April 17, 1956 E. L. STREMPEL 2,742,183

CUP DISPENSERS

Filed Oct. 26, 1950 4 Sheets-Sheet 1

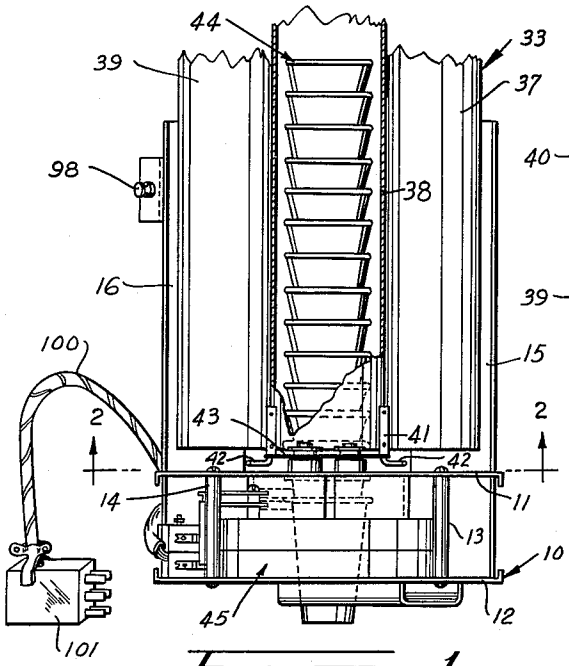


FIG. 1

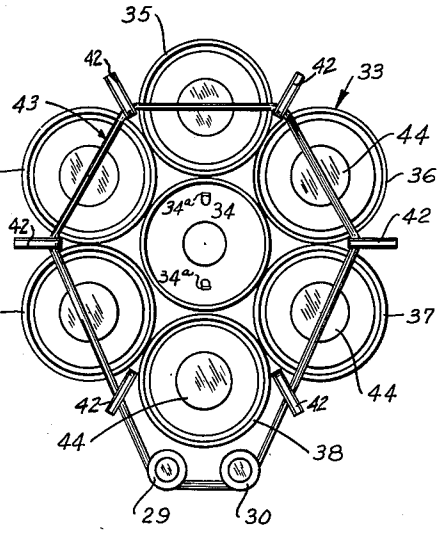


FIG. 2

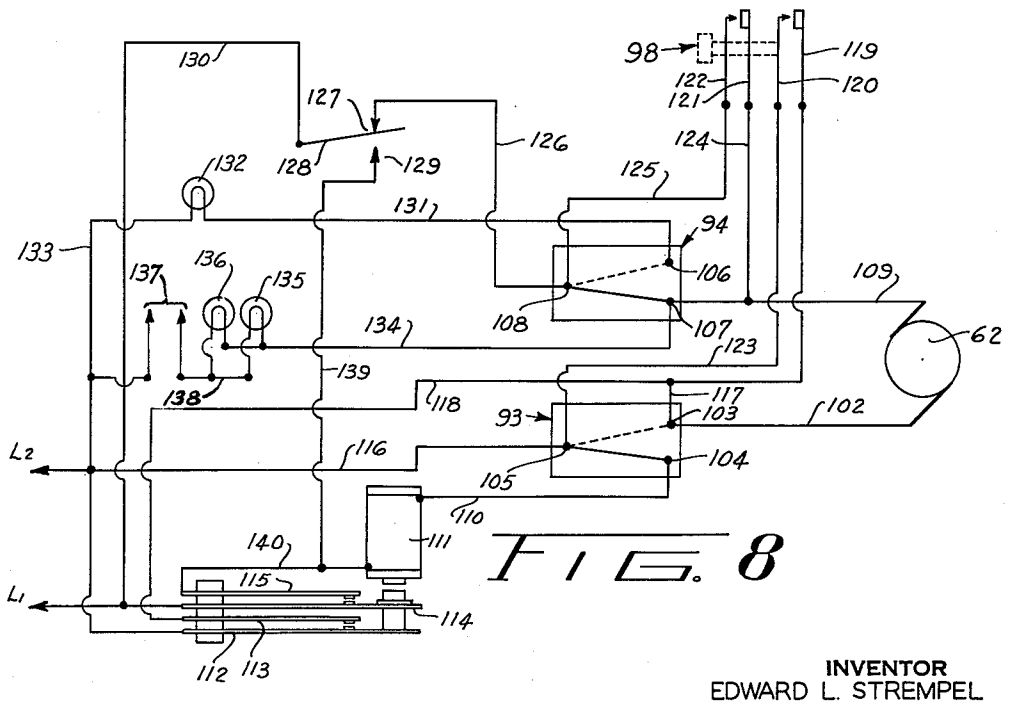


FIG. 8

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CUP DISPENSERS

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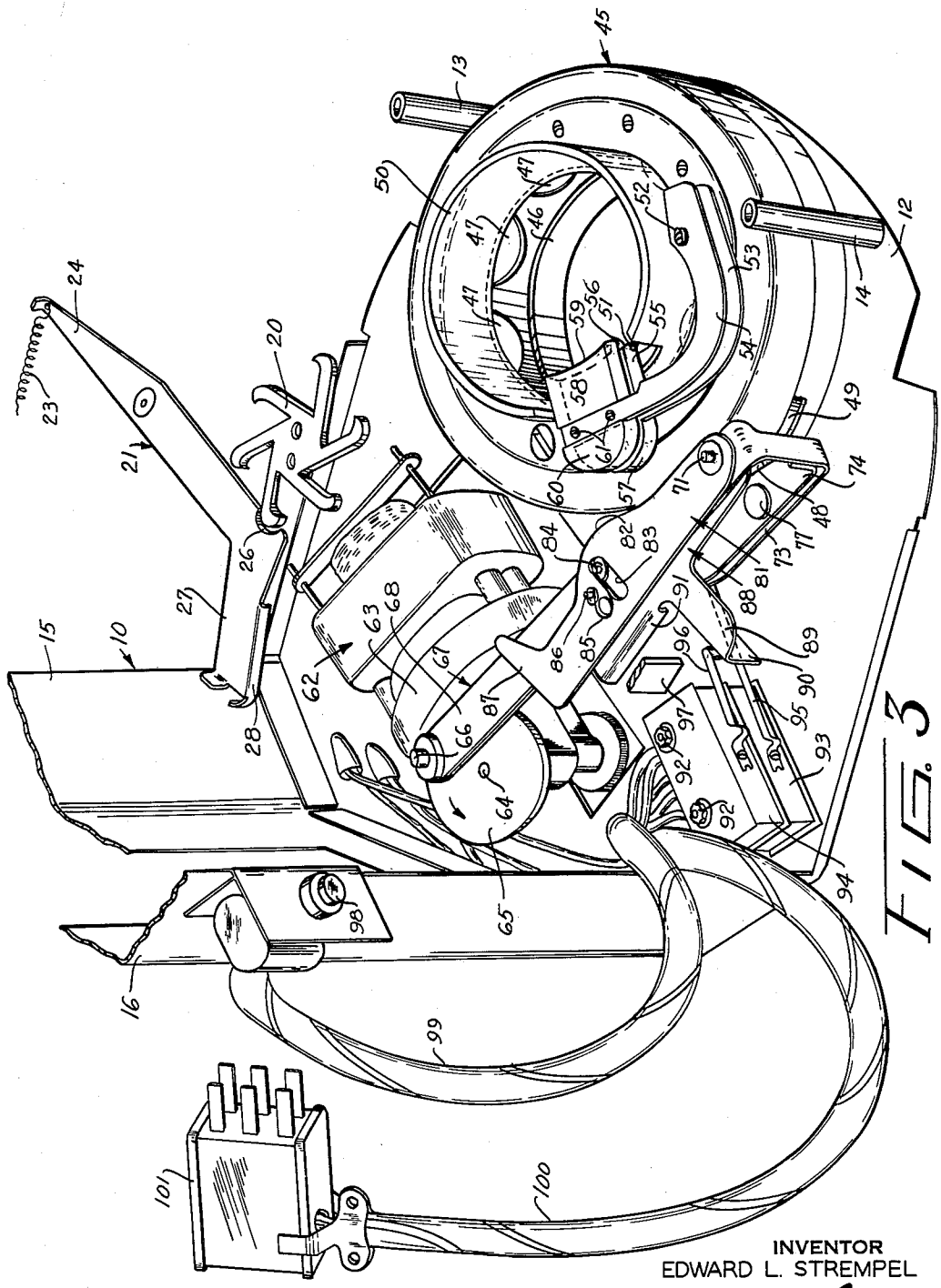


FIG. 3

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CUP DISPENSERS

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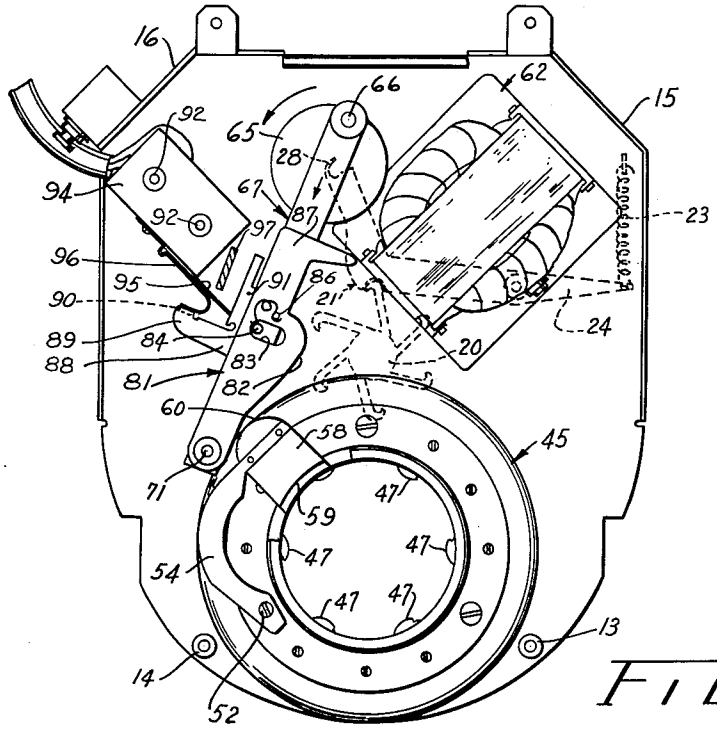


FIG. 4

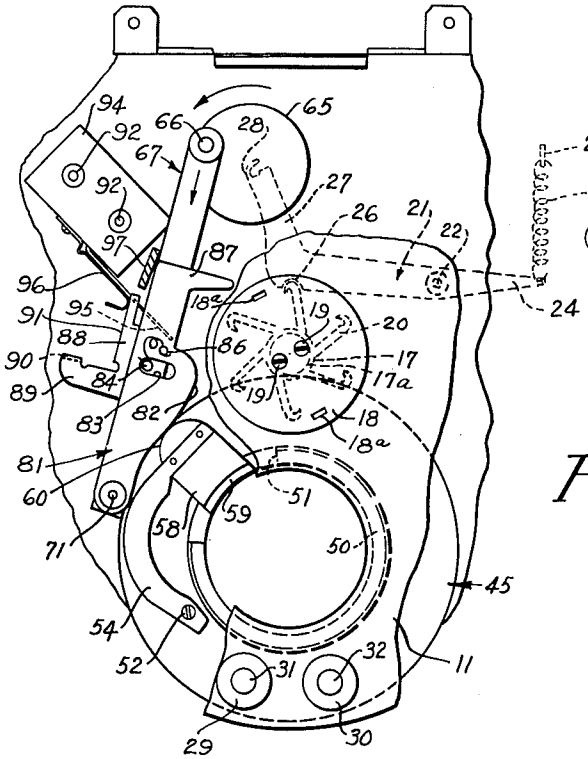


FIG. 11

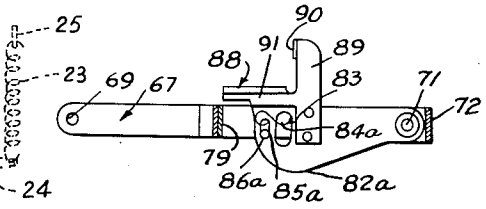


FIG. 5

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CUP DISPENSERS

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FIG. 6

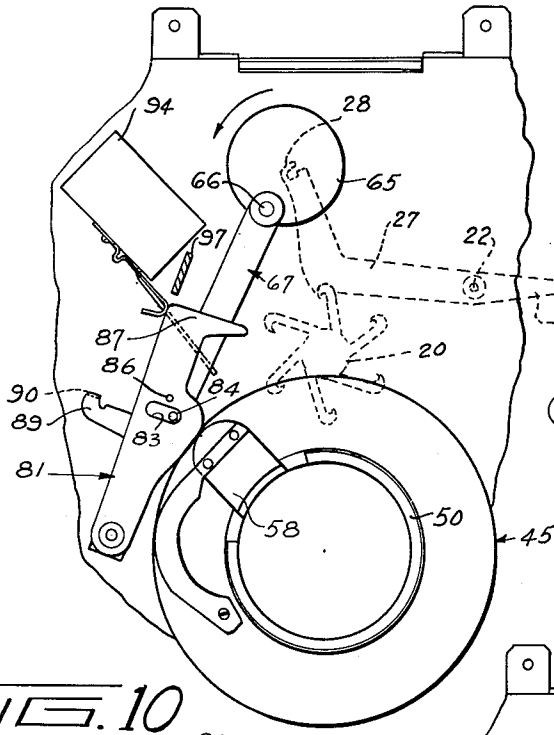


FIG. 12

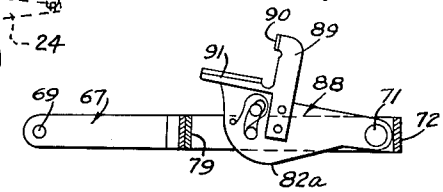


FIG. 7

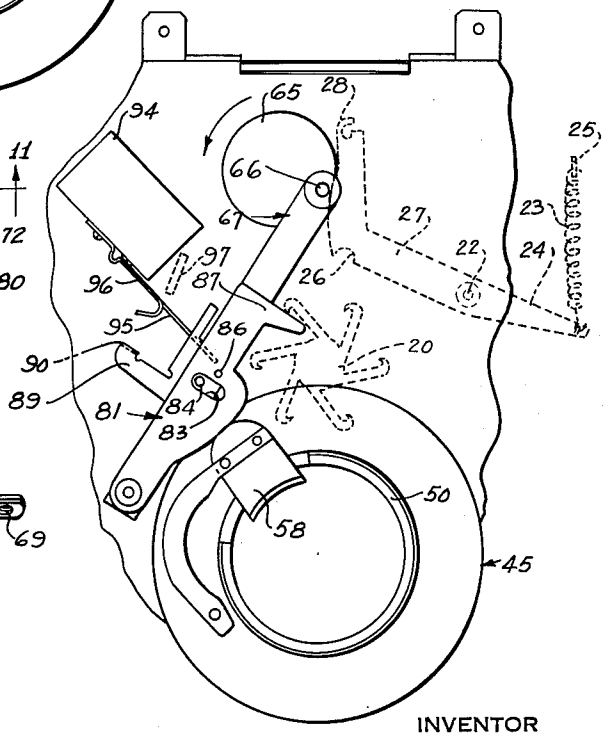
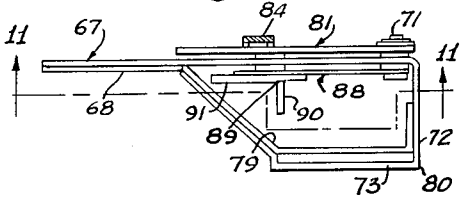


FIG. 10



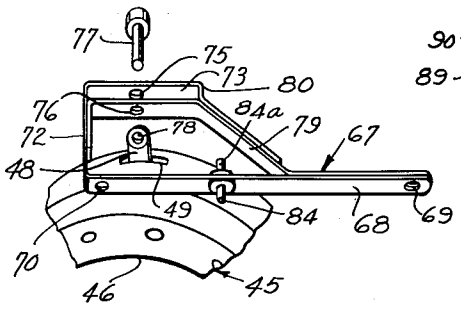


FIG. 9

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United States Patent Office 2,742,183 Patented Apr. 17, 1956

2,742,183

CUP DISPENSERS

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Application October 26, 1950, Serial No. 192,312

7 Claims. (Cl. 221—6)

This invention relates to improvements in cup dispensers, and has for an object the provision of a dispenser having a turret, thereon carrying a plurality of stacks of paper cups, means supporting said stacks by engaging the bottoms thereof, and means automatically displacing the supporting means as each stack is moved into alignment with a dispensing station in the device.

Another object of the invention is the provision, in a cup dispenser, of a plastic well at the dispensing station to prevent the cups from contacting any metal passage in the mechanism per se.

A further object of the invention is the provision of a simplified mechanism for feeding cups at the dispensing station and for advancing the turret, said mechanism including improved fingers for controlling the same.

Other objects and advantages of the invention will be apparent to those skilled in the art upon a study of this specification and the accompanying drawings.

Referring to the drawings, which are one example illustrating the invention:

Figure 1 is an elevation partly broken away showing my new and improved cup dispenser;

Figure 2 is a view of the bottom of the turret as seen along the line 2—2 of Figure 1;

Figure 3 is a perspective view of the mechanism with the top plate removed;

Figure 4 is a plan view of the mechanism with the top plate removed showing the elements in their normal positions;

Figure 5 is a view similar to Figure 4, showing the elements in positions advanced from the positions shown in 3 and 4;

Figure 6 is a view similar to Figure 5 with the exception that the elements are in different positions;

Figure 7 is a view similar to Figure 6 with the elements still further advanced;

Figure 8 is a circuit diagram;

Figure 9 is a perspective view of the connecting rod showing how it is connected to the device for dropping the cups;

Figure 10 is a side elevation of the connecting rod with the toggle elements thereon;

Figure 11 is a view taken along the line 11—11 of Figure 10 showing the lower lever in one toggle position; and

Figure 12 is a view similar to Figure 11 wherein the lower lever has been shifted to its other toggle position.

Referring first to Figures 1 and 2, the cup dispenser frame 10 includes an upper plate 11 and a lower plate 12 which are secured together in spaced relation in the front by means of spacer rods 13 and 14 and in the rear by uprights 15 and 16 secured thereto in any suitable manner, for example, by means of screws.

Diverting for the moment to Figure 5, the top plate 11 has a shaft 17 journalled in a suitable bearing 17*a* therein, and secured to the upper end of this shaft is an inverted cup 18 which is secured to the shaft by means of screws 19. Secured to the lower end of the shaft 17

is an indexing wheel 20. In the present embodiment, the indexing wheel 20 has six positions due to the fact that the turret, which will presently be described, has six columns.

A lever 21 is positioned adjacent to the lower surface of the top plate 11 and is fulcrumed on a stud shaft 22 depending from the top plate 11. A spring 23 has one end connected to the end 24 of the lever 21 and the other end is connected to a tab 25 on the top plate 11. The other end of the lever 21 has a curved notch 26 formed therein to cooperate with the index wheel 20. The lever 21 has an extension 27 which carries a camming surface 28 which will presently be described. Mounted on the top plate 11 are grooved rollers 29 and 30 which are journalled on studs 31 and 32 respectively.

Turning back to Figures 1 and 2, a turret 33 has a central cup-like member 34 located at the lower end thereof and a like cup-like member (not shown) at the upper end thereof. Disposed about the cup-like members are elongated tubes 35, 36, 37, 38, 39, and 40 to form a unitary structure. Secured at the junction of each pair of tubes is a bracket 41 having a depending arm 42 extending at a right angle thereto. Since there are six tubes in the structure there are also six of the brackets 41 with the depending arms 42. Spanning all of these arms is a spring belt 43. This belt as will be noted in Figure 2, spans the center of each of the tubes except the one in the dispensing position, where the belt is diverted from the center by passing over the rollers 29 and 30. By this improvement the bottom cup in each of the columns of cups 44 except the one in the dispensing position as aforesaid, rest directly on the spring wire belt instead of projecting downwardly onto some flat surface which might gather dirt and dust.

The cup-like member 34 fits on the cupped member 18 with the tabs 34*a* therein engaging the slots 18*a* in the member 18, thereby keying the turret to the shaft 17 so that the latter positively drives the turret.

When the turret is so positioned on the cup-like member 34, the wire belt 43, where it spans the tubular member 38 above the dispensing stage (to be presently described), is pulled forward and placed in engagement with the grooved pulleys 29 and 30, thereby leaving the column of cups 44 immediately above the dispensing station free to move downwardly into the dispensing station and yet the wire belt spans the bottoms of all of the rest of the cylinders 36 and holds the cups therein against movement downwardly. Now as the turret is advanced to bring the next succeeding tubular column 36 to the dispensing position, the wire belt 43 is, by the movement of the turret and the positions of the pulleys 29 and 30, displaced from its spanning relation of the column advancing into the dispensing position, thereby leaving the cups in that column free to move downwardly to the dispensing stage. This is repeated each time the turret is advanced one index point.

The dispensing stage is comprised of a cup dispenser 45 described in Patent No. 2,268,421 made by the Lily-Tulip Cup Corporation. This dispenser includes a central passage 46 for the cups and this passage is bordered by a plurality of cam-like rollers 47 which are rotated through a portion of a revolution by means of a lever 48 which projects through a slot 49 in the casing of the dispenser.

In Figure 3, the lever 48 on the cup dispenser 45 is shown in its normal position and when the lever is moved to the right (as viewed in that figure) the cam-like rollers 47 are rotated to positions where they provide passage for the bottom cup in the stack and yet hold up the next to the bottom cup.

Set into the upper end of the cup dispenser 45, and concentric with the passage 46 therein is a cylindrical

member 50 which is formed of "Lucite" or any other suitable material.

The cylinder has an arcuate notch 51 formed therein. A stud shaft 52 mounted on the body of the cup dispenser 45 has journalled thereon a generally L-shaped lever 53 and spaced apart therefrom on the shaft 52 is a second L-shaped lever 54. Secured on the end of the lever 53 is a feeler member 55 which has a cup-engaging face 56 which extends through the arcuate notch 51 and which has a camming surface 57 on the opposite end thereof. Secured on the lever 54 is a like feeler member 58 which has a cup-engaging face 59 which extends through the notch 51. The other end 60 of the feeler member 58 constitutes a camming member. The feelers are secured on the respective levers by means of screws 61. An electric motor 62 is mounted on the plate 12 and has operatively connected thereto, via a suitable reduction gear 63, a vertical shaft 64. Secured on the upper end of the shaft 64 is a disk 65 which carries a crank pin 66. A connecting rod member, generally designated by the numeral 67, and best seen in Figure 9, is comprised of a bar 68 having a bearing hole 69 formed in one end thereof, to accommodate the crank pin 66 and which has a hole 70 near the other end thereof to accommodate a pivot pin 71. Secured to the bar 68 is a depending leg 72 which is connected to spaced-bar sections 73 and 74 which have aligned holes 75 and 76 therein to accommodate a clevis pin 77 which is passed through the holes 75 and 76 when a hole 78 is positioned between the portions 73 and 74 with the hole 70 in alignment with the holes 75 and 76. Now with the hole 69 engaging the crank pin 66, any rotative movement of the disk 65 carrying the crank pin, is imparted to the lever 48 of the cup-dispenser 45. The connecting rod member has extensions of the portions 73 and 74 extending upwardly at an angle and designated by the numeral 79, and due to this angularity, an actuating shoulder 80 is formed.

Pivotally mounted on the pivot pin 71 is a lever 81 which has a camming surface 82 adapted to cooperate with the camming surface 60 on the feeler 58. A laterally disposed slot 83 is formed in the lever 81, and a spring post 84 carried on the lever member 67 extends through the slot 83 and is engaged by one end of a spring 85. The other end of the spring engages a spring post 86 carried on the lever 81. The spring 85 is a toggle spring which retains the lever 81 in either one of two extreme positions defined by the engagement of the ends of the slot 83 with the spring post 84. The lever 81 also carries a pawl 87 which engages and advances the index wheel 20 under certain conditions which will hereinafter be explained.

A second lever member 88 is carried on the pivot pin 71 below and closely adjacent to the lower surface of the bar 67. This lever likewise carries a slot 83*a* which is in the same relative position as the slot 83. The spring post extension 84*a* extends downwardly into the slot 83*a* and is provided with a toggle spring 85*a* like the spring 85. The arm 88 has a tab 89 extending at right angles thereto and this tab has a depending ear 90 which cooperates with a switch to be presently described. The lever 88 also has a depending tab 91, the purpose of which will presently be described. Mounted on the plate 12, one above the other by means of screws 92 are switches 93 and 94. The switch 93 has a springy actuating arm 95 which is engaged during a predetermined portion of the operating cycle by the actuating shoulder 80 on the connecting rod member 67. The switch 94 has a springy actuating arm 96 which is lightly engaged during a predetermined portion of each operating cycle by the above mentioned depending ear 90 on the lever 88, however such engagement is not sufficient to actuate the switch 94 per se unless the stack of cups at the dispensing stage has been depleted to the extent that the feeler 58 is not restrained by the presence of a cup in the path of its face 59. The top plate 11 has a depending lug 97 which is in the path of both the lever 81 and the lever 88 when either of them has been cammed over by the camming surfaces 60 and 57 respectively to positions where the right end of the slot in either or both levers is against the stud 84. This lug 97 is contacted by the depending tab 91 and by the left edge of the lever 81.

A push switch 98 is mounted at a point convenient for the service man to cycle the machine after replenishing operations, and this switch is connected via a cable 99 to switches 93 and 94. A second cable 100 encloses conductors to be presently described and these terminate in a male connector plug 101.

The circuit diagram is shown in Figure 8, wherein the motor 62 has one conductor 102 connected to a terminal 103 on the switch 93, and a second conductor 109 connected to a terminal 107 on the switch 94. The switch 93 has a terminal 104 which is connected via a conductor 110 to one end of a relay winding 111, and has a terminal 105 which is connected via a conductor 116 to one side L_2 of a source of current. The terminal 103 is also connected via a branch wire 117 to a conductor 118 which is connected to a switch arm 119, in the push switch 98, and also to a switch arm 113 in the relay 111. The terminal 105 is also connected via a branch conductor 123 to a switch arm 120 which cooperates with the switch arm 119 in the push switch 98.

The terminal 107 on the switch 94 is also connected via a wire 124 to a switch arm 121 in the push switch 98, and a switch arm 122 cooperating therewith is connected via a wire 125 to a terminal 108 on the switch 94, which is in turn connected via a branch wire 126 to an "up" contact 127 of a coin switch 128. The contact arm of this switch is normally in contact with the contact 127 and is connected, via a conductor 130, to the other side L_1 of the source of current and also to a contact arm 114 of the relay 111.

A terminal 106 of switch 94 has connected thereto a line 131 which leads to a signal lamp 132 and thence via a conductor 133 to L_2. This lamp signals the exhaustion of the cups in the turret. The terminal 107 is also connected via a wire 134 to one terminal of each of lamps 135 and 136, and these lamps have their other terminals connected via a wire 138 to L_2, a series branch circuit 137 of which leads to a change maker. These lamps are normally illuminated, except when the exhaustion of change in the change maker opens the branch circuit 137. The "down" contact 129 of the coin switch is connected via a conductor 139 to a branch wire 140, which is connected to the other terminal of the relay winding 111 and to the contact arm 115 of the relay.

The switch 93 is termed herein the "end of stroke switch," and the switch 94 is termed the "empty switch."

Operation of the circuits

When the arm 128 of the coin switch is swung downwardly by a coin, it contacts the "down" contact 129 and connects 139 and 140 to L_1 of the source, thereby supplying energy to the relay winding 111, the other end of which is connected to L_2 via 110, the end of stroke switch 93 and the conductor 116. This causes the relay contacts to close, connecting L_2 to one terminal of the motor 62 via 133, contact arm 112, contact arm 113, the conductor 118 and conductor 102. At the same time the arm 128 of the coin switch has returned to its normal position in contact with the "up" contact, thus connecting the other terminal of the motor to L_1 over a circuit which may be traced as follows: From L_1, via 130 to arm 128, from contact 127 via 126, the switch 94 and the conductor 109 to the motor, so that the motor drives the mechanism through a cycle, which will be presently described.

As the mechanism is so driven, the switch 93 snaps over to its other position, disconnecting terminals 104 and

105 and connecting the terminals 103 and 105 together so that the motor is connected directly to L_2 instead of through relay contacts 112 and 113. Also, as the switch terminal 104 is disconnected from the terminal 105 by the snap-over, the relay winding 111 is deenergized and the contact arms return to their normal positions. When the mechanism completes its cycle, the switch 93 is snapped back to its original position, where the terminals 104 and 105 are connected together, however the motor does not immediately start operating again because the relay is open. It can only be started into operation again by the movement of the coin switch lever 128 down into contact with 129 and up again into contact with the contact 127.

When the dispenser is empty, the empty switch 94 is thrown to the position where terminals 106 and 108 are connected and current is supplied to the lamp 132. Normally this switch keeps lamps 135, 136 illuminated.

The push switch 98 is provided so that the service man may cycle the mechanism after replenishing the cups in the machine or after repairing it. When it is depressed, one side of the motor is connected to L_1 via the contact arms 121 and 122, and the other side of the motor is connected to L_2 via the contact arms 119 and 120 so that the motor starts the mechanism through a cycle. As soon as the cycle starts, the switch 93 connects terminals 105 and 103 and the mechanism controls the cycle as usual.

Operation of the mechanism

When the cup turret 33 is positioned in the machine with the cup-like member 34 engaging and fitting on the cup-like member 18, the spring wire belt 43 which normally spans the bottoms of all of the tubes 35, 36, 37, 38, 39, and 40 is displaced from the bottom of the tube in the dispensing position (which in the showing in Figure 2 is the tube 38) and is positioned about the pulleys 29 and 30, thereby allowing the column of cups in this tube to descend into the dispenser 45. Now, when this stack is exhausted, the turret is advanced to bring the tube 39 to the dispensing position, and as it is so moved, the portion of the wire belt 43 spanning its bottom moves out about the pulleys 29 and 30, and the portion of the belt which was spanning these pulleys before the turret was shifted returns to spanning relation with the bottom of the tube 38, etc. From this it will be seen that the bottoms of all of the columns of cups are held up by the wire belt 43 until each column reaches the dispensing stage. This feature coupled with the provision of the plastic annulus 50 makes this cup dispenser more sanitary than those of the prior art.

When the motor 62 starts, the mechanism is in the relation shown in Figure 4, and it is assumed that a stack of cups is in the dispensing position and, therefore, the cup feeler members 55 and 58 are normally engaging these cups. In Figure 5, the mechanism has advanced to a point where the camming surfaces 57 and 60 of the cup feelers 55 and 58 are engaging and have started to displace the members 81 and 88 toward the left to bring the other ends of the slots 83 toward the stud 84, thereby moving the engaging end 87 out of the range of the index wheel 20, so that the turret is not advanced. At the same time, the switch lever 95 of the switch 93 is released so that the contact arm therein shifts to the dotted position shown in the circuit diagram (Figure 8). The lever 96 on the switch 94 is as stated above lightly engaged during a portion of each operating cycle and the relation of the contacts of the switch 94 remain unchanged until the column of the turret in the dispensing position is empty. When the turret is empty or when the top cup in the stack being dispensed is below the path of the feeler 58, the latter is not arrested by a cup and consequently its camming surface 60 is not restrained. This means that the member 81 is not displaced and the pawl end 87 is not displaced from the range of the

indexing wheel 20, and the pawl advances the turret one step or stage, thereby bringing a succeeding column into the dispensing position. As the cycle progresses the wrist pin 66 engages the lever 28, swinging it clockwise and disengaging the notch 26 from the arm of the index wheel 20, and camming off the end 28 of the lever. This allows the notch 26 to reengage the arm of the index wheel 20. The levers 81 and 88 are shifted to the left by the arrested feelers 58 and 55 respectively, and they are shifted to the right, or reset, by the depending tab 97 during each cycle, as long as the feelers are arrested by cups at the dispensing stage.

During the cycle, the cup device 45 has had its lever 48 moved forward to drop a cup, and moved back to its initial position by the time the wrist pin 66 reaches its at rest position at the end of the cycle.

When the upper feeler 58 is not arrested by a cup due to the exhaustion of the cups therein, the feeler 58 does not encounter any cups so that it offers no resistance to the lever 81, therefore the lever 81 is not shifted to the left (Figure 7). This results in leaving the pawl end 87 of this lever in the range of the indexing wheel 20 so that it engages one of the arms of the indexing wheel and advances the indexing wheel, and the turret carried thereby, one index point as the mechanism completes its cycle. The succeeding tube of the turret is thereby moved in registration with the dispensing stage and the portion of the spring wire belt which spanned the bottom end of that tube is moved outwardly by the pulleys 29, and 30 and the lower end of the stack of cups drops into the well 50 of the cup mechanism 45. When all of the cups in all of the columns of the turret are exhausted, both feelers meet no resistance, so the empty switch 94 is depressed by the lever 88 under control of the feeler 58, therefore the lamp 132 remains illuminated, indicating that the supply of cups is exhausted.

From the above, it will be noted that there are three functions performed by the device:

1. The normal function of cup dispensing.
2. The function of advancing the turret to bring a fresh column of cups into alignment with the dispensing stage.
3. The function of signaling an indication that the supply of cups in the turret is exhausted.

The device functions normally and continues to do so just as long as the feeler member 58 encounters or "feels" cups at the dispensing stage, so that the camming surface 60 of this feeler is engaged by the camming surface 82 of the lever and causes the lever to snap to its other toggle position, where the engaging end 87 is moved to a position where it cannot engage the indexing wheel 20 and advance the turret.

When the column of cups at the dispensing stage, for example, the column within the tube 38 is exhausted to the point where the uppermost one is below the level of the "feeler" 58, the latter is not arrested or restrained. This means that when the cycle has progressed to a point where the surface 82 of the lever 81 contacts the cam surface 60 of the feeler, the feeler is merely moved to the right (as viewed in Figure 5) and the lever 81, which earlier in the cycle was shifted by the depending tab 97 to the position shown in Figures 4, 5, and 7, has its pawl end 87 in the path of the index wheel 20. During the latter portion of the cycle the pawl 87 advances the turret one index point, thereby bringing the next column of cups, those in the turret tube 39, into alignment with the dispensing stage. As this occurs, the wire belt under this tube is diverted by its passage over the grooved rollers 29 and 30, thereby allowing the cups to drop into the few remaining at the dispensing stage.

Now, having a fresh column of cups at the dispensing stage, at each operation of the machine it functions normally as 1 above until that column of cups is exhausted.

Then the function 2 above obtains, shifting another column of cups to the dispensing stage. Functions 1 and 2 alternate as above described until the stage is reached where all of the columns of cups have been dispensed. When this stage has been reached, function 3, obtains.

The lever member **88**, which is also toggled over or shifted during the cycle by the depending tab **97**, to a position where its cam surface **82***a* would normally cam against the cam surface **57** of the lower feeler **55**. However, since the lower feeler meets no resistance due to the absence of cups it cannot toggle the lever member back to a position such as that shown in Figure 12, and consequently the depending portion **90** thereof actuates the element **96** on the switch **94** and shifts the switch to a position where elements **106** and **108** are connected together, thereby supplying energy to the signal light **132** to indicate the exhaustion of cups.

The switches **93** and **94** are preferably micro-switches in which the movable arm is connected to contact **108** in switch **94** and is normally in contact with the contact **107**, which is connected via wire **109** to one side of the motor **62**, and when the movable arm is actuated, it connects **108** to **106** to illuminate the signal light **132**, so the movement, in addition to energizing the light **132**, it deenergizes the motor **62** and the mechanism stops in this position shown in Figure 3 with the switch held so that the signal light remains burning. In this position the motor cannot be operated, and this is intended because no cups are available.

When the service man replenishes the cups in the turret, he can start the motor by means of the push button **98**, closing the contacts **121**, **122** and **119**, **120** respectively to put the machine through one or more cycles, following which the machine will operate normally due to the fact that both feelers feel cups at the dispensing stage.

Although I have herein shown and described, by way of example, one embodiment of the invention, it is obvious that many changes may be made in the arrangements shown, within the scope of the following claims:

What is claimed is:

1. In a cup dispenser, a dispensing stage, a turret for carrying a plurality of stacks of cups, said turret being supported for rotation along a path crossing the center of said dispensing stage, indexing means for said turret, a motor-driven shaft, a disk on said shaft carrying a crank pin, connecting rod means connected to said crank pin and to an actuator arm of said dispensing stage, a retainer pawl normally engaging said indexing means and having a camming surface thereon adapted to be actuated by said crank pin for displacing said pawl during a predetermined portion of each dispensing cycle, a second pawl means on said connecting rod shiftable to two positions thereon, feeler means for cups at said dispensing stage, cam means on said feeler means for camming said second pawl means out of the path of said index means when cups are present at said stage, and fixed means in the path of said second pawl means for resetting said second pawl means during each dispensing cycle.

2. In a cup dispenser, a dispensing stage, a turret for carrying a plurality of stacks of cups, said turret being supported for rotation along a path crossing the center of said dispensing stage, indexing means for said turret, a motor-driven shaft, a disk on said shaft carrying a crank pin, connecting rod means connected to said crank means and to an actuator arm of said dispensing stage, a retainer pawl normally engaging said indexing means and adapted to be engaged by said crank pin and disengaged from said indexing means during a predetermined portion of each dispensing cycle, a second pawl means on said connecting rod shiftable to two positions thereon, a pivoted feeler means for cups at said dispensing stage, cam means on said feeler means for camming said pawl means out of the path of said index means when cups are present at said stage, and fixed means for resetting said pawl means during each dispensing cycle, a pivoted second feeler means for cups at said dispensing stage coaxial with and parallel to said first feeler means, switching means controlled by said second feeler means for completing a circuit to indicate the exhaustion of the supply of cups when said last feeler means encounters no cups at said dispensing stage.

3. The invention, according to claim 2, in which switching means and circuits connected thereto and connected to a source of current are provided under control of said first feeler means for terminating the supply of current to said motor just prior to the end of each dispensing cycle.

4. A cup dispenser, according to claim 1, in which a second feeler means for cups at said dispensing stage is positioned below and substantially parallel to said first feeler means, a microswitch controlled by said first feeler means, a second microswitch controlled by said second feeler means, electrical circuits connected to said first microswitch and to said motor, said circuits being connected to a source of current and including a relay and a coin-actuated switch, said coin-actuated switch being adapted to energize said relay to initiate a dispensing cycle and said first-mentioned switch being adapted to take over control from said relay for the remainder of the said operating cycle and each cycle being adapted to be terminated by said first microswitch under control of said connecting rod means, a second circuit connected to said second microswitch and adapted to be closed when said second feeler means encounters no cups at said dispensing stage.

5. A cup dispenser according to claim 1 in which said feeler means for the cups at the dispensing stage are comprised of two levers, one above the other on a common axis and each lever having a non-metallic element thereon which constitutes the sole means contacting the cups.

6. A cup dispenser according to claim 1 in which said dispensing stage includes a non-metallic annulus which embraces the cups in the lower portion of each stack at said dispensing stage.

7. A cup dispenser according to claim 1 in which said dispensing stage includes a non-metallic annulus which embraces the lower cups in each stack at said dispensing stage, said annulus having a clearance slot formed therein, and in which said feeler means constitutes a pair of levers on a common axis, each carrying a non-metallic feeler element which extends through said clearance slot and engages cups at said dispensing stage.

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