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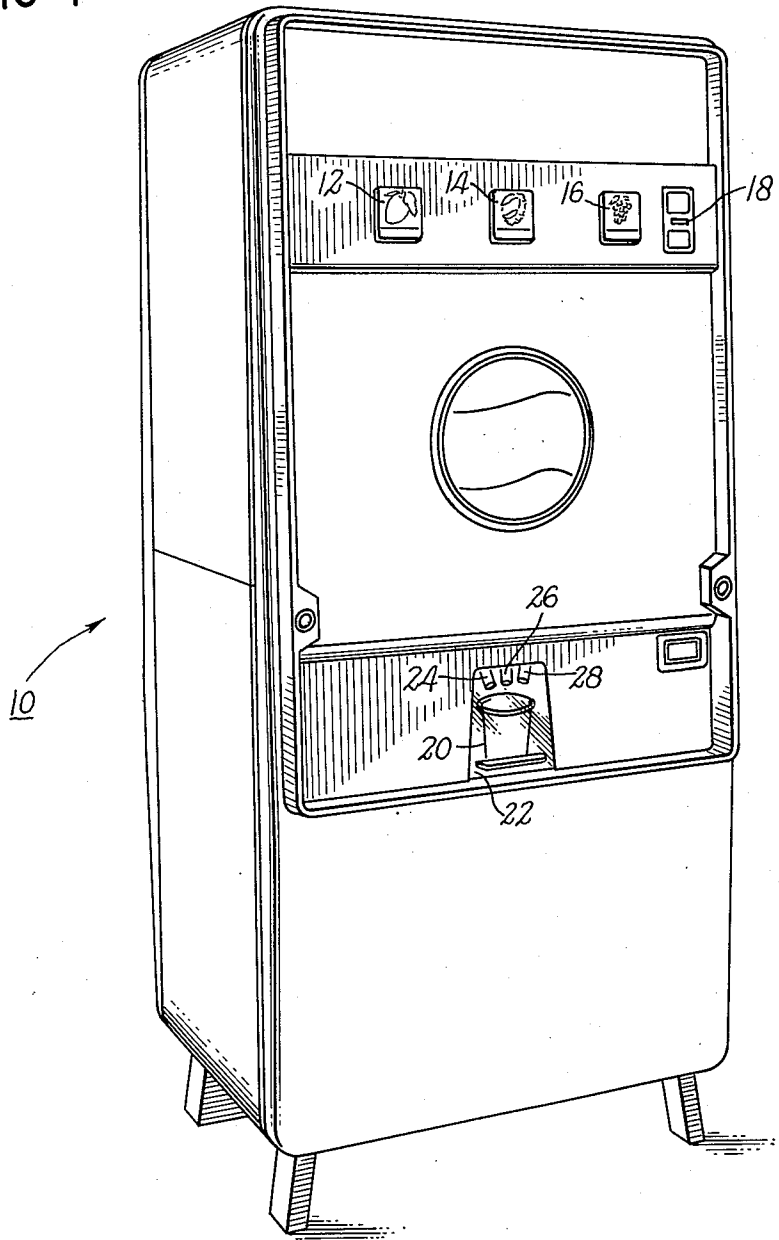
D. L. DICKINSON ET AL
COLD BEVERAGE VENDER

2,963,202

Filed Oct. 13, 1958

5 Sheets-Sheet 1

FIG 1



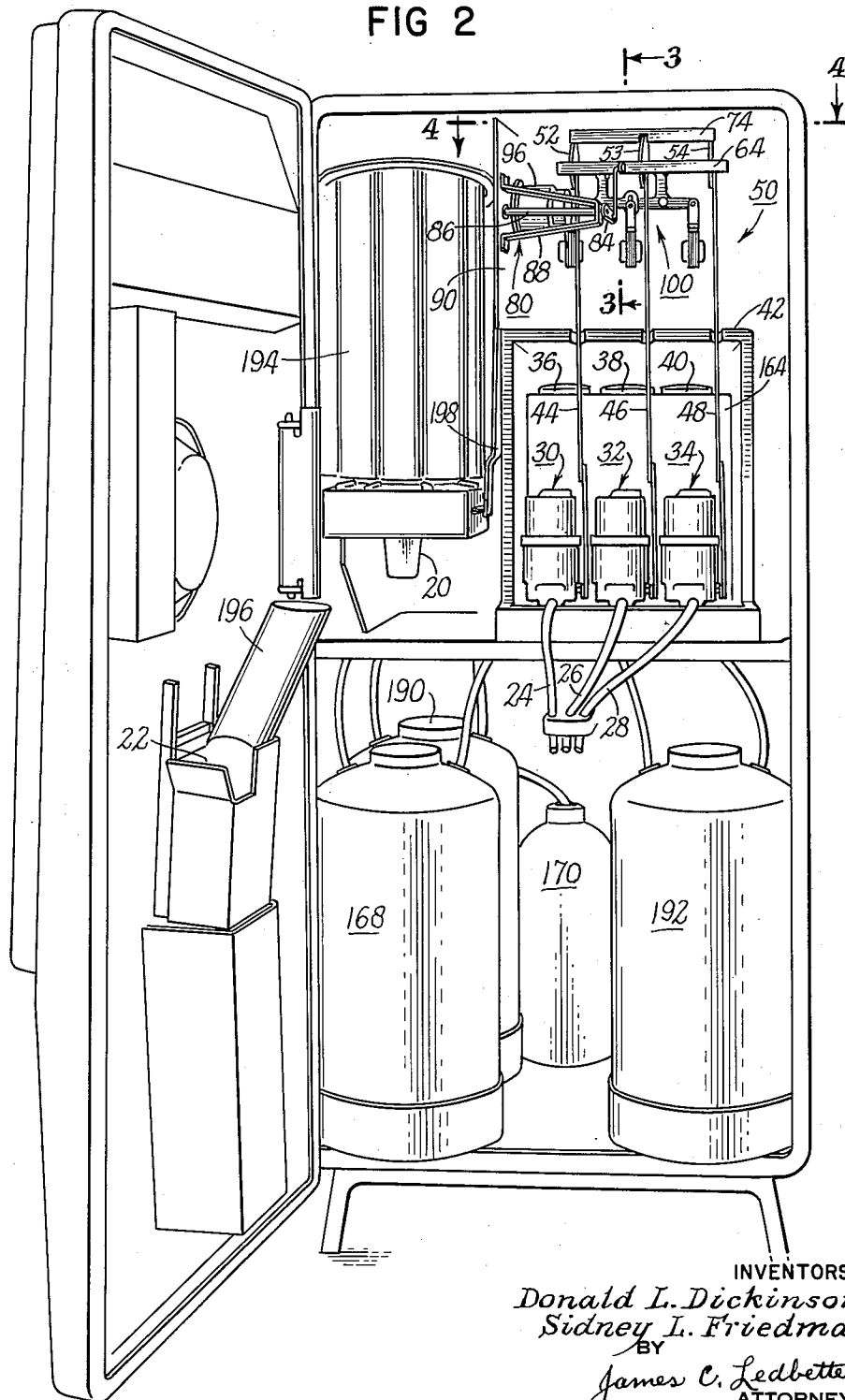
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COLD BEVERAGE VENDER

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FIG 2



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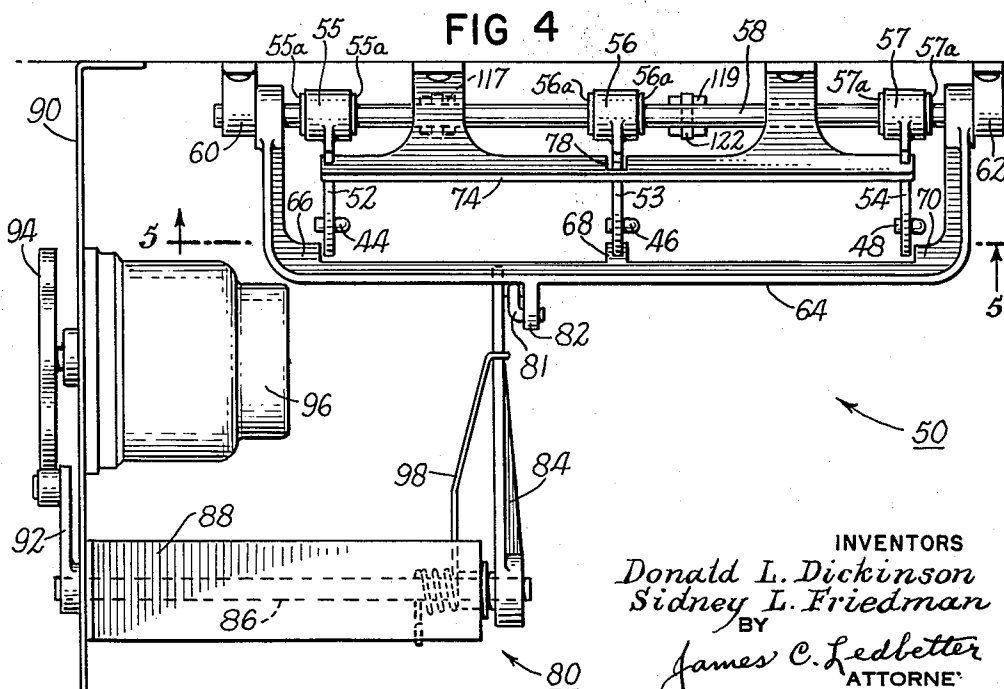
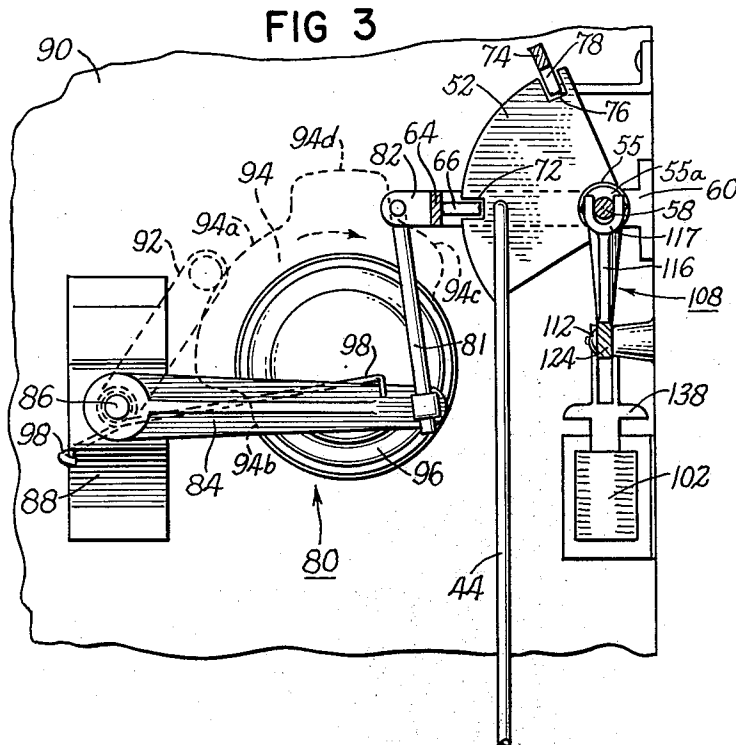
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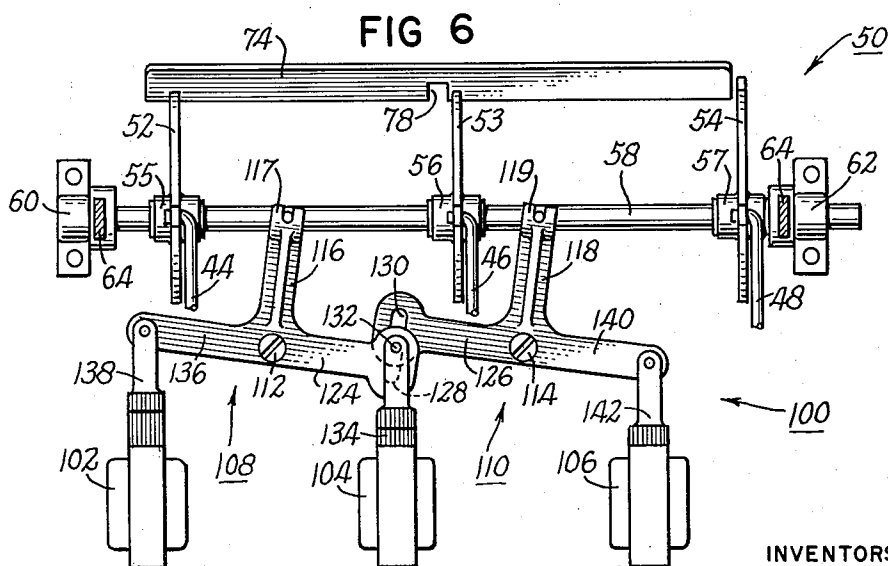
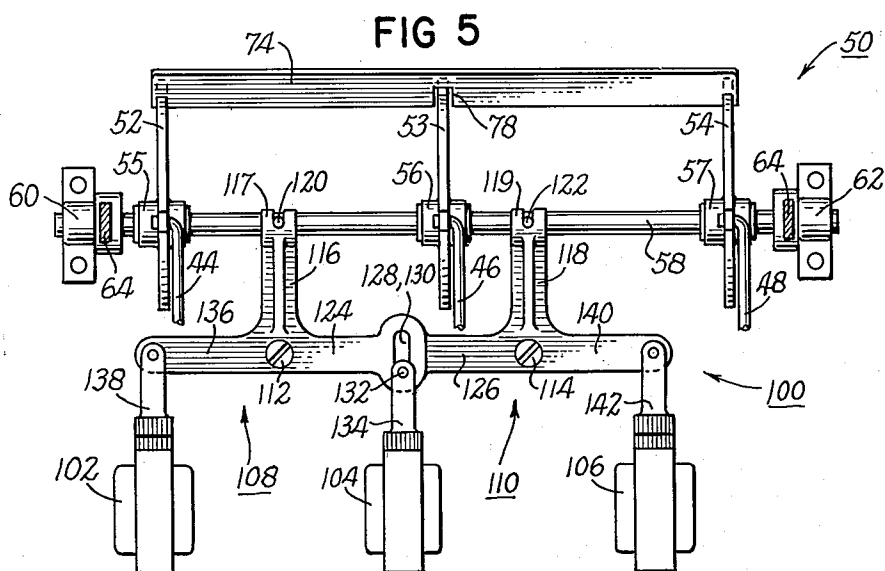
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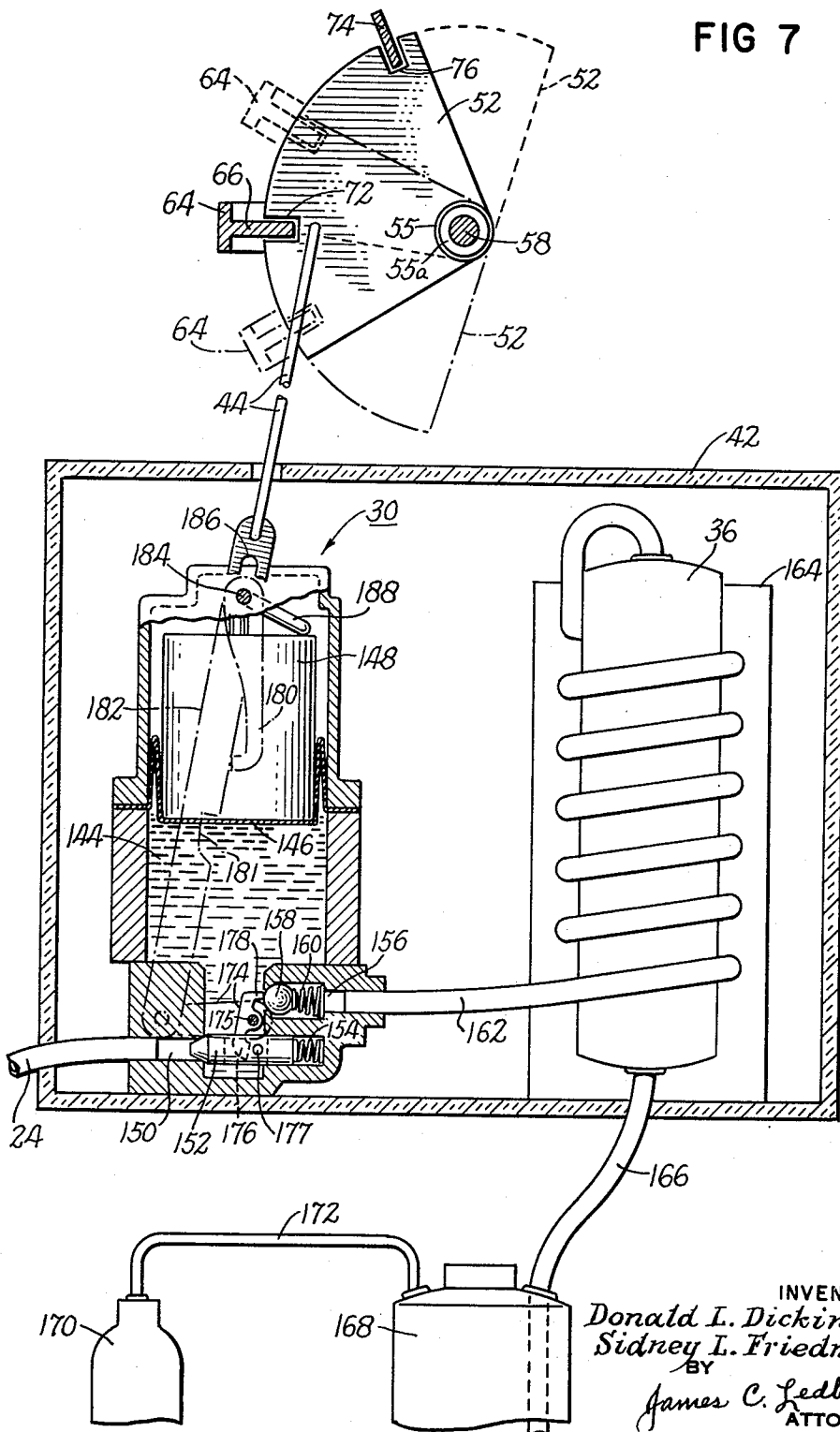
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FIG 7



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2,963,202

COLD BEVERAGE VENDER

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Filed Oct. 13, 1958, Ser. No. 766,966

16 Claims. (Cl. 222—144.5)

This invention relates to vending machines of the type adapted to dispense a selected one of several items, for example beverages like ginger ale, root beer, etc. More in particular, this invention relates to improvements in apparatus for automatically selecting and dispensing a desired item in accordance with the setting of manually-operable devices such as push-buttons on the vending machine cabinet.

In a preferred embodiment of the invention, to be described hereinbelow in detail, there is provided a coin-operated beverage vending machine arranged to dispense any one of three different beverages. This vending machine is of the type commonly referred to as "pre-mix," i.e. the beverages are stored in the machine in fully prepared condition, as distinct from the "post-mix" machines wherein the beverages are mixed after the customer has deposited his coin.

Vending machines offering multiple selections have, of course, been proposed heretofore. However, these prior machines have had a number of limitations which inhibited their commercial usefulness. For example, apparatus heretofore employed in such machines for automatically selecting and dispensing the desired item has been quite complex, with the result that prior vending machines have been unduly expensive to manufacture and also have been subject to excessive operational difficulties.

Accordingly, it is an object of this invention to provide vending machine apparatus that is superior to such apparatus provided heretofore. It is a more specific object of this invention to provide improved selection apparatus for automatically controlling the dispensing of a desired one of several items. It is a still further object of this invention to provide selection apparatus that is simple in construction, positive and fool-proof in operation, and economical to manufacture. Other objects, aspects and advantages of this invention will be pointed out in, or apparent from, the following description considered together with the accompanying drawings, in which:

Figure 1 is a perspective view of a three-drink beverage vending machine including apparatus in accordance with the present invention;

Figure 2 shows the vending machine of Figure 1 with its front door open to provide a view of the principal operating elements within the cabinet;

Figure 3 is a detail cross-section taken along line 3—3 of Figure 2 showing certain features of the automatic selection apparatus;

Figure 4 is a detail horizontal section taken along line 4—4 of Figure 2, showing further features of the selection apparatus;

Figure 5 is a detail vertical section taken along line 5—5 of Figure 4 to show the linkage mechanism used for controlling the automatic selection apparatus;

Figure 6 shows the linkage mechanism of Figure 5 in an alternate operating condition; and

Figure 7 is a diagrammatic view showing the beverage flow system and various valve arrangements for controlling this flow.

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Referring now to the drawings, Figure 1 shows a three-drink beverage vending machine comprising a cabinet generally indicated at 10 and provided on its front panel with three push-buttons 12, 14, 16 adapted to be pressed by the customer to select any one of three different beverages. The front panel of the cabinet also includes the usual coin slot 18 into which the customer drops a coin to initiate operation of the vending machine. After the proper coin has been deposited in the slot, and the desired selection made by pressing one of the push-buttons 12, 14, 16, a mechanism within the machine automatically operates to drop a paper cup 20 onto the bottom of a recessed cup receptacle 22, and then pours the selected beverage into this cup through one of three dispensing spouts 24, 26, 28.

As shown in Figure 2, these spouts 24, 26, 28 are connected to respective dispensing units generally indicated at 30, 32, 34, and which comprise measuring chambers each normally carrying a quantity of beverage just sufficient to fill one cup. These dispensing units are provided with valve means including both inlet and outlet valves (to be described hereinbelow in more detail) which operate during a dispensing cycle to (1) open the measuring chamber outlet to the respective spout for a time sufficient to allow all of the beverage to flow down into the cup, (2) reseal the measuring chamber from the spout, (3) open the measuring chamber inlet to a corresponding one of three cold storage reservoirs 36, 38, 40 so as to refill the chamber with beverage, and (4) reseal the measuring chamber from the reservoir. The reservoirs and dispensing units all are contained within an insulated refrigerating chest 42 which maintains the beverages at the desired low temperature.

The valve means in the dispensing units 30, 32, 34 are operated by respective connecting means consisting of connecting rods 44, 46, 48 which extend up through small openings in the top wall of the refrigerating chest 42 to beverage selection apparatus, generally indicated at 50. This apparatus serves, in a manner now to be described, to move any selected connecting rod through a reciprocating cycle in which the rod is (1) moved from its normal position to a lower position to operate the valve means for the purpose of emptying the corresponding measuring chamber into the cup, (2) moved back up to its normal position to seal the chamber from its spout, (3) moved to an upper position in which the measuring chamber is refilled from the respective one of the reservoirs 36, 38, 40, and (4) returned to its normal position to seal the chamber from its reservoir.

Referring now also to Figures 3 and 4, the upper tips of the connecting rods 44, 46, 48 are bent over horizontally and fitted into holes formed in respective coupling devices consisting specifically, in this embodiment, of quadrant plates 52, 53, 54 (referred to hereinafter as quadrants). These quadrants are provided with hubs 55, 56, 57 which are rotatably mounted at axially-spaced intervals along a selector means comprising a shaft 58. Each of the hubs is freely and independently rotatable about the selector shaft, but the hubs are axially fixed in position with respect to the selector shaft by means of stops 55a, 56a, 57a.

The selector shaft 58 is supported at its ends by sleeve bearings 60, 62 which allow this shaft to be shifted back-and-forth axially a short distance. Also rotatably mounted on the selector shaft is a drive member comprising a bail 64, which is prevented from moving longitudinally by abutting side bearing surfaces of the sleeve bearings 60, 62. The inner edge of this bail is formed with axially-spaced tongues 66, 68, 70 arranged to selectively engage corresponding peripheral drive notches (as shown at 72 in Figure 3) cut in the quadrants 52, 53, 54.

When the selector shaft 58 is in a position intermediate

its two end positions, as shown in Figure 4, the center tongue 68 of the bail 64 engages the drive notch of the center quadrant 53 so that any rotation of the bail about the selector shaft will produce a corresponding rotation of this center quadrant. The end tongues 66, 70 of the bail are, however, disengaged from the drive notches of the end quadrants 52, 54, so that no motion can be transmitted from the bail to these quadrants.

In order positively to prevent any rotary movement of the quadrants not engaged by the bail 64, a fixed locking bar 74 is mounted alongside the quadrants and parallel to the selector shaft 58. This bar selectively engages corresponding locking notches (as shown at 76 in Figure 3) formed in the upper edges of the quadrant plates, in accordance with the axial positioning of the selector shaft 58. In the Figure 4 positioning of this shaft, the locking bar engages the two end quadrants 52, 54, but the center quadrant is free to move through a cut-out 78 formed in the center of the locking bar.

It will be evident from the above that if the selector shaft 58 is shifted axially from its intermediate position (shown in Figure 4) to its left-hand end position, the left-hand quadrant 52 will engage the left-hand tongue 66 of the bail and will be disengaged from the locking bar 74, while the other two quadrants 53, 54 will be disengaged from the bail and engage the locking bar. Consequently, any rotary movement of the bail about the selector shaft will be transmitted directly to the left-hand quadrant, the other two quadrants remaining stationary. Alternatively, if the selector shaft 58 is moved to its right-hand end position, the right-hand quadrant 54 will be engaged by the bail and disengaged from the locking bar, while the other two quadrants will be disengaged from the bail and held in position by the locking bar. Thus, in this position any rotation of the bail will be transmitted only to the right-hand quadrant.

As indicated in dotted outline in Figure 7, during a dispensing cycle the bail 64 first is rotated down from its normal position about 30 degrees, then is reciprocated back through its normal position and up about 30 degrees, and finally is returned to its normal position until the next dispensing operation. This reciprocating motion is effected by cam-operated drive means generally indicated at 80. This drive means includes a vertical drive lever 81 the upper end of which is bent over to a horizontal position and loosely fitted within a hole in a lug 82 forming part of the bail. The lower end of the drive lever is operably connected to a crank arm 84 which is fastened to one end of a horizontal drive shaft 86. This drive shaft is supported for rotary motion by a frame 88 which is fastened to an interior partition 90 of the vending machine cabinet. The drive shaft 86 extends through this partition, and its remote end is secured to a cam follower 92 (shown in dotted outline in Figure 3) the free end of which engages the periphery of a cam 94. During a dispensing operation, this cam is rotated clockwise by a drive motor 96 which is energized at the start of the dispensing operation by the usual electrical circuitry (not shown), and which is automatically stopped at the end of a single revolution. A cam spring 98 has one end wrapped around the drive shaft, and its other end pressed against the top of the crank arm, in order to urge the cam follower into contact with the cam.

The operation of this portion of the selection apparatus is, briefly, as follows: After the customer has deposited the proper coin in the machine and pressed one of the push-buttons 12, 14, 16, the drive motor 96 is automatically energized to rotate the cam 94. After a short angular rotation (during which the paper cup 20 is dropped down onto the cup receptacle 22), the cam follower 92 moves down from the neutral cam lobe 94a to the lower cam lobe 94b. Thus, the crank arm 84 is rotated clockwise to pull the drive lever 81 down

and thereby rotate the bail 64 about the selector shaft 58. This motion of the bail correspondingly rotates the selected quadrant (e.g. quadrant 53 when the selector shaft is positioned as shown in Figures 3 and 4), in a counterclockwise direction, and this quadrant correspondingly shifts the connecting rod 46 down a short distance to operate the valve in the outlet of the dispensing unit 32 (Figure 2). Accordingly, the cold beverage in the measuring chamber of this dispensing unit flows down through the spout 26 and into the paper cup 20.

After a further period of time, sufficient to assure that all of the beverage in the measuring chamber has been dispensed, the cam follower 92 rides up on an intermediate cam lobe 94c which returns the crank arm 84, the bail 64, and the quadrant 53 to neutral position. Thus, the connecting rod 46 will close the outlet valve of the dispensing unit 32 so that the measuring chamber thereof can be refilled. Shortly thereafter, the cam follower rides up on an upper cam lobe 94d, thereby rotating the crank arm counterclockwise away from its neutral position. This motion rotates the bail 64 and the selected quadrant 53 clockwise, and pulls up the connecting rod 46 which, in turn, opens the inlet valve to the dispensing unit 26. The measuring chamber of this dispensing unit then is refilled (as will be explained), and subsequently the cam follower 92 drops down back to the neutral cam lobe 94a and the drive motor 96 is shut off.

It may be noted that in the above-described motion-transmitting arrangement, the selector shaft 58 does not form part of the actual transmission path, and hence does not have to be rotated with the quadrants. This considerably simplifies the structure, since it eliminates the awkward problem of rotatably driving a shaft which also must be adapted to move axially to set up the desired selections. Moreover, the use of independently rotatable quadrants, driven by a common bail, provides an advantageous and positive-operating coupling that is especially suited for use in a multiple-selection vending machine.

Referring now also to Figures 5 and 6, the selector shaft 58 is shifted axially into any one of its three positions by means of a simple and positive linkage mechanism, generally indicated at 100, which now will be described. This linkage mechanism is operated by the selective actuation of three control means consisting specifically in this embodiment of solenoids 102, 104, 106. These solenoids are individually energized (by the usual electrical circuitry not shown herein) by pressing the respective push-buttons 12, 14, 16 on the front panel of the vending machine cabinet. Specifically, the first solenoid 102 is actuated whenever the first push-button 12 is pressed, the second solenoid 104 is actuated whenever the second push-button 14 is pressed, and a third solenoid 106 is actuated whenever the third push-button 16 is pressed.

The linkage mechanism 100 includes a pair of T-links 108, 110 which are positioned side-by-side and are pivotally mounted at their center points 112, 114 (the center point being defined as the region of intersection between the vertical leg and the cross-arms of the T-links). The vertical legs 116, 118 of these links are provided at their ends with U-shaped members 117, 119 which are (see also Figure 3) fitted around the selector shaft 58. These U-shaped members are slotted to receive side pins 120, 122 on the selector shaft, so that pivotal movement of the links 108, 110 will produce a corresponding axial movement of the selector shaft.

The two adjacent cross-arms 124, 126 of the T-links 108, 110 are positioned in overlying relation, and are formed with enlarged ends provided with corresponding aligned vertical slots 128, 130. A pin 132 extends through both of these slots and is secured to the armature 134 of the center solenoid 104. This pin and slot arrangement

operates as a lost-motion mechanism to permit relative movement between the two links. The remote cross-arm 136 of the left-hand T-link 108 is pinned directly to the armature 138 of the left-hand solenoid 102, and similarly the remote cross-arm 140 of the right-hand T-link 110 is pinned directly to the armature 142 of the right-hand solenoid 106.

In operation, and assuming that the right-hand solenoid 106 has been energized (as shown in Figure 6), the armature 142 of this solenoid will be pulled down so as to rotate the right-hand T-link 110 clockwise. This rotation shifts the upper end of the vertical leg 118 to the right and accordingly moves the selector shaft 58 to its right-hand position wherein the right-hand quadrant 54 is out of engagement with the locking bar 74, and (Figure 4) is engaged by the tongue 70 of the bail 64. Subsequent rotation of this bail will therefore rotate quadrant 54 to operate the right-hand dispensing unit 34 (Figure 2). The left-hand T-link 108 of course, also will be rotated clockwise due to the motion of the selector shaft 58, and the left-hand armature 138 will be pulled up a short distance while the center armature 134 remains in its normal position.

If the left-hand solenoid 102 is energized for the next vending operation, the operation of the linkage mechanism 100 will be the reverse to that described above. That is, the left-hand armature 138 will be drawn down carrying with it the cross-arm 136, thereby rotating the T-link 108 counterclockwise to move the selector shaft 58 to its left-hand end position. In this position, the left-hand quadrant 52 is engaged with the bail 64 and is disengaged from the locking bar 74, so that rotation of the bail will operate the left-hand dispensing unit 30.

If the linkage mechanism is conditioned as shown in Figure 6, and the center solenoid 104 then is actuated, the selector shaft 58 will be shifted to its intermediate position as shown in Figure 5. More specifically, when the center armature 134 moves down, the pin 132 carried by this armature will engage the lower edge of the slot 130 (Figure 6), and thus will rotate the right-hand T-link 110 counterclockwise so as to shift the selector shaft 58 to the left. This will cause the other T-link 108 to rotate counterclockwise so that its adjacent cross-arm 124 moves up until the bottom edge of its slot 128 meets the pin 132. The downward force of the center armature will, at this time, tend to rotate the left-hand link 108 clockwise and, at the same time, tend to rotate the right-hand link 110 counterclockwise. Since the two links cannot rotate in opposite directions (because of the common connection through the selector shaft 58), the forces on these links will be balanced and they will remain in their neutral position as shown in Figure 5. In this neutral position the center quadrant 53 will engage the bail 64, and will be disengaged from the locking bar 74. Accordingly, the motion of the bail will rotate the center quadrant to operate the corresponding center dispensing unit 32.

Figure 7 shows details of one of the dispensing units 30 to illustrate the manner in which the dispensing units are operated by the reciprocating motion of the corresponding connecting rod (44). The dispensing unit includes a measuring chamber 144 (shown filled with one cup of mixed beverage) the top of which is sealed by a flexible diaphragm 146 carrying a cylindrical block 148 adapted to move vertically within the chamber to follow changes in the liquid level. At the bottom of the measuring chamber is an outlet passage 150 which connects with the spout 24, and against which is pressed the tapered head of a valve body 152 urged into seating position by a valve spring 154. The measuring chamber also includes an inlet passage 156 provided at its left-hand end with a reduced diameter orifice against which is seated a valve ball 158 urged into position by a second valve spring 160.

The inlet passage 156 is connected by a pipe 162 to the reservoir 36 which contains, for example, a quantity of cold beverage equivalent to about 12 cups. The reservoir

is surrounded by an aluminum block 164, and the pipe 162 is wrapped around the reservoir within this block. The lower end of the reservoir is connected by a tube 166 to the main storage tank 168 of the particular beverage to be dispensed from the dispensing unit 30, and the beverage to be dispensed from the dispensing unit 30, and the beverage within this storage tank is maintained under pressure by the usual carbon-dioxide flask 170 which is connected to the tank by a tube 172.

In operation, when the connecting rod 44 is moved down by the quadrant 52, its lower end rotates a T-shaped rocking lever 174 counterclockwise about its pivot 175. The lower arm 176 of this lever engages a shoulder 177 on the valve body 152 and thereby moves this valve body to the right so as to open the outlet passage 150 to permit the beverage to flow from the measuring chamber 144 out through the spout 24. As the beverage flows out of the chamber, the flexible diaphragm 146 and the cylindrical block 148 move down substantially to the bottom of the chamber.

Subsequently, as the connecting rod 44 moves back up to its normal position, the rocking lever 174 is rotated clockwise to permit the valve body 152 to be shifted leftwardly by the spring 154 until its valve head seats against the outlet passage 150 and seals the measuring chamber 144 from the spout 24. Thereafter, the connecting rod moves up from its normal position and rotates the rocking lever still further clockwise. The upper arm 178 of this lever thereupon engages the valve ball 158 and moves it to the right so as to open the orifice in the inlet passage 156. At the same time, a spring-loaded catch-link 180 drops into a notch 181 formed in the side of the lower extension 182 of the connecting rod 44, so as to prevent the connecting rod from moving back to its normal position until this catch link has been shifted out of the notch. The catch-link is rotatably mounted on a control shaft 184 which passes through a slot 186 in the connecting rod and extends into the interior of the dispensing unit 30. This control shaft carries on its inner end a sensing finger 188 adapted to be engaged by the top of the cylindrical block 148, so as to rotate the control shaft and the catch-link counterclockwise when the measuring chamber has been filled with liquid.

With the inlet passage 156 open, beverage flows from the reservoir 36 through the pipe 162 and into the measuring chamber 144, due to the pressure provided by the carbon-dioxide flask 170. As the beverage flows into the chamber, the flexible diaphragm 146 and the cylindrical block 148 are moved upwards until the block actuates the sensing finger 188 to shift the catch-link 180 out of engagement with the notch 181. Thus, the connecting rod 44 is released for return motion to its normal position. Ordinarily, at this point in the timing cycle the cam follower 92 (Figure 3) will already have been disengaged from the upper cam lobe 94d, so that release of the connecting rod 44 permits the cam follower to drop back down onto the neutral cam lobe 94a and return the quadrant 52 to its normal position. Returning again to Figure 7, the downward motion of the connecting rod 44 in returning to its normal position operates to rotate the rocking lever 174 counterclockwise, permitting the valve ball 158 to reseal against the orifice in the inlet passage 156, and thereby shutting off the flow of beverage into the measuring chamber.

Reverting to Figure 2, it will be seen that each of the three reservoirs 36, 38, 40 is provided with a corresponding storage tank 168, 190, 192, all pressurized from the common carbon dioxide flask 170. The storage tanks are outside of the refrigerated chest 42 and hence maintain the beverage at normal room temperature.

The supply of paper cups are stacked in a cup container 194 which is of usual construction. One cup is automatically dispensed from the bottom of this container at the start of each vending operation, and is deposited in the top of a chute 196 through which it slides to the

cup receptacle 22. This cup-dispensing operation may, for example, be controlled by a lever 198 shown extending up alongside the interior partition 90, and having on its upper end a cam follower to engage the cam 94 (Figure 3) which is rotated by the drive motor 96.

This disclosure explains the principles of the invention and the best mode contemplated in applying such principles, so as to distinguish the invention from others; and there is particularly pointed out and distinctly claimed the part, improvement or combination, which constitutes the invention or discovery, as understood by a comparison thereof with the prior art.

This invention is presented to fill a need for a new and useful cold beverage vender. Various modifications in construction, mode of operation, use and method, may and often do occur to others, especially so after acquaintance with an invention. Accordingly, it is to be understood that this disclosure is exemplary of the principles herein and embraces equivalent constructions.

What is claimed is:

1. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with the conditioning of said control means; that improvement in said selection apparatus which comprises: a movable drive member, selector means mounted adjacent said drive member and shiftable into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling devices carried by said selector means and mounted for independent movement with respect thereto, each of said coupling devices being provided with means to selectively engage said drive member in accordance with the positioning of said selector means relative to said drive member, whereby said drive member can transmit motion through said coupling devices without requiring any corresponding motion of said selector means other than the positioning of said selector means relative to said drive means; connecting means for transmitting the movement of said coupling devices to said dispensing units respectively; and linkage means interconnecting said control means with said selector means to shift said selector means into any one of said positions in accordance with the conditioning of said control means.

2. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with the conditioning of said control means; that improvement in said selection apparatus which comprises: a movable drive member, selector means mounted adjacent said drive member and shiftable into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling devices mounted on said selector means at fixed spaced intervals therealong, said coupling devices being independently rotatable about said selector means, each of said coupling devices being provided with means to selectively engage said drive member in accordance with the positioning of said selector means relative to said drive member so that the selected one of said coupling devices may be rotatably moved by said drive member without requiring any corresponding movement of said selector means; connecting means for each of said coupling devices respectively to transmit the movement of said coupling devices to the corresponding ones of said dispensing units; and linkage means interconnecting said control means with said selector means to shift said selector means into any one of said positions in accordance with the conditioning of said control means.

3. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dis-

pense a predetermined quantity of material, and wherein control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with the conditioning of said control means; that improvement in said selection apparatus which comprises: a movable drive member, selector means mounted adjacent said drive member and shiftable into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling devices carried by said selector means and mounted for independent movement with respect thereto, each of said coupling devices being provided with means to selectively engage said drive member in accordance with the positioning of said selector means relative to said drive member; locking means mounted adjacent said selector means and selectively engageable with said coupling devices in accordance with the positioning of said selector means relative to said drive member, said locking means preventing movement of all of said coupling devices except

the one engaged with said drive member; connecting means for transmitting the movement of said coupling devices to said dispensing units respectively; and linkage means interconnecting said control means with said selector means to shift said selector means into any one of said positions in accordance with the conditioning of said control means.

4. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein a plurality of control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with which of said control means is actuated; that improvement in said selection apparatus which comprises: an elongated drive member mounted for reciprocating movement in a direction transverse to the axis thereof, a selector shaft mounted parallel to and alongside said drive member and shiftable axially into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling devices carried by said selector shaft, said coupling devices and said drive member being provided with cooperative means to produce selective engagement therebetween in accordance with the positioning of said selector shaft relative to said drive member, said selector shaft being operatively independent of said drive member; connecting means for transmitting movement from said coupling devices to said dispensing units respectively; and linkage means interconnecting said control means with said selector shaft to shift said selector shaft to any one of said positions in accordance with which of said control means is actuated.

5. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein a plurality of control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with which of said control means is actuated; that improvement in said selection apparatus which comprises: a selector shaft mounted for axial shifting movement into any one of a plurality of predetermined positions, an elongated bail extending along the side of said selector shaft and rotatably mounted thereabout, means for preventing axial movement of said bail when said selector shaft is shifted axially; a plurality of coupling devices rotatably mounted on said selector shaft, said coupling devices and said bail being provided with cooperating interengageable means to produce selective engagement between said coupling devices and said bail in accordance with the axial positioning of said selector shaft relative to said bail; motor means for rotating said bail so as correspondingly to rotate the engaged one of said coupling devices; connecting means for transmitting movement from said coupling devices to said dispensing units respectively; and linkage means interconnecting said control means with said selec-

tor shaft to shift said selector shaft to any one of said positions in accordance with which of said control means is actuated.

6. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein a plurality of control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with which of said control means is actuated; that improvement in said selection apparatus which comprises: an elongated drive member mounted for rotation about an axis offset transversely from said drive member, a selector shaft mounted parallel to and alongside said drive member and shiftable longitudinally into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling devices carried by said selector shaft, said coupling devices and said drive member being provided with cooperative means to produce selective engagement therebetween in accordance with the positioning of said selector shaft relative to said drive member; a crank arm pivotally mounted adjacent said drive member and operatively coupled thereto to produce motion of said drive member about its rotational axis; cam means for reciprocating said crank arm about its pivot so as to transmit a reciprocating motion through said drive member and to the selected one of said coupling devices; connecting means for transmitting said reciprocating motion from said coupling devices to said dispensing units respectively; and linkage means interconnecting said control means with said selector shaft to shift said selector shaft to any one of said positions in accordance with which of said control means is actuated.

7. In a vending machine of the type having a plurality of dispensing units each arranged when operated to dispense a predetermined quantity of material, and wherein a plurality of control means are provided for actuating selection apparatus adapted to selectively operate said dispensing units in accordance with which of said control means is actuated; that improvement in said selection apparatus which comprises: an elongated drive member, drive means for reciprocating said drive member in a direction transverse to its axis, an elongated selector shaft mounted parallel to and alongside said drive member, said selector shaft being supported for longitudinal shifting movement into any one of a plurality of predetermined positions relative to said drive member; a plurality of coupling plates rotatably mounted at fixed intervals along said selector shaft and transverse with respect to the axis thereof, each of said coupling plates being formed with a peripheral drive notch, a plurality of protruding tongues on said drive member adapted to selectively engage the respective drive notches in said coupling plates in accordance with the positioning of said selector shaft relative to said drive member, whereby the movement of said drive member rotates the selected one of said plates about said selector shaft; connecting rod means for transmitting the movement of said coupling plates to said dispensing units respectively; and linkage means interconnecting said control means with said selector shaft to shift said selector shaft to any one of said positions in accordance with which of said control elements is actuated.

8. Apparatus as claimed in claim 7, wherein said coupling plates are formed with respective peripheral locking notches; and a fixed locking bar extending parallel to said selector shaft to selectively engage said locking notches in accordance with the longitudinal positioning of said selector shaft relative to said locking bar, said locking bar preventing rotational movement of all of said coupling plates except the one coupling plate engaged with said drive member.

9. Apparatus as claimed in claim 7, wherein said dispensing units include valve means operable by said connecting rod means in one position thereof for refilling

said dispensing units after a dispensing operation has been completed, catch means for holding said connecting rod means in said one position during a refilling operation; and sensing means operable to release said catch means from said connecting rod means when the refilling operation has been completed.

10. In a vending machine of the type having at least three dispensing units each arranged when operated to dispense a predetermined quantity of material, drive means for furnishing the motive power for operating said dispensing units, selector means mounted adjacent said drive means and shiftable into any one of a plurality of predetermined positions relative to said drive means, a plurality of coupling devices carried by said selector means, each of said coupling devices being provided with means to selectively transmit movement from said drive means to said dispensing units respectively in accordance with the positioning of said selector means relative to said drive means; that improvement in an apparatus for shifting said selector means which comprises: first, second and third control means individually actuatable in accordance with the desired selection; a first link connecting said first control means to said selector means for shifting said selector means in one direction when said first control means is actuated, a second link connecting said second control means to said selector means for shifting said selector means in the opposite direction when said second control means is actuated; and means coupling said third control means to said first and second links for shifting said selector means to an intermediate position when said third control means is actuated.

11. In a vending machine of the type having at least three dispensing units each arranged when operated to dispense a predetermined quantity of material, drive means for furnishing the motive power for operating said dispensing units, selector means mounted adjacent said drive means and shiftable into any one of a plurality of predetermined positions relative to said drive means, a plurality of coupling devices carried by said selector means, each of said coupling devices being provided with means to selectively transmit movement from said drive means to said dispensing units respectively in accordance with the positioning of said selector means relative to said drive means; that improvement in an apparatus for shifting said selector means which comprises: first, second and third control elements individually actuatable in accordance with the desired selection; a first pivotally-mounted link connecting said first control element to said selector means for shifting said selector means in one direction to a first end position when said first control element is actuated, a second pivotally-mounted link connecting said second control element to said selector means for shifting said selector means in the opposite direction to a second end position when said second control element is actuated; a lost-motion mechanism coupling said first and second links together and permitting relative movement therebetween; and means connecting said third control element to said lost-motion mechanism and operable to return both of said links to a neutral position so as to shift said selector means to a position between said two end positions when said third control element is actuated.

12. In a vending machine of the type having at least three dispensing units each arranged when operated to dispense a predetermined quantity of material, drive means for furnishing the motive power for operating said dispensing units, selector means mounted adjacent said drive means and shiftable into any one of a plurality of predetermined positions relative to said drive means, a plurality of coupling devices carried by said selector means, each of said coupling devices being provided with means to selectively transmit movement from said drive means to said dispensing units respectively in accordance with the positioning of said selector means relative to said drive means; that improvement in an apparatus for

shifting said selector means which comprises: first, second and third control elements individually actuatable in accordance with the desired selection; a first pivotally-mounted link connecting said first control element to said selector means for shifting said selector means in one direction to a first end position when said first control element is actuated; a second pivotally-mounted link connecting said second control element to said selector means for shifting said selector means in the opposite direction to a second end position when said second control element is actuated; first and second arms for said links respectively, said arms being positioned adjacent one another in overlying relationship and provided with aligned slots; a pin extending through both of said slots; and means connecting said third control element to said pin to rotate both of said links in opposite directions to a neutral position when said third control element is actuated, whereby said selector means is shifted to an intermediate position between said two end positions.

13. In a vending machine of the type having at least three dispensing units each arranged when operated to dispense a predetermined quantity of material, drive means for furnishing the motive power for operating said dispensing units, selector means mounted adjacent said drive means and shiftable into any one of a plurality of predetermined positions relative to said drive means, a plurality of coupling devices carried by said selector means, each of said coupling devices being provided with means to selectively transmit movement from said drive means to said dispensing units respectively in accordance with the positioning of said selector means relative to said drive means; that improvement in an apparatus for shifting said selector means which comprises: first, second and third control elements individually actuatable in accordance with the desired selection; a first T-link pivoted about its center point with the leg thereof connected to said selector means, a second T-link positioned alongside said first T-link and pivoted about its center point with the leg thereof connected to said selector means; a lost-motion mechanism coupling the adjacent arms of said first and second T-links together; means connecting said first control element to the remote arm of said first T-link so that actuation of said first control element shifts said selector means in one direction, means connecting the remote arm of said second T-link to said second control element so that actuation of said second control element shifts said selector means in the opposite direction; and means connecting said third control

element to said lost-motion mechanism and arranged to return both of said T-links and said selector means to a neutral position when said third control element is actuated.

14. Apparatus as claimed in claim 13, wherein said selector means comprises a shaft mounted for longitudinal shifting movement, said first and second T-links being mounted with their legs substantially perpendicular to the axis of said shaft and their cross-arms substantially parallel to the axis of said shaft.

15. Apparatus as claimed in claim 14, wherein said lost-motion mechanism comprises aligned slots formed in said adjacent cross-arms respectively, said slots extending generally parallel to said T-link legs; and pin means extending through both of said slots and connected to said third control element; said first, second and third control elements being positioned to move said cross-arms in directions substantially parallel to the legs of said T-links.

16. In a vending machine of the type having a plurality of dispensing units, each arranged when operated to dispense a predetermined quantity of material, and wherein control means are provided for actuating a selection apparatus adapted to selectively operate one of said dispensing units in accordance with the conditioning of said control means; that improvement in said selection apparatus which comprises: a selector shaft shiftable axially into any one of a plurality of predetermined positions; a drive member mounted alongside said selector shaft, means mounting said drive member to provide movement thereof in a direction transverse to the axis of said selector shaft; a plurality of coupling devices carried by said selector shaft; motion-transmitting means for coupling said drive member to said coupling devices to oscillate the latter in response to transverse movement of said drive member; linkage means interconnecting said control means with said selector shaft for shifting said selector shaft into any one of its positions, said linkage means being operative independently of said motion-transmitting means; and connecting means for transmitting movement from said coupling devices to said dispensing units in accordance with the axial positioning of said selector shaft.

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