

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 1

Fig. 1.

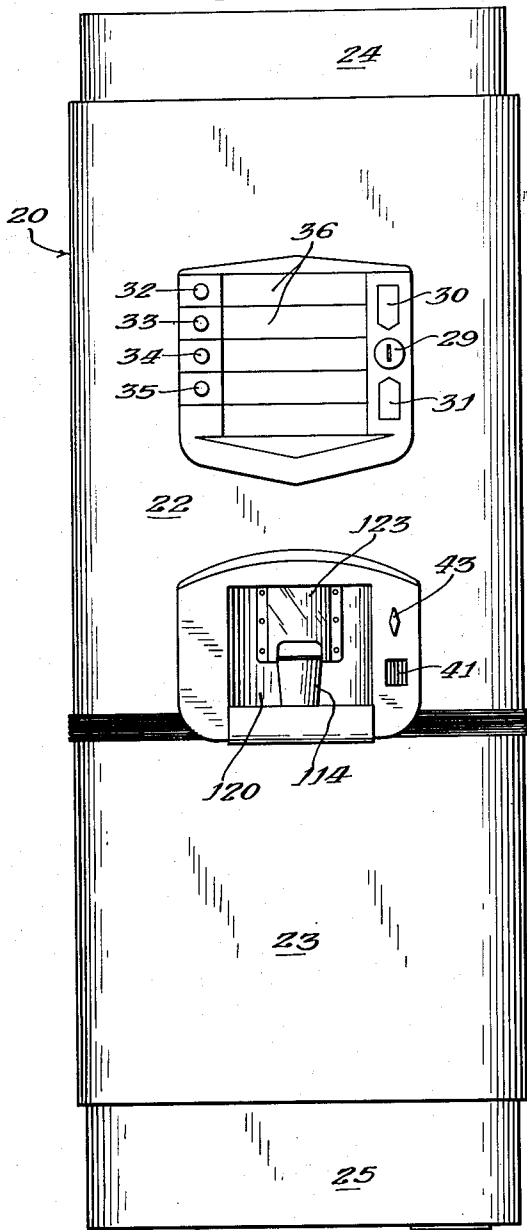
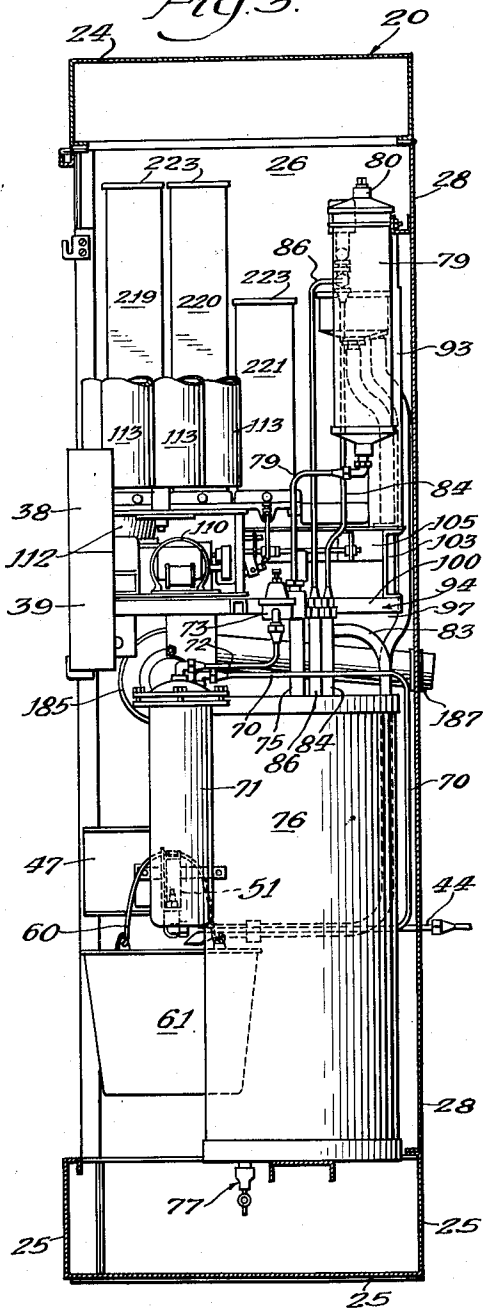


Fig. 3.



Inventor:
Bert E. Mills

By: Carl V. Hargis

Attorney

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 2

Fig. 2.

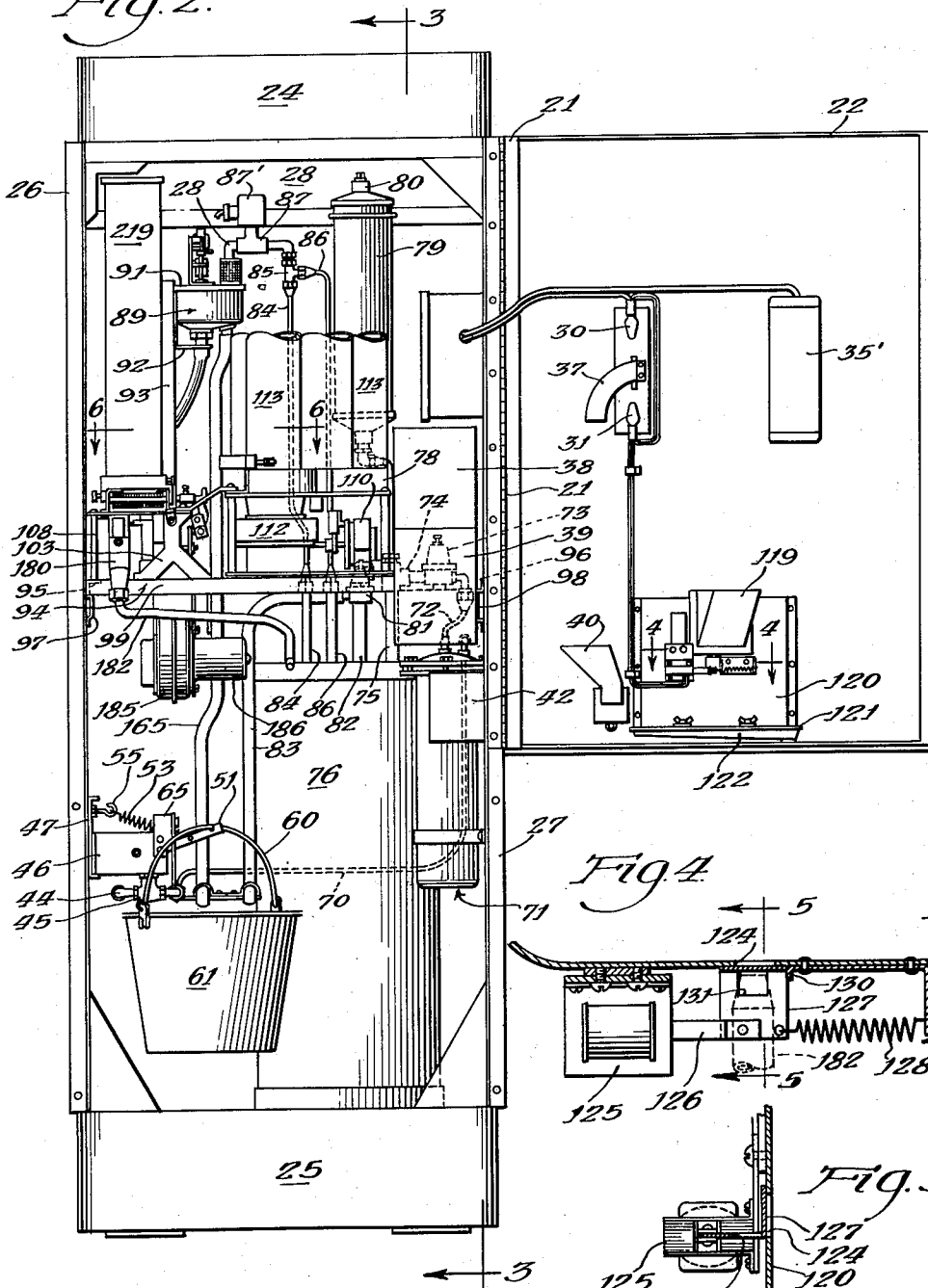


Fig. 4.

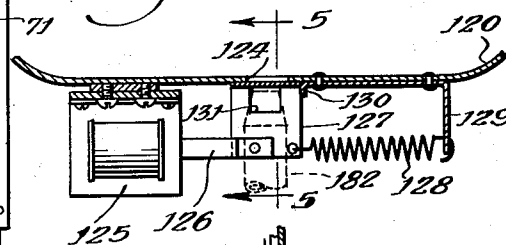
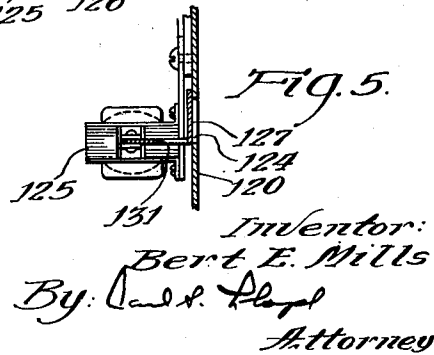


Fig. 5.



Inventor:
Bert E. Mills
By: Carl H. Klop
Attorney

Oct. 21, 1952

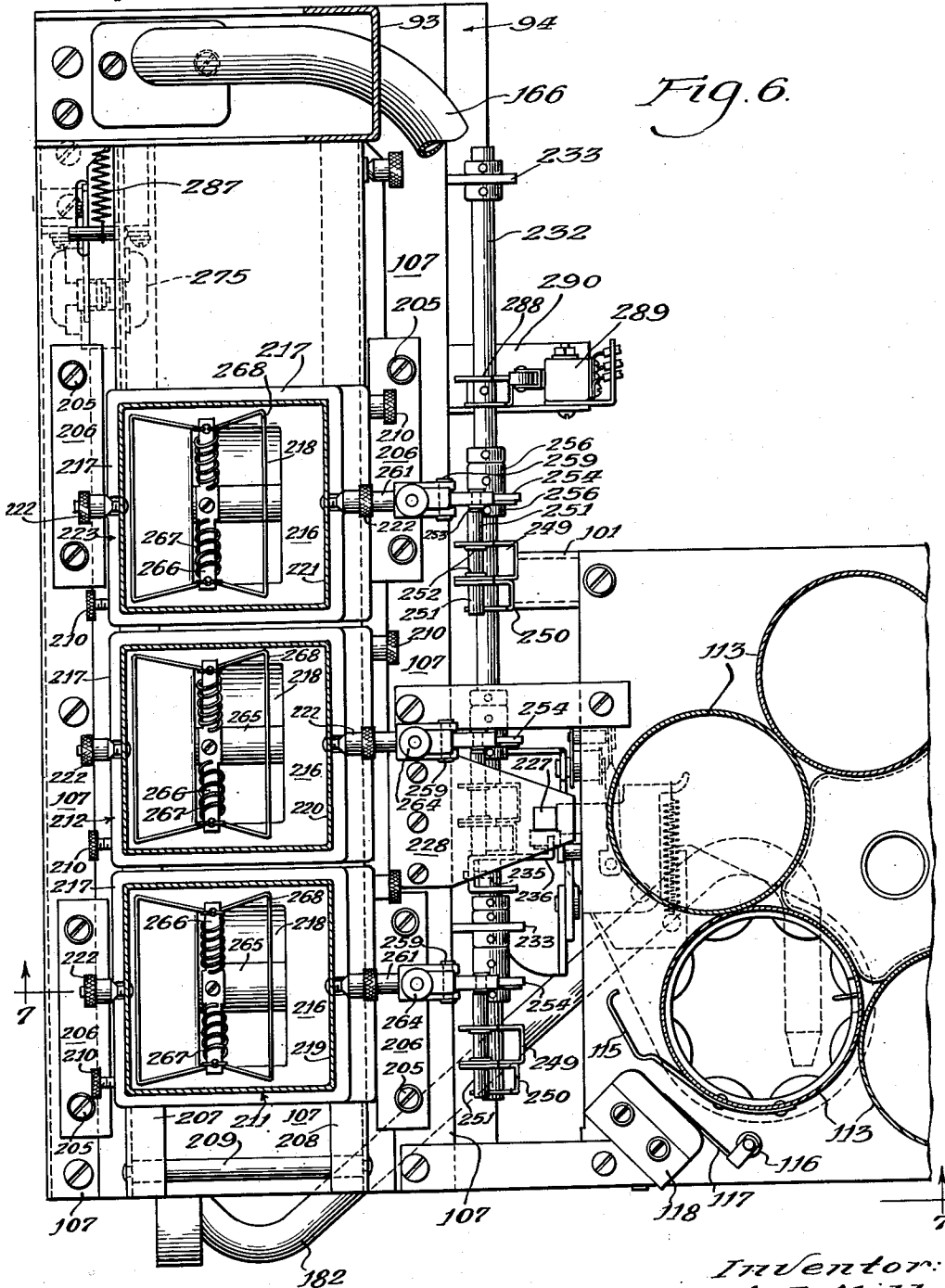
B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

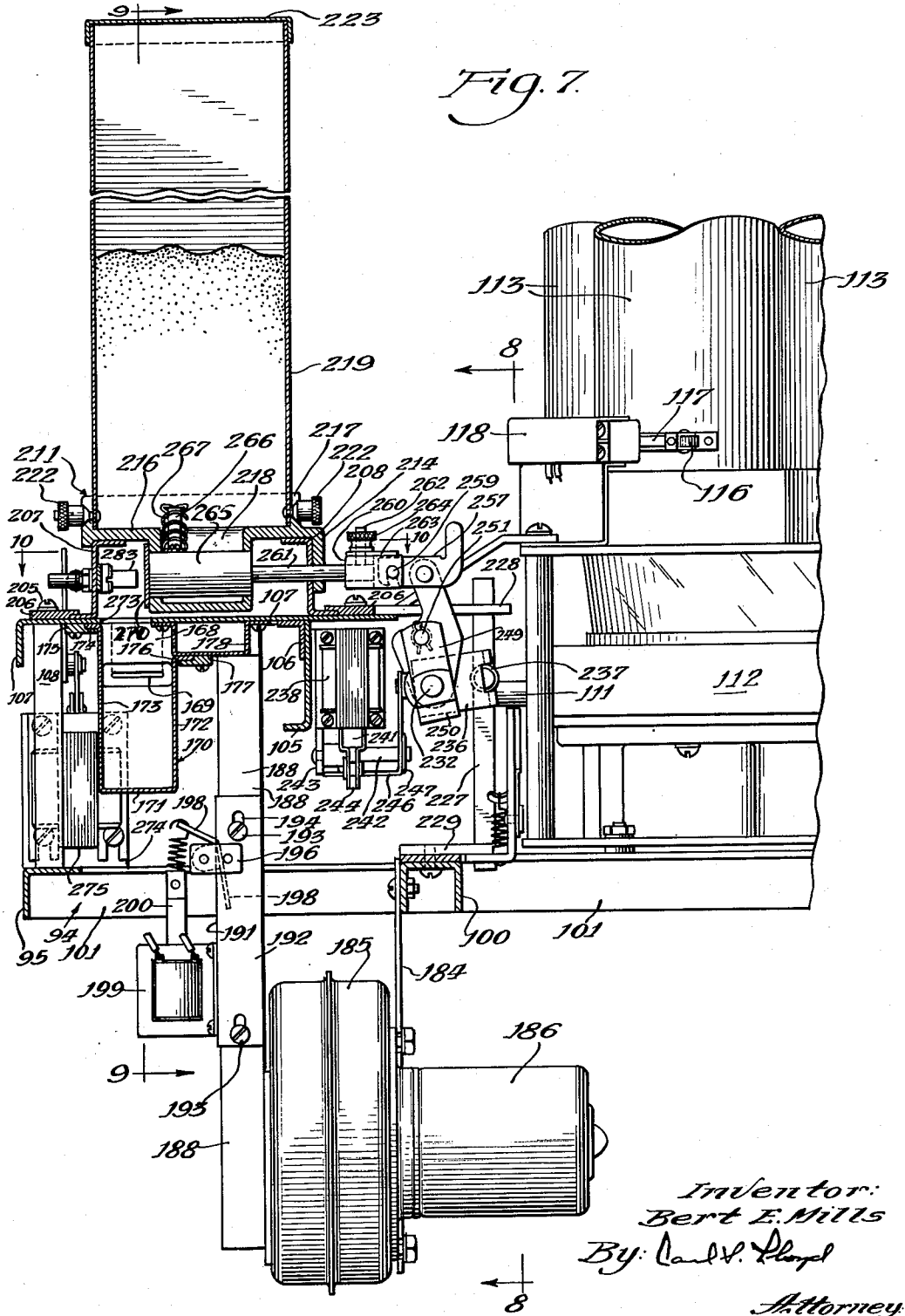
11 Sheets-Sheet 3



Inventor:
Bert E. Mills
By: Carl V. Floyd
Attorney

2,614,738

11 Sheets-Sheet 4



Oct. 21, 1952

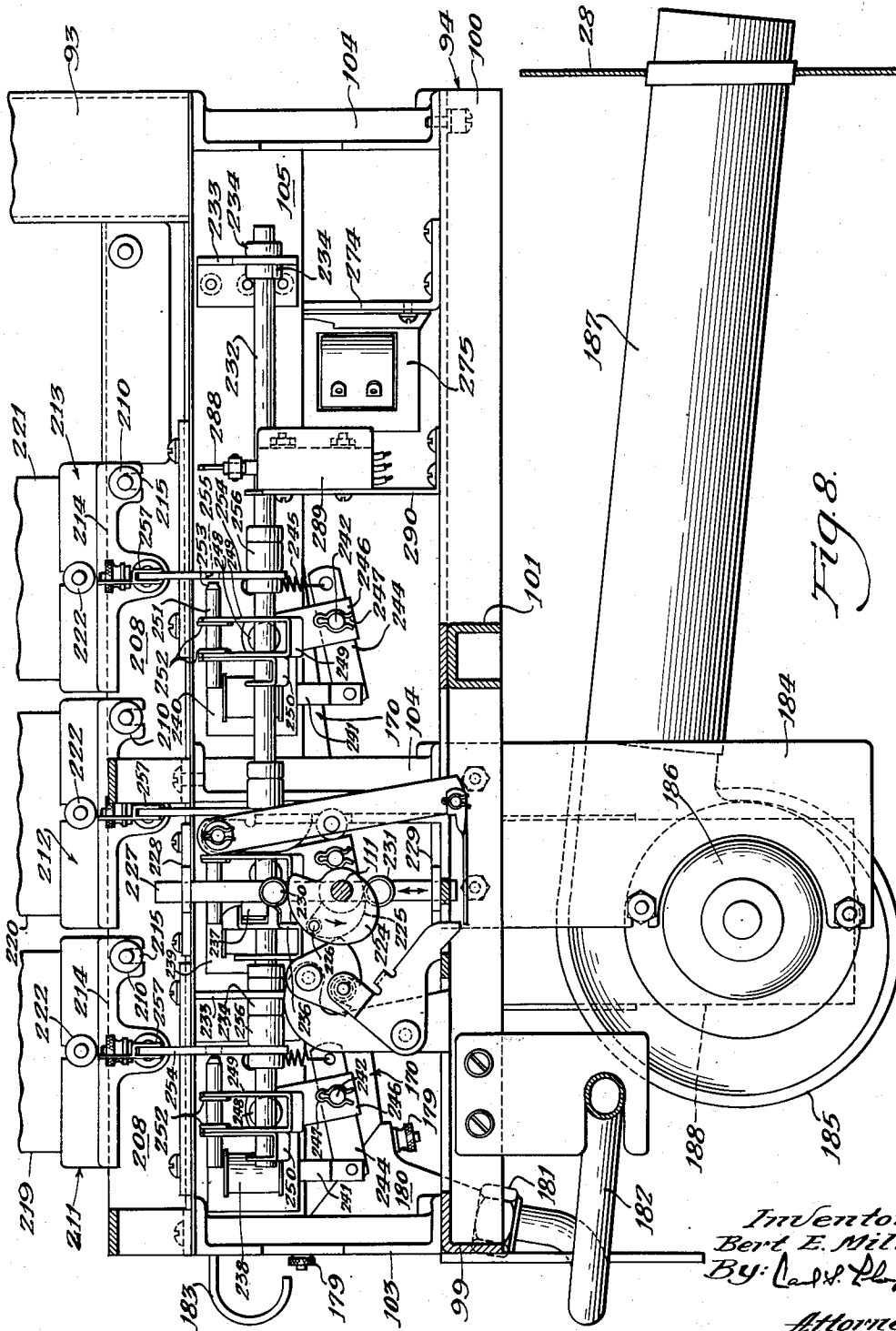
B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 5



Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 6

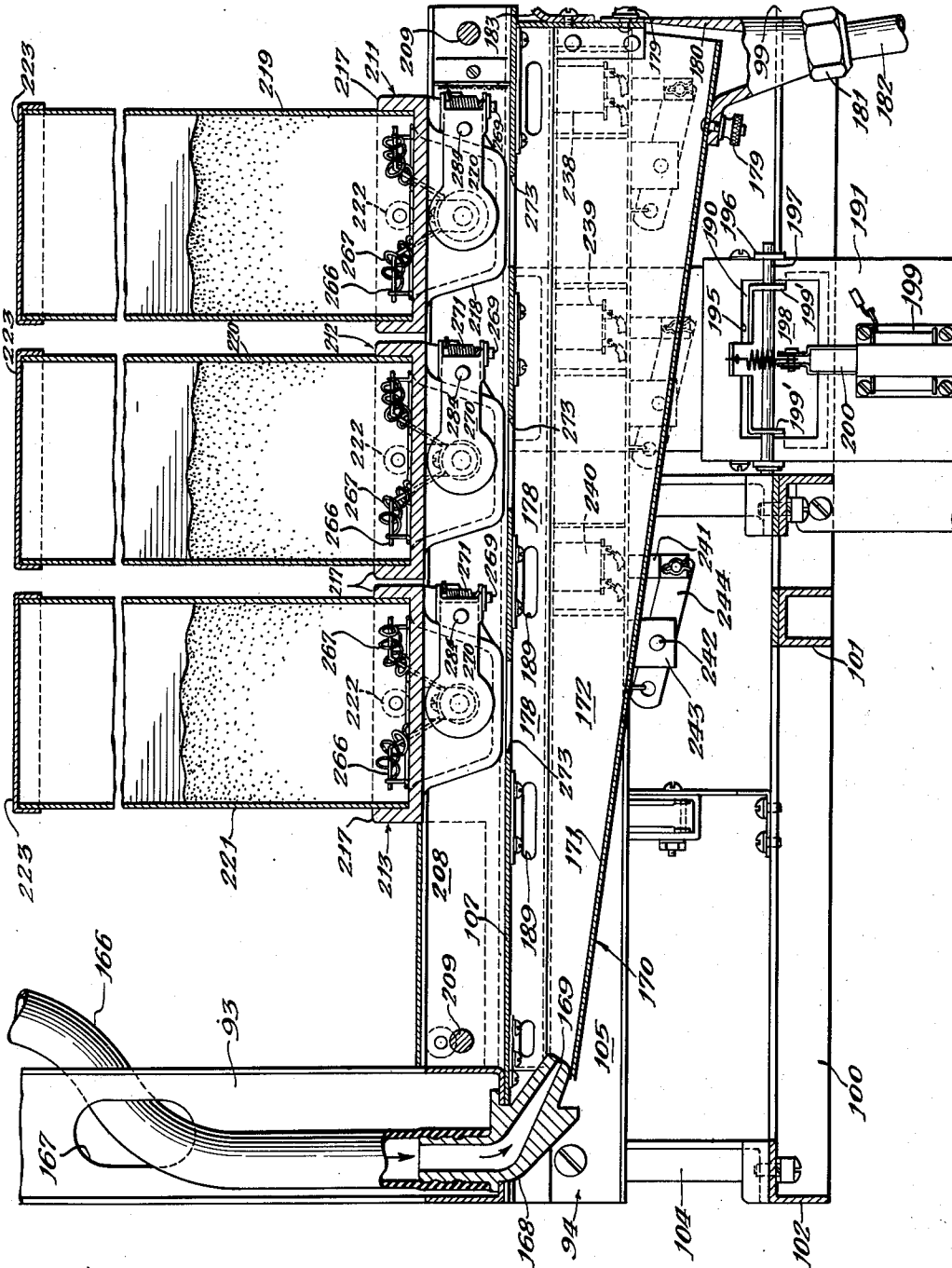


Fig. 9.

Inventor:
Bert E. Mills
By: Carl S. Thompson
Attorney:

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 7

Fig. 10.

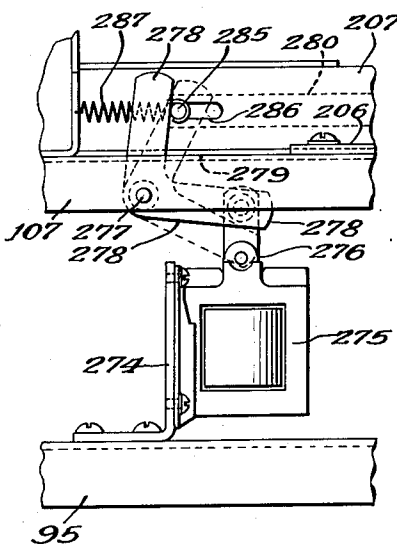
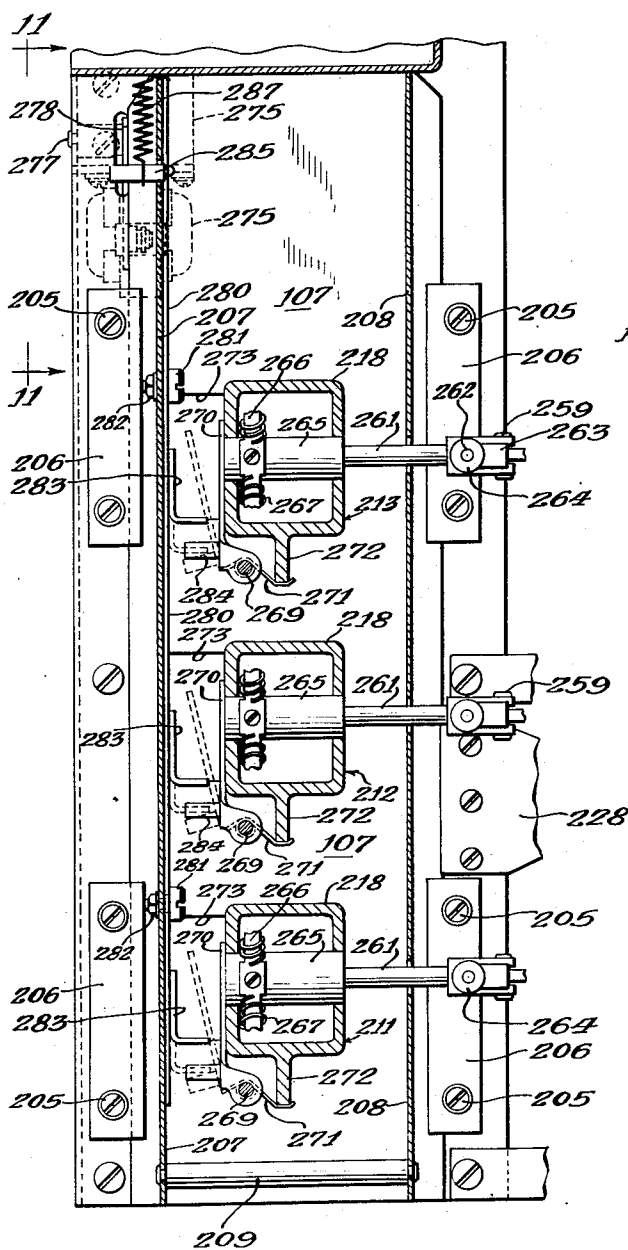


Fig. 11.

Inventor:
Bert E. Mills

By: Carl V. Lloyd

Attorney:

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 8

Fig. 12.

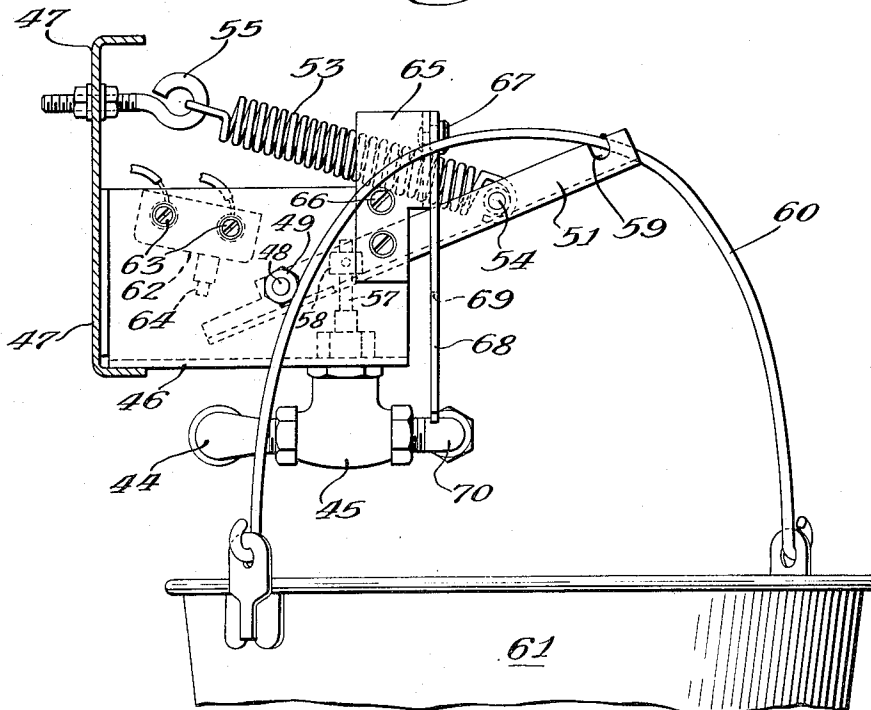
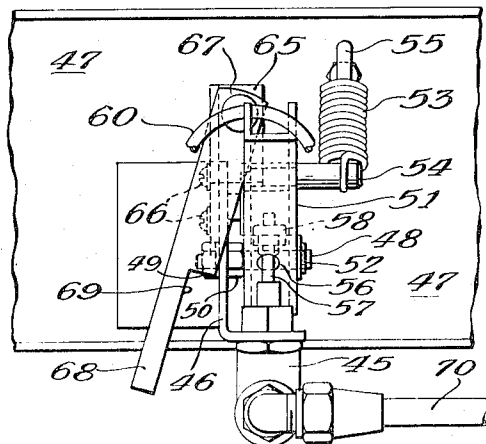


Fig. 13.



Inventor
Bert E. Mills
By *Carl E. Dyer*
Attorney

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 9

Fig. 15.

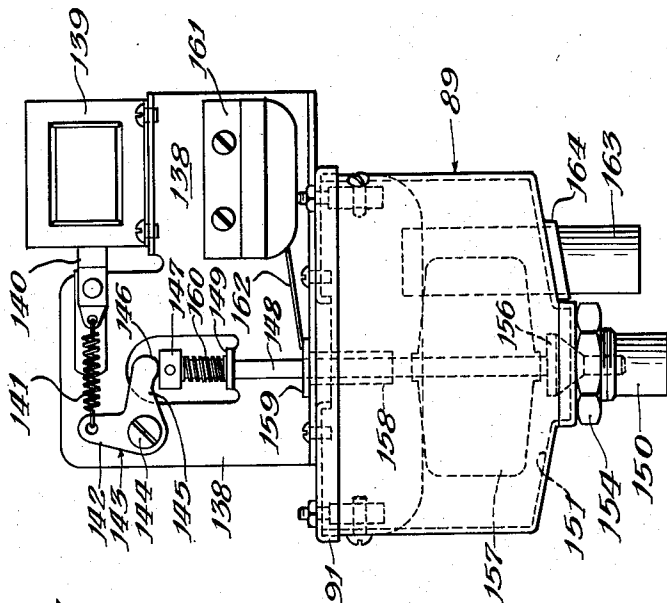
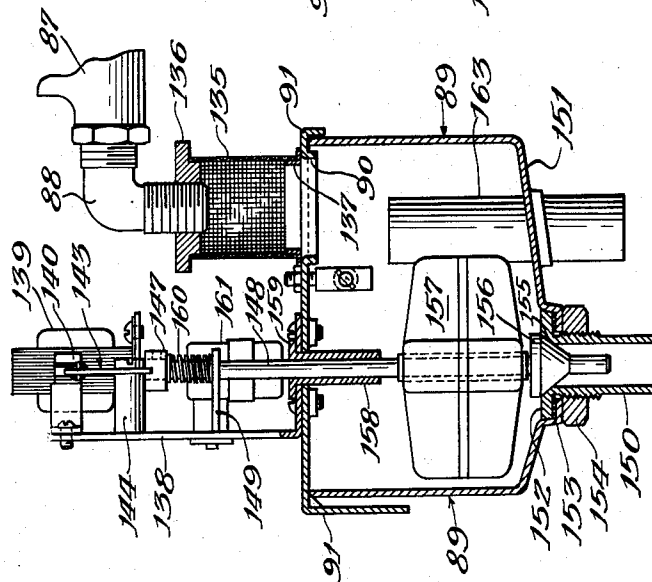


Fig. 14.



Inventor:
Bert E. Mills
By: Carl S. Floyd

Attorney:

Oct. 21, 1952

B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 10

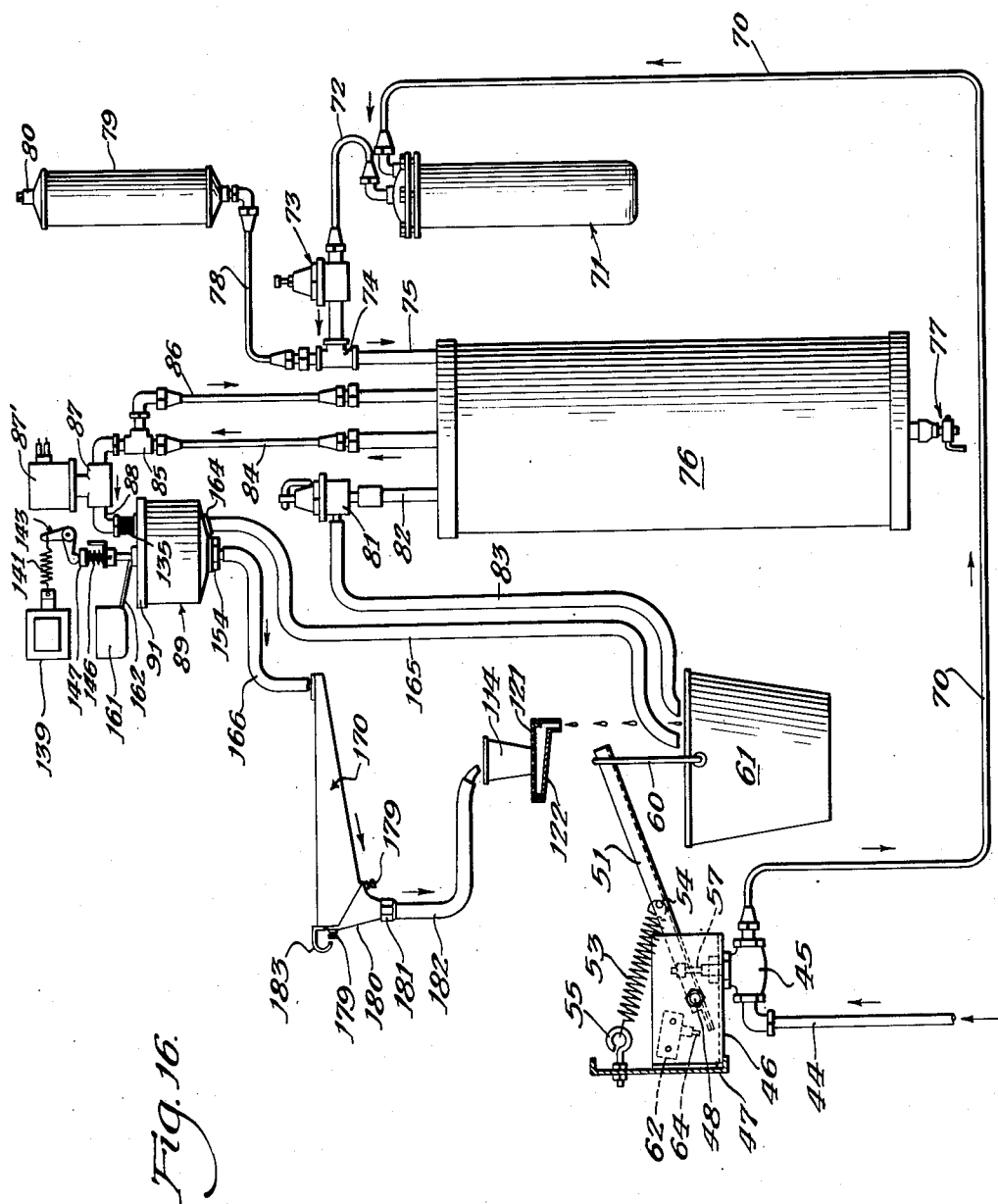


Fig. 16.

Inventor:
Bert E. Mills
By: Carl H. Knapf

Attorney:

Oct. 21, 1952

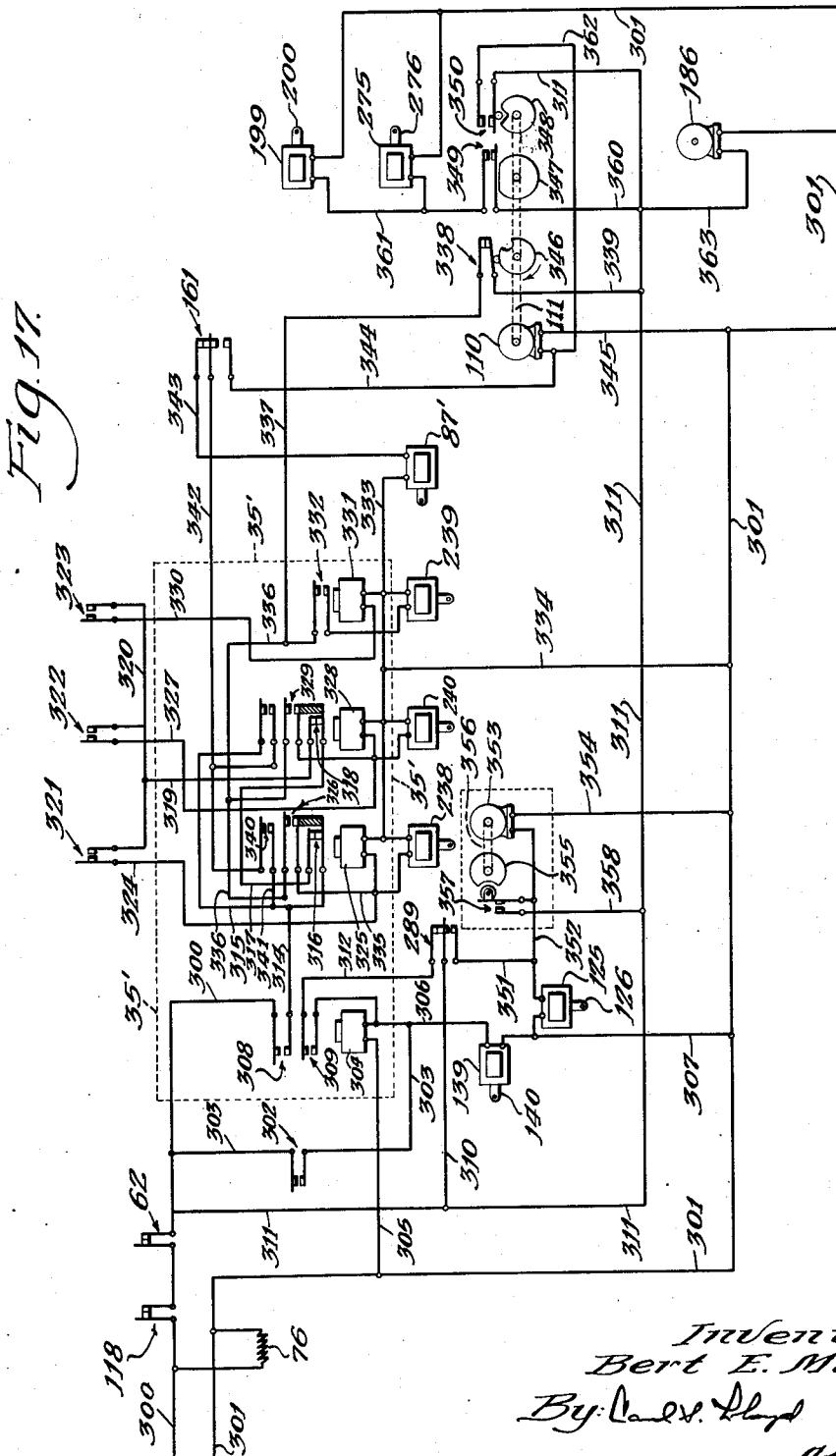
B. E. MILLS

2,614,738

BEVERAGE DISPENSING MACHINE

Filed Sept. 28, 1948

11 Sheets-Sheet 11



Inventor:
Bert E. Mills
By: Carl V. Lloyd
Attorney:

UNITED STATES PATENT OFFICE

2,614,738

BEVERAGE DISPENSING MACHINE

Bert E. Mills, St. Charles, Ill., assignor to The Bert Mills Corporation, Chicago, Ill., a corporation of Illinois

Application September 28, 1948, Serial No. 51,518

27 Claims. (Cl. 225—21)

1

This invention relates to a beverage dispensing machine of a type particularly adapted for vending coffee although in certain respects the invention is also applicable to the vending of other beverages or like products. More specifically, the present invention relates to improvements in a beverage dispensing machine, preferably coin-operated, which, upon activation by a customer, may automatically position a cup, measure and mix the ingredients for the beverage, and discharge the finished drink into said cup.

An object of the invention is to provide in a beverage dispensing machine of the above character improved and simplified means for measuring the liquid ingredient for a beverage, discharging the measured liquid ingredient into a mixing receptacle, and thereupon adding to said liquid ingredient powdered or other ingredients for the drink while said liquid ingredient is in motion within said mixing receptacle.

Another object of the present invention is to provide in a beverage dispensing machine of the aforesaid character an improved means for measuring the second ingredient for the beverage and for ejecting the same into the liquid ingredient therefor.

Still another object of the invention is to provide in a beverage dispensing machine of the kind aforesaid, a simple and reliable means for activating the means for measuring and ejecting the second ingredient for the various beverages.

A further object of the invention is to provide an effective means for preventing moisture contamination of the supply of the aforesaid second ingredient and the mechanism for measuring and ejecting the same.

Still another object of the invention is to provide in a beverage dispensing machine of the above character an improved and sanitary means for collecting the beverage which may be spilled or wasted in dispensing the same, said collecting means being utilized to make the machine inoperative when a predetermined amount of the spilled beverage has been collected.

A still further object of the invention is to provide in a beverage dispensing machine of the aforesaid description means whereby the liquid measuring and dry ingredient storage, measuring and ejecting apparatuses therein, may be quickly removed, separately or collectively, from a cabinet therefor to facilitate inspection and servicing of said apparatuses.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a cabinet within which a beverage dispensing machine embodying my invention may be housed;

2

Fig. 2 is a front elevational view of the machine showing the general arrangement of the various parts thereof within the cabinet, a lower front panel having been removed from said cabinet and a front door on said cabinet being shown in an open position;

Fig. 3 is an elevational cross-sectional view of the machine taken substantially on the line 3—3 in Fig. 2 to show, in further detail, the arrangement of the parts of said machine within the cabinet;

Fig. 4 is a fragmentary horizontal cross-sectional view taken on the line 4—4 in Fig. 2 to illustrate certain structural details of a closure for a beverage discharge opening which is provided in a rear wall of a dispensing stage located on the door of said cabinet;

Fig. 5 is a fragmentary vertical cross-sectional view taken on the line 5—5 in Fig. 4 to further illustrate the construction of said closure.

Fig. 6 is a horizontal cross-sectional view taken substantially on the line 6—6 in Fig. 2 to illustrate a portion of the structure for storing and for selectively dispensing various dry ingredients for beverages;

Fig. 7 is a vertical cross-sectional view taken substantially on the line 7—7 in Fig. 6 to show in further detail the storing and dispensing mechanism for the beverage ingredients and to illustrate the arrangement of a blower by which vapors may be removed from a trough within which the dry ingredients may be mixed with a liquid;

Fig. 8 is a similar view taken on the line 8—8 in Fig. 7 to bring out further the details of the dry ingredient dispensing mechanism and the arrangement of said blower;

Fig. 9 is a vertical cross-sectional view taken on the line 9—9 in Fig. 7;

Fig. 10 is a horizontal cross-sectional view taken on the line 10—10 in Fig. 7 to show a means for operating closures for openings through which the dry beverage ingredients are dispensed from storage hoppers therefor;

Fig. 11 is a fragmentary elevational view taken on the line 11—11 in Fig. 10;

Fig. 12 is another fragmentary elevational view showing in detail the construction of a spring-loaded shut-off valve for the machine of my invention;

Fig. 13 is a similar view of said valve taken from the right of Fig. 12;

Fig. 14 is a fragmentary cross-sectional view of a liquid measuring cup apparatus comprising a part of my invention;

Fig. 15 is an elevational view of the same with a liquid intake nozzle and ventilating screen removed therefrom;

Fig. 16 is a liquid flow diagram for the machine of my invention; and

Fig. 17 is a schematic electrical diagram for the machine.

As thus illustrated, the machine of my invention is embodied in a cabinet, shown generally at 29, having mounted on the upper portion of the front thereof, as by a piano-type hinge 21 (Fig. 2), a door 22. The lower portion of the front of the cabinet may be enclosed by a removable panel 23, and the remainder of the cabinet may comprise a top 24, a base 25 of any suitable construction, sides 26 and 27, and a back 28. In the front of the door may be suitably mounted a coin-receiving slot 29 above and below which may be arranged warning lights 30 and 31, showing, respectively, suitable words when illuminated, such as "Use nickels only" or "Use nickels, dimes, or quarters." Opposite the coin-receiving slot on the door may be arranged selector buttons 32, 33, 34 and 35 which may be selectively operated by a customer to cause a beverage of his choice to be mixed and dispensed by the machine in a manner hereinafter described. A housing 35' may be employed on the rear side of the door to cover electrical switches or contacts operated by the pressing of said button. Descriptions of the available beverages may be posted in the spaces 36 beside the selector buttons, if desired.

With the door closed, as in Fig. 1, a coin inserted into the coin receiver 29 may be conducted by a chute 37 (Fig. 2) to a counterfeit coin rejector, shown generally at 38, from which genuine coins requiring change may pass downwardly into a coin changer arranged below the rejector, as at 39. Change dispensed from the changer may be conducted by means of a coin chute 40, to a receptacle 41 mounted on the face of the door wherein said change will be accessible to a customer. Coins retained in payment for beverage dispensed by the machine may drop from the coin rejector 38 or the changer 39 into a cash box 42. If desired, coin-return apparatus of any suitable type (not shown) may be employed in conjunction with the coin rejector to cause the return of a coin to a customer by the operation of a coin-return lever 43 provided on the face of the door above the receptacle 41.

Within the cabinet are housed the various parts which comprise the mechanism for mixing, measuring and dispensing the various beverages. From a source of water under pressure, such as a city water supply, water is conducted into the interior of the cabinet through a pipe 44 which passes through the back 28 of said cabinet to a plunger-type valve 45 mounted on a bracket 46 which is in turn fixed, as by welding or otherwise, to a channel 47 firmly secured to the inner left-hand side of the cabinet, as viewed in Fig. 2. A bolt 48 is passed through the bracket 46 and is secured thereto, as by nuts 49 and 50 disposed on opposite sides of the bracket (Figs. 12 and 13). An arm 51 of U-shaped or other suitable cross-section is pivotally mounted, adjacent one of its ends, upon the bolt 48 and secured thereon as by a cotter key 52 (Fig. 13). A heavy coil-type tension spring 53 is attached at one of its ends to a pin 54, which is passed through the arm 51, and at its other end to an eye bolt 55 fixed to the channel 47 whereby the arm 51 is normally supported in the diagonal position best shown in Fig. 12. An opening 56 (Fig. 13) is provided in the arm 51 to receive a plunger 57 of the valve 45, and on the upper end of the plunger is fixed a ring 58 which is also attached to the arm. A groove 59 may be provided in the arm 51 adjacent its uppermost end and the bail 60 of an ordinary bucket 61 may be supported therein. Adjacent the lower end of the arm 51, a

plunger-type electrical switch 62 may be attached to the bracket 46, as by mounting screws 63, in a position in line with the lower end of said arm.

It will be understood that under normal conditions the spring 53 will retain the arm 51 in the position shown in the drawings. However, when the liquid contents of the bucket 61 reaches a predetermined volume, the weight of said bucket and the contents therein will overcome the tension of the spring 53 and will pivot the arm 51 clockwise about the pin 48, as viewed in Fig. 12. The pivotation of said arm causes the plunger 57 to move downwardly into the valve 45 to stop the flow of water therethrough and also causes the lower end of the arm to come into contact with a plunger 64 of the switch 62 to open the latter.

In order to retain the arm in its pivoted position and to thus keep the valve 45 closed and the switch 62 open until the contents of the bucket have been emptied, means is provided for automatically locking the arm in the pivoted position. To this end a bracket 65 is attached to the outermost end of the bracket 46 as by studs 66. A pivot pin 67 is fixed to the bracket 65 and pivotally suspended therefrom is a latch 68 which normally rests against one side of the arm 51 in the position shown in Fig. 13. When said arm is pivoted in a clockwise direction, as above described, the latch 68 will be free to swing to a vertical position in which a notch 69 on said latch will engage the arm 51 and prevent the spring 53 from returning said arm to its normal position until the latch has been manually disengaged from the arm.

With the arm 51 in the normal position shown in the drawings, the valve 45 will be open as aforesaid, and water reaching said valve through the pipe 44 will be free to flow through the valve and through a pipe 70 to a water filter 71 which may be of any suitable commercial construction. From the water filter said water flows through a pipe 72, through a one-way valve 73, and thence into a T-joint 74 (Fig. 16). Attached to one side of the T-joint is a pipe 75 which conducts said water into an automatic electric water heater 76 of commercial design, disposed on the base 25 of the cabinet and provided with a suitable thermostat (not shown) for keeping water therein at a predetermined temperature. Said water heater may be provided at its lower end with a drain-cock 77 through which the water therein may be drained whenever necessary for purposes of repair and the like.

Attached to the other side of the T-joint 74 is another pipe 78 which leads to a cushion tank 79 which is partially filled with air and thus compensates for any expansion of the water due to the heating of the latter in the water heater. An air valve 80 is provided at the upper end of the cushion tank whereby the supply of air therein may be replenished or removed as may be necessary.

A pressure safety valve 81 is provided in a pipe 82 leading from and supported by the hot water heater. Any steam or hot water released from said heater through the safety valve is conducted by a tube 83 from the valve to the bucket 61 suspended on the arm 51.

A second pipe 84 conducts hot water from the water heater 76 to a T-joint 85 from which a return pipe 86 will return said water to the heater. It will be understood that the pipes 84 and 86, with the T-joint 85, provide a circuit

5

through which hot water from the heater will circulate by convection, thus always maintaining a supply of hot water at said T-joint available for use as one of the ingredients of the various beverages which may be selectively mixed and dispensed by the machine of my invention.

The third opening in the T-joint 85 is connected to a valve 87 which is operated by a solenoid 87'. When the solenoid is energized, the valve 87 will be opened and will allow hot water to flow from the T-joint, pass through the valve and an elbow 88, and thence drop into a measuring cup (shown generally at 89) through an opening 90 provided in a top cover 91 of the cup (Fig. 14).

In the embodiment of the invention shown, the measuring cup 89 is supported by a bracket 92 (Fig. 2) which is fixed, as by welding or other suitable manner, to an upright member 93 of a frame shown generally at 94. The frame, in the form thereof illustrated, is comprised of a length of angle iron 95 which serves as the left-hand side member of the frame (as viewed from the front of the machine) and extends from the front to the rear of the cabinet. A similar length of angle iron 96 serves as the right side member of the base of the frame, said frame members 95 and 96 being horizontally and slidably supported on horizontal rails 97 and 98, respectively, the latter of which are mounted in any suitable manner on the opposite inner surfaces of the sides of the cabinet (Fig. 2). Another angle iron 99 extends between the forward ends of the members 95 and 96 and serves as the front member of the frame.

A support member 100, of U-shaped cross-section, is fixed to the front member 99, as by welding, and extends to the rear of the cabinet parallel to the side members 95 and 96, while another support member 101, of similar cross-section, is fixed to and extends between said side members in a central position parallel to the front member 99. (See Figs. 8 and 9.) From the rear end of the side member 95 a back frame member 102 extends to the rear end of the support member 100 (Fig. 9). All of the aforementioned members of the frame are welded to the adjoining members and together they provide a strong base, slidably mounted on the rails 97 and 98, which may be pulled forward from the cabinet when the door thereof is open, as in Fig. 2.

Strong support posts 103 and 104, of inverted Y-shape, are fixed respectively, to the upper surfaces of the front and back frame members 99 and 102 to the left of the center of the frame 94 (Figs. 2 and 8). Extending between these two posts is a strong vertically disposed web 105 (Figs. 7 and 8). A length of angle iron 106 is attached to the web 105 along the upper edge of the latter, as by spot welding, and a horizontal plate 107 of rectangular shape is fixed to the angle iron 106 in a similar manner. The plate 107 extends from the front to the back of the frame 94 above and between the side member 95 and the support member 100. A plurality of cylindrical support posts 108 may support the plate upon the side member 95.

In approximately the center of the frame 94, on the front portion thereof, an automatic cup dispensing apparatus of a commercial type is supported upon and fixed to the front frame member 99, the side member 96 and the support members 100 and 101 (Figs. 2, 3 and 7). The cup dispensing apparatus shown comprises an

6

electric motor 110 which, through gears not shown, turns a drive shaft 111. Said cup dispensing apparatus also includes a cup ejecting mechanism shown generally at 112, and a plurality of upright tubular cup storage magazines 113 which are fixed on a base (not shown) above the ejecting mechanism 112. Each time the motor is energized to turn the drive shaft one complete revolution, a cup 114 is ejected from the base of the ejecting mechanism, one of the cup storage magazines 113 being in a position directly above the ejecting mechanism. When a magazine from which cups have been received into the ejecting mechanism has been emptied, gears (not shown) may be automatically engaged with the drive shaft 111 and the base upon which the magazines are mounted may be caused to rotate upon the next energization of the motor to bring another of the magazines into position above the ejecting mechanism. This process may be repeated in the ejecting of the cups until the supply thereof in the last of the magazines is depleted, whereupon subsequent rotation of the base for the magazines may cause a finger 115 mounted externally of one of the magazines (Fig. 6) to be brought against a roller 116 on a switch leaf 117 to open a cut-off switch 118, thus preventing further energization of the motor 110 until the supply of cups has been replenished.

With the door 22 of the cabinet closed, a cup 114, upon being ejected from the cup-ejecting mechanism 112, drops downwardly to a beverage vending stage, which is recessed in the lower center portion of the door, through a chute 119 (Fig. 2). Said beverage vending stage comprises a curved back wall 120 which is fixed to the back surface of the door and which supports the chute 119. Said stage also comprises a grate-like floor 121 beneath which is detachably mounted a waste-collecting trough 122 which slopes toward one of its ends and has in its lower end an opening which, when said door is closed, is disposed directly above the bucket 61 so that any liquid which may be spilled on the stage will immediately find its way to the bucket.

A transparent plastic cup receiver 123 (Fig. 1) may be mounted in a suitable fashion on the forward side of the vending stage wall 120 and at its lower end may be provided rails or the like (not shown) which will catch the lip of the cup on opposite sides thereof to steady said cup for receiving a beverage. It will be understood that when the cup has been filled with a beverage in the manner hereinafter described, the cup may be removed from the stage by a customer.

In the central portion of the wall 120 of the vending stage is an opening 124 and to one side of said opening a solenoid 125, having an armature 126, is mounted upon the back side of said wall. Fixed upon the outer end of the armature is an L-shaped slide 127 to one corner of which is fastened a tension spring 128 which is fixed at its other end to a bracket 129 secured to the back side of the wall 120. In its normal position the slide 127 is in a position covering, and thus closing, the opening 124 in the wall 120. However, when the solenoid 125 is activated, the armature 126 is moved to the left (as seen in Fig. 4) and the slide 127 is carried away from the opening. When the solenoid is de-activated, the tension of the spring 128 carries

the slide back to its closed position, a stop 130 determining said position.

An opening 131 is provided in the slide 127 for a purpose which will hereinafter be explained.

Returning now to the measuring cup 89 (Figs. 14 and 15), it will be noted that although the elbow 88 has a fixed position, the cup does not. Inasmuch as said cup is fixed to the aforesaid upright member 93, which is in turn fixed in a suitable manner to the frame 94, said cup will be removed along with said frame when the latter is pulled forward on the rails 97 and 98 and removed from the cabinet as aforesaid. There is no hydraulic connection between the elbow 88 and said cup, but rather, the water passing from the elbow falls freely from the latter into the cup through the opening 91 therein when the frame is in the operative position shown in the drawings. In this manner the pressure of the water is completely dissipated as it drops into the cup. If desired, a cylindrical ventilating screen 135 (Fig. 14) suspended from a washer 136, of rubber or the like, fixed about the lower portion of the elbow 88, may be arranged between the elbow and the top 91 of the cup 89 to prevent the water, in dropping into said cup, from becoming contaminated by dust and the like. A flange 137 may be fixed upon the base of the screen 135, said flange being in sliding contact with the top 91 of the cup so as not to obstruct the removal of said cup from the cabinet along with the frame 94.

Fixed to the top 91 of the measuring cup 89 is a vertically disposed bracket 138 upon which is mounted a solenoid 139 having an armature 140. A tension spring 141 is attached at one of its ends to the armature 140 and at its other end to an arm 142 of a small bell-crank (shown generally at 143) which is pivotally mounted in a vertical position upon a pivot pin 144 threaded into or otherwise secured upon the bracket 138. Another arm 145 of the bell-crank has formed on its extremity a bearing surface 146 which is in contact with the upper surface of a head 147 secured to the top of a vertical plunger rod 148. A bracket 149 is formed on the bracket 138 and occupies a position below the arm 145 of the bell-crank 143. Said plunger rod 148 is slidably mounted in the bracket 149 and extends downwardly through the top 91 of the cup 89 into the interior of an outlet nipple 150 which is mounted in a water-tight manner in the bottom 151 of the cup which is formed to receive said nipple. The upper end of the nipple 150 may have a flange 152 formed thereon, and between said flange and the interior of the bottom 151 of the cup may be a washer 153 of rubber or the like. A nut 154, threaded upon the exterior of the nipple and screwed tightly against the exterior of the bottom 151 of the cup, may be employed to prevent the leakage of water past the flange 152 of the nipple.

The upper end of the nipple 150 has a valve seat 155 formed therein and a tapered valve ring 156, of rubber or the like, is fixed upon the plunger rod 148 adjacent its lower end in a position to be seated on the valve seat 155 when the rod is lowered to the position shown in Fig. 14. Above the valve ring 156 a float 157 is slidably mounted upon the rod 148 and above said float is a bushing 158 also slidably arranged on said rod, the bushing being normally supported by a lip 159 formed on the top thereof which rests upon the upper surface of the top 91 of the cup.

Disposed about the plunger rod 148 between the bracket 149 and the head 147 is a compres-

sion spring 160 which, it will be understood, tends to raise the rod and thus raise the valve ring 156 from the valve seat 155 on the nipple 150.

A two-way switch 161 is mounted upon the bracket 138 below the solenoid 139 and is provided with an operating leaf 162, the extremity of which is supported by the upper surface of the lip 159 on the bushing 158.

An overflow pipe 163 extends upwardly into the interior of the cup 89 to a predetermined level through an appropriate water-tight fitting 164 in the bottom 151 of said cup. To the lower end of the overflow pipe may be fitted a rubber tube 165 (Fig. 2) which will direct all water entering the overflow pipe to the bucket 61.

Attached to the lower end of the nipple 150 is a pipe 166 which may pass downwardly, through an opening 167 in the upright member 93 (Fig. 9), to a nozzle 168 which extends through and is fixed to the rear of the horizontal plate 107. The lower tip of said nozzle is curved diagonally downward and has therein a slot-like orifice 169 through which water entering the pipe 166 from the measuring cup 89 will be discharged. Said lower tip of the nozzle is received by an open rear end of a beverage mixing trough, shown generally at 170, which comprises a bottom 171 sloping down from said nozzle and two vertical sides 172 and 173 (Figs. 7 and 9). The side 173 has on its upper horizontal edge a lip 174 which is slidably received and supported by a rail 175 which is mounted, as by screws, on the lower side of the plate 107 (Fig. 7). The other side 172 has formed on its upper horizontal edge a similar lip 176 which is similarly received and supported by a rail 177 which is secured, as by screws, to the lower side of a horizontal ventilating duct 178, the latter of which is mounted, as by screws, on the lower side of the plate 107 and extends along substantially the entire length of the trough 170. The lower and forward end of the trough is open (Fig. 9) and removably secured thereto, as by thumb screws 179, is a liquid receiving nozzle 180, of funnel shape, which conforms to the contour of the end of the trough. Secured to the lower end of the nozzle 180, as by a nut 181, is a beverage discharge pipe 182 which leads downwardly to a position immediately to the rear of the rear wall 120 of the vending stage opposite the opening 124 therein when the door 22 of the cabinet is closed. (See Fig. 4.)

Inasmuch as the mixing trough 170 is slidably mounted upon and supported by the rails 175 and 177, it will readily be seen that, when the door 22 of the cabinet is open, said trough may be pulled forward and removed from the machine together with the nozzle 180 and the beverage discharge pipe 182 without requiring the removal of other parts. This is an important object of the invention and greatly simplifies the cleaning of the trough and beverage discharge pipe, thus adding to cleanliness of the apparatus. If desired, a handle 183 (Fig. 9) may be secured to the forward end of said trough as an aid in its removal.

It will be understood that all water discharged from the measuring cup 89 past the valve ring 156 therein will enter the mixing trough 170, pass therethrough, and be discharged from the lower end of the beverage discharge pipe 182 through the opening 124 in the rear wall 120 of the vending stage and into a cup 114 which will have been positioned as aforesaid. Any liquid which may thereafter drip from the lower end of

the beverage discharge pipe 182 will drop through the opening 131 (Fig. 4) in the slide 127 (when the latter has been returned to its closed position) and fall downwardly into the bucket 61.

It will thus be seen that unsightly and messy pools of beverage which might ordinarily result from drippings from the beverage discharge pipe are avoided by the unusual positioning of the lower end of the latter to the rear of the rear wall 120 of the vending stage, above the opening 131 in the slide 127, and directly above the bucket 61. Increased cleanliness in the operation of the machine is thus obtained.

Suspended from the support member 100 of the frame 94 (Figs. 7 and 8), as by a bracket 184, is a rotary air-blower 185 driven by a motor 186. From a discharge opening in the casing of said blower an air discharge pipe 187 leads rearwardly through the rear wall 28 of the cabinet whereby the air moved by the blower may be expelled from within said cabinet. From the intake side of the blower an air-conduit 188 leads upwardly to the horizontal ventilating duct 178, the latter of which is provided with openings 189 (Fig. 9) into the space within and above the mixing trough 170. The air-conduit 188 is provided with an opening 190 therein between the blower 185 and the ventilating duct 178. On a level with said opening a plate 191 (Fig. 9), having side flanges 192 (Fig. 7), is adjustably mounted upon the conduit as by screws 193 which are threaded into the sides of the conduit and pass through slots 194 in said flanges 192. Said plate 191 is provided with an opening 195 (Fig. 9) which corresponds to the opening 190 in the conduit, and on the side flanges 192 are formed ears 196 which pivotally support a horizontal pin 197 (Figs. 7 and 9). A gate 198, having ears 199' formed thereon, is pivotally mounted on said pin 197. A solenoid 199, having an armature 200, is fixed upon the plate 191, and a tension spring 201 has one of its ends attached to the armature and its other end secured to the uppermost edge of the gate 198. It will thus be seen that when the solenoid 199 is energized, the armature 200 will be drawn downward to pivot the gate 198 to a position closing the passage through the conduit 188 to the ventilating duct 178 and creating a free passage from the interior of the cabinet into the conduit.

In practice, the motor 186 drives the blower 185 at all times. Normally the solenoid 199 is de-energized and the blower, it will thus be understood, normally removes warm or moist air from the interior of the mixing trough 170. Upon the energization of the solenoid 199, however, the gate 198 will be pivoted as above described and said blower will remove air and steam from within the interior of the cabinet.

Secured to the upper surface of the plate 107, as by studs 205, are two parallel rows of guide rails 206 (Figs. 7 and 10) adapted, respectively, to slidably receive the lowermost edges of two parallel base members 207 and 208 of Z-shaped cross-section. Said base members are secured together at their forward ends by a spacer rod 209 which is riveted to each and serves as a handle by means of which the base members may be pulled forward on the plate 107, which supports said members, and thus be removed therefrom and from the guide rails 206. When the door of the cabinet is open, it will be understood that said base members 207 and 208 may be pulled forward or removed as a single unit.

Resting upon the upper surfaces of the base

members 207 and 208, and secured to the latter, as by thumb screws 210 (Fig. 6), are three castings shown generally at 211, 212 and 213. The upper portions of said castings are generally square in cross-section and skirts 214 are provided on opposite sides thereof, which fit down over the sides of the base members 207 and 208, and have slots 215 therein for receiving the thumb screws 210 which may be threaded in said base members. (See Fig. 8.) Said castings are provided with a horizontal inner floor 216 (Fig. 7) and with raised flanges 217 about the four sides of said floor. A well 218 is formed in the central portion of each of said floors 216, said wells extending downwardly between the base members 207 and 208 (Fig. 9).

Bottomless hoppers 219, 220 and 221, of square cross-section, are adapted to fit down within the flanges 217 on the castings 211, 212 and 213, respectively, and to rest on the floors 216 thereof. Each of said hoppers may be provided with thumb screws 222 on opposite sides thereof, which, when tightened, may be received in countersunk notches provided therefor in the flanges 217, thus removably securing said hoppers to the castings. Said hoppers may also be provided with suitable lids 223 for protecting the powdered ingredients for beverages which may be placed therein, as will be hereinafter more fully described.

On the end of the horizontal drive shaft 111 driven by the motor 110, as herein described, are fixed a pair of cams 224 and 225 which are separated each from the other by a space and have a pin 226 fixed therebetween (Fig. 8). Adjacent the end of the shaft and intersecting the axis of the latter is a vertical bar 227, of square cross-section, which is arranged to be moved up and down. The upper end of said bar is supported in an opening provided therefor in a support plate 228 firmly secured, as by screws, to the plate 107. The lower end of said bar is similarly supported in a support plate 229 fixed to the support member 100 of the frame 94. On the side of the bar 227, adjacent the end of the shaft 111, are pivotally fixed two spaced rollers 230 and 231 which are adapted to ride on the cams 224 and 225, respectively. It will thus be understood that as the drive shaft 111 is turned by the motor 110, the bar 227 will be moved up and down by the action of the cams 224 and 225 on the rollers 230 and 231 (Fig. 8). It will also be apparent that said bar will be moved through one complete cycle upon each revolution of the drive shaft.

A shaft 232 is bearinged in two hanger brackets 233 which may be spotwelded or otherwise firmly secured to the web 105. Collars 234 may be fixed to the shaft on opposite sides of said brackets to take up axial forces which may be applied to the shaft (Fig. 8). Supported by said shaft, and fixed thereto by a pin 235 (Fig. 6), is a rocker member 236, the outermost end of which is bifurcated to receive within the bifurcation a roller 237 which is rotatably fixed on a side of the vertical bar 227 (Fig. 7). Thus, as the bar 227 is moved up and down in the rotation of the drive shaft 111, the shaft 232 is rocked back and forth by the action of the roller 237 on the rocker member 236.

At equally spaced intervals along the side of the web 105 are three clutch solenoids 238, 239 and 240, each being fixed upon the web as by screws or the like (not shown), and each being provided with an armature 241 (Fig. 8). To the left of each of said armatures, as viewed in Fig. 8, is a horizontal pin 242 which is fixed in any

suitable manner to a mounting plate 243 fixedly suspended from each of said solenoids (Fig. 7). Pivotally mounted upon each of the pins 242 is an arm 244, each of which arms is pivotally attached at one end to the lower end of one of the armatures 241. At the opposite end of each of the arms 244 is attached the lower end of a tension spring 245, said spring having its upper end firmly secured to the web 105 in any suitable manner (Fig. 8). An L-shaped bracket 246 is also pivotally mounted on each pin 242 and secured thereon as by a cotter pin 247, each of said brackets 246 being fixed, as by riveting (not shown), to the corresponding arm 244. At the uppermost end of each of the brackets 246 is rotatably mounted a roller 248 which rides between the legs of a U-shaped clutch member 249 which is slidably mounted on the shaft 232. Immediately adjacent each of the U-shaped clutch members 249 and fixedly mounted upon the shaft 232 is a J-shaped clutch member 250. Passed horizontally through both legs of each of the U-shaped clutch members 249, adjacent their outer ends, is a clutch pin 251. Each of said clutch pins is fixed in the corresponding clutch member 249 as by cotter pins 252. One end of each of said clutch pins is tapered, as at 253, and the opposite end of each of said pins is slidably mounted in the longer leg of the corresponding J-shaped clutch member 250 adjacent its outer end. Loosely mounted upon the shaft 232, to the right of the tapered end of each of the pins 251 (as seen in Fig. 8), is an ejector arm 254, each of which arms is provided with a hole 255 therein for receiving the adjacent pin 251. Suitable collars 256, fixed to the shaft 232 on opposite sides of the ejector arm 254, may be provided for preventing axial sliding of said arms on said shaft (Figs. 6 and 8).

From the foregoing description of the solenoids 238, 239 and 240, and the parts associated therewith, it will be understood that when any one of said solenoids is energized, the armature 241 thereof will be moved upwardly to pivot the attached arm 244 on the corresponding pin 242 and thus rotate the bracket 246 and cause the roller 248 thereon to move the corresponding U-shaped clutch member 249 toward the adjacent ejector arm 254. In the movement of the member 249 toward the arm 254, the clutch pin 251 is carried into the opposing hole 255 in the arm 254. While this condition exists, it will be seen that any rotative motion of the shaft 232 will be transmitted through the J-shaped clutch member 250 to the pin 251 and the arm 254 will thus be caused to move with the shaft. It will therefore be understood that as the shaft 232 rotates back and forth upon each rotation of the drive shaft 111, as hereinbefore described, any one of the ejector arms 254 may be selectively caused to move with the shaft 232 by energizing the proper solenoid 238, 239 or 240.

Upon the upper end of each of the ejector arms 254 is pivotally mounted a latch bracket 257 of inverted U-shaped cross-section (Figs. 7 and 8). Slots 258 are provided in the vertical walls of each of the latch brackets and are adapted to receive a pin 259 fixed horizontally between the legs of a yoke 260, the latter of each of which is fixed upon one end of a horizontal plunger rod 261. If desired, a stud 262 may be threaded into the top of each yoke, an upon each of said studs may be pivotally arranged a securing plate 263 which will extend over the adjacent end of the corresponding latch bracket 257. Each of said securing plates may be held in this position by a

finger-nut 264 threaded on the stud 262, each of said nuts being tightened down upon the plate (Fig. 8).

Each of the plunger rods 261 rides horizontally in suitable bearing holes provided therefor in the adjacent skirts 214 of the castings 211, and attached to the opposite end of each rod is a plunger 265. Said plungers 265 are supported in bearing holes provided therefor in the sides of the wells 218 formed in the floors 216 of the castings 211. Upon the upper sides of each of the plungers is attached, as by a screw, a yoke 266 about each leg of which may be fastened a coil spring 267 (Figs. 6, 7 and 10). A horizontally disposed wire frame 268, of generally square shape, may also be secured to each of said yokes at the ends thereof.

It will be apparent that when one of the clutch solenoids 238, 239 or 240 has been energized and the motor 110 is driving the shaft 111 to rock the shaft 232 in the manner heretofore described, the ejector arm 254 corresponding to the clutch solenoid which has been energized will transmit reciprocal motion to the attached plunger rod 261 through the latch bracket 257 and the yoke 260 on said plunger rod. The plunger 265, attached to the end of the plunger rod, will likewise be reciprocated within the well 218 of the casting 211, 212 or 213, as the case may be.

Suspended from the bottom of each of the castings 211, 212 and 213, to one side of the well 218 therein, is a pivot pin 269 (Figs. 9 and 10). Pivotaly mounted upon each of said pivot pins is a dispensing door 270, each of which doors is spring-loaded by means of a coil spring 271 disposed about the pin. One end of each of the springs 271 lies against the end of the door 270 and the other end of each spring lies against a fin 272 which protrudes from the adjacent and corresponding well 218. It will be understood, that said dispensing doors are normally forced by the springs 271 to lie flat against the ends of the wells 218, in which position said doors cover the round openings in the wells normally occupied by the free ends of the plungers 265 (Fig. 10). Below each of the doors 270 a rectangular opening 273 is provided in the plate 107 directly above the mixing trough 170.

On the upper surface of the base member 95 of the frame 94 and adjacent the rear thereof, is fixed, as by screws, a bracket 274 upon which is mounted a solenoid 275 having an armature 276. (See Figs. 10 and 11.) On a skirted edge of the plate 107 is fixed a horizontally disposed pivot pin 277 upon which is pivotally mounted a bell-crank 278, one arm of which is pivotally secured to the armature 276 of the solenoid 275. The other arm of the bell-crank extends upwardly through a slot 279 in the plate 107.

On the inner side of the base member 207, opposite the dispensing doors 270, is slidably mounted a dispensing door operating slide 280 which may be mounted upon said base member 207, as by mounting bolts 281, which may be received by longitudinal slots (not shown) in the slide and may be fixedly secured to the base member as by nuts 282 (Fig. 10). The slide 280 extends over substantially the entire length of the base member 207, and adjacent each of the dispensing doors 270 is provided with a bracket 283 adapted to engage an activating pin 284 which protrudes from each door adjacent its pivot pin 269. On the rear end of the slide 280 is fixed a horizontally disposed pin 285 which passes through and rides in a slot 286 in the vertical wall

of the base member 207. A coil tension spring 287 has one of its ends secured to the pin 285 and its other end fastened to the rear end of said base member 207. It will thus be understood that the spring 287 tends to retain the slide 280 in a rear-most position with the brackets 283 thereon disengaged from the activating pins 284 on the dispensing doors 270.

The forward edge of the arm of the bell-crank 278 which extends upwardly through the slot 279 in the base member 207, rides on the rear side of the horizontal pin 285. It will therefore be readily understood that when the solenoid 275 is activated and the armature 276 thereof is moved in a downward direction (viewing Fig. 11), the bell-crank 278 will be pivoted on the pivot pin 277 and will be forced against the horizontal pin 285 to overcome the tension of the spring 287 and move the slide 280 forwardly. This movement of the slide brings the brackets 283 thereon into contact with the activating pins 284 on the dispensing doors 270 to overcome the tension of the springs 271 and thus open said doors to the position shown by the broken lines in Fig. 10. When the solenoid 275 is de-energized, the spring 287 returns the slide 280 to its rearward and normal position out of engagement with the activating pins 284 on the doors 270, and the springs 271 cause said doors 270 to return to their normal positions, closing the openings in the walls of the wells 218.

A cam member 288 is fixed upon the shaft 232 in any suitable manner and, in the movement of said shaft, serves to operate a master relay control switch 289, of a double throw type, which may be mounted upon a bracket 290, secured, as by screws, upon the frame member 100 of the frame 94 (Figs. 6 and 8).

The embodiment of my invention shown in the drawings is particularly well adapted for selectively mixing and vending a variety of warm drinks. For example, a mixture of powdered coffee and dehydrated cream may be placed in the hopper 219, powdered sugar in the hopper 220, and plain powdered coffee in the hopper 221. When this combination of dry ingredients is provided in said hoppers, the machine of my invention will, in a manner to be hereinafter more fully explained, mix and vend black coffee, black coffee with sugar, coffee with cream, or coffee with cream and sugar. Fig. 17, which is about to be described, shows an electrical circuit suitable for use in conjunction with my beverage dispensing machine when the same is employed to selectively mix and vend coffee as aforesaid. However, the illustrated electrical circuit may be varied by one skilled in the art to alter the sequence of operation of the various parts of the machine, and it must not be understood from Fig. 17, or from the following description thereof, that the machine is limited to the mixing and vending of coffee. On the contrary, the machine of my invention, with certain variations which will in part be hereinafter pointed out, may be adapted to selectively mix and vend any drink or drinks which may be compounded by mixing soluble dry ingredients in a liquid ingredient for said drink or drinks.

When my machine is employed for dispensing coffee, as aforesaid, electric current may be supplied to the machine from a suitable power source (not shown) by means of two lead lines 300 and 301. The electric water heater may be electrically disposed across these two lines, and in the line 300 the cut-off switches 62 and

118 may be placed in series so that all current will be cut off from the machine, and said machine will thus be made inoperative, when the supply of cups has been depleted and the switch 118 has been opened, or when the accumulation of spilled beverage in the bucket 61 has become great enough to overcome the tension of the spring 53 and has caused the arm 51 to pivot to open the switch 62.

Upon the insertion of a proper coin into the coin-receiver 29 on the face of the door 22 of the cabinet 20, said coin will drop downwardly through the coin chute 37 and into the counterfeited coin rejector 38 and thence into the coin changer 39 wherein said coin will momentarily close a coin switch 302 in a line 303 running from the lead line 300 to one side of a master relay solenoid 304 which has connected to its other side a line 305 running to the line 301. A line 306 also runs from the line 303 adjacent the master relay solenoid 304 to one side of the measuring cup solenoid 139, the other side of which is connected to the lead line 301 by means of a line 307. It will thus be understood that upon the momentary closing of the coin switch 302, the master relay solenoid 304 and the measuring cup solenoid 139 will be energized. The latter solenoid will immediately pivot the bell-crank 143 above the measuring cup to overcome the compression spring 160 and move the plunger rod 148 downwardly to seat the valve 156 on the valve seat 155 at the bottom of the measuring cup. Simultaneously, the master relay solenoid will close switches 308 and 309 thereon, the latter of which will close a secondary circuit to the master relay solenoid and to the measuring cup solenoid 139. Said secondary circuit comprises: a line 310 which extends from a secondary lead line 311, attached to the lead line 300, to the middle leaf of the master relay control switch 289 which is normally closed as shown in Fig. 17; a line 312 extending from the normally closed side of the master relay switch 289 to one side of the switch 309; and another line 313 running from the other side of the switch 309 to the line 306. It will be apparent, therefore, that the master relay solenoid 304 and the measuring cup solenoid 139 will remain energized until the normally closed side of the master relay control switch 289 is opened in the rotation of the shaft 232.

Upon the energization of the measuring cup solenoid 139 and the master relay solenoid 304, as aforesaid, the switch 308 on the latter will also be closed to complete a circuit from the lead line 300 through lines 314 and 315 to one side of a normally closed switch 316. From the other side of the switch 316 a line 317 extends to one side of another normally closed switch 318. From the other side of the switch 318 a line 319 extends to a line 320 which is connected to one side of each of three selector switches 321, 322 and 323. From the switch 321 a line 324 extends to one side of a relay solenoid 325, to one side of the clutch solenoid 238 and to one side of a switch 326, the latter of which is operatable by the relay solenoid 325. From the switch 322 a line 327 extends to one side of another relay solenoid 328, to one side of the clutch solenoid 240, and to one side of a switch 329 which corresponds to the switch 326 and is operatable by the relay solenoid 328. From the switch 323 a line 330 extends to one side of still another relay solenoid 331, one side of the clutch solenoid 239, and to one side of a normally open

switch 332 which corresponds to the switches 326 and 329 and which is operatable by the relay solenoid 331. A common line 333 extends between the other sides of the relay solenoids 325, 328 and 331 and the other sides of the clutch solenoids 238, 240 and 239. From the line 333 another line 334 extends to the lead line 301. It will thus be apparent that when the master relay solenoid 304 has been energized in the manner above described, the switches 321, 322 and 323 will be operatable respectively and selectively to energize the relay solenoid 325 and the clutch solenoid 238, the relay solenoid 328 and the clutch solenoid 240, and the relay solenoid 331 and the clutch solenoid 239.

As above described, a mixture of powdered coffee and dehydrated cream may be placed, for example, in the hopper 219, powdered sugar may be placed in the hopper 220, and plain powdered coffee may be placed in the hopper 221. By means well known in the art and therefore not shown, the four selector buttons 32, 33, 34 and 35, on the face of the door 22 of the cabinet 20, may be arranged to operate the switches 321, 322 and 323. If, for example, the operation of the button 32 is desired to cause the dispensing of black coffee, said button may be caused, upon the pressing thereof, to close the switch 322. If, on the other hand, the operation of the button 33 is desired to cause the dispensing of a mixture of coffee and cream, said button 33 may be arranged to close the switch 321. The button 34 may be arranged, upon the pressing thereof, to cause the dispensing of black coffee with sugar, in which case the operation of the button 34 may be arranged to close simultaneously the switches 322 and 323 to cause the energization of the relay solenoids 328 and 331 and the clutch solenoids 239 and 240. If the button 35 is desired, upon the pressing thereof, to cause the dispensing of a mixture of coffee, cream and sugar, said button may be arranged to simultaneously close the switches 321 and 323 to cause the energization of the relay solenoids 325 and 331 and the clutch solenoids 238 and 239.

If, for example, a customer desires a cup of coffee with cream, he may, after insertion of a coin in the coin-receiver 29, press the button 33. The presence of the coin within the machine will momentarily close the coin switch 302, as aforesaid, which will immediately energize the master relay solenoid 304 and the measuring cup solenoid 139, the latter of which will close the valve 156 in the liquid measuring cup 89. When the customer presses the button 33, the switch 321 will be closed to complete the circuit to the relay solenoid 325 and the clutch solenoid 238. The latter solenoid will pivot the corresponding arm 244 on the pin 242 and will cause the clutch member 249 to slide to the right (as viewed in Fig. 8) toward the ejector arm 254, which will cause the clutch pin 251 on the clutch member to enter the opening 255 therefor in said ejector arm. The energization of the relay solenoid 325 will cause the switch 326 to close. Closing of the switch 326 will, by means of a fiber post 326' suspended from one leaf thereof, cause the switch 316 to be open. Although the switch 316 will thus be opened, a holding circuit to the relay solenoid 325 and the clutch solenoid 238 will remain closed through the closed switch 326 which completes said holding circuit through a line 335 extending from the line 324 to one side of said switch and through a line 336 which extends from the other side of said switch to

a line 337, the latter of which extends to one side of a normally closed circuit lock-in switch 338 which is disposed between the latter line and a line 339 connected to the secondary lead line 311. It will thus be seen that although the switch 321 will be but momentarily closed by the operation of the button 33 to initially energize the relay solenoid 325 and the clutch solenoid 238, said solenoids will thereafter remain energized until the circuit lock-in switch 338 is opened in a manner hereinafter described.

A switch 340, also operatable by the relay solenoid 325, will be closed simultaneously with the switch 326 and will complete a circuit from the line 315, through a line 341 and a line 342, to a center leaf of the float-operated switch 161. One side of the latter switch is normally closed (as shown in Fig. 17), and through said side a circuit is completed through a line 343 to one side of the solenoid 87' of the solenoid valve 87. The other side of said solenoid may be connected to the line 333. It will thus be apparent that, upon the energization of the relay solenoid 325, the solenoids 238 and 87' will be energized simultaneously, the latter to open the valve 87 and allow water to flow therethrough into the measuring cup 89 in which the valve 156 will have been previously closed by the energization of the measuring cup solenoid 139, as hereinbefore described. When the level of the water in the measuring cup has been raised sufficiently to carry the float 157 upwardly to raise the bushing 158 and thus move the operating leaf 162 on the switch 161, the normally closed side of the switch will be opened and the other side will be closed to complete a circuit to the one side of the electric motor 110 through a line 344. The other side of the motor may be connected to the lead line 301 by means of a line 345. Upon the opening of the normally closed side of the switch 161 the circuit to the solenoid 87' will, of course, be broken and as a result thereof the valve 87 will be immediately closed to stop the flow of water into the measuring cup 89. By the closing of the other side of the switch 161, however, the motor 110 will be immediately put into operation to rotate the shaft 111 in the direction shown by the arrow in Fig. 17. Said shaft has mounted thereon, in addition to the cams 224 and 225 previously described, a cam 346 which, just before the completion of one revolution thereof, will open momentarily the switch 338. Also mounted upon the shaft 111 (see Fig. 17) are cams 347 and 348 which operate, respectively, to close switches 349 and 350, the purposes of which switches will be hereinafter described.

As the motor 110 begins to turn the shaft 111, the cams 224 and 225 thereon will cause the reciprocation of the bar 227 and, by means heretofore described, will thereby cause reciprocal rotation of the shaft 232. Upon the initial movement of the shaft 232 the normally closed side of the master relay switch 289 will be opened to break the holding circuit, comprising the line 312 and the switch 309, maintaining the energization of the master relay solenoid 304 and the measuring cup solenoid 139. Upon the de-energization of the solenoid 139, the spring 160 in the measuring cup assembly will immediately cause the valve 156 to be raised from the seat 155 and allow the measured contents of the cup 89 to flow downwardly through the pipe 166 into the mixing trough 170.

With the opening of the normally closed side of the master relay switch 289, the other side

thereof will simultaneously be closed to complete a circuit, through connecting lines 351 and 352, to one side of the solenoid 125 and to one side of a spout shutter timing-control motor 353. The other side of the solenoid 125 may be connected to the line 307 and the other side of the timing motor 353 may be connected to the lead line 301 by means of a line 354. Upon the energization of said timing motor 353, a cam 355 on a shaft 356, driven by said motor, may close a switch 357. One side of the switch 357 may be connected to the secondary lead line 311 by means of a line 358 and the other side of the switch 357 may be connected to the line 352. It will thus be seen that the initial rotation of the cam 355 by the timing motor 353 will close the switch 357 and complete a holding circuit to the timing motor 353 and the solenoid 125. In the return reciprocal rotational movement of the shaft 232, the master relay switch 289 will be returned to its normal condition, opening that side of switch which initially completed the circuit to the solenoid 125 and the timing motor 353. The switch 357, however, will maintain the holding circuit to said timing motor and said solenoid until the shaft 356 and the cam 355 thereon have been rotated through one complete revolution. In practice, the shaft 356 is driven by the timing motor 353 through a set of speed reducing gears (not shown). By the use of the timing motor, the switch 357 and the holding circuit, the slide 127, operated by the solenoid 125, may be moved to one side of its normally obstructing position over the opening 124 in the back wall 120 of the vending stage until after all of the liquid released from the measuring cup 89 into the mixing trough 170 has flowed downwardly through the latter and has been discharged from the lower end of the discharge pipe 182.

As the bar 227 is moved through one cycle of up and down reciprocation by the cams of 224 and 225, the shaft 232 will be rotationally reciprocated by means of the bifurcated rocker member 236 which is fixed to the shaft 232 and moved by the bar 227, as aforesaid. As above described, the normally closed side of the master relay switch 289 will be opened and the normally opened side of said switch will be closed in the initial reciprocal rotation of the shaft 232. The ejector arm 254 will at the same time be pivoted to draw the plunger rod 261 to the right (as viewed in Fig. 6), and thus to similarly move the plunger 265. Being so moved, the extremity of the plunger 265 will be withdrawn from its normal position in the discharge opening in the side of the well 218 below the hopper 219. At this time the cam 347 on the shaft 111 will have been rotated sufficiently to close the switch 349 and thus close a circuit to one side of the solenoid 275 and the solenoid 199, said circuit comprising: a line 360 extending from the secondary lead line 311 to one side of the switch 349, and a line 361 extending from the other side of the switch 349 to the solenoid 199 and 275. The other sides of the solenoids 199 and 275 may be suitably connected to the lead line 301 (as illustrated in Fig. 17).

Upon the closing of the switch 349 and the energization of the solenoids 199 and 275, the gate 198 in the air conduit 188 extending upwardly from the blower 195 will be closed to interrupt the evacuation of air and moisture which is normally taking place from the interior of the mixing trough 170 through the ventilating duct 178. With the closing of said gate the blower 195 will

evacuate air or steam which may have accumulated within the interior of the cabinet. The energization of the solenoid 275, on the other hand, will pivot the bell-crank 278 on its mounting pin 277 and will cause the upper arm of said bell-crank to move against the pin 285 on the slide 280 to overcome the tension of the spring 287 and thus move said slide forwardly, causing the brackets 283 thereon to contact the actuating pins 284 on the dispensing doors 270 to cause the latter to be pivoted to the open position indicated by the broken lines in the Fig. 10.

In the meantime the cam 348, upon the initial rotational movement of the shaft 111, will have closed the switch 350, one side of which is attached to the secondary lead line 311, and will have thus completed a secondary circuit through a line 362 to the motor 110. By the closing of the latter switch it will be seen that a circuit to the motor 110 will be maintained even though the original circuit thereto, which was initially completed by the closing of the normally open side of the float-operated switch 161, will have been interrupted immediately upon the de-energization of the solenoid 139 and the consequent opening of the valve 156 in the measuring cup 89.

Continued rotation of the shaft 111 will cause the shaft 232 to complete its reciprocal rotational cycle and pivotally return the ejector arm 254 to its normal position shown in the drawings, and in so doing will return the plunger 265 to its normal position with the end thereof disposed in closing position in the discharge opening in the side of the well 218. In this return movement of said plunger, a predetermined amount of the mixture of powdered coffee and dehydrated cream in the hopper 219 and in the well 218 will be ejected, by said plunger through the opening in the well, to drop downwardly through the opening 273 in the plate 107 and into the water which at that time will be flowing downwardly across the inclined floor of the mixing trough 170. In the movement of the water through the trough the mixture of the coffee and cream will be dissolved in said water and the mixed beverage will be discharged from the lower end of the discharge pipe 182 through the opening 124 in the rear wall 120 of the vending stage and into a cup 114 which will have been positioned on the vending stage by the cup dispensing mechanism upon the initial energization of the motor 110.

As the shaft 111 completes one rotation and the plunger 265 returns to its normal position, closing the metering opening in the well 218, as aforesaid, the master relay switch 289, in the return rotation of the shaft 232, will be returned to its normal condition (as shown in Fig. 17). Upon completion of the return movement of the shaft 232, the switch 338 will be opened momentarily by the cam 346 to break the holding circuit to the relay solenoid 325 and to the clutch solenoid 238. De-energization of the clutch solenoid 238 will permit the tension spring 245 to pivot the arm 244 to its normal position and thereby withdraw the clutch pin 251 from the opening 255 in the ejector arm 254. At approximately the same time, the cam 347 on the shaft 111 will have been rotated sufficiently to again open the switch 349 to interrupt the circuit to the solenoids 199 and 275 thereby causing the gate 198 to be returned to its normal position wherein the blower 195 will resume the evacuation of moisture, air and steam or the like, from the interior of the mixing trough 170. The de-energization of the solenoid 275, on the other

hand, will permit the slide 280 to be moved rearwardly by the tension of the spring 287 to thus disengage the brackets 283 on the slide from the pins 284, on the doors 270, to allow the latter to return to their normal positions against the ends of the wells 218, to cover the metering openings in said wells and to cover the ends of the plungers 265 and thus prevent the same from becoming contaminated by moisture and steam, or the like, which may rise from the interior of the mixing trough 170.

Finally, the shaft 111, upon completing its cycle of one rotation, will have brought the cam 348 to its original position (as shown in Fig. 17), in which position the switch 350 will again be opened to interrupt the holding circuit to the motor 110 and thus stop the same. Shortly thereafter, and corresponding to the time at which all of the liquid introduced into the mixing trough 170 will have been discharged from the lower end of the discharge pipe 182 into the positioned cup 114, the cam 355 on the shaft 356, turned by the timing motor 353, will have been moved through one complete revolution and will have returned to its normal position (as shown in Fig. 17), whereupon the switch 357 will be opened to interrupt the holding circuit to the timing motor 353 and to the solenoid 125 to thus stop said motor and de-energize the solenoid to permit the tension of the spring 128 to return the slide 127 to its normal position (as shown in Fig. 4) covering the opening 124 in the rear wall 120 of the vending stage. Upon this latter operation the entire machine will have been returned to its normal condition and will be ready for another selection by a customer.

A line 363 leads from the secondary lead line 311 to one side of the blower motor 186, the other side of said blower motor being connected to the lead line 301. It will thus be understood that the blower 185 will be continuously in operation except at such times as the circuit thereto may be interrupted by the opening of the switch 118 upon exhaustion of the supply of cups, or by the opening of the switch 62 by the weight of the contents of the bucket 61. Except when the contents of one of the hoppers 219, 220 or 221 is being ejected by the corresponding plunger 265, it will be understood that the gate 198 in the conduit 188 will be positioned in such manner that moisture-laden air and steam will be evacuated from the interior of the mixing trough 170 and the area above the same. In this manner moisture, which might otherwise cause caking of the powdered ingredients in the hoppers, will be withdrawn from the contaminating area by the action of the blower 185 and will be expelled from the cabinet through discharge pipe 187.

While the above description of the operation of the machine has been directed to the operational sequence which may take place when a customer presses the proper button to close the switch 321 to cause the dispensing of a mixture of coffee and cream, it will be understood that should the customer press the proper button to close the switch 322 to cause the dispensing of plain black coffee, a similar operational sequence may be obtained. If the button 34 is pressed to cause the simultaneous closing of the switches 322 and 323 a similar operational sequence will follow, except that in this case both of the relay solenoids 328 and 331 will be energized along with the clutch solenoids 240 and 239, the latter solenoids causing the plungers 265 below the hoppers 220 and 221 to be engaged with the shaft

232 to cause the ejection of measured amounts of both plain coffee and sugar. Similarly, if the button 35 is pressed to cause the simultaneous closing of the switches 321 and 323 and to cause the dispensing of a beverage comprising coffee with cream and sugar, both of the relay solenoids 325 and 331 will be energized along with the corresponding clutch solenoids 238 and 239, the latter two solenoids causing the plungers 265 below the hoppers 219 and 220 to be engaged and reciprocated with the shaft 232 to cause the ejection of measured amounts of the mixture of coffee and cream and of sugar into the water flowing through the mixing trough 170.

It will also be understood that the present machine, like the machine which I have disclosed and claimed in my co-pending application, Serial No. 606,263, filed July 20, 1945, may be used for purposes of mixing and dispensing beverages other than coffee. The electrical circuit for the present machine may be changed, as may be necessary, to provide the operational result desired. For example, the hoppers 219, 220 and 221 may each be used to contain a powdered or other dry ingredient for fruit-flavored drinks. In this case the arrangement of the switches operated by the relay solenoids 325, 328 and 331 may be such, that upon the closing of the switch 321, 322 or 323, only the corresponding relay solenoid 325, 328 or 331, as the case may be, will be energized along with the corresponding clutch solenoids. In case the machine is used for dispensing such fruit-flavored beverages, it may be desirable to substitute for the electric water heater 76 a suitable water refrigeration apparatus. With such a substitution, the machine will thus be adapted selectively to mix and dispense a variety of cold drinks.

It will be obvious to those acquainted with the art, that the necessary electrical circuits for lighting the lights 30 and 31, and for operating the counterfeit coin rejector 38 and the coin-changer 39, may be suitably incorporated into the electrical circuit shown in Fig. 17, or into the variations thereof which may be found desirable to produce the aforesaid different operational sequences when beverages other than coffee are to be dispensed by the machine.

As a variation of that portion of the structure above described for ejecting the dry ingredients from the hoppers 219, 220 and 221 into the stream of water or other liquid ingredient as the latter flows downwardly across the bottom of the trough 170, I have found that auger-like screws may be substituted for the reciprocating plungers 265. In this variation the screws are disposed horizontally in the wells 218 of the bases of the hoppers and are arranged to be selectively rotated by the rotation of the shaft 111, suitable selectively operatable clutches being provided between said shaft and said screws. The screws may be supported at each end in the vertical walls of the wells and, upon rotation for a predetermined time period, will discharge a measured amount of the powdered ingredients into the trough 170.

It will be seen that, inasmuch as the mixing trough 170 is slidably suspended from the rails 175 and 177, said trough may be readily pulled forward on said rails when the door 22 of the cabinet 20 is opened. Said trough may thus be quickly removed for inspection and cleaning. To fill the hoppers 219, 220 and 221, the thumb-screws 264 may first be loosened on the studs 262 and the securing plates 263 may be

turned approximately ninety degrees to expose the inner end of the latch brackets 257, whereupon said brackets may be pivoted clockwise (as viewed in Fig. 7) to disengage the pins 259 in the yokes 260 on the plunger rods 261. The two base members 207 and 208, with the castings 211 and hoppers mounted thereon, may thereupon be pulled forward on the plate 107 to provide easy access for inspection and re-supplying the ingredients in the hoppers. When this service and maintenance has been accomplished, the base members, with the parts mounted thereon, may be slid back into normal position and the latch brackets 257 returned and secured in engagement with the pins 259 on the yokes 260. It will also be seen that inasmuch as the frame 94 with all of the parts mounted thereon is slidably supported on the rails 97 and 98, said frame may be pulled forward in the cabinet and removed therefrom with all of its parts still mounted thereon, if such is desired. This easy and simplified manner for removing or exposing the various parts of the dispensing mechanism greatly simplifies the maintenance and servicing of the machine and is an important object of the invention.

A high degree of sanitation is maintained in my machine inasmuch as all of the beverage which may be spilled on the vending stage will find its way directly to the bucket 61 which may be suspended on the arm 51. Any water which may be released by the safety valve 81, or which may enter the overflow pipe 163 in the measuring cup 89, will also be directed into the bucket. Likewise, any of the beverage which may drip from the discharge orifice at the lowermost end of the discharge pipe 182 will drop vertically behind the wall 129 of the vending stage and into the bucket 61. In this manner the vending stage may be kept clean. As previously described, when the weight of the contents of said bucket 61 has reached a predetermined maximum, the arm 51 will be pivoted downwardly to close the valve 45 to shut off the water supply to the machine and open the switch 62 to prevent operation of the machine. In this manner assurance is obtained against flooding which might occur if, for example, the valve 87 should, over a long period of operation, become defective.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, for it will be apparent that various changes may be made in the form, construction and arrangement of parts without departing from the spirit and scope of the invention.

I claim:

1. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means controlled by the liquid level in said vessel for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge open-

ing; motivating means connectable to said member for moving the same to cause it to forcibly eject a predetermined quantity of said second ingredient through said opening and into said mixing receptacle by said member upon movement thereof; and means controlled by the opening of said valve to initiate action of said motivating means and thereby cause the ejection of said second ingredient after the flow of said liquid ingredient into said mixing receptacle has begun.

2. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a reciprocating ejecting plunger in said container, one end of said plunger being normally disposed within said discharge opening to close the same; and means connectable to said plunger for reciprocating the same, subsequent to the opening of said valve, to withdraw the end of said plunger from said discharge opening and into the interior of said container, and to thereafter return said end to closing position in said opening, whereby said plunger will forcibly eject through said opening and into said mixing receptacle a predetermined quantity of said second ingredient, the action of said last-mentioned means being initiated by the opening of said valve.

3. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a reciprocating ejecting plunger in said container, one end of said plunger being normally disposed within said discharge opening to close the same; means connectable to said plunger for reciprocating the same, subsequent to the opening of said valve, to withdraw the end of said plunger from said discharge opening and into the interior of said container, and to thereafter return said end to closing position in said opening, whereby said plunger will forcibly eject through said opening and into said mixing receptacle a predetermined quantity of said second ingredient, the action of said last-mentioned means being initiated by the opening of said valve; and a frame on said plunger within said container, said frame being reciprocatable with said plunger to stir the contents of said container.

4. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing

movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; an outlet in said mixing receptacle, and an inclined bottom in the latter, whereby the measured liquid ingredient flowing into said receptacle will pass there-through in continuous movement; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; and motivating means connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being thereby forcibly ejected through said opening and into said mixing receptacle by said member upon movement thereof, the action of said last-mentioned means being initiated by the opening of said valve.

5. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; a solenoid in operative association with said valve for controlling the operation thereof; a float in said measuring vessel; a switch operatable by said float when a predetermined quantity of the liquid ingredient has been received by said vessel; an electric motor operated by said switch; a second switch operatable by said motor in the initial movement thereof to operate said solenoid and thereby cause the opening of said valve, whereby a measured quantity of said liquid ingredient will flow from said measuring vessel into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; and a reciprocating ejecting plunger in said container, one end of said plunger being normally disposed within said metering opening to close the same, said motor being connectable to said plunger for reciprocating the same, subsequent to the opening of said valve, to withdraw the end of said plunger from said metering opening and into the interior of said container, and to thereafter return said end to closing position in said opening, whereby said plunger will forcibly eject through said opening and into said mixing receptacle a predetermined quantity of said second ingredient.

6. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; a solenoid in operative association with said valve for controlling the operation thereof; a float in said measuring vessel; a switch operatable by said float when a predetermined quantity of the liquid ingredient has been received by said vessel; an electric motor operated by said switch; a second switch operatable by said motor in the initial movement thereof to operate said solenoid and thereby cause the opening of said valve, whereby a measured quantity of said liquid ingredient will flow from said measuring vessel into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in

communication with said mixing receptacle; and a movable member disposed in said container with an end of said member contiguous to said discharge opening, said motor being connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being discharged through said opening and into said mixing receptacle by said member in the movement thereof.

7. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing the movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; power operated mechanism; and a clutch between said power operated mechanism and said movable member; means controlled by the opening of said valve for causing said clutch to engage said mechanism with said member for moving the latter subsequent to the opening of said valve, a predetermined quantity of said second ingredient being discharged through said opening and into said mixing receptacle by said member upon movement thereof.

8. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a reciprocating ejecting plunger in said container, one end of said plunger being normally disposed within said opening to close the same; power operated mechanism; and a clutch between said power operated mechanism and said plunger; means controlled by the opening of said valve for causing said clutch to engage said mechanism with said plunger for reciprocating the latter, subsequent to the opening of said valve, to withdraw the end of said plunger from said discharge opening and into the interior of said container, and to thereafter return said end to closing position in said opening, whereby said plunger will eject through said opening and into said mixing receptacle a predetermined quantity of said second ingredient.

9. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a plurality of

containers for other ingredients for the beverage; a discharge opening in each of said containers in communication with said mixing receptacle; a reciprocating ejecting plunger in each of said containers corresponding to the opening therein, one end of each of said plungers being normally disposed within its corresponding opening to close the same; and power-operated mechanism selectively engageable with said plungers, respectively, for reciprocating the selected plungers to withdraw the ends thereof from said openings and into the interiors of said containers, and to thereafter return said ends to closing position in said openings, whereby said plungers will respectively eject through said openings corresponding thereto, and into said mixing receptacle, a predetermined quantity of the selected other ingredients, the action of said last-mentioned means being initiated by the opening of said valve.

10. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; motivating means connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being ejected through said opening and into said mixing receptacle by said member upon movement thereof, the action of said last-mentioned means being initiated by the opening of said valve; a ventilating fan; and an air conduit in communication with said fan and with the interior of said mixing receptacle whereby moist air may be removed from the interior of said mixing receptacle to prevent moisture contamination of said member and the contents of said container.

11. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle; means for causing movement of said valve to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; motivating means connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being ejected through said opening and into said mixing receptacle by said member upon movement thereof; a ventilating fan; an air conduit in communication with said fan and with the interior of said mixing receptacle whereby moist air may be

removed from the interior of said mixing receptacle to prevent moisture contamination of said member and the contents of said container; and means for interrupting the passage of air in said conduit while said second ingredient is being ejected through said opening by said member.

12. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle, said valve being movable to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; motivating means connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being ejected through said opening and into said mixing receptacle by said member upon movement thereof; a cover for the exterior of said discharge opening; and means for removing said cover from said opening while said second ingredient is being ejected through said opening by said member.

13. In a beverage dispensing machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel; a valve in the line of communication between said vessel and said receptacle, said valve being movable to open position when a predetermined quantity of the liquid ingredient has been received by said vessel, thereby permitting a measured quantity of said liquid ingredient to flow into said mixing receptacle; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; motivating means connectable to said member for moving the same subsequent to the opening of said valve, a predetermined quantity of said second ingredient being ejected through said discharge opening and into said mixing receptacle by said member upon movement thereof; a ventilating fan; an air conduit in communication with said fan and with the interior of said mixing receptacle whereby moist air may be removed from the latter; a cover for the exterior of said discharge opening; means for interrupting the passage of air in said conduit; and means for removing said cover from said discharge opening while said second ingredient is being ejected through the latter, said cover and the removal of moist air serving to prevent moisture contamination of said member and the contents of said container.

14. In a beverage vending machine: a source of a liquid ingredient of the beverage; means for measuring a charge of said liquid ingredient; a mixing receptacle in communication with said last-mentioned means and adapted to receive from the latter a measured quantity of said liquid ingredient; means for adding a measured quantity of a second ingredient of the beverage to said liquid ingredient while the latter is in said mix-

ing receptacle; a discharge conduit extending from said mixing receptacle; a housing in which the aforesaid structure is contained, said housing including a wall having a vending opening therein; and a cup support in front of said wall; the discharge end of said conduit terminating behind the wall and substantially in alignment with said opening therein, whereby the mixed beverage discharged therefrom will be directed through said opening to the cup on said support during the vending operation and any drippings from the end of said conduit thereafter will drop behind the wall to an overflow receptacle located below said discharge end of the conduit.

15. In a beverage vending machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel and adapted to receive from the latter a measured quantity of said liquid ingredient; means for adding a measured quantity of a second ingredient of the beverage to said liquid ingredient while the latter is in said mixing receptacle; a discharge conduit extending from said mixing receptacle, said conduit having an orifice therein through which the mixed ingredients may be discharged; a valve through which said liquid ingredient must pass to reach said measuring vessel; a pivoted arm in operative association with said valve; and a container supported by said arm and adapted to receive drippings from said orifice, said arm being pivotable to close said valve upon the accumulation in said container of a quantity of drippings of a predetermined weight.

16. In a beverage vending machine: a measuring vessel for receiving and measuring a liquid ingredient of the beverage; a mixing receptacle in communication with said measuring vessel and adapted to receive from the latter a measured quantity of said liquid ingredient; electrically operated means for adding a measured quantity of a second ingredient of the beverage to said liquid ingredient while the latter is in said mixing receptacle; a discharge conduit extending from said mixing receptacle, said conduit having an orifice therein through which the mixed ingredients may be discharged; a switch through which electric current must flow to reach said electrically operated means; a pivoted arm in operative association with said switch; and a container supported by said arm and adapted to receive drippings from said orifice, said arm being pivotable to open said switch upon the accumulation in said container of a quantity of drippings of a predetermined weight.

17. In a beverage vending machine: a mixing receptacle; means for delivering the ingredients of the beverage to said receptacle and for causing the same to be mixed therein, one of said ingredients being a liquid; a cup-supporting mechanism; a conduit leading from said mixing receptacle to discharge the beverage into a cup on said support; a normally open liquid supply line for supplying the liquid ingredient to the machine; a cut-off valve in said line; a pivoted arm operably connected with said valve and adapted to support a container in position to receive overflow liquid from the machine, whereby the valve is closed when the accumulation of liquid in said container reaches a predetermined weight; and means for normally holding said arm in valve-opening position.

18. In a beverage vending machine: a mixing receptacle; a source of a hot liquid ingredient communicating with said mixing receptacle; a

source of a dry beverage ingredient positioned above and communicating with said mixing receptacle; mechanisms for causing discharge of said liquid and dry ingredients, respectively, into said mixing receptacle on each cycle of the machine; a conduit for conveying the mixed beverage to a drinking cup or the like; and means for withdrawing heat and steam from the area above said mixing receptacle and preventing access thereof to said source of the dry ingredient, said means including an air duct in communication with said mixing receptacle and also having intake openings for admitting outside air thereto, and a suction device communicably connected with said duct for withdrawing the air therefrom and thus drawing such heat and steam from said area into said duct and dissipating the same with the exhaust air.

19. In a beverage vending machine: a mixing receptacle; a source of a hot liquid ingredient communicating with said mixing receptacle; a source of a dry beverage ingredient positioned above and communicating with said mixing receptacle; mechanisms for causing discharge of said liquid and dry ingredients, respectively, into said mixing receptacle on each cycle of the machine; a conduit for conveying the mixed beverage to a drinking cup or the like; a blower for withdrawing heat and steam from the area above said mixing receptacle and preventing access thereof to said source of the dry ingredient; and means for interrupting the operation of said blower during the period of discharge of said dry ingredient into said mixing receptacle.

20. In a beverage vending machine: a mixing receptacle; a source of a hot liquid ingredient communicating with said mixing receptacle; a source of a dry beverage ingredient positioned above and communicating with said mixing receptacle; mechanisms for causing discharge of said liquid and dry ingredients, respectively, into said mixing receptacle on each cycle of the machine; a conduit for conveying the mixed beverage to a drinking cup or the like; and means for withdrawing heat and steam from the area above said mixing receptacle and preventing access thereof to said source of the dry ingredient, said means including an air duct in communication with said mixing receptacle and also having intake openings for admitting outside air thereto, and a suction device communicably connected with said duct for withdrawing the air therefrom and thus drawing such heat and steam from said area into said duct and dissipating the same with the exhaust air, said duct and the air intake openings therein being arranged adjacent the outlet opening of said source of the dry ingredient so that the incoming air is drawn past said opening to keep the area thereof cool and dry.

21. In a beverage vending machine: a source of a liquid ingredient of the beverage; a mixing receptacle arranged to receive measured charges of the liquid ingredient from said source; a container for a second ingredient for the beverage; a discharge opening in said container in communication with said mixing receptacle; a movable member horizontally disposed in said container with an end of said member contiguous to said discharge opening; motivating means connectable to said member for moving the same, a predetermined quantity of said second ingredient being ejected through said opening and into said mixing receptacle by said member upon movement thereof; a cover for the exterior of said discharge opening; and means for removing said

cover from said opening while said second ingredient is being ejected through said opening by said member.

22. In a beverage vending machine: a mixing receptacle; electrically operated means for delivering the ingredients of the beverage to said receptacle and for causing the same to be mixed therein, one of said ingredients being a liquid; a cup-supporting mechanism; a conduit leading from said mixing receptacle to discharge the beverage into a cup on said support; a switch through which electric current must flow to reach said electrically operated means; a pivoted arm in operative association with said switch; and a container supported by said arm and adapted to receive overflow liquid from the machine, said arm being pivotable to open said switch upon the accumulation in said container of a quantity of overflow liquid of a predetermined weight.

23. In a beverage vending machine: an enclosed mixing receptacle; a source of a hot liquid ingredient communicating with said receptacle; a source of a dry beverage ingredient communicating with said mixing receptacle; mechanisms for causing discharge of said liquid and dry ingredients, respectively, into said mixing receptacle on each cycle of the machine; a conduit for conveying the mixed beverage to a drinking cup or the like; and means for withdrawing heat and steam from the enclosed area about said mixing receptacle and preventing access thereof to said source of the dry ingredient, said means including an air duct in communication with said mixing receptacle and air intake openings for admitting outside air to the enclosed space about said mixing receptacle and to said duct, and a suction device communicably connected with said duct for withdrawing the air therefrom and thus drawing such heat and steam from said area into said duct and dissipating the same with the exhaust air, said duct and said air intake openings being so arranged relative to the outlet opening of said source of dry ingredient so as to cause the incoming air to maintain the area about said opening in cool and dry condition.

24. In a beverage vending machine: a source of a liquid ingredient of the beverage; a mixing receptacle arranged to receive measured charges of the liquid ingredient from said source; a container for a second ingredient of the beverage; a discharge opening in said container in communication with said mixing receptacle; a feeding member operable to eject measured charges of said second ingredient through said discharge opening; motivating means for operating said feeding member, a predetermined quantity of said second ingredient being ejected through said opening and into said mixing receptacle by said member upon each operation thereof; a cover for the exterior of said discharge opening; and means operable to remove said cover from said opening while said second ingredient is being ejected through said opening by said member.

25. In a beverage vending machine: a mixing receptacle; source of a hot liquid ingredient communicating with said mixing receptacle; a source of a dry beverage ingredient positioned above and communicating with said mixing receptacle; mechanisms for causing discharge of said liquid and dry ingredients, respectively, into said mixing receptacle on each cycle of the machine; and

means for withdrawing heat and steam from the area above said mixing receptacle and preventing access thereof to said source of the dry ingredient, said means including an air duct in communication with said mixing receptacle and also having an intake opening for admitting outside air thereto, and an air circulating device communicably connected with said duct for moving the air therethrough and thus transferring such heat and steam from said area into said duct and dissipating the same with the outgoing air.

26. In a beverage vending machine: an enclosed mixing receptacle; a source of a hot liquid ingredient communicating with said receptacle; a source of a dry beverage ingredient communicating with said receptacle; mechanisms for causing discharge of said liquid ingredients, respectively, into said mixing receptacle on each cycle of the machine; a conduit for conveying the mixed beverage to a drinking cup or the like; and means for withdrawing heat and steam from the enclosed area about said mixing receptacle and preventing access thereof to said source of the dry ingredient, said means including an air duct in communication with said mixing receptacle and an air intake opening for admitting outside air to the enclosed space about said mixing receptacle and to said duct, and an air circulating device communicably connected with said duct and moving the air therethrough and thus transferring such heat and steam from said area into said duct and dissipating the same with the outgoing air, said duct and said air intake opening being so arranged relative to the outlet opening of said source of dry ingredient as to cause the circulated air to maintain the area about said opening in cool and dry condition.

27. In a beverage vending machine: a source of a liquid ingredient of the beverage; a mixing receptacle arranged to receive measured charges of a liquid ingredient from said source; a container for a second ingredient of the beverage; a member operable to cause discharge of charges of said second ingredient through said discharge opening; motivating means for operating said member, a pre-determined quantity of said second ingredient being discharged through said opening and into said mixing receptacle by said member upon each operation thereof; a cover for the exterior of said discharge opening; and means operable to remove said cover from said opening while said second ingredient is being discharged through said opening by operation of said member.

BERT E. MILLS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,470,584	Kreutz	Oct. 9, 1923
1,694,381	Hartman	Dec. 11, 1928
1,789,064	Borislavsky	June 13, 1931
1,944,810	Rogers	Jan. 23, 1934
2,319,233	Hoppe	May 18, 1943
2,321,844	Nicholson	June 15, 1943
2,346,290	Carlson	Apr. 11, 1944
2,376,403	Thompson et al.	May 22, 1945
2,401,914	Di Pietro	June 11, 1946