

United States Patent

Greaves et al.

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[54] **IMPROVEMENTS IN OR RELATING TO
CUP HOLDERS FOR BEVERAGE
DISPENSING MACHINES**

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[51] Int. Cl. **G07f 11/12**
[58] Field of Search **221/11, 105, 106**

[56]

References Cited

UNITED STATES PATENTS

2,869,754 1/1959 Booth et al.221/11
3,279,650 10/1966 Maxwell221/11

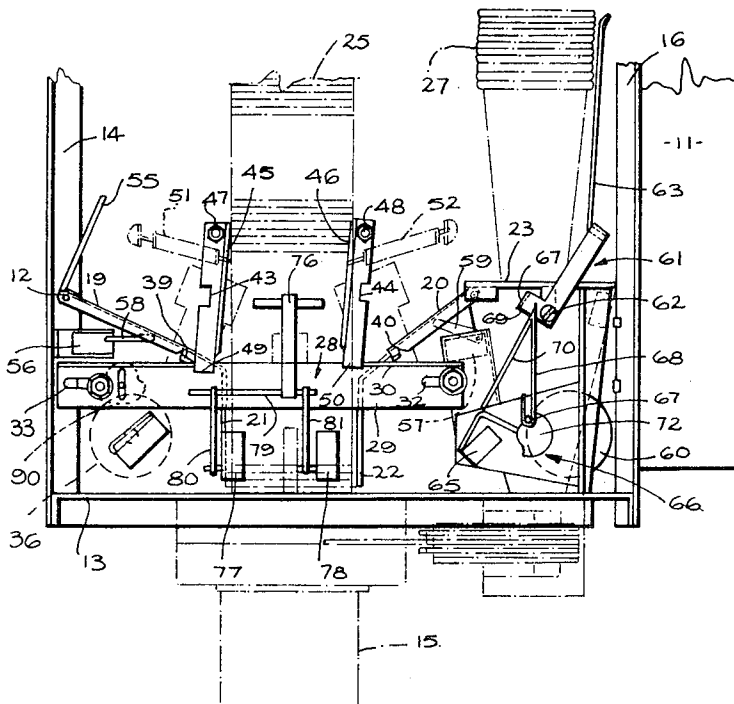
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[57]

ABSTRACT

A cup holder for beverage dispensing machine includes a pair of pivotally mounted platforms for supporting cups disposed one on each side of a dispensing position. A further column of cups is supported on a fixed platform and a pusher mechanism is provided to move this column of cups into the dispensing position when the other cups have been used.

2 Claims, 6 Drawing Figures



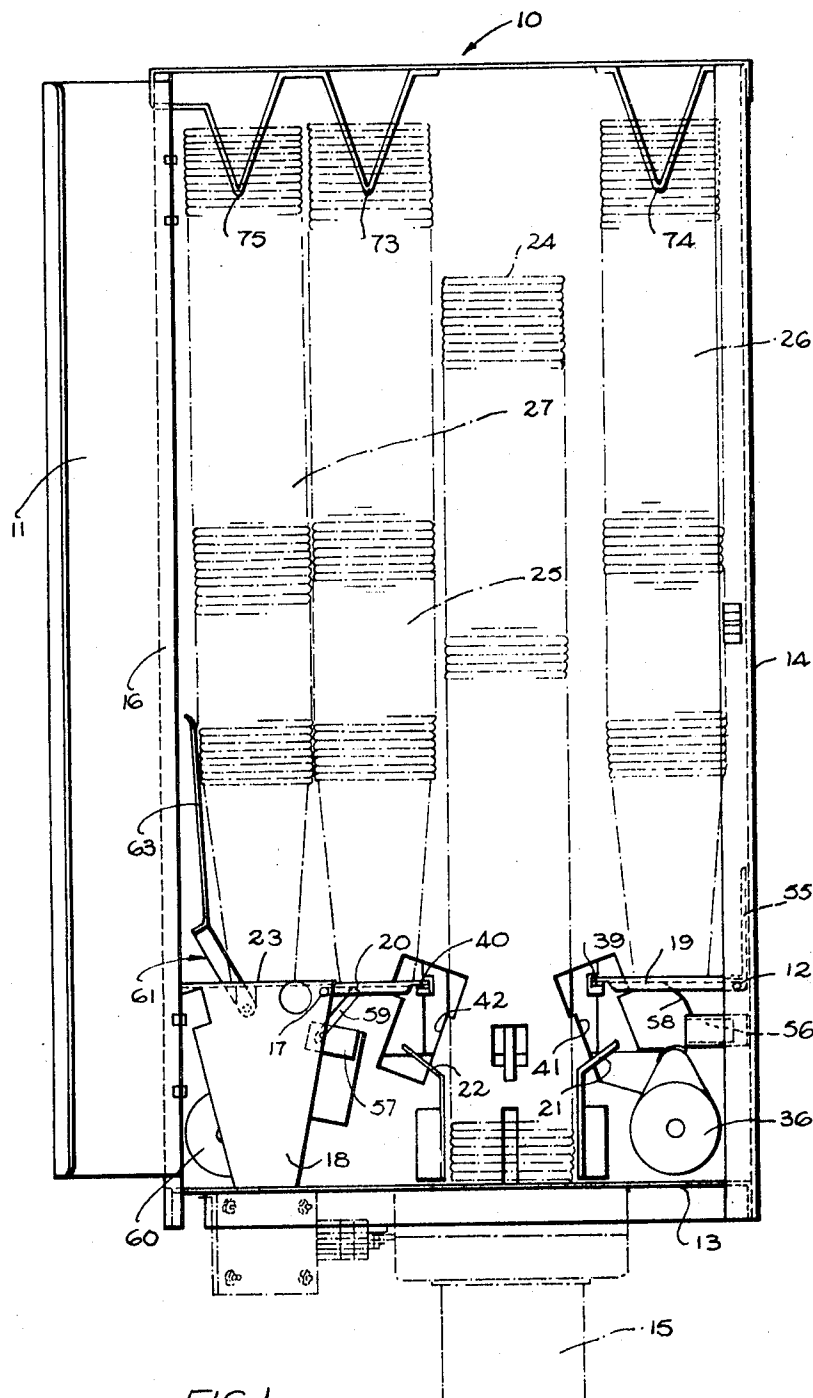


FIG. 1.

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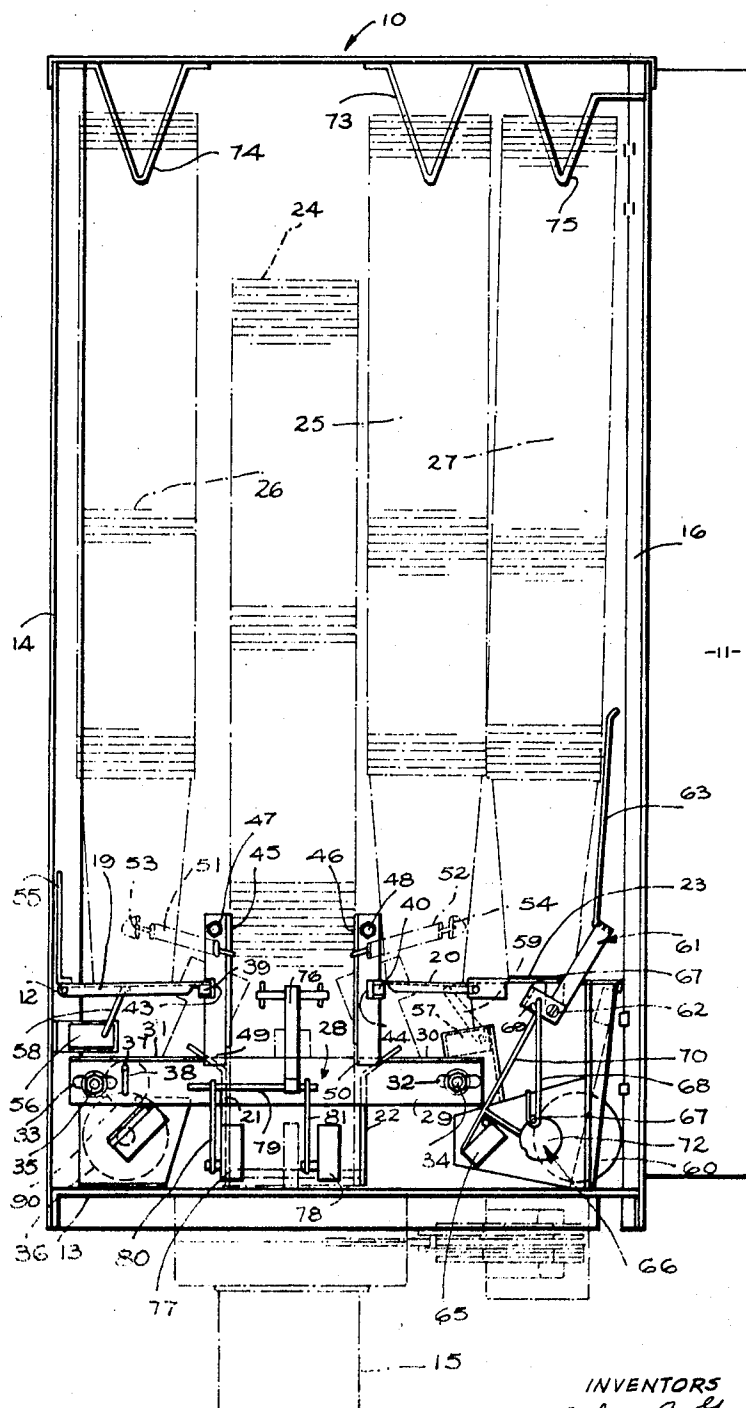


FIG. 2.

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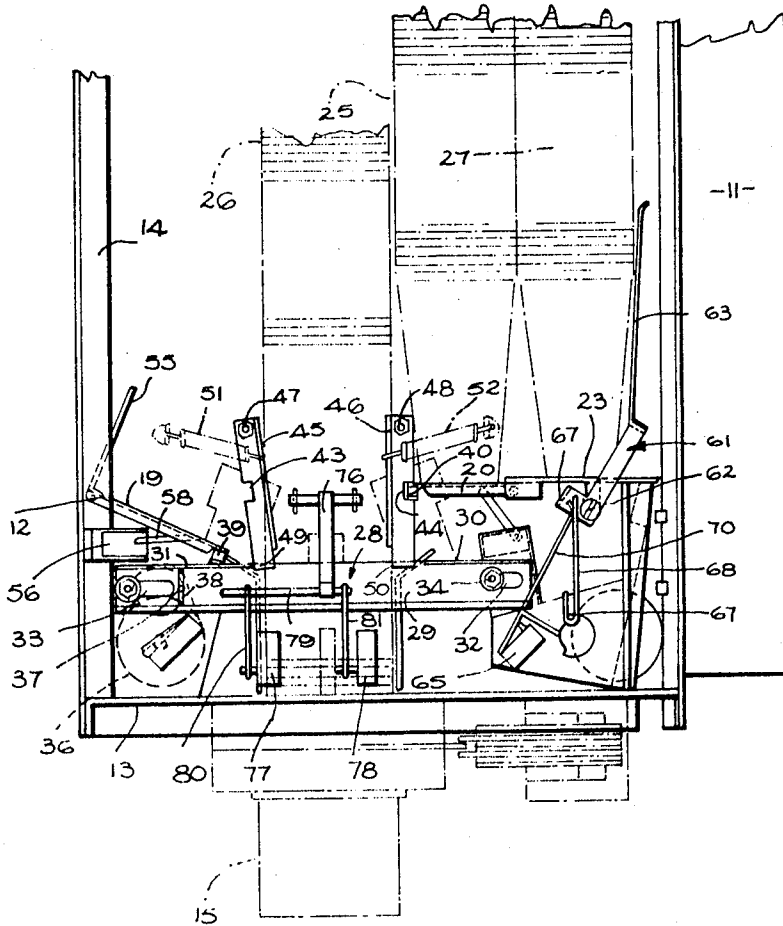


FIG. 3.

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FIG. 4.

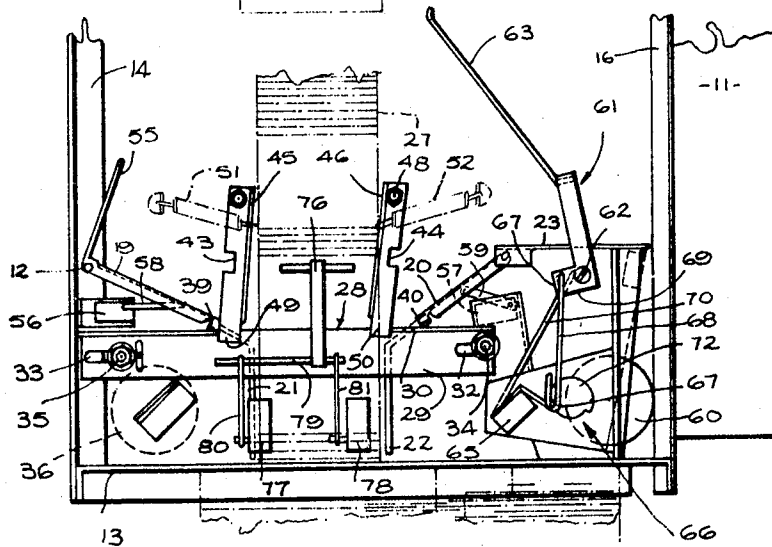
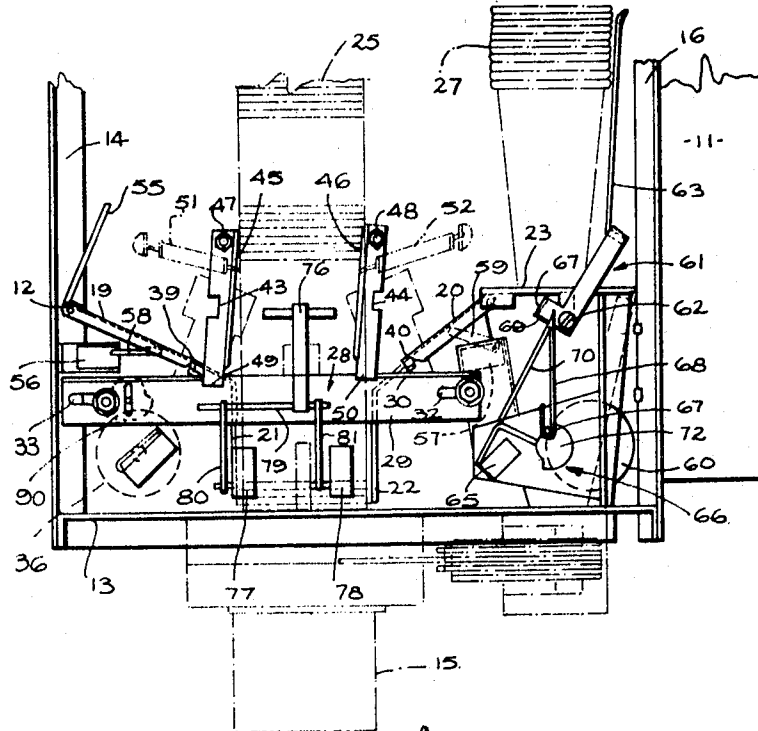


FIG. 5.

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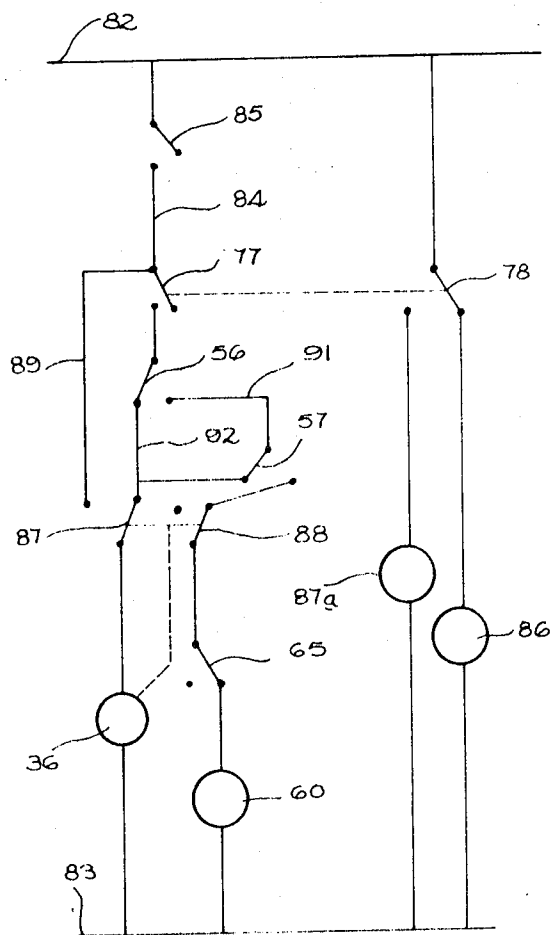


FIG. 6.

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IMPROVEMENTS IN OR RELATING TO CUP HOLDERS FOR BEVERAGE DISPENSING MACHINES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a multi-column cup holders for beverage dispensing machines.

2. Description of the Prior Art

U.S. Pat. No. 3,279,650 discloses a cup holder which includes a magazine having a delivery compartment, a first storage compartment at one side of the delivery compartment and a second storage compartment at the other side of the delivery compartment, a pivotally mounted platform in each of said storage compartments, a stack of nested cups on each platform and in the delivery compartment and release means operable when the uppermost cup in the delivery compartment reaches a predetermined level to effect transfer of the cups in one of the storage compartments to the delivery compartment and operable when the uppermost cup in the delivery compartment again reaches this predetermined level to effect transfer of the cups in the other storage compartment into the delivery compartment.

The cup holder of U.S. Pat. No. 3,279,650 contains, in its fully loaded condition, three columns of cups and it is an object of the present invention to provide a cup holder having an increased storage capacity as compared with that shown in U.S. Pat. No. 3,279,650.

SUMMARY OF THE INVENTION

Provision is made for the holding of a further column of cups on a non-pivotally mounted platform disposed adjacent one of the pivotally mounted platforms and a pusher mechanism is provided for moving the column of cups on this platform towards the delivery position when the other columns of cups have been used.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a front view of a cup holder with the door thereof open,

FIG. 2 is a rear view of the cup holder when filled with cups,

FIG. 3 is a part rear view of the cup holder when one column of cups has been used,

FIG. 4 is a view corresponding to FIG. 3 but showing the condition obtaining after two columns of cups have been used,

FIG. 5 is a view corresponding to FIG. 3 but showing the condition obtaining after three columns of cups have been used, and

FIG. 6 illustrates part of the circuit of a machine containing the cup holder.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The cup holder includes a rectangular cabiner 10 arranged with its major axis vertical and it has a hinged front door 11, the cup holder being intended to be mounted on the inside of the hinged front door of a vending machine (not shown). A first pivot pin 12 is mounted horizontally between the front and rear walls of the cabinet a few inches above the base 13 thereof and close to one 14 of the side walls. The base 13 of the cabinet 10 has a downwardly depending passage containing a cup dispensing mechanism 15 which is of known form and forms no part of the present invention. Said passage is closer to said one side wall 14 than to the other 16.

A second pivot pin 17 is mounted horizontally between the rear wall of the cabinet and a support plate 18 at the same height as the first pivot pin 12 and at the same spacing from the discharge passage as said first pivot pin 12. The first pivot pin 12 carries a platform 19 and the second pivot pin 17 carries a platform 20. Each platform can swing downwardly from a horizontal position to an inclined position, the inclined position of each platform 19, 20 being determined by the engagement of the end portion thereof remote from its pivot pin 12,

17 with an inclined guide 21, 22 leading into the discharge opening through which the cups are dispensed. A third fixed platform 23 is provided which extends horizontally and is integral with the support plate 18. The pivot pin 17 for the second pivotable platform 20 is carried beneath said fixed platform 23, said fixed platform being connected to the other side wall 16 of the cabinet 10. To facilitate understanding of the invention the rear wall of the cabinet has been omitted from FIGS. 2 to 5.

As shown in the drawings, the cabinet is intended to contain four vertical columns 24, 25, 26 and 27 of paper or plastic cups, one 27 of the columns being supported on the fixed platform 23, two 26 and 25 of the columns being supported one on each of the pivotable platforms 19 and 20 when these are horizontal and the fourth column 24 being disposed between these last two columns 26 and 25 and extending through the aperture in the base 13 of the cabinet 10, this fourth column 24 of the cups being supported by the cup dispenser 15 and the cups being removed singly from the base of said column during each vending cycle of the machine.

A horizontally reciprocable actuator bar 28 (see FIGS. 2 to 5) is mounted on the back of the cabinet 10 externally thereof, the actuator bar 28 having a vertical limb 29 and a pair of horizontal limb portions 30 and 31 at the upper end of the vertical limb 29, there being one limb portion 30, 31 at each end of the vertical limb 29. A pair of longitudinally extending slots 32, 33 are formed in the vertical limb 29 of the bar 28, the shank of a headed bearing member 34, 35 being received in each of said slots 32, 33, the bearing members 34, 35 being secured, as by welding, to the back face of the cabinet 10. Said bearing members 34 and 35 support the actuator bar 28 in such a manner as to permit limited horizontal movement thereof. An electric motor 36 is mounted beneath the first pivotable platform 19 and the output shaft of the motor has secured thereto an eccentrically mounted peg 37 which projects horizontally rearwardly through an opening in the back wall of the cabinet 10 and said peg 37 is arranged to engage in a vertical slot 38 formed in the vertical limb 29 of the actuator bar 28.

During a vending cycle of operations the electric motor 36 is driven, when the electrical circuit thereof is completed, so that its output shaft turns through half a revolution, the actuator bar 28 being moved first in one direction through 90° of said movement and then being returned to its original position during the remaining 90° of rotation. When the motor is next actuated, as hereinafter described, the bar 28 is moved first in the opposite direction and then returned to its original position. As hereafter described the motor 36 is arranged so that the electrical supply thereto is terminated after half a revolution.

Each of the tiltable platforms 19, 20 is provided with a projection 39, 40 on the forward edge thereof which projects rearwardly through an opening 41, 42 in the back wall of the cabinet (see FIG. 1) and, when each platform 19, 20 is in a horizontal position, the projections 39, 40 are engaged in notches 43, 44 formed in pivotally mounted latch members 45, 46 secured to the back wall of the cabinet 10 externally thereof. Each of said pivotally mounted latch members 45, 46 has a pivot 47, 48 at its upper end and the lower end portion 49, 50 of each of said latch members 45, 46 engages a horizontal limb portion 31, 30 of the actuator bar. A helical spring 51, 52 is connected to each of said pivotally mounted latch members 45, 46, the springs 51, 52 also being connected to tabs 53, 54 pressed out from the back wall of the cabinet 10. Said tabs 53, 54 are located between the pivotal mountings 47, 48 of the latch members 45 and 44 and the adjacent side walls 14, 16 of the cabinet so that each of said latch members 45, 46 is spring urged in a direction towards its adjacent side wall 14, 16 into a generally horizontal position.

When the electric motor 36 is actuated to effect reciprocation of the actuator bar 28 the engagement between said latch members 45, 46 and the horizontal limb portions 31, 30 of the actuator bar 28 tends to urge one or other of the pivotally

mounted latch members about its pivot axis, the lower end portion of the acted on latch member tending to move in the same direction as the actuator bar. As the platforms 19 and 20 are disposed between the pivotal mountings of said latch members 45, 46 and the adjacent side walls 14, 16 of the cabinet 10 such movement of the actuator bar 28 will result in movement of one of the latch members away from its associated platform, the projection on said platform becoming disengaged from its notch whereby the platform is then free to tilt downwardly so that its column of nested cups slides from the platform towards the cup dispensing mechanism.

Assuming that, as viewed in FIGS. 2 to 5 the actuator bar 28 is first moved to the right, the horizontal limb portion 31 will engage the lower end portion 49 of latch member 45 to move the latch member 45 in an anticlockwise direction about its pivot 47. The projection 39 will clear the notch 43 and the platform 19 will tilt under the weight of the column 26 of cups so that the column of cups slides from the platform 19 towards the cup dispensing mechanism 15. Transfer of the column 26 is assisted by a limb 55 attached to the platform 19 which engages the column 26 near the lower end thereof. The condition shown in FIG. 3 is thus reached.

When the column of cups from which the cups are removed by the dispensing mechanism 15 again reaches said predetermined level, the motor 36 is again actuated and the actuator bar 28 is now moved in the opposite direction i.e., to the left as viewed in FIGS. 2 to 5 and is then returned to its original position. During movement of the actuator bar 28 away from its original position the other pivotally mounted latch member 46 is moved by engagement of limb portion 30 with the lower end portion 50 of latch member 46 so that its notch 44 is clear of the projection 40 on platform 20 and this platform 20 then tilts whereby its column of cups slides to replenish the column from which the cups are removed by the dispensing mechanism. FIG. 4 shows the condition obtained after the second platform 20 has tilted.

When each platform 19, 20 tilts to transfer its column of cups, a microswitch 56, 57 having a spring-loaded operating element 58, 59 is actuated and the arrangement is such that, when both platforms 19, 20 have tilted and the column of cups from which the cups are removed again reaches said predetermined level, operation of the release means results in energization of a second electric motor 60 as hereinafter more particularly described with reference to the circuit drawing of FIG. 6 and a pusher member 61 is operated, the pusher member 61 being pivotally mounted at 62 and including an arm 63 which engages the column 27 of cups supported on the fixed platform 23 adjacent the lower end 64 thereof whereby said lower end 64 is moved towards the adjacent tilted platform 20 (see FIGS. 4 and 5), movement of the pusher member resulting in operation of a microswitch 65 to deactuate the motor 60.

The motor 60 drives a cam 66 which has a peg 67 attached to it. A link 68 acts between the peg 67 and a limb 69 of the pusher member. The microswitch 65 has a pair of contact elements 70 and 71. Contact element 70 is arranged to be engaged by limb 69 and contact element 71 is arranged to be engaged by a greater radius portion 72 of the cam 66. The contact elements 70 and 71 are arranged to control operation of the microswitch 65 such that the motor 60 drives the cam 66 through 360° and then stops.

There are guide elements 73, 74 and 75 arranged depending from the top of the cabinet whereby the columns 25, 26 and 27 are maintained substantially vertically when the columns of cups are resting on their platforms 20, 19 and 23 but said guide elements 73, 74 and 75, which are in the form of V's are sufficiently short that, when the columns move downwardly on operation of the release means, the upper cups of the columns clear their associated guide elements.

The release means comprises a spring-loaded striker element 76 which is urged into engagement with the cups in the column from which they are dispensed and the arrangement is that said striker element 76 is free to move over the rim of the

top cup in said column when there are say five cups in said column. Striker element 76 is arranged so that, when it moves over the rim of the uppermost cup, it operates a pair of microswitches 77 and 78 the functions of which are more particularly described with reference to FIG. 6, i.e., the circuit drawing. The striker element 76 is freely pivoted to the back of the rear wall of the cabinet and is linked to a bar 79 which is arranged to engage the contacts 80 and 81 of the two microswitches 77 and 78.

The circuit drawing shows part of the circuit of the machine and includes main current supply lines 82 and 83. There is a first line 84 extending from the main supply line 82 and this contains a timer-controlled switch 85 which is moved from its open position as shown in the drawing to its closed position during a vending cycle of operations of the machine, the timer-control system being as described in U.S. Pat. No. 3,249,196.

The striker element 76 which bears against the column of cups is arranged to operate the pair of microswitches 77 and 78 to move them from the positions shown in the drawing. The microswitch 78 is arranged so that, in its inoperative position, current is supplied to a blocking relay 86 so that the armature of the blocking relay is held out of the coin insertion path. When the microswitch 78 is operated the relay 86 is deenergized and the armature projects into the coin path to prevent the machine from accepting any further coins. At the same time as the relay 86 is deenergized a "sold-out" light 87a is operated to indicate to customers that the machine is in a "sold-out" condition.

When the first platform 19 is tilted to transfer its column of cups the platform switch 57 is operated, when the second platform 20 is tilted the second platform switch 57 is operated and when the pusher member 61 is moved under the action of the second motor 60 the third platform switch 63 is operated, the switches 56, 57 and 65 being shown in FIG. 6 in the positions which they occupy when all three platforms support columns of cups.

The first motor 36 controls operation of a pair of switches 87 and 88 and the arrangement is that, when the motor 36 begins a cycle of operations, the switches 87 and 88 are moved from the positions shown in FIG. 6.

When the striker element 76 is operated to operate the switches 77 and 78, with a column of cups supported on each platform, closure of the timer-controlled switch 85 will complete a line to the motor 36 which will start to operate and will move the switches 87 and 88 whereby the motor 36 is driven via a line 89 which by-passes the microswitch 56. When the motor 36 has driven its output shaft through half a revolution, the switches 87 and 88 return to the position shown in FIG. 6 so that, as the microswitch 77 will have returned to its original position on completion of transfer of the column of cups, the motor 36 will no longer be driven. The switches 87 and 88 are spring-loaded switches which bear against the outer surface of a cam 90 (see FIGS. 4 and 5) driven by the motor 36, the switches 87 and 88 having bearer elements which bear on the surface of the cam and are arranged to enter diametrically opposed recesses formed in the cam surface. When the cam 90 is in its "at rest" position or turned through 180° therefrom the switches 87 and 88 are in the positions shown in FIG. 6 whereas, when the cam is rotated, the switches 87 and 88 are moved from said positions.

When the first platform 19 has been tilted the switch 56 is moved from the position shown so that, when the microswitch 77 is again closed the supply to the motor 36 is obtained through a line 91 containing the switch 57 as opposed to a line 92 extending directly from switch 56 to switch 87.

When the second platform 20 tilts to transfer its column of cups to the dispensing position the switch 57 is moved from the position shown in FIG. 6 but the switch 88 is at this time away from its "at rest" position so that the second motor 60 is not at this time energized. By the time that the switch 88 returns to its original position the microswitch 77 will have been opened and the motor 60 is not energized until the

column of cups in the delivery position is again depleted to allow the striker element 76 to move under the action of its gravitational biasing whereby a line is completed, on closure of the switch 83, through the switch 77, operated switch 56, line 91, operated switch 57, motor controlled switch 88 and the third platform switch 65 to the motor 60 whereby the pusher member 61 is moved to engage the lower end 64 of the column of cups on the fixed platform 23 to transfer this column of cups into the dispensing position. During movement of the pusher member 61 to transfer the cups it operates switch 65 to open this switch to deenergize the motor 60.

To reset the machine the pusher member 61 is returned to its original position whereby switch 65 is closed and the two tiltable platforms 19 and 20 are moved upwardly whereby the projections 39 and 40 thereon enter the notches 43 and 44 in the spring-loaded pivotally mounted latch members 45 and 46 and so that the switches 56 and 57 return to their original positions. The columns of cups can then be placed on the three supporting platforms and in the dispensing position.

As the circuit to the two electric motors 36 and 60 is not completed until the timer-controlled switch 85 is closed by the timer motor (not shown) no cup transfer operation is effected except during a vending cycle of operations. This means that, if a vandal gaining access through the delivery station of the machine urges the cups in the dispensing position in an upward direction whereby the striker element 76 is free to move inwardly the microswitches 77 and 78 will be energized, the blocking relay 86 deenergized and the "sold-out" lamp 87a will be lit but neither motor will be operated, no cup transfer operation will be effected and the machine will be in a operative condition when the cups return to their original positions.

What we claim is:

1. A cup holder which includes a magazine having a delivery compartment for a stack of nested cups, a first storage compartment for a stack of nested cups at one side of the delivery compartment, a second storage compartment for a stack of nested cups at the other side of the delivery compartment, a pivotally mounted platform in each of said storage compartments to support said stacks therein, a non-pivoted platform for supporting a further stack of nested cups and disposed adjacent one of the pivotally mounted platforms, releasable means for maintaining the pivotally mounted platforms in a horizontal condition, release means including a striker element arranged to engage the cups of a nested stack in the delivery compartment and operable when the uppermost cup in a nested stack of cups in the delivery compartment reaches a predetermined level for actuating one of said maintaining means whereby the associated platform is pivoted to transfer a nested stack of cups supported thereby into the delivery com-

partment, said maintaining means being actuated in sequence, and a pusher member associated with the non-pivoted platform, the release means including operating means operable to actuate the pusher member when, after both the pivotally mounted platforms have pivoted to transfer the cups supported thereby to the delivery compartment, the uppermost cup in a nested stack of cups in the delivery compartment again reaches said predetermined level.

2. A cup holder which includes a magazine having a delivery compartment for a stack of nested cups, a first storage compartment for a stack of nested cups at one side of the delivery compartment, a second storage compartment for a stack of nested cups at the other side of the delivery compartment, a pivotally mounted platform in each of said storage compartments to support said stacks therein, said platforms being arranged for pivotal movement about horizontal axes, each pivotally mounted platform having a projection, a pivotally mounted member associated with each platform and including means for supporting the projection on the associated platform, spring means acting on each of said pivotally mounted members to urge it into a position in which it is arranged to engage the projection on its associated platform, a reciprocable bar for effecting pivotal movement of said pivotally mounted members away from said projections, a first electric motor for reciprocating said bar, release means rendered operative when the uppermost cup in a nested stack of cups in the delivery compartment reaches a predetermined level for actuating said first electric motor to reciprocate the bar whereby the platform in the first storage compartment is caused to pivot to transfer a stack of cups supported thereby into the delivery compartment, said release means being again rendered operative when the uppermost cup in a nested stack of cups in the delivery compartment again reaches said predetermined level to actuate said first electric motor to reciprocate the bar whereby the platform in the second storage compartment is caused to pivot to transfer a stack of cups supported thereby into the delivery compartment, a non-pivoted platform for supporting a further stack of nested cups and disposed adjacent one of said pivotally mounted platforms, a pusher member and a second electric motor for operating said pusher member, the release means being operable after both said platforms have pivoted to transfer their stacks of cups to the delivery compartment and when the uppermost cup in a nested stack of cups in the delivery compartment again reaches said predetermined level to complete a circuit for said second electric motor to effect movement of the pusher member to push a stack of cups on the non-pivoted platform into the delivery compartment.

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