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D. E. LAWSON

2,624,647

CUP DISPENSER

Filed Dec. 17, 1948

4 Sheets-Sheet 1

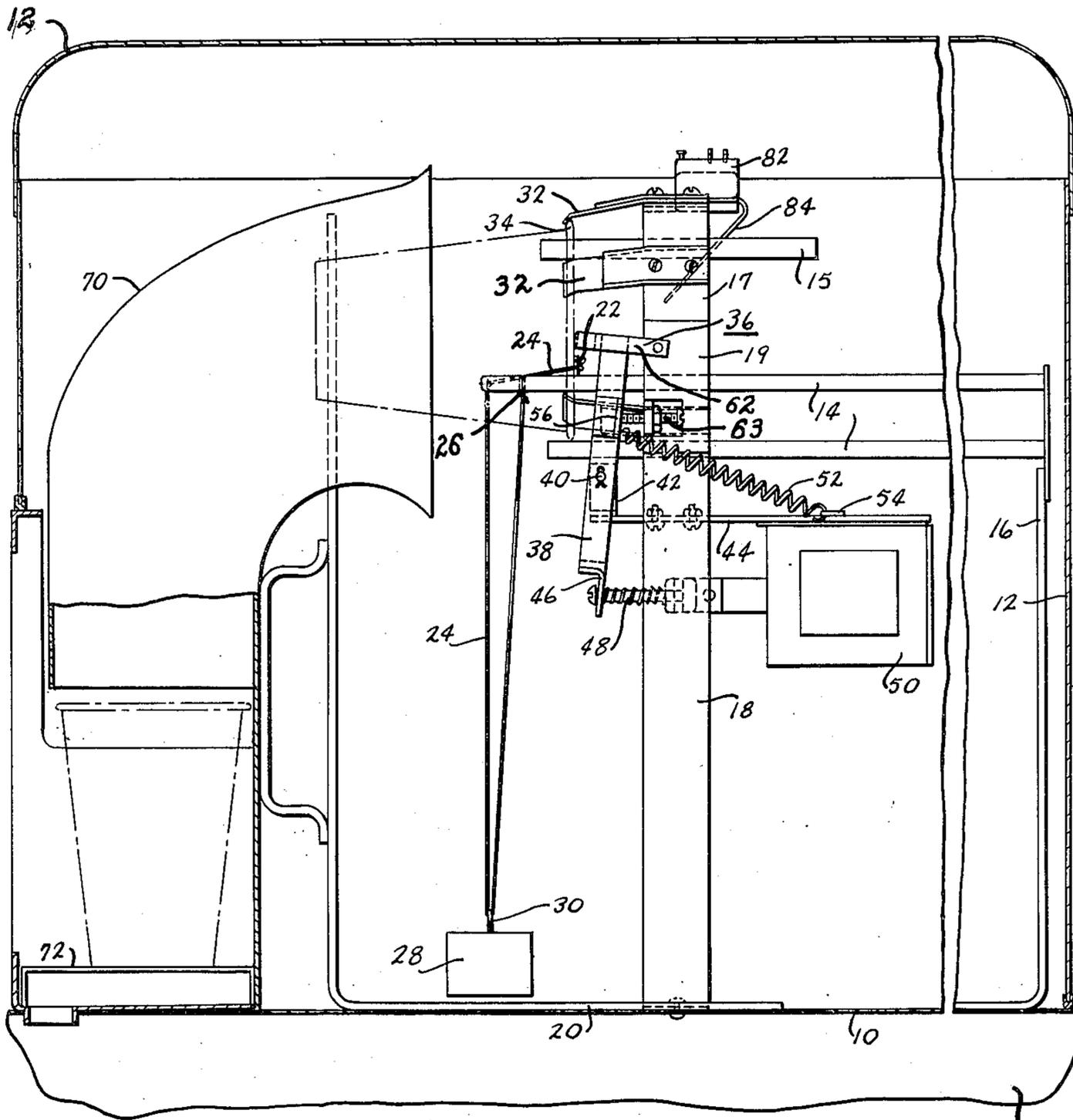


Fig. 1

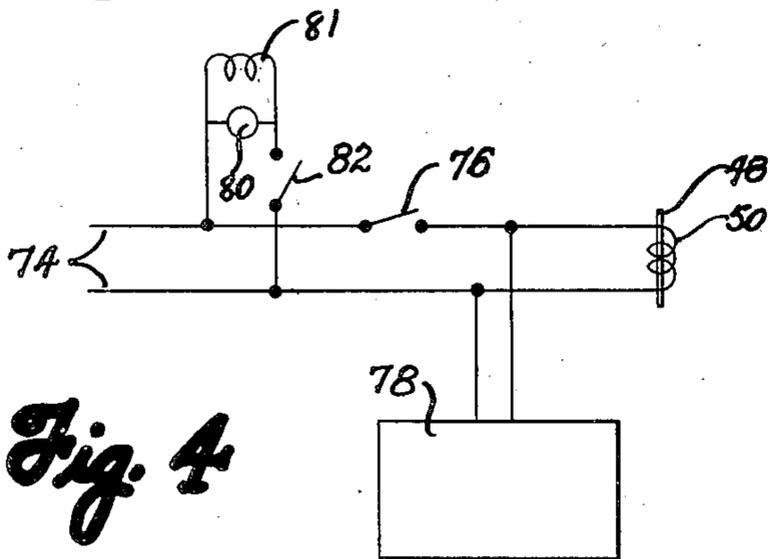


Fig. 4

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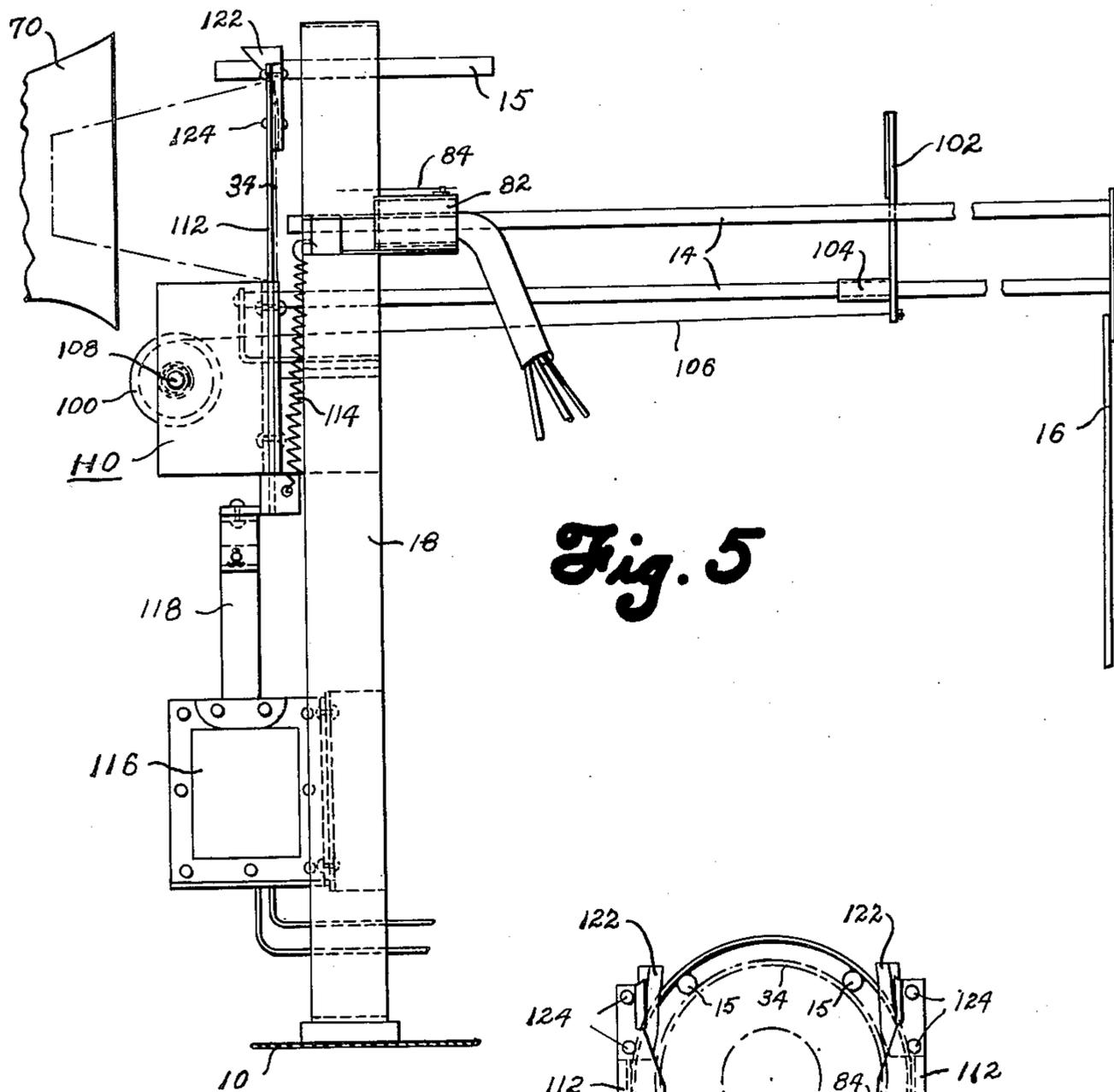
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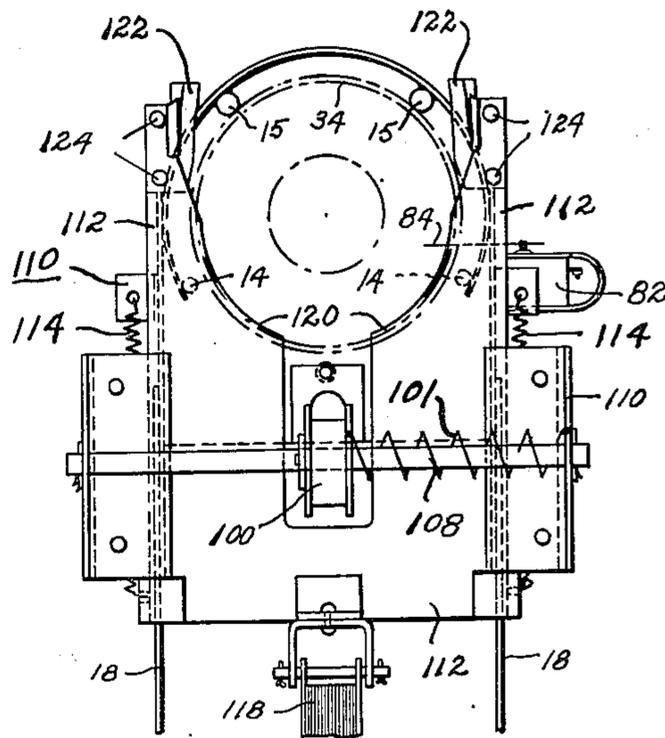
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*Fig. 5*

*Fig. 6*



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4 Sheets-Sheet 4

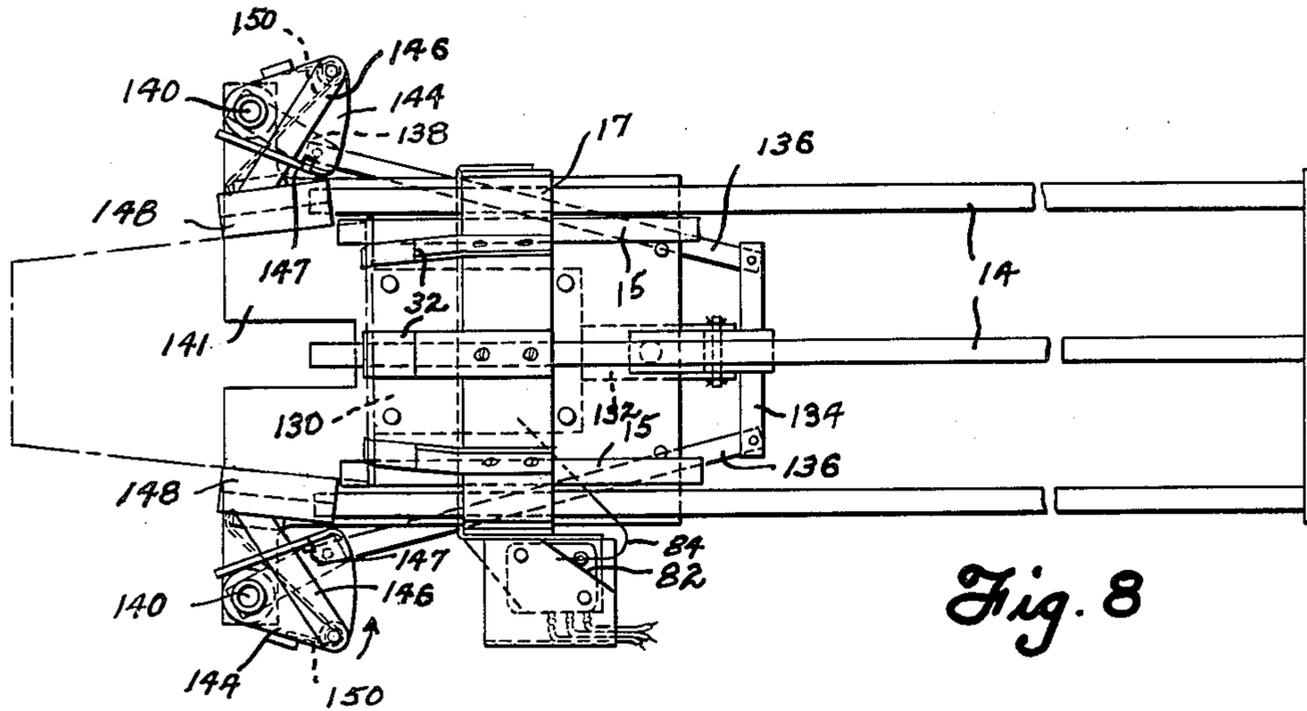


Fig. 8

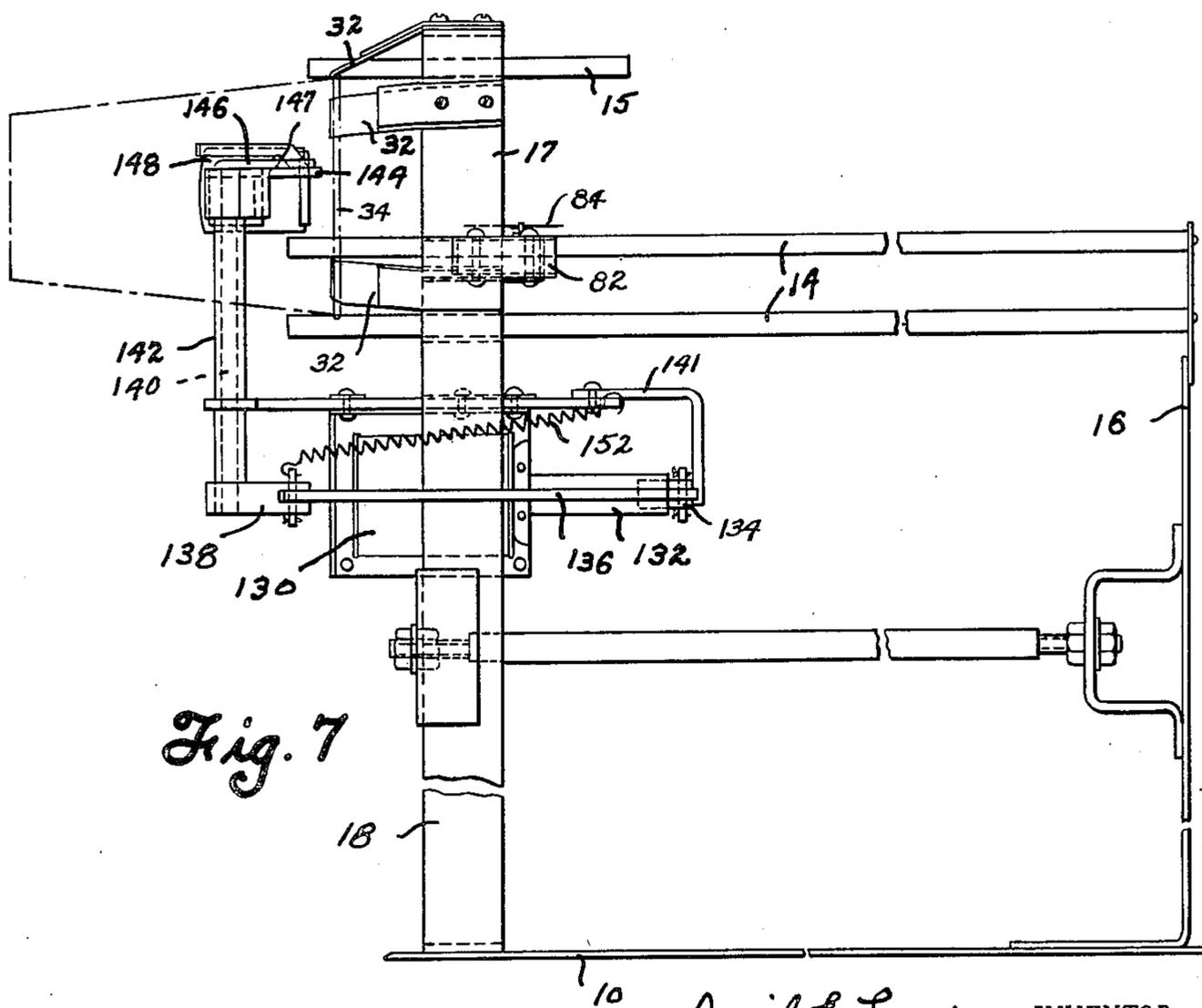


Fig. 7

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# UNITED STATES PATENT OFFICE

2,624,647

## CUP DISPENSER

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1 Claim. (Cl. 312—44)

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This invention relates to a cup dispenser and more particularly to a coin operated type of dispenser in which the individual cups are automatically dispensed.

One of the objects of this invention is to provide a dispenser of the type which may be operated by means of a solenoid energized in response to the insertion of a coin in an automatic drink dispenser.

Another object of this invention is to provide a cup dispenser which is inexpensive to manufacture and trouble-free in operation.

Another object of this invention is to provide a dispenser in which the cups are fed from a horizontally disposed series of cups and are delivered in the upright position.

Still another object of this invention is to provide a cup dispenser in which the cups leave the dispenser at a sufficient velocity to be delivered onto a shelf or the like located at some distance from the main dispensing mechanism.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawings;

Figure 1 is a vertical sectional view showing the cup dispenser mounted within a beverage dispensing cabinet;

Figure 2 is a fragmentary front elevational view showing the construction of the cup feeding mechanism;

Figure 3 is a fragmentary view partly in section showing the construction of the cup ejecting fingers;

Figure 4 is a schematic circuit diagram;

Figure 5 is a side elevational view of a modified cup dispenser;

Figure 6 is a front elevational view of the modified cup dispenser;

Figure 7 is a side elevational view of a further modification; and

Figure 8 is a top plan view thereof.

Referring now to the drawings wherein I have shown a preferred embodiment of my invention, reference numerals 10 and 12 designate respectively the main housing of a drink dispensing machine and an auxiliary housing mounted on the main housing 10 and serving to enclose the cup dispensing mechanism as well as certain parts of the drink dispensing mechanism such as the drink dispensing faucet (not shown). Since the cup dispensing mechanism may be used with many different types of drink dispensing machines, the internal construction of

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the drink dispensing machine need not be described.

For purposes of illustrating the invention, I have shown an arrangement in which the main supply of cups is adapted to be supported on a plurality of horizontally arranged rods 14 which in turn are supported on the frame elements 16 and 18 secured to the top wall 20 of the main cabinet 10. Certain features of the invention are equally applicable to arrangements in which the cups are arranged in a vertical stack either in the main drink dispenser cabinet or in an auxiliary cabinet, as will be apparent from the description which follows.

Fragmentary guide rods 15, which are welded or otherwise secured to a stationary ring 17, serve to guide the cups as they approach the dispensing position. The ring 17 is welded or otherwise secured to the frame element 18 through the medium of a U-shaped element 19 as best shown in Figure 2 of the drawings.

The cups resting on the rods 14 are normally urged to the left (as viewed in Figure 1) or toward the front wall of the housing 12 by means of the weight operated crossbar 22 which engages the final cup in the row of cups. The crossbar 22 has each end thereof attached to one end of a cable or string 24 as shown. The other end of each cable 24 is anchored as at 26 (see Figure 1) whereby a weight 28, slidably mounted on each cable, tends to exert a pull on the cable and consequently the crossbar 22, so as to urge the cups toward the left. Each cable 24 passes through a loop 30 secured to the associated weight 28 and freely passes through the loop as the crossbar 22 moves in a horizontal direction. The front ends of the two side rods 14 are slotted as shown, so as to guide the cable in its movement.

A plurality of retaining spring fingers 32 are provided for engaging the conventional bead 34 of each cup as the cups move past the spring fingers 32. These fingers have sufficient strength to hold the cups against the force exerted by the weights 28, so that unless the force of the weight 28 is augmented by some additional force such as that produced by the solenoid operated spring fingers 36, the cups will not move past the retaining spring fingers 32.

The cup ejecting fingers 36 are carried adjacent the upper ends of the U-shaped lever or yoke 38 which is pivotally mounted on a cross-rod 40 which in turn is mounted on the U-shaped member 42 carried by the solenoid supporting bracket 44 which is bolted to the lower portion of the stationary member 19. The lower end of the

U-shaped members 38 has secured thereto a lug 46 which is adapted to be engaged by the plunger 48 of a solenoid 50 carried by the bracket 44. The cup ejecting fingers are biased into the position in which they are shown in Figure 1 by means of one or more springs, such as the spring 52 which has its one end anchored to the stationary member 54 and has its other end fastened to a projecting lug 56 which in turn is spot welded or otherwise secured to the U-shaped member 38.

Energization of the solenoid 50 tends to oscillate the U-shaped element or yoke 38 about the pivot 40 in a counter-clockwise direction as viewed in Figure 1, with the result that the cup ejecting fingers 36 move to the left during the cup dispensing operation. Each cup ejecting finger (see Figure 3) comprises a rigid member 60 which serves to support a yieldable spring finger 62. Each spring finger is arranged to have its free end contact the bead 34 of each cup to be ejected, the arrangement being such that as the rigid element 60 moves toward cup ejecting position, the spring finger 62 is backed up by the rigid portion 60 so as not to flex any appreciable amount. However, as the solenoid 50 is deenergized and the spring 52 returns the finger supporting yoke to the position in which it is shown in Figure 1, the spring finger 62 is free to flex throughout substantially its entire length, with the result that it freely passes over the bead of the next cup so as to resume the position in which it is shown in Figures 1 and 3. Adjustable stops 63 (see Figure 1) carried by the arms of the U-shaped element 19 engage the ears 56 on the spring finger supporting yoke 38 so as to limit the movement of the yoke and the spring fingers.

The cups are ejected from the main stack of cups with a quick flip and enter into the cup guiding chute 70 which serves to direct each cup down onto the cup filling rack 72. The exact construction and arrangement of the guide chute 70 may be varied considerably without departing from the spirit of my invention. The shape of the chute is preferably such that the cup lands directly under the dispensing faucet (not shown).

Referring now to the circuit diagram wherein I have diagrammatically illustrated an arrangement for operating the cup dispensing mechanism, reference numeral 74 designates the main power lines which supply power to the cup dispensing solenoid 50 through a coin operated switch 76. The switch 76 is adapted to be closed by the insertion of a coin in the drink vending machine in accordance with standard practice. Closing of the switch 76 thus energizes the solenoid 50 at the same time that it sets into operation the drink dispensing mechanism designated by the reference numeral 78. A warning light 80 and a coin rejecting solenoid 81 have been provided under the control of a switch 82. As illustrated in Figures 1 and 2 of the drawings, the switch 82 is provided with a switch actuator 84 arranged in the path of the cups supported on the crossbar 14. The arrangement is such that when only a small number of cups are left, the switch operator 84 is no longer held in the switch opening position and consequently the warning signal goes on and the coin rejecting solenoid serves to reject coins inserted so long as the switch 82 remains closed.

In Figures 5 and 6 of the drawings, I have shown a slightly modified cup dispenser which may be used in place of the corresponding cup dispensing mechanism illustrated in Figures 1 and

2. Like reference numerals have been used to designate corresponding parts in all figures of the drawings and, unless otherwise indicated, the elements shown in Figures 5 and 6 function in the same manner and have the same general purpose as the correspondingly designated elements of Figures 1 and 2.

In the modification shown in Figures 5 and 6, the cups are adapted to be slidably supported on the guide rods 14 and are biased to the left, as viewed in Figure 5, by means of a spring loaded reel mechanism 100 which serves to urge the cup moving slide 102 toward the left at all times. The slide 102 includes a guide sleeve 104 which is arranged to reciprocate on the lowermost guide rod 14. A flexible cable member 105 leads from the slide 102 to the spring loaded reel 100. A spring 101, which has its one end secured to the reel 100 and its other end anchored to the stationary portion of the apparatus maintains tension on the cable 105 at all times. The reel 100 is supported on a shaft 103 which in turn is supported on the stationary frame 110 carried by the uprights 18.

The cups are restrained from moving into dispensing position by means of a vertically reciprocating slide 112. The slide 112 is biased into its upper or cup restraining position by means of a pair of springs 114, each of which has its lower end attached to the slide and its upper end attached to the stationary frame generally designated by the reference numeral 110. A solenoid 116 having an armature 118 is provided for pulling the slide or cup restraining element 112 downwardly against the action of the springs 114. Thus, when the solenoid 116 is energized, the armature 118 moves downwardly and carries with it the slide 112.

The slide 112 is provided with arcuate cup restraining portions 120 which engage the bead 34 of the leading cup when the slide is in its upper position. However, as the slide is moved down, the bead of the cup clears the arcuate portions 120, whereby the cup is free to be dispensed into a cup dispensing chute 70 shown in Figure 1.

In order to prevent more than one cup from being dispensed at a time and in order to separate the leading cup from the next succeeding cup after the restraining slide 112 has moved out of restraining position, a pair of wedge-shaped restraining elements 122 have been provided adjacent the upper end of the slide 112. These wedge-shaped elements may be attached to the slide in any convenient manner such as by rivets 124, as shown, whereby as the slide 112 moves downwardly out of cup restraining position, the elements 122 will move down between the bead of the leading cup and the bead of the next succeeding or second cup so as to restrain the second cup in line and so as to pry the leading cup out of engagement with the second cup. The shape of the wedge element 122 is such that the leading cup is given a quick flip, sending the leading cup into the guide chute 70.

The slide 112 thus constitutes a means for restraining the cups from moving into the guide chute which is arranged to receive one cup at a time and to deliver the cup onto the cup filling rack 72 in a vertical position, as indicated in Figure 1 of the drawings. Energization of the solenoid 116 moves the slide 112 downwardly until the cup restraining portions 120 of the slide are no longer effective in restraining the cups.

The control switch 82 is mounted alongside the cups in this modification rather than adja-

cent the top of the cups, as shown in Figure 1 of the drawings.

In Figures 7 and 8 of the drawings, I have shown a still further modification of a cup dispenser mechanism which could be substituted for the corresponding mechanism in Figures 1 and 2 of the drawings. The basic arrangement of the cup dispenser mechanism shown in Figures 7 and 8 is the same as that shown in the other figures of the drawings and for that reason like reference numerals have been used to designate similar parts and, unless otherwise indicated, the similarly designated parts are similar both in construction and operation. The principal difference between the structure shown in this latter modification and the structure shown in Figures 1 and 2 of the drawings is in the mechanism used for ejecting the cups. In this latter modification, a solenoid 130 has been provided which includes an armature 132 for reciprocating a cross rod 134 which in turn operates levers 136. The levers 136 are pivotally connected to crank arms 138, each of which is secured to a shaft 140 journaled in a bearing 142 attached to the main frame 18, as shown. The upper end of each shaft 140 has rigidly secured thereto a movable platform 144 which pivotally supports a cup dispensing finger generally designated by the reference numeral 146. The finger 146 is provided with a cup gripping member or pad 148 which may, for example, be in the form of a conventional rubber suction cup or may be in the form of a sponge rubber pad or the like for frictionally engaging the side walls of the cups to be dispensed.

Each finger 146 is biased into cup engaging position by means of a torsion spring 150 which has its one end anchored to the platform 144 and has its other end attached to the finger 146.

Energization of the solenoid 130 causes the cross rod 134 to move to the left, as shown in the drawings, and this in turn causes each of the platforms to rotate in the direction indicated by the arrows. The location of the pivotal connection between the finger 146 and the platform 144 is such that as the platform 144 rotates in the direction of the arrow, the pads 148 tend to move more tightly into engagement with the side walls of the cup and to shove the cup to the left until the fingers 146 engage the stop elements 147 carried by the platform 144, at which time the fingers begin to release their grip on the cup. The arrangement of the finger 146 and the platform is such that a toggle action takes place when the solenoid first begins to rotate the platform 144, whereby the pad 148 on the outer end of the finger 146 firmly grips the side wall of the cup.

Upon deenergization of the solenoid 130, spring means 152 causes the cross rod 134 to move to the right, with the result that the cup engaging fingers return to the position in which they are shown in Figure 7 of the drawings without exerting any appreciable force on the side walls of the next cup to be dispensed. The stationary spring fingers 32 carried by the frame, as shown, exert a restraining force on the bead of the leading cup, but this force is not sufficient to prevent the cup ejecting fingers 146 from dispensing the leading cup upon energization of the solenoid 130.

The cups may be biased into the cup feeding position by any conventional means. Thus a cup biasing arrangement of the type using weights, as in the construction shown in Figures 1 and 2, could be used or a spring arrangement

of the type shown in Figures 5 and 6 could equally well be used.

While I have shown the stack of cups arranged horizontally, it is obvious that the cup dispensing arrangements disclosed herein could equally well be used in cup dispensers wherein the cups are stacked up vertically.

The cup ejecting solenoids 116 and 130 are intended to be connected into the electric circuit in the same manner as the solenoid 50 has been shown connected in the circuit in Figure 4 of the drawings.

Although the preferred embodiments of the device have been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claim.

Having thus described my invention, I claim:

In a cup dispensing device, a frame, a plurality of horizontally disposed rods carried by said frame for supporting a succession of horizontally arranged cups to be dispensed, means for urging said cups toward dispensing position, said last named means comprising a first member arranged to slide on said rods and a spring loaded reel mechanism carried by said frame for biasing said first member against the last one of the cups in said succession, first means slidably mounted on said frame for vertical movement relative to said frame for restraining the leading one of said cups from being dispensed, second restraining means attached to said first restraining means and having a portion arranged in spaced relationship to said first restraining means and movable into position to restrain the next succeeding cup as said first restraining means moves out of cup restraining position, said second restraining means comprising a vertically movable wedge operable between portions of the two leading cups so as to forcefully separate the leading cup from the next succeeding cup so as to dispense the same, an electric solenoid having a vertically moving armature connected to said first restraining means whereby energization of said solenoid causes the leading one of said cups to be given a quick shove horizontally, and a cup delivery chute positioned adjacent the restraining means, said chute having its inlet end horizontally disposed adjacent one end of said succession of cups so that its inlet receives the cup projected by the wedge, said chute having its other end vertically disposed for delivering cups at a point remote from said succession of cups in an upright position.

DAVID E. LAWSON.

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