioned that, when it is opened by the action of the basket, it will lie under the basket, so that the gate will in effect provide means on which the bottle will slide as it leaves the basket. In order that the gate may be locked when the basket is in normal position, empty of any bottle, the slot is formed with an upwardly extending notch 52 in which the pin 53 will normally lodge.

Refrigeration provided for the machine may be obtained by means of a suitable refrigerating coil unit 91 disposed at the back of the frame 18 and enclosed in a suitable metal casing 90. The casing may be formed with suitable louvers 94 disposed preferably parallel with the slides and provided with an intake 95 adjacent the top of the casing and adjacent an electric fan 92.

What I claim is:

1. In a coin-controlled vending machine including a casing having an ejection opening in a wall thereof to permit delivery of the article being vended, the combination of a member adapted to receive an article being vended and to tilt under the weight of the article to cause the same to slide toward said ejection opening, means for bringing said member back to article-receiving position when free of the article, a gate for closing said ejection opening, and means between said member and said gate operating to hold said gate in closed position when said member is in bottle-receiving position and to move said gate to opened position when said member is tilted.

2. In a machine as set forth in claim 1, said member including a rigid member having a pin, and said gate including a rigid member slotted to slidably receive said pin.

3. In a machine as set forth in claim 1, said member including a rigid member having a pin, and said gate including a rigid member slotted to slidably receive said pin, said slot including a notch to receive said pin when said gate is closed.

4. In a coin-controlled vending machine, the combination of superposed lower and upper trays forming supports for bottles lying transversely on their sides, said upper tray being movable above said lower tray, semi-cylindrical members associated with said trays, respectively, operable to deliver the bottles, each of said members being adapted when in a certain rotary position and empty, to receive a bottle from its associated tray, said upper tray having means adapted to form a stop for a bottle on said lower tray when said upper tray is loaded thereby preventing the bottle from being received into the member associated with said lower tray, and means for moving said upper tray to cause said stop to clear the bottle on said lower tray when said upper tray is unloaded.

5. In a coin-controlled vending machine, the combination of at least two superposed trays forming supports for bottles lying transversely on their sides, the lower tray being fixed, the upper tray being pivotally supported, simultaneously rotatable, semi-cylindrical bottle-receiving members associated with said trays, respectively, each adapted when in a certain rotary position and empty, to receive a bottle from its associated tray, said upper tray having means adjacent its associated bottle-receiving member adapted to form a stop for a bottle on said lower tray when said upper tray is loaded thereby preventing the bottle from being received into the member associated with said lower tray, and means operating to raise said upper tray to cause said stop to clear the bottle on said lower tray when said upper tray is unloaded.

6. In a coin-controlled vending machine including a casing having an ejection opening in a wall thereof to permit delivery of the article being vended, the combination of a member adapted to receive an article being vended and to tilt under the weight of the article to cause the same to slide toward said ejection opening, means for bringing said member back to article-receiving position when free of the article, and a gate for closing said ejection opening, said member including a rigid member having a pin, and said gate including a rigid member having a curved slot in which said pin is slidable to actuate said gate by said first-named member.

7. In a machine as set forth in claim 6, said slot including a notch to receive said pin and releasably lock said gate in closed position when said first-named member is in article-receiving position.

8. In a machine as set forth in claim 1, said means including a bracket extending from said member, a bracket extending from said gate, one of said brackets carrying a pin, and said other bracket having a curved slot in which said pin slides.

9. In a machine as set forth in claim 1, said means including a bracket extending from said member, a bracket extending from said gate, one of said brackets carrying a pin, said other bracket having a curved slot in which said pin slides, and

said slot having a notch receiving said pin when said member is in bottle-receiving position.

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