Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 1

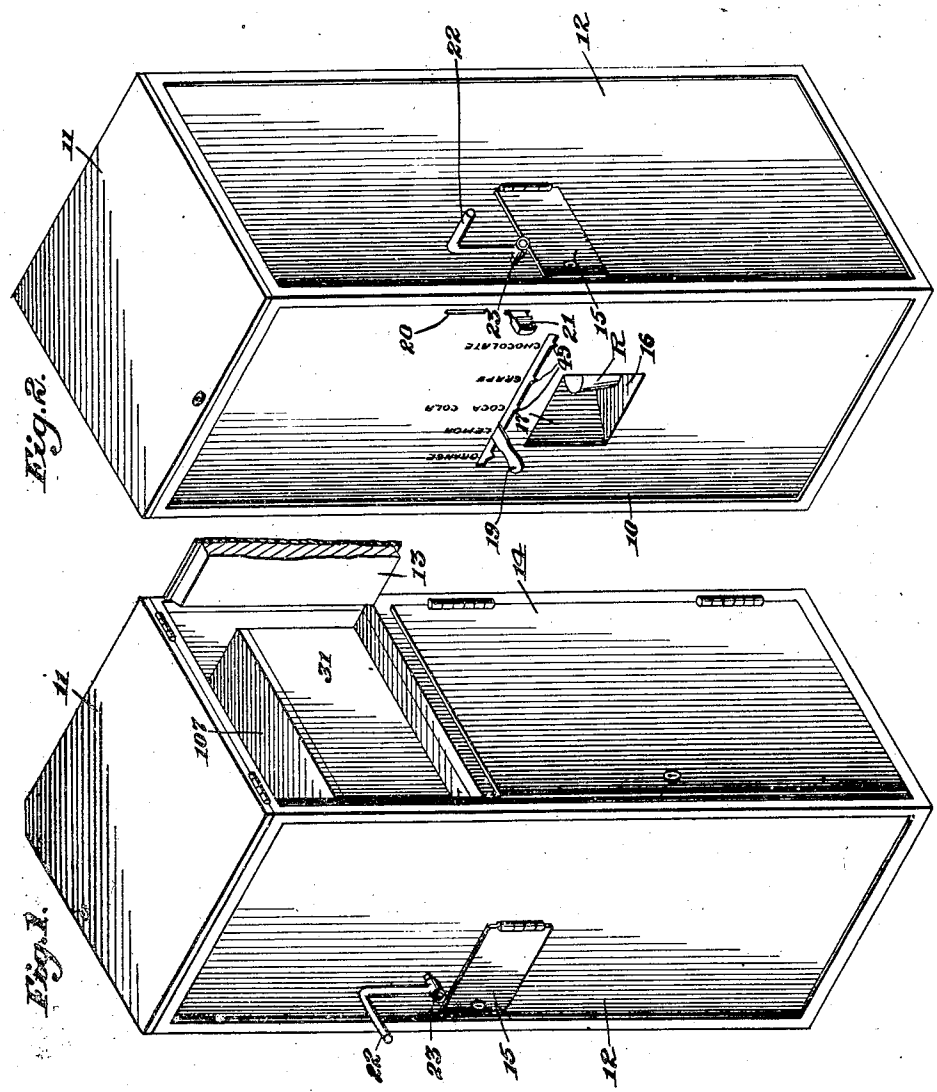


Fig. 2.

Fig. 1.

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Brudnant & Mann,
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Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 2

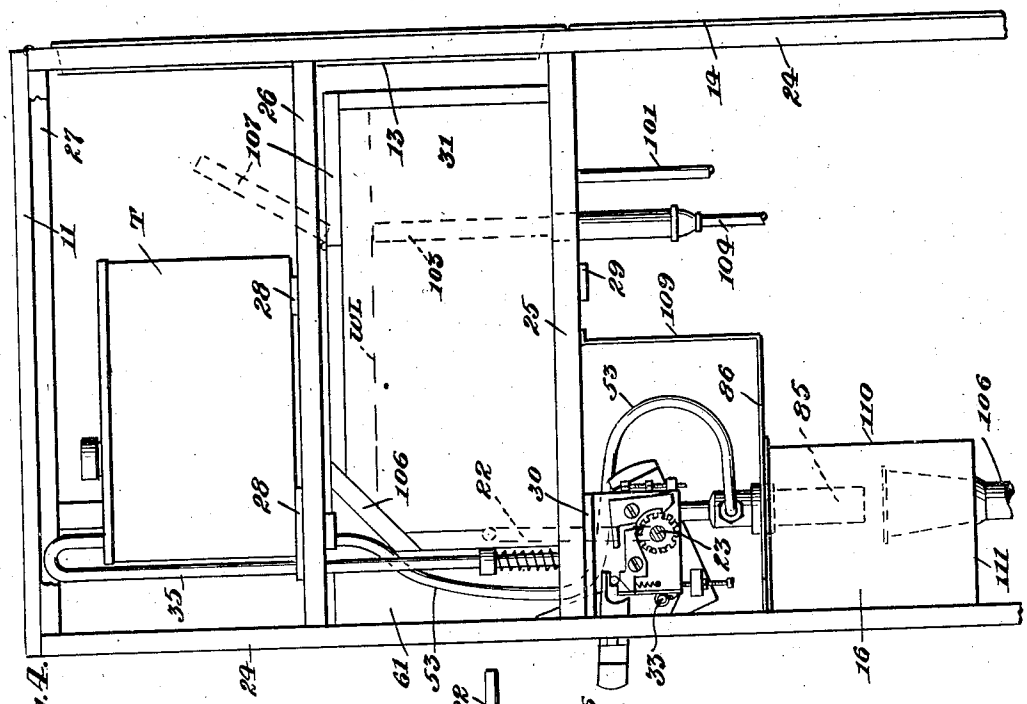


Fig. 4.

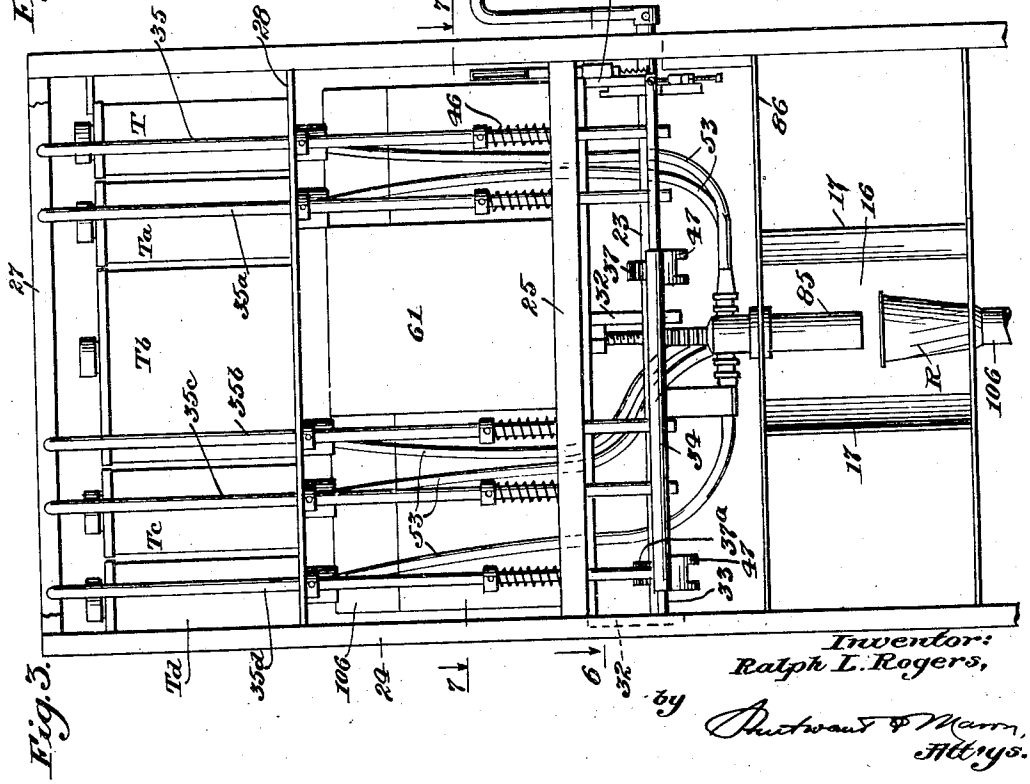


Fig. 3.

Inventor:
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Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 3

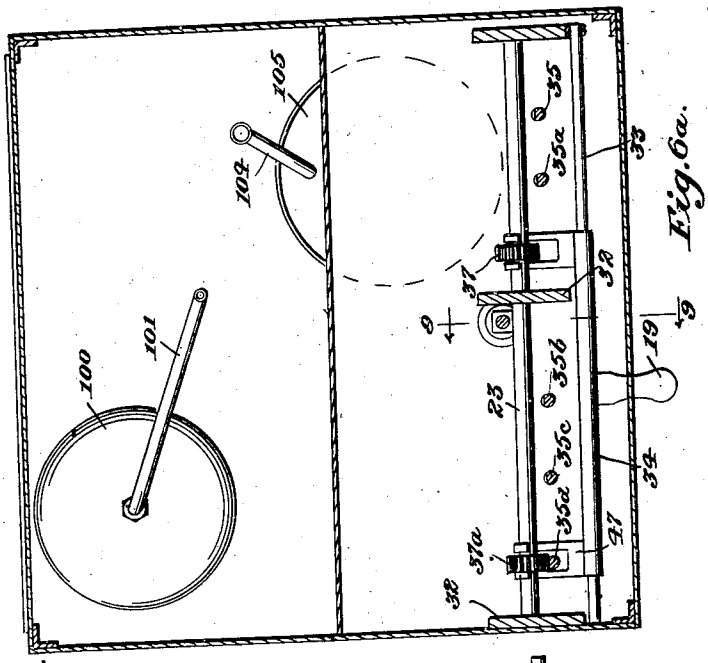


Fig. 6.

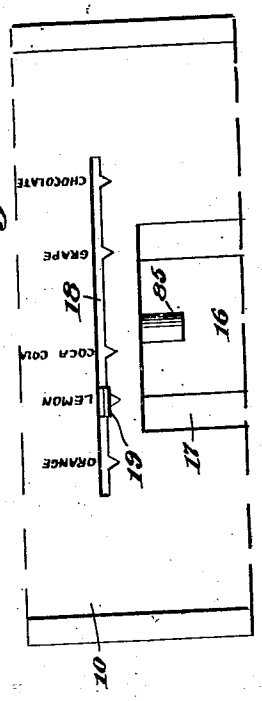


Fig. 6a.

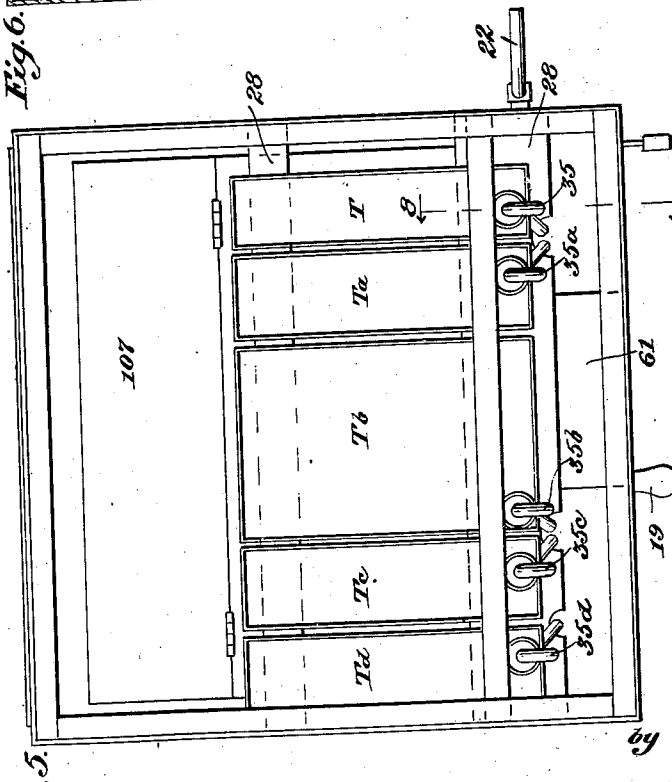


Fig. 5.

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Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 4

Fig.14.

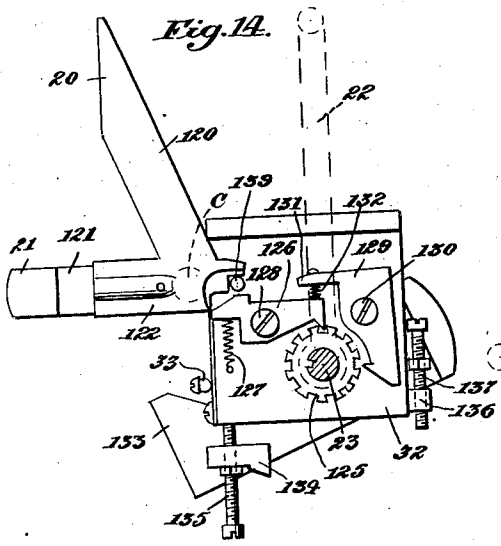


Fig.16.

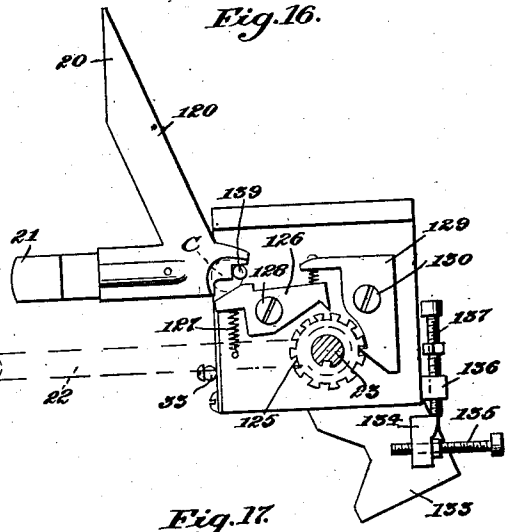


Fig.15.

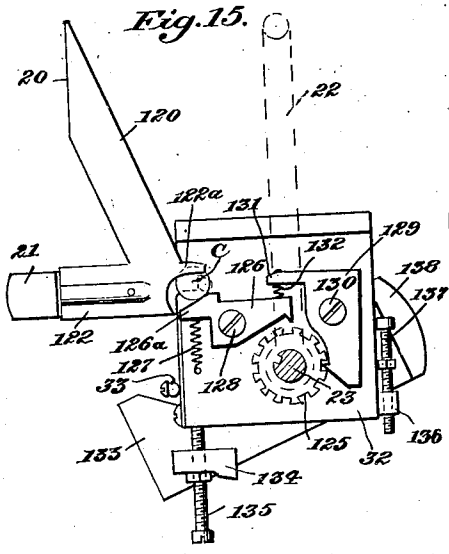


Fig.17.

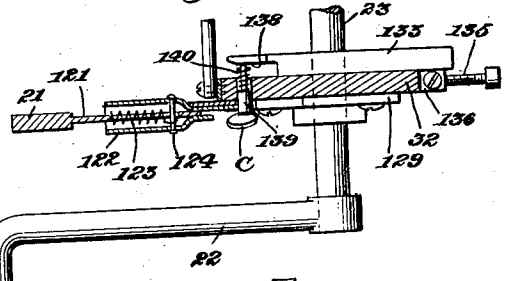
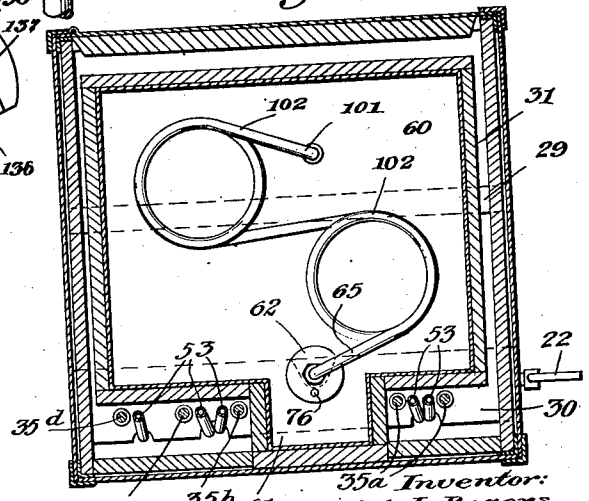


Fig.7.



Inventor:
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Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 5

Fig. 8.

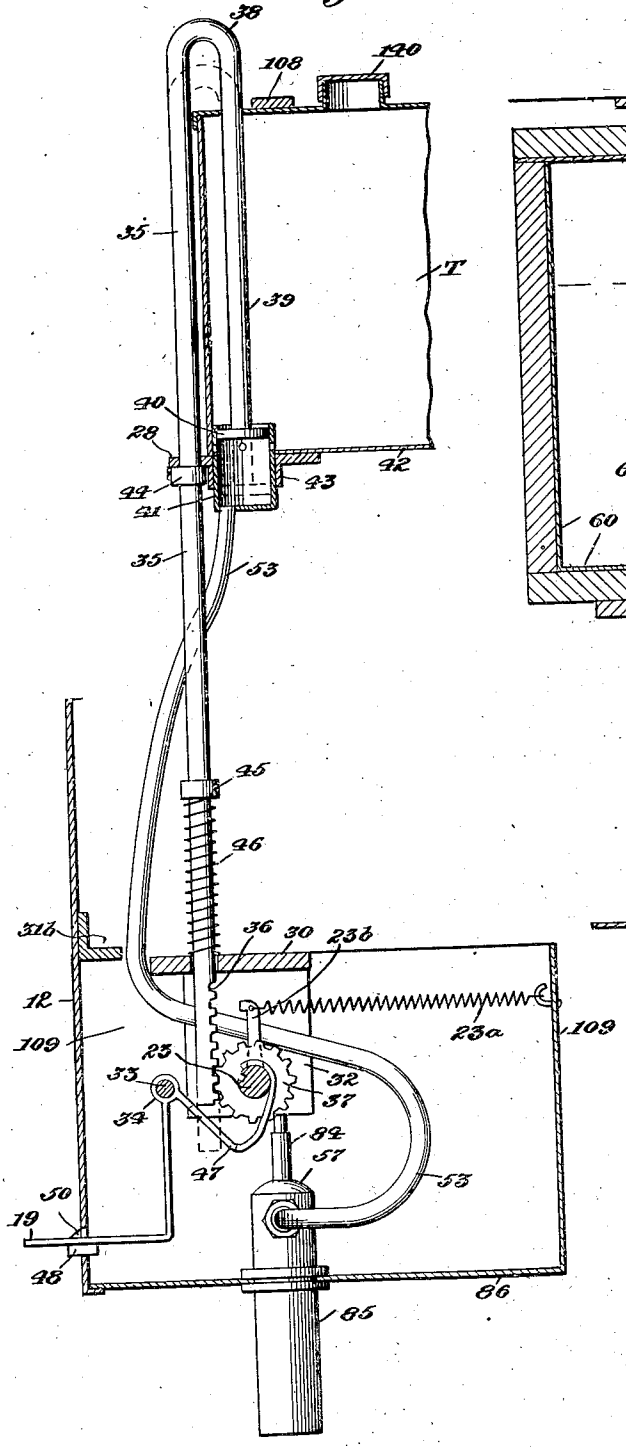
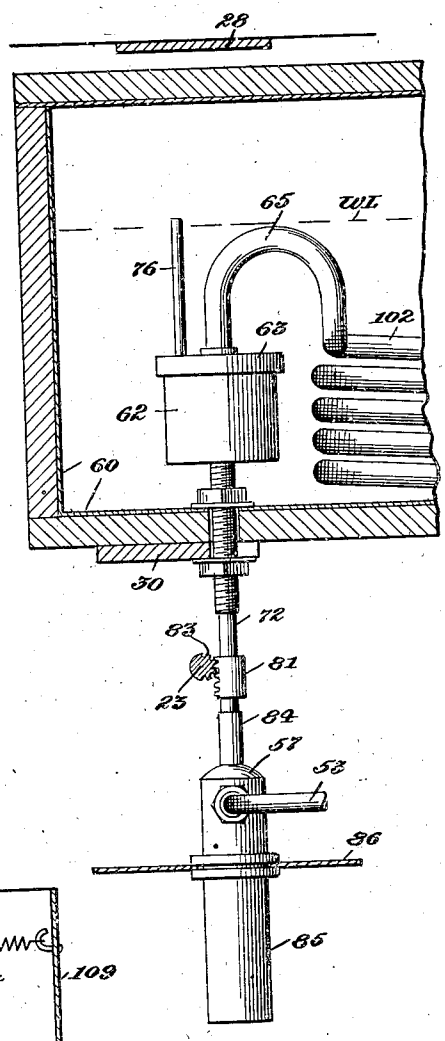


Fig. 9.



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Jan. 23, 1934. R. L. ROGERS 1,944,809

BEVERAGE VENDING MACHINE

Filed Jan. 27, 1930 6 Sheets-Sheet 6

Fig. 10.

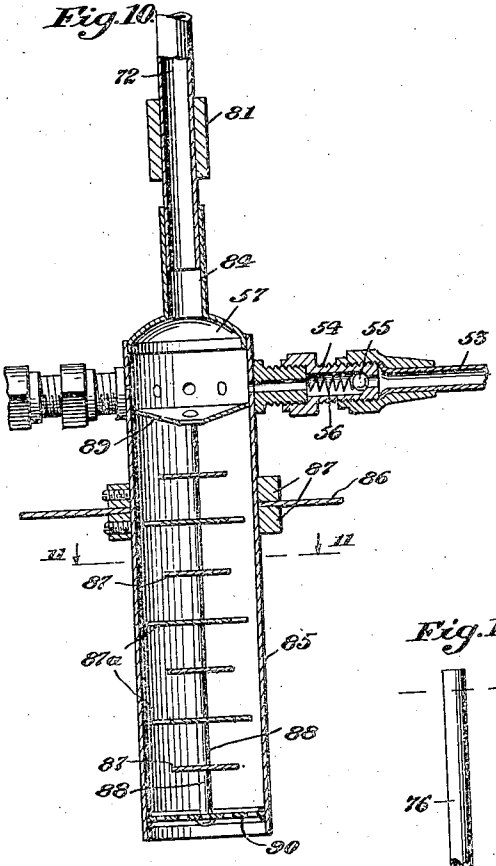


Fig. 11.

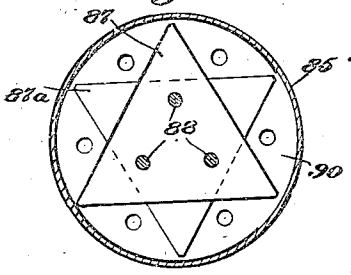


Fig. 12.

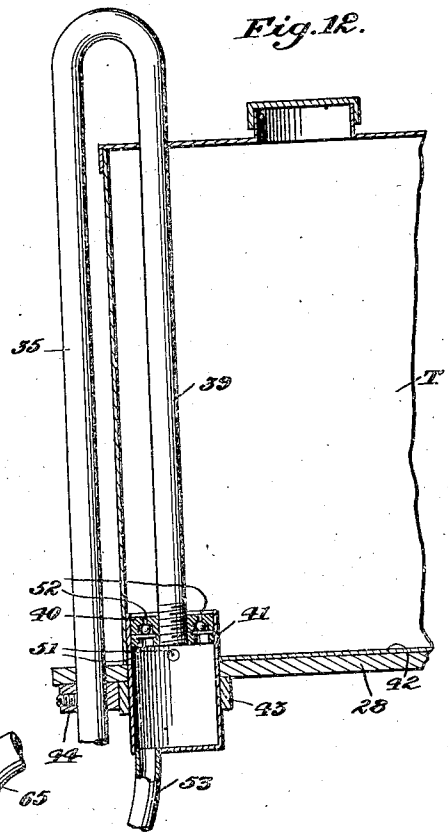
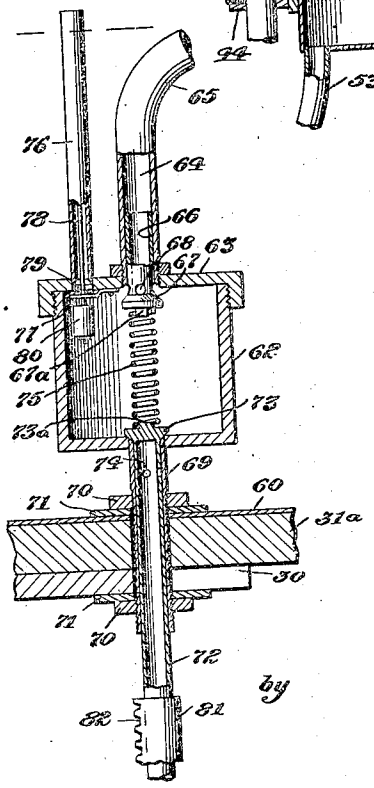


Fig. 13.



Inventor:
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Patented Jan. 23, 1934 1,944,809

UNITED STATES PATENT OFFICE

1,944,809

BEVERAGE VENDING MACHINE

Ralph L. Rogers, Knoxville, Tenn., assignor to The General Automatic Merchandising Corporation, a corporation of Delaware

Application January 27, 1930. Serial No. 423,842

30 Claims. (Cl. 225—21)

This invention relates to improvements in beverage vending machines, and more particularly concerns a coin controlled vending machine of this type, which is self-contained and portable.

One of the features of the present invention is the provision of an operating mechanism for such a machine, in which a single handle is employed for vending any of a plurality of flavors of beverage, the choosing of the particular flavor of beverage being accomplished by a selector mechanism accessible to the customer.

Another feature of the invention is to provide a novel type of coin controlled mechanism which prevents the movement of the operating handle until after the deposit and insertion of the required token, usually a coin; this mechanism operating after the discharge of the beverage to eject the coin and prepare the machine for a new operation.

A further feature of the invention is the provision of a novel valve and control system whereby a predetermined volume of syrup and/or carbonated water is prepared and discharged at each dispensing operation.

Still another feature of the invention is the provision of means whereby "milking" or fraudulent obtaining of an excess quantity of beverage is prevented.

A still further feature of the invention is the provision of a valving and mixing system whereby the valve controlling the particular syrup is located closely adjacent the point of mixing with the carbonated water and the like, and means are provided for regulating the flow of carbonated water and the like so that the syrup is fully discharged into the mixing chamber prior to the completion of the discharge of the water, and the last portions of the water serve to rinse the mixing chamber and associated parts whereby to prevent the carrying over of a portion of one flavor so that it might mingle with and modify the next dispensed quantity.

Another feature of the invention is the provision of a machine in which the syrup tanks, ice compartment, and other elements are of simple construction and are adapted for preassembly and simple exchange for repairs.

A further feature of the invention is the provision of a machine in which the various elements are so constructed and arranged as to permit easy servicing or resupplying with the necessary carbonated water, syrup and ice: while the operating parts are protected against injury by mechanical contact or the dripping or splashing of liquids: and the coin controlled mechanism and syrups are maintained under lock and key so that they are not accessible during the servicing operations for ice and carbonated water.

A particular feature of the invention is the provision of a machine having simple and directly connected parts, and in which the cup into which the dispensed quantity of beverage is delivered is located closely adjacent the front of the machine so that it may be easily inserted and removed as desired.

Another feature of the invention is the provision of interlocking mechanisms for controlling the sequence of movements of the several parts, and to prevent the intentional or accidental movement of parts when such movement should be prevented during the operation of the machine.

With these and other objects in view, an illustrative form of constructing a machine according to the present invention is shown on the accompanying drawings.

In the drawings:

Figure 1 is an isometric view showing the right side and rear of the apparatus.

Fig. 2 is a corresponding isometric view showing the front and right side of the apparatus.

Fig. 3 is a front view, with the face panel removed, of the upper part of the apparatus on a larger scale.

Fig. 4 is a corresponding end view with the casing removed.

Fig. 5 is a corresponding top view, with the top door removed.

Fig. 6 is a horizontal sectional view on line 6—6 of Fig. 3.

Fig. 6*a* is a face view of a part of the front panel, showing the selector slot.

Fig. 7 is a horizontal sectional view substantially on line 7—7 of Fig. 3.

Fig. 8 is a fragmentary detail view, substantially on line 8—8 of Fig. 5, on a larger scale.

Fig. 9 is a corresponding detail sectional view substantially on line 9—9 of Fig. 6.

Fig. 10 is an enlarged vertical axial section through the mixing chamber.

Fig. 11 is a horizontal section substantially on line 11—11 of Fig. 10, on a larger scale.

Fig. 12 is a vertical section through the syrup measuring chamber with associated parts.

Fig. 13 is a vertical axial view through the measuring chamber for the carbonated water, with associated parts.

Fig. 14 is a detail view of the coin controlled

mechanism, corresponding to and on a larger scale than Fig. 4, showing the parts in the normal or rest position.

Fig. 15 is a corresponding view showing the parts after the insertion of a coin.

Fig. 16 is a corresponding view, showing the parts after the handle has been operated.

Fig. 17 is a sectional view of the parts shown in Figures 14 to 16, taken horizontally through the coin injecting bar.

In these drawings, the machine is illustrated as comprising a portable casing having appropriate doors for access to the various parts. Within this casing are provided the containers for the syrups and the mixing liquid, which ordinarily is carbonated water, measuring and delivering devices for the respective liquids, means for mixing the measured volumes of these liquids and delivering them into a cup or similar receptacle, together with the necessary mechanical elements for the selection of the desired flavor and the operation of the system under appropriate check controls.

The syrups are contained in individual tanks and a predetermined quantity thereof is delivered upon the operation of the machine into a mixing chamber, where it is encountered by a predetermined volume of mixing liquid and ultimately delivered into the receptacle. These operations are determined by manipulation of the machine following the insertion of the required check or coin. A rocking movement of an operating handle causes the measuring and delivery of the liquids, and means are provided for interlocking the parts upon such operation so that the machine will deliver only the predetermined quantities, and no "milking" or fraudulent obtaining of an excess quantity above that predetermined by the construction and adjustment of the machine is feasible. The return movement of the handle restores the parts to position for the next dispensing operation.

In Figs. 1 and 2 the casing of the machine is shown to comprise the front wall 10, hinged top door 11, side wall 12 and the rear doors 13, 14. In the side wall 12 is provided a door 15 with suitable lock through which the deposited coins or other tokens may be withdrawn by the person holding the key thereto. In the front wall 10 is a recess 16 shut off from the remaining portion of the interior of the container by the partition wall 17, and intended to hold the receptacle R, which may be a cup or tumbler, into which the beverage is delivered. Above the cavity 16 is a horizontal slot 18 along which may be moved the selecting handle 19. The slot 20 receives the coin and delivers it into proper position opposite the check controlled mechanisms into which it may be injected by the coin knob 21. The handle 22 is connected rigidly to a shaft 23 passing through the side wall 12 of the casing.

The aforesaid walls of the casing are supported by vertical angle irons 24 at the four corners, which are braced and held in proper relationship to one another by the horizontal angle irons 25, 26, 27. The angle iron 26 supports also the transverse shelf members 28 upon which rest the bottoms of the syrup tanks T, T*a*, T*b*, T*c*, T*d*, of which the four end tanks T, T*a*, T*c*, T*d* may be of the same size if so desired, while the middle tank T*b* is preferably of greater width and is intended to hold a much larger volume of the particular syrup, and hence is adapted for a syrup whose flavor is in the greatest demand.

The angle irons 25 support the transverse bars 29, 30 which in turn support the insulating casing 31 surrounding the ice tank which will be described in greater detail hereinafter. The bar 30 is provided with the downwardly extending brackets 32 which support the operating shaft 23 and the guide rod 33 for the selector sleeve 34.

Each of the syrup tanks is provided with a plunger or operating rod 35, 35*a*, 35*b*, 35*c*, 35*d*, which are identical in construction and are spaced apart a proper distance according to the respective dimensions of the syrup tanks. A description of the operating parts associated with one therefore applies to each of the others. The rod 35 is guided in apertures of the horizontal bars 28 and 30, and is provided with rack teeth 36 below the bar 30 for engagement with a respective gear 37 which is splined to be slidable along the shaft 23. When the shaft 23 is rotated in a counterclockwise direction in Fig. 4, the gear 37 causes a downward movement of the rod 35. The upper end of the rod 35 is rebent to form a loop 38 which permits the rod to pass over the upper edge of the can and avoids the necessity of providing a liquid tight packing joint in the can. The rebent end 39 of the rod 35 is provided with a plunger piston 40 operating in the measuring cup 41 tightly secured in the bottom wall 42 of the tank T, and received in a cylindrical flange 43 of the transverse bar 28, whereby the tank is held positively in alinement for cooperation with the rod 35.

The rod 35 is provided with a stop collar 44 which is fixed thereto for engagement with the lower surface of the upper transverse bar 28 to limit the upward movement of the rod 35. A similar collar 45 is fastened to the rod 35 and acts against a return coil spring 46 surrounding the rod 35 and bearing against the upper surface of the lower transverse bar 30, so that the spring 46 at all times tends to move the rod 35 upwardly into the normal or rest position shown in full lines in Fig. 4.

A selector sleeve 34 may be slid back and forth on the selector guide rod 33 by means of the selector handle 19 which is rigidly secured thereto. The sleeve 34 also includes a pair of rearwardly extending bifurcated arms 47 which fit around the respective gears 37, 37*a* and cause the sliding movement of these gears along the shaft 23 as the selector handle 19 is operated. The selector handle 19 is provided on its bottom with a ridge 48 adapted to be seated in notches 49 along the lower edge wall of the selector slot 18, whereby the proper positioning of the selector handle 19 is assured, and thus the engagement of the driving pinions 37, 37*a* with the proper selecting operating rod 35, 35*a*, 35*b*, 35*c*, 35*d*. The upper surface of the selector handle 19 is provided with an indicating spur 50 which is opposite the proper legend above the slot 18 (Fig. 2) when the ridge 48 is in the corresponding notch 49, thus giving a visual indication of the flavor which will then be delivered from the machine. The handle 19 and associated parts may be moved horizontally from one position to another by a slight upward movement on the handle 19 so that the handle may be moved without resistance by the engagement of the ridge 48 in any of the notches 49 until the indicator 50 is opposite the desired flavor, and then released so that it will move back by its own resilience and gravitationally into the proper notch 49.

In Fig. 12 the measuring cup 41 is shown to extend above the bottom 42 of the tank T and is provided with a plurality of apertures 51 so

that the syrup may drain from the tank T into the measuring cup. The piston 40 is provided with apertures 52 provided with ball valves whereby air or liquid is permitted to enter the cup during the return or upward stroke of the rod 35: these valves being closed by the hydrostatic pressure of the syrup in the cup during the downward movement of the rod 35. From the bottom of the cup 41 leads a pipe 53, of material not subject to corrosion by the syrups, and itself being without action upon the syrups. The pipes 53 from the several tanks lead to respective valve members 54 including the valve balls 55 and the valve springs 56, and thence into the upper end of the mixing chamber 57. It will be particularly noted that the ball valves are located closely adjacent the mixing chamber.

The insulated ice tank terminates a sufficient distance from the front wall of the machine to permit the passage of the rods 35, 35*a*, 35*b*, 35*c*, 35*d* (Fig. 7), but projects forwardly with an offset portion 61 between the rods 35*a* and 35*b* for the reception of the water measuring chamber 62, which is shown (Fig. 13) to have a closed cover 63 into which opens the end 64 of the cooling coil 65 for the carbonated water. The portion 64 is straight and serves as a guide for the hollow stem 66 of the water admission valve having the valve closing plate 67 within the measuring chamber 62, and having the openings 68 through its wall immediately above the valve closing plate 67. A guide bushing 69 is similarly connected in the bottom wall of the measuring chamber 62 and passes through the metal floor 60 of the ice chamber and through the floor insulation 31*a* thereof being rigidly connected in position by the clamping nuts 70 operating against the washers 71. An operating and delivery sleeve 72 is slidable in the bushing 69, with a close fit, and is provided with a valve closing plate 73 at its upper end, adapted to close a valve seat formed at the upper end of the bushing 69. The sleeve 72 is provided with a plurality of apertures 74 through which water may flow from the chamber 62 into the sleeve 72 when the latter is raised. A water valve spring 75 is supported between bosses 67*a* and 73*a* of the valve plates 67 and 73, and is of such dimensions and strength that when the sleeve 72 is in the lowered position (Fig. 13), the valve plate 67 is free to drop by gravity and under the pressure of the carbonated liquid in the coil 65 into the position shown in Fig. 13, whereby the water may flow from the coil 65 into the measuring chamber 62.

The cover 63 of the measuring chamber also is provided with a relief pipe 76 extending upwardly to a point above the water line WL in the ice chamber, and communicating at its lower end with the measuring chamber 62. A bracket 77 secured to the cover 63 is provided with an aperture for the passage of the valve stem 78 which supports a valve 79 above the bracket 77 and a float 80 below this bracket.

The lower end of the sleeve 72 is provided with a member 81 having rack teeth 82 thereon for engagement by the teeth 83 (Fig. 9) of the shaft 23, so that when the crank handle 22 is moved in a counterclockwise direction in Fig. 4, the sleeve 72 will be forced upwardly. The sleeve 72 continues below the member 81 (Fig. 10) and into the conduit 84 communicating with the upper end of the mixing chamber 57.

The mixing chamber has the cylindrical casing 85 extending downwardly from its upper end and passes through the top wall 86 of the recess 16 which holds the cup or receptacle R, being held in position therein by the clamping collars 87.

Internally, the mixing chamber 85 is provided with a plurality of baffles comprising triangular members 87, 87*a* in alternate arrangement as shown in Fig. 11, which are held spaced from one another by the three vertical stay rods 88, the rods and triangular plates being secured together by soldering, for example, so that a rigid structure is provided. At the upper end of the stay rods 88 is secured a dished plate 89 having a slight angle and provided with a central aperture. This plate 89 substantially closes the upper end of the cylindrical mixing chamber 85 and provides the upper mixing compartment 57 therein. At the lower end, the stay rods 88 are connected to a plate disk 90 having a number of apertures therethrough, which is soldered or otherwise fixed in position in the lower end of the cylindrical mixing chamber 85, whereby to support the assembly comprising the upper plate 89 and the triangular baffle plates 87, 87*a* in proper position.

Within the lower part of the general casing of the machine, and inside the lower rear door 14 thereof, is provided the container 100 for carbonated water, which is connected with a pipe 101 which in turn passes upwardly through the floor 41*a*, 60 of the ice chamber and is provided with the several coils 102, and ultimately ends in the carbonated water delivery pipe 65.

The ice tank is provided with an overflow pipe 103 opening into a drain 104 which leads to a slop can 105, located inside the lower door 14, this can also receiving any drippings from the waste pipe 106 in the floor of the recess 16 (Figs. 3 and 4).

The insulating wall 31 surrounding the ice tank on all sides is preferably provided at the front end, at the portions extending laterally from the projection 61 with a bevel portion 106 at its upper edge to provide clearance for the pipes 53 and the measuring chambers 41 (Figs. 3 and 4). The rear end of this ice tank extends beyond the wall of the syrup tanks T . . . , (Fig. 4), and is provided with a hinged top door 107 through which ice may be introduced into the ice chamber. The ice chamber and its insulating walls are constructed as a unit and may be slid into and out of position freely, for interchange or repair. It is held in position by the downward pressure of the sleeve 69 through the lower transverse bar 30 (Figs. 9 and 13): and hence the ice tank and its parts may be removed by releasing the nuts 70 and withdrawing the sleeve 69 upwardly to disengage it from the lower bar 30: and by disconnecting the carbonated water supply pipe 101 from its tank.

The syrup tanks are likewise removable. The tanks T, T*a*, T*c* and T*d* are of uniform shape and size, so that interchange is possible; and these smaller tank units may be made in quantity ready for substitution: the same is true of the larger syrup tank T*b*. These tanks are preferably assembled with their measuring cups 41 and delivery pipes 53. To substitute a new tank it is merely necessary to remove the respective operating rod 35 and the top clamping bar 108 and disconnect the upper or lower end of the pipe 53 by releasing the respective connecting nut at its end. The pipe is flexible and can be withdrawn from position while the respective syrup tank is being raised to disengage its measuring cup from the boss 43 of the upper transverse bar 28. The tank may then be withdrawn as

a whole through the top of the machine, and a new tank and pipe substituted.

The upper portion of the machine, above the lower transverse bars 29, 30 is preferably provided with an insulating jacket including the insulating floor 31*b* which is an extension of the insulation 31*a* of the jacket surrounding the ice tank, and the vertical enclosing insulating walls 109. The top of this insulated compartment is closed by the heat insulating top door 11 and the rear wall by the heat insulating door 13. By this means, the syrup tanks are maintained cool by the same ice charge which refrigerates the carbonated water entering through the pipe 101.

The lower compartment containing the carbonated water tank and the slop can is closed off from the front of the machine by the vertical wall 109 which preferably is formed as an integral upward extension of the floor 86 of the mechanism compartment, and by the rear wall 110 which is likewise formed as an integral upward extension of the floor 111 of recess 16, being provided as described hereinafter with the drain 106. These walls likewise prevent the splashing or dripping of liquid from the recess 16 into other parts of the machine.

The coin control mechanism includes the chute 120 leading downward and backwardly from the coin slot 20 to a position behind the rear end of the coin injecting bar 121 of the coin push handle 21. In the position of Fig. 14, the coin C is shown in dotted lines as located at the lower end of the chute 120 and within the enclosing wall 122 surrounding the injecting bar 121. This injecting bar is normally held in its outermost position by a return spring 123 (Fig. 17) which reacts against a pin 124 passing through the casing 122.

The shaft 23 is provided with a ratchet wheel 125 fixed thereto. The coin actuated retaining pawl 126 is pivotally mounted on one of the downwardly extending shaft brackets 32, and is moved in a counterclockwise direction by a compression spring 127 about its pivot 128. A full-stroke pawl 129 is mounted on a pivot 130 of the bracket 32 and has an end 131 projecting over the end of the coin actuated pawl 126, and a compression spring 132 is located between the two.

The shaft 23 likewise has keyed thereon a cam member 133 carrying a laterally extending lug 134 which has the adjustable stop screw 135 therein for engagement with the lower surface of the bracket 32, whereby to determine the normal or rest position of the shaft 23 (Figs. 14 and 15). The bracket 32 is similarly provided with a lug 136 having the adjustable stop screw 137 therein for engagement by the lug 134 whereby to determine the limit of rocking of the shaft 23 (Fig. 16). The cam member 133 has a cam surface 138 thereon which engages the end of a pin 139 guided in the bracket 32 and located opposite the position of the coin when injected into the machine. This pin is normally forced inwardly toward the cam surface 138 by a spring 140, and is provided with a suitably enlarged head at the coin end to prevent withdrawal of the pin from the bracket 32.

The method of operation of the machine is as follows:

The customer deposits a proper coin in the coin slot 20 so that the coin passes into the position shown in dotted lines in Fig. 14. The coin knob 21 is now pushed in whereby the coin injecting bar 121 forces the coin from the position of Fig. 14 into the position of Fig. 15. The coin is now engaged between the upper wall 122*a* of the casing 122, and has forced downwardly the beveled end 126*a* of the coin actuated pawl 126 until the pawl has liberated the ratchet 125. Prior to this, or thereafter, the customer moves the selecting handle 19 until it is opposite the desired flavor.

The customer now operates the handle 22 by pulling it forwardly and downwardly, i. e., in a counterclockwise direction in Figs. 2, 4 and 14 to 16. The coin actuated pawl 126 which has heretofore prevented this movement of the handle, has been withdrawn by the injection of the coin. The counterclockwise rocking movement of the coin actuated pawl 126, however, has compressed the spring 132 and caused a clockwise rocking of the full-stroke pawl 129, so that the latter engages the ratchet wheel 125 and at all times prevents any return or clockwise movement of the handle 22 during this phase of the operation.

The counterclockwise movement of the shaft 23 as occasioned by the handle 22 causes the rotation of the operating gears 37 and 37*a*, and of the teeth 83. Only one of the gears 37 or 37*a* is in engagement with the teeth on the lower end of the operating rods 35, 35*a*, 35*b*, 35*c*, 35*d* at a time. The provision of the two gears 37, 37*a* permits the employment of a much shorter total movement of the handle 19 for accomplishing the selection, and hence of a shorter slot 18 in the face panel of the machine: and at the same time permits the employment of the water measuring chamber and associated parts near the center of the machine, as one of the gears 37 or 37*a* is located on each side thereof, and the sliding movement of the gears is not impeded by the presence of the teeth 83 on the shaft 23 or the central bracket 32 and sleeve 72.

As the shaft 23 rocks, the pinion 37 or 37*a* which is in engagement with the selected syrup rod, say 35 (Fig. 8), causes a downward movement of this operating rod 35 against the action of the return spring 46. The plunger piston 40 is moved downward in the measuring cup 41 at the bottom of the syrup tank T and forces a measured quantity of syrup from this cup through the conduit pipe 53 and past the check valve 55 into the upper compartment 57 of the mixing chamber. At the same time, the shaft 23 has operated by the teeth 83 on the toothed member 81 to produce an upward movement of the sleeve 72. The initial effect is that the spring 75 is slightly compressed and the upper valve sleeve 66 is raised so that the openings 68 are closed and finally the valve plate 67 produces a seal against its seat in the cover 63 of the water measuring chamber 62. During this time, no water has been discharged from the measuring chamber or passed into the mixing chamber. The further movement of the shaft 23 causes a continued raising of the bushing 72 until ultimately the openings 74 are raised above the floor of the measuring chamber 62. And the measured quantity of water in this chamber may now flow through these openings and downwardly in the sleeve 72 and into and through the upper compartment 57 of the mixing chamber, where it encounters the charge of syrup and establishes a mixture therewith, this mixture being facilitated by the passage of the two liquids downwardly through the lower portion 85 of the mixing chamber and over the baffles 87, 87*a* there-

in until ultimately the mixture is delivered through the openings 90 into the receptacle R. The projection of the syrup under pressure, and the permitted gravitational flow of the water, results in the complete discharge of the measured quantity of syrup before all of the water has left the measuring chamber 62. Any gas pressure in the chamber 62 facilitates the discharge of this water, but it has been found that normally it is necessary to admit air through the relief pipe 76 and past the valve 79, which has now dropped by gravity owing to the lack of flotation of the cork 80 by liquid in the measuring chamber 62. The last water entering the upper end of the mixing chamber 57 scours this compartment and its associated passages and prevents the carrying over of traces of one flavor for the next dispensing operation, so that each dispensed quantity of beverage is substantially free of taint from the previous one.

The customer during these steps has pulled the handle 22 to the limit of its movement as determined by the engagement of the lug 134 against the stop screw 137 (Fig. 16). As the cam 133 nears the end of this handle stroke, its surface 138 engages the pin 139 and forces the latter axially (Fig. 17) until it pushes the coin from between the coin actuated pawl 126 and the upper wall 122*a* of the casing 122. The coin is thus free to drop into the coin box inside the door 15. The coin-actuated pawl 126 moves in a clockwise direction under the urge of its spring 127 and engages the ratchet wheel 125, while releasing the spring 132 and permitting the full-stroke pawl 129 to return to its normal position (Fig. 14). The handle 22 and shaft 23 are thus relieved of the interlocking effect of the full-stroke pawl 129 and are free to return under the pressure of the spring 46 and of the auxiliary shaft return spring 23*a* which is attached at one end to the partition wall 109 and at the other end to a crank arm 23*b* of the shaft 23.

As the handle 22 and its shaft 23 move backwardly in a clockwise direction to the initial position, the coin actuated pawl 123 prevents any movement in the counterclockwise direction. Ultimately the stop screw 135 encounters the lower surface of the bracket 32 and prevents any further return movement of the shaft 23. These parts have now returned to their normal or initial position.

During this return of the shaft 23, the spring 46 has returned the operating rod 35 to its upper position (shown in full lines in Fig. 8), and the plunger 40 has moved upwardly in the syrup measuring chamber 41, while syrup has flowed downwardly in the openings 52 and ultimately through the openings 51 to fill the measuring chamber 41 again.

Also, the return rocking movement of the shaft 23 has moved the sleeve 72 downwardly, so that the openings 74 are first closed to shut off the flow of any liquid from the chamber 62, with a final closure of the valve plate 73 against the flow of the measuring chamber 62. During this movement, the spring 75 has been relieved of tension until the upper valve stem 66 is free to move downwardly under gravitational effect and the pressure of the liquid in the water pipe 65 until the openings 68 are again uncovered and water can flow into the measuring chamber 62 to fill the same. Air or gas in the chamber then escapes through the pipe 76 until the liquid level has raised the cork 80 and closed the valve 79 upon its seat. In this way a charge of carbonated water is measured ready for the next dispensing operation, and maintained beneath the water level in the ice compartment so that it is thoroughly chilled awaiting this operation, in addition to the chilling which has already been effected in the several coils 102.

During the downward movement of the operating rod 35, its lower end has passed through the slot in the bifurcated arm 47 of the gear 37 or 37*a*, and thus prevented any movement of the selecting handle 19 and its sleeve 34 along the guide rod 33 during the dispensing operation, so that mingling of syrups or a disengagement of the mechanism is rendered impossible at this time: in Fig. 6 the engagement of the lower end of the rod 35*d* in the bifurcated member 47 for the gear 37*a* is shown.

In servicing the machine, the rear door 14 may be opened and the carbonated water tank 100 exchanged: or the slop can 105 removed and emptied. The person performing these operations has no access to the remaining portions of the apparatus.

The upper door 13 may likewise be opened and the hinged cover door 107 of the box raised for filling the ice tank with ice. This operation likewise does not permit any access to other parts of the machine.

The top door 11 may be unlocked and thereby access gained to the top of the syrup cans T, T*a*, T*b*, T*c*, T*d*, so that the holder of the key may remove the cover 140 of any particular can and refill this can with syrup, but without gaining access to the coin control mechanism.

Only the person having the key to the coin door 15 is enabled to remove the coins or tokens which have been deposited in the machine.

It will particularly be noted that the rebent upper end 39 of the rod 35 may be adjusted in the piston 40 whereby to regulate the volume of syrup which is delivered. The upper end of the measuring cup 41, projecting above the floor 42 of the tank T serves as a guide for the piston, and this piston moves freely downwardly until it has passed the bottom edges of the apertures 51 of the measuring cup 41, and then operates to force the liquid syrup remaining in the cup downwardly through the delivery pipe 53. The distance of travel of the piston 40 below the bottom edge of the apertures 51 therefore may be adjusted by varying the position of the piston on the rebent end 39 of the plunger. The amount of movement of the piston above the apertures 51 plays no part in the operation of the device, since liquid can freely enter through the apertures 51 beneath the piston during the upward movement of the latter, and be discharged therefrom during the downward movement of the piston. In this way it is possible to adjust the machine according to the strength of the flavoring syrups employed.

The water measuring chamber 62 is supported above the bottom of the ice tank, and hence is exposed to the cooling effect of the ice or the like while it is held awaiting a dispensing operation. It will particularly be noted that the entire volume of water for any dispensing operation is retained within the ice tank until the moment of delivery for mixing: and hence it is thoroughly cooled prior to dispensing, while the water for the succeeding dispensing operation is likewise being chilled within the refrigerating coils 102.

During the operation of the machine, the operating rod 35 is pulled downward immediately upon the turning of the handle 22, and shortly thereafter, in normal course, the piston 40 passes

below the apertures 51 and the syrup is forced under pressure through the foot check valve 54 of the respective pipe 53 and thence into the mixing chamber. At the same time, the upward movement of the water delivery sleeve 72 initially closes the upper valve plate 67 to shut off the access of further carbonated water, and then raises the apertures 74 until water may flow downwardly through the sleeve 72 into the upper end 57 of the mixing chamber. The first quantity of water is delivered under the full pressure which has been prevailing in the water measuring chamber 62, so that this water is discharged immediately upon the syrup, and by reason of the rapid expansion and "boiling" produced by the evolution of gas, establishes a primary mixture which is thinly liquid and flows downwardly through the mixing chamber for thorough mingling. As water continues to flow from the measuring chamber 62, the original pressure is quickly relieved, and thereafter the water flows substantially by gravity, and air is admitted at the top of the measuring chamber 62 to permit this flow. At the same time, the sleeve 72 continues to rise so that larger ports are provided for the gravitational flow of the remaining portion of the water. In this way a quick jet of water under high pressure is employed for the primary mixing, followed by a much slower and larger stream of water for the secondary mixing within the mixing chamber and in the cup, and assuring that the last portions of the water will be withheld for a sufficient length of time owing to the gravitational flow of the water as opposed to the pressure delivery of the syrup, and by reason of the length of the water conduit in sleeve 72, so that such last portion of the water operates to rinse the upper end 57 of the mixing chamber and prevent contamination or carrying over of the flavor from one dispensing operation to the next. A further advantage of this construction and operation is that the "boiling" caused by the rapid escape of gas during the first part of the operation is employed for a primary mixing; while the slow delivery of water in the final stage prevents the dispensed quantity from overflowing the receptacle R provided to receive it, as might be the case of the entire quantity of water were discharged under pressure.

The front insulating wall 31 of the ice tank is substantially flush with the front wall of the syrup tanks T, Ta . . ., and the operating shaft 23 is located substantially in the plane of these walls. The operating rods 35 are directly driven from the shaft 23, and pass upwardly in front of but closely adjacent this plane. The upper front edge of the ice tank is beveled away to afford space for the connection of the syrup delivery to pipes 53. The offset portion 61 of the tank extends between the operating rods 35 and permits the cooling of the measuring chamber 62 and water close to the aforesaid plane, whereby the vertical operating and conduit sleeve 72 may likewise be directly driven from the shaft 23, and located close to the front of the machine, to the end that the outlet of the mixing chamber casing 35 is close to the front of the machine, and the customer is not required to reach far into the interior of the machine for insertion or withdrawal of the receptacle R.

It is preferred to facilitate the assembly and dismounting of the ice tank by providing a V-shaped notch extending from the rear edge of the front lower transverse bar 30 inwardly to the aperture through which the pipe sleeve 72 and its surrounding bushing 69 projects. In removing the tank, it is merely necesssary to disconnect and lower the mixing chamber, and to release the lower nut 70, whereupon the tank and measuring chamber may be withdrawn rearwardly a sufficient distance to permit it to be rocked for clearing the sleeve 72 with respect to the partition wall 109: and now the ice tank may be lifted out of the machine for repair or replacement. It will be understood that during these operations, the pipe 101 has been disconnected from the carbonated water container.

The invention is not limited to the details of construction herein shown and described, but may be modified in many ways within the scope of the appended claims.

I claim:

1. A beverage mixing and dispensing machine, comprising a plurality of syrup containers each having independent measuring and dispensing means including a valved conduit, a mixing liquid measuring and delivering device including a conduit, means providing a mixing chamber, said conduits opening into said chamber and all of said valves being located adjacent said chamber, a single operating shaft, means carried by and rocked with said shaft and slidable therealong into operative engagement with a selected syrup measuring and dispensing means to effect the delivery of a predetermined quantity of the selected syrup when the shaft is rocked, means positively connected to said shaft to actuate said liquid measuring and delivering means for the delivery of a predetermined quantity of the mixed liquid into said chamber so that the delivery of the mixing liquid continues after the completed delivery of said syrup whereby said mixing liquid may flush and rinse said chamber and said syrup conduits up to said valve and therefore prevent mingling of the syrups of successive dispensing operations.

2. A measuring apparatus for dispensing liquids comprising a member for providing a measuring chamber having co-axially disposed inlet and outlet conduits, separate valve members slidable in said conduits to control the inlet and discharge of liquid to and from said measuring chamber, means for positively moving said outlet valve member, and resilient means for connecting said valve members whereby said inlet valve member is closed prior to the opening of said outlet valve member and whereby said resilient means permits the continued movement of said outlet valve member thereafter into open position.

3. In a beverage mixing and dispensing machine including a plurality of syrup containers, a cooling coil and measuring chamber for the mixing liquid, walls forming a cooling compartment located around said coil and measuring chamber and beneath said tanks, independent syrup measuring and dispensing devices for the respective tanks including independent operating rods extending downwardly past said refrigerating compartment, said compartment having an extension projecting between said rods, said measuring chamber being located substantially in said projection, the syrup tank located above said projection being larger than the other tanks whereby said rods are located externally of said refrigerating container, and means to selectively operate said rods and located beneath said compartment.

4. A measuring apparatus as in claim 2, wherein the outlet valve of the mixing chamber is located at the bottom for gravitational disch[illegible]e

of the water, said chamber having an air inlet opening at its top, a valve adapted to close said air inlet, and a float located in said chamber to close said valve when a predetermined quantity of liquid has entered said chamber.

5. A measuring apparatus for dispensing liquids as in claim 2, in which the measuring device is located in an ice tank having a predetermined liquid level, an air inlet conduit communicating with said chamber and extending upwardly to above said liquid level, a valve adapted to close said air conduit and a float located in said chamber to close said valve at a predetermined liquid level in said chamber.

6. In a dispensing device for beverages, a supply tank, means for providing a measuring chamber extending below the bottom of said tank and having a free aperture in communication with said tank adjacent the bottom of the tank, a piston in said chamber movable upwardly past said aperture so liquid can flow freely into said chamber through the aperture and means to move said piston downwardly past said aperture for forcing liquid from said chamber whereby initially to force excess liquid from the chamber so that a predetermined quantity of liquid is in said chamber when said piston passes said aperture, and thereafter to force liquid from said chamber and to return the piston upwardly, an outlet conduit connected to said chamber at its bottom to receive the liquid forced from said chamber after said piston has passed said aperture, and a check valve to permit the flow of liquid from said tank into said chamber independently of said aperture during the return movement of said piston.

7. A dispensing device for beverages as in claim 6, in which a valve is provided in said conduit to prevent the return of air or liquid through said conduit into said chamber.

8. A liquid dispensing machine comprising a frame, transverse members on said frame having a guide aperture therethrough, and a removable supply tank including a measuring chamber projecting below its bottom, said measuring chamber being adapted to enter said aperture whereby to aline the supply tank in position on said frame, and liquid delivery devices including a member guided in one of said transverse members for delivering liquid from said tank.

9. A liquid dispensing machine comprising a frame, transverse members on said frame having guide apertures therethrough, a removable supply tank including a downwardly projecting member adapted to enter one of said apertures whereby to aline the supply tank in position on said frame, and liquid delivery devices including an operating rod and adapted to deliver liquid from said tank, said rod being guided in another of said apertures and extending upwardly past said tank and being rebent over the upper edge of the tank and passing down thereinto whereby to eliminate a packing joint between said rod and tank.

10. A liquid dispensing machine including a plurality of supply tanks, for various first liquids, means for measuring and delivering a mixing liquid, independent means to dispense a predetermined quantity of a first liquid from a selected tank, a shaft, a member positively rocked with but slidable axially along said shaft, a selector to slide said member along said shaft, said member being operatively engageable with the selected one of said dispensing means, means on said shaft to actuate said measuring and delivering means, and means to rock said shaft.

11. A liquid dispensing device as in claim 10, in which each measuring device includes a movable member, and the selector and sliding member include an apertured portion engageable by said movable member when operated whereby to prevent movement of said selector and sliding member during a dispensing operation.

12. In a beverage mixing and dispensing machine including means to deliver a predetermined quantity of syrup and means to deliver a predetermined quantity of mixing liquid, a mixing chamber connected to said means and including a vertical cylindrical casing, a plurality of alternately arranged horizontal triangular baffle plates located in said casing, a rod connecting said baffle plates and maintaining them in vertically spaced relationship, and supporting means carried by said cylindrical casing to hold said rod in position in said mixing chamber.

13. In a beverage mixing and dispensing machine including a plurality of syrup tanks and independent measuring and delivery devices for each of said tanks including a downwardly extending reciprocable operating member, a mixing liquid measuring and dispensing device including a downwardly extending operating member located centrally of the machine, said reciprocable members being located at both sides of said liquid measuring device, a horizontal shaft extending past said operating members, means fixed on said shaft to move the operating member of said water dispensing device, means positively rocked with said shaft but slidable therealong to selectively engage one of the operating members of said syrup measuring devices and including two members located on opposite sides of said fixed means, and a single selector connecting said devices for simultaneous sliding movement.

14. A liquid dispensing machine including a supply tank having an opening in its top, an operating shaft located beneath said tank, a measuring cylinder communicating with said tank adjacent its bottom, a piston movable vertically in said cylinder, a pull rod including means operable by said shaft to move it downwardly, said rod having an upwardly extending portion located externally of said tank and a rebent end passing through the open top of the tank and fixed to said piston, and a discharge conduit leading from the bottom of said cylinder.

15. A machine as in claim 14, in which said shaft operates to move said rod a definite predetermined distance and means are provided for fixing said piston at different positions of height on said rebent end whereby to vary the downward limit of travel of said piston below said aperture and vary the volume of liquid forced from said chamber during the dispensing operation.

16. A beverage mixing and dispensing machine comprising a syrup tank and means to deliver a predetermined quantity of syrup therefrom including a rod which is moved downwardly for the delivery and extends downwardly below the floor of said tank, a conduit to supply mixing liquid and including a measuring chamber, an inlet valve to control the flow of mixing liquid into said measuring chamber and an outlet valve to control the flow of liquid from said chamber, said valves including an actuating member which is moved upwardly for the dispensing operation, the operating member for said valves extending downwardly parallel to said rod, a horizontal shaft located beneath said tank and extending

between said rod and member, and means on said shaft to move said rod downwardly and said member upwardly for a dispensing operation.

17. In a liquid dispensing machine, a supply tank having an opening in its top, a measuring and discharging device in said tank, an operating rod for said device passing through said open top and then extending downwardly outside of said tank, spaced members surrounding said rod to guide the same for rectilinear movement, a stop collar on said rod engageable with one of said members to limit the upward movement of said rod, a spring stop collar on said rod, a spring surrounding said rod and engaging said spring stop collar and one of said members to normally urge said rod upwardly, and operating means on said rod whereby it may be moved downwardly against the action of said spring.

18. A device as in claim 17 including a horizontal shaft having a pinion thereon, said operating means for said rod comprising rack teeth engageable by said pinion.

19. In a liquid dispensing machine, a conduit including a liquid measuring chamber, an inlet valve to control the entry of liquid into said chamber, a vertically downwardly extending bushing communicating at its upper end with said chamber, a conduit member slidable in said bushing and including a valve at its upper end for controlling the flow of liquid from said chamber into said conduit, and means operated by said member to move said inlet valve.

20. A machine as in claim 19 including a mixing chamber, said conduit member extending into said mixing chamber for the discharge of the liquid thereto, and means on said conduit member between said bushing and said mixing chamber whereby said conduit member may be moved axially.

21. In a liquid dispensing machine, a liquid supply conduit including a measuring chamber, the inlet and outlet opening to said chamber being arranged one above the other, an inlet valve slidable in said inlet opening, an outlet valve slidable in said outlet opening, and a spring of predetermined length located between said valves and operating during the movement of said outlet valve toward open position to close said inlet valve prior to the opening of said outlet valve, and thereafter permitting a further movement of the outlet valve into its open position.

22. In a liquid dispensing machine including a plurality of liquid tanks each having an independent dispensing device including an operating member, a shaft extending past all of the operating members, a selecting device movable along said shaft for engagement with a selected one of said members whereby to operate on the same for accomplishing a dispensing operation, independent springs associated with said operating members to return the same following a dispensing operation, and a shaft return spring connected to said shaft to return the same whereby the shaft is brought back to its original position whether the selecting device is in or out of engagement with any of said operating members.

23. A machine as in claim 22 including a measuring and discharging device for mixing liquid and means carried by said shaft in constant engagement with said measuring device to operate the same, said shaft spring serving to return said liquid measuring device to its original position after a dispensing operation.

24. A beverage mixing and dispensing machine comprising a plurality of syrup tanks, an operating shaft, an independent syrup delivery device for each of said tanks, including an operating member, means providing a common chamber, conduits from each device opening into said common chamber, and means carried by and rocked with said shaft and slidable therealong to engage a selected one of said members whereby to produce the delivery of the corresponding syrup upon actuation of said shaft.

25. A liquid dispensing machine comprising a supply tank, means for providing a measuring and discharging chamber projecting above and below the bottom wall of said tank, said chamber having a free aperture through its wall communicating with said tank and adjacent the bottom thereof, a piston movable in said chamber to positions above and below said aperture so that liquid in the tank may flow by gravity through said aperture and beneath said piston when the latter is raised above the aperture, a discharge conduit extending from the bottom of said chamber and including a valve adjacent its discharge end, means to move said piston downward whereby to force excess liquid out of said chamber through said aperture into the tank whereby to prepare a predetermined quantity of liquid in said chamber, said moving means operating thereafter to close said aperture and to move said piston a predetermined distance below the lower edge of said aperture whereby to force through said valve a volume of liquid determined by the bore of said chamber and the travel of said piston below said aperture, said piston being guided in said chamber throughout its stroke, and devices cooperative with said moving means to prevent retrograde movement of said moving means until said predetermined quantity has been forced out and to prevent further downward movement thereof after initiation of the retrograde movement until the piston has been restored to its initial upper position.

26. In a liquid dispensing machine, a liquid supply tank, a measuring and delivering cylinder including means to admit liquid from said supply tank through a port into said cylinder at an intermediate point of its length, a piston movable between the raised position in which said port is free so that liquid may flow by gravity from said supply tank into said cylinder and a position in which it closes said port, a discharge conduit leading from said cylinder, a pressure-operated check valve in said conduit, means for moving said piston to close said port while forcing liquid outward through said port for delivering a predetermined quantity of liquid in said chamber and conduit, said moving means operating upon said piston after the closure of said port to cause the forcing of the predetermined quantity of liquid from said cylinder through said conduit and past said valve, and devices cooperative with said moving means to prevent retrograde movement of said moving means until said predetermined quantity has been forced out and to prevent further downward movement thereof after initiation of the retrograde movement until the piston has been restored to its initial upper position.

27. In a beverage mixing and dispensing machine, means to deliver a predetermined volume of syrup under pressure, a mixing chamber to receive said syrup, said syrup delivering means including a valve adjacent said chamber, and means to prepare a predetermined volume of mixing liquid and including a measuring vessel located at a higher level than said mixing

chamber and a gravity-flow conduit from said vessel to said chamber for delivering the liquid into said mixing chamber, said mixing chamber having an outlet, whereby said mixing liquid is initially delivered under pressure into said mixing chamber for producing a preliminary mixture and finally under free gravitational flow whereby to delay the delivery of the last portion of the mixing liquid so that the syrup is rinsed from said mixing chamber and from said conduit up to said valve and overflowing of the receptacle is prevented.

28. In a liquid dispensing machine, a mixing chamber, means to deliver a predetermined quantity of syrup into said mixing chamber and including a valve adjacent said chamber, means including a measuring vessel located at a higher level than said mixing chamber and a conduit from said vessel to said chamber whereby to deliver a predetermined quantity of mixing liquid into said mixing chamber, and a common operating device for said delivering means operative to complete the delivery of said syrup prior to the completion of the delivery of said mixing liquid, whereby the final portions of said mixing liquid may rinse the syrup from said mixing chamber and from said conduit up to said valve.

29. A beverage mixing and dispensing machine comprising means for providing a liquid measuring chamber having oppositely located inlet and outlet connections, an inlet valve for closing said inlet, an outlet valve for closing said outlet, a delivery conduit extending through said outlet and connected to said outlet valve to move the same and having an aperture which establishes communication with said chamber when said outlet valve is opened, an operating shaft, means on the shaft to move the conduit for opening the outlet valve, and a resilient connection between said conduit and said inlet valve whereby to close said inlet valve during the opening movement of said conduit prior to the exposure of said aperture for communication with said chamber and then to hold said inlet valve closed while the aperture is exposed.

30. A beverage mixing and dispensing machine comprising a plurality of syrup tanks, an operating shaft, an independent syrup delivery device for each of said tanks including an operating member, means for providing a common chamber, conduits from each device opening into said common chamber, means providing a measuring chamber for mixing liquid, means for charging and discharging said chamber including an operating element, a conduit from said measuring chamber to said common chamber, means carried by and rocked with and slidable along said shaft for engaging a selected one of said operating members whereby to produce the delivery of the corresponding syrup upon actuation of said shaft, and means on said shaft for operating said operating element.

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