

Dec. 27, 1927.

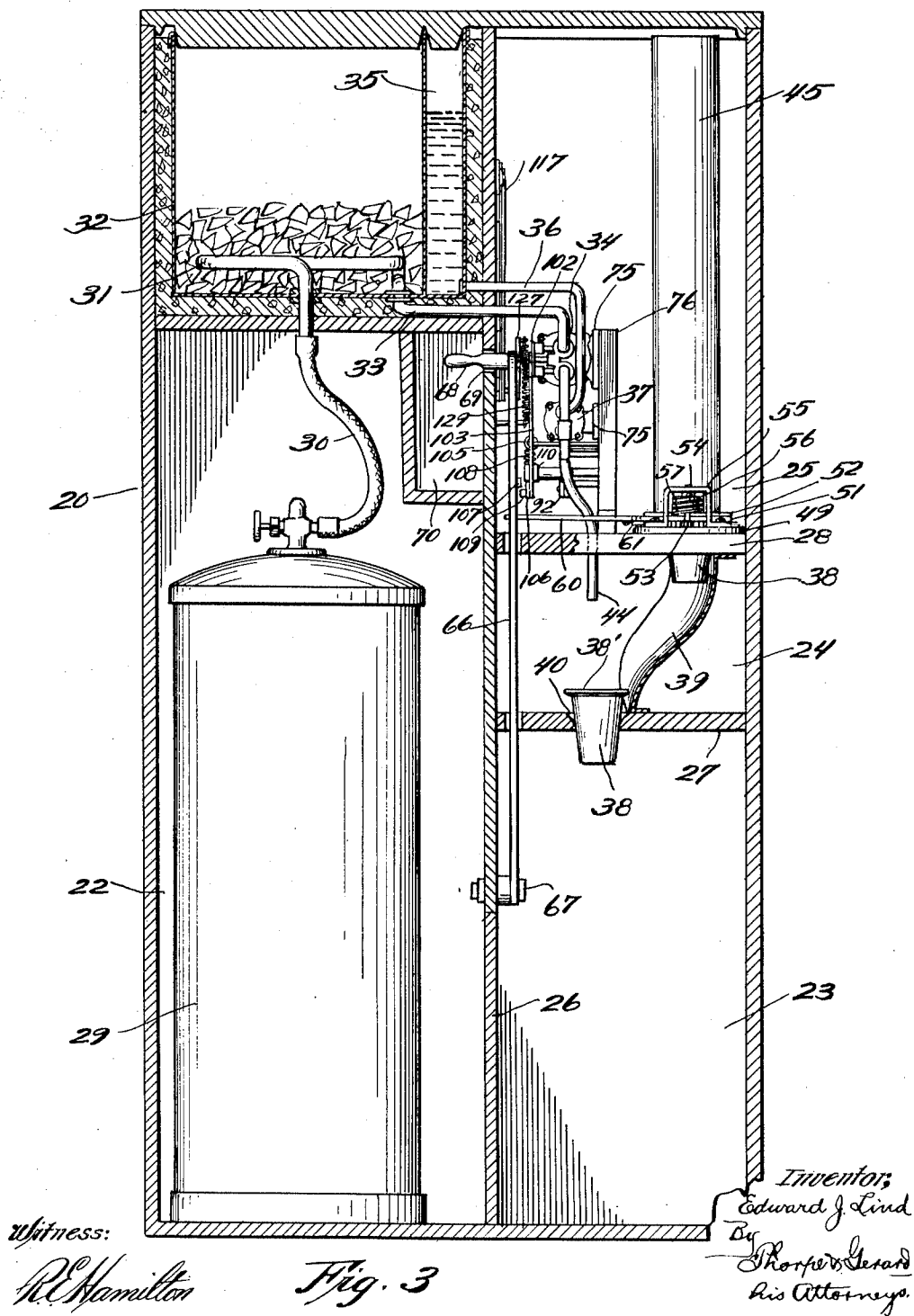
E. J. LIND

1,654,004

LIQUID DISPENSING MACHINE

Original Filed April 17, 1922

5 Sheets-Sheet 2



Dec. 27, 1927.

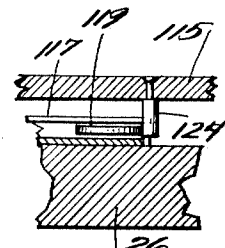
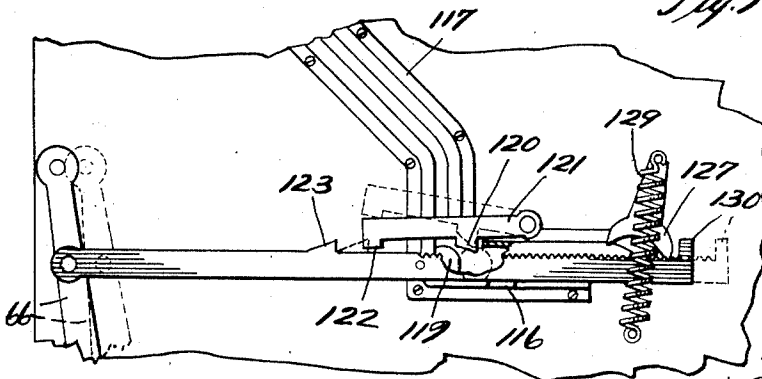
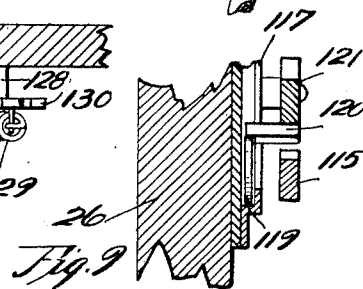
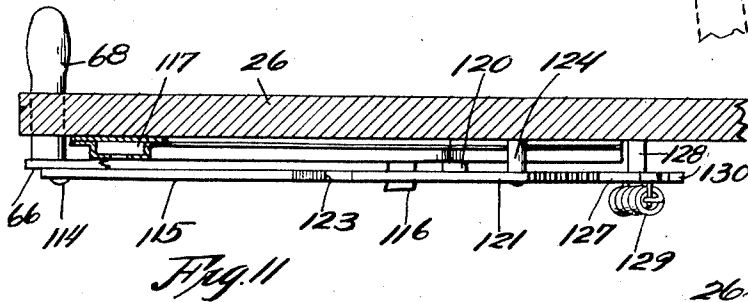
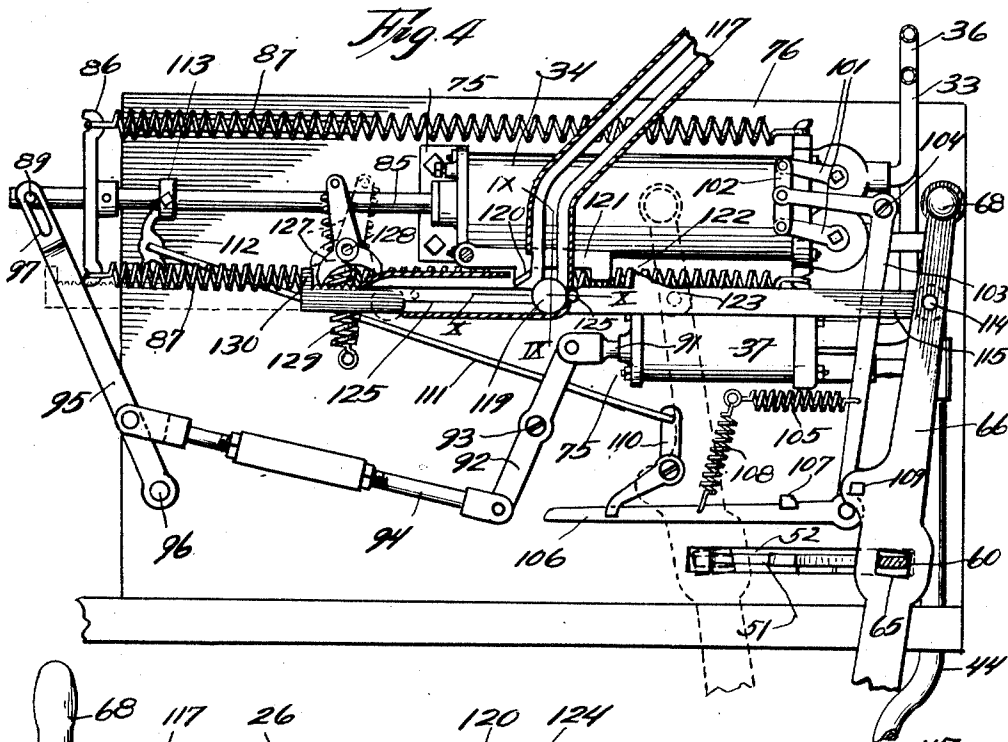
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LIQUID DISPENSING MACHINE

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Witness:

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Fig. 12

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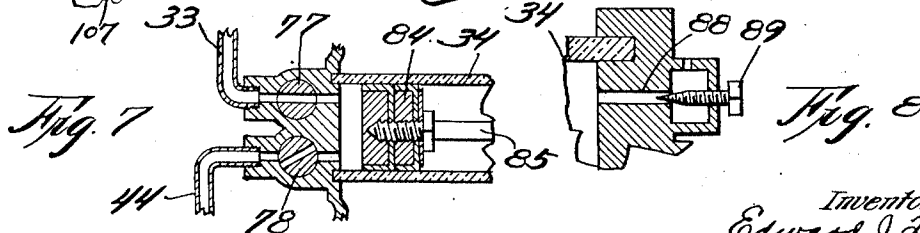
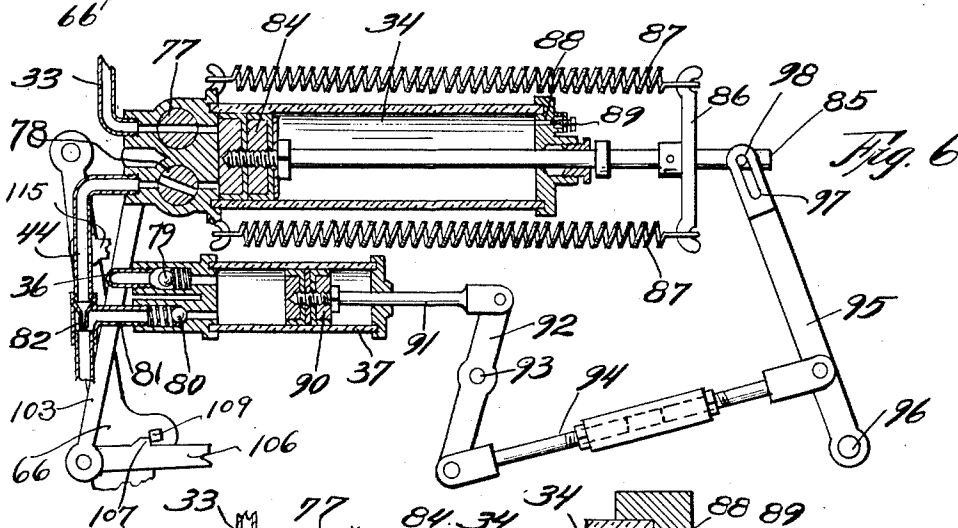
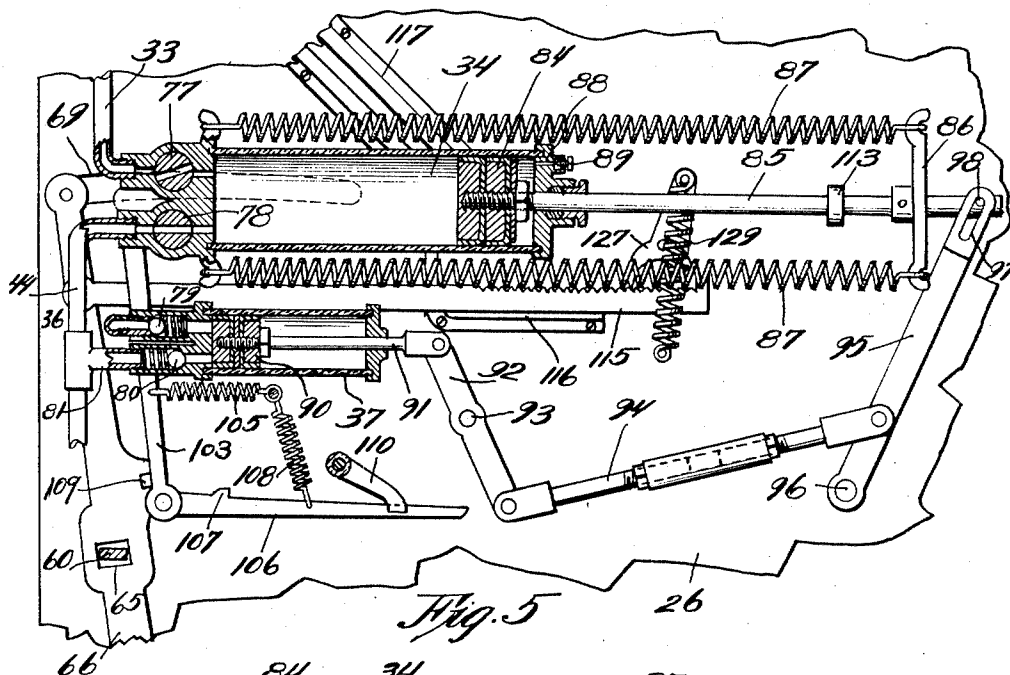
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1,654,004

LIQUID DISPENSING MACHINE

Original Filed April 17, 1922

5 Sheets-Sheet 4



witness:

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1,654,004

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LIQUID DISPENSING MACHINE

Original Filed April 17, 1922

5 Sheets-Sheet 5

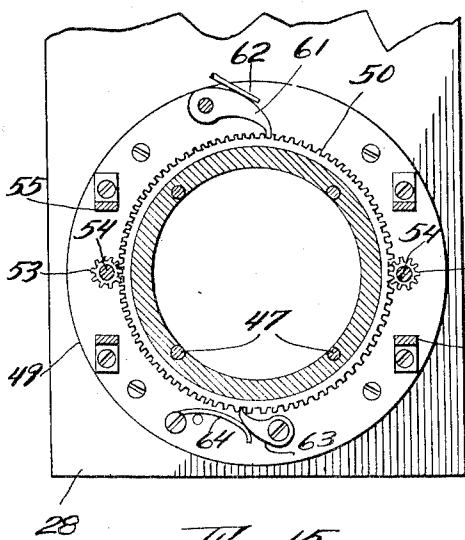
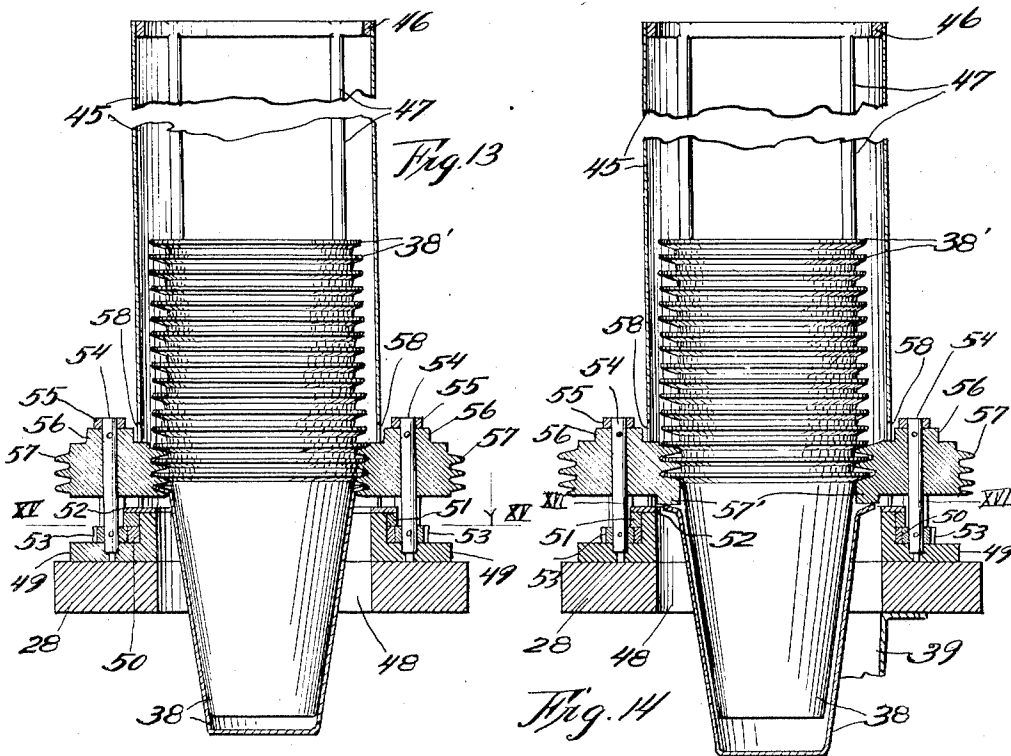


Fig. 15

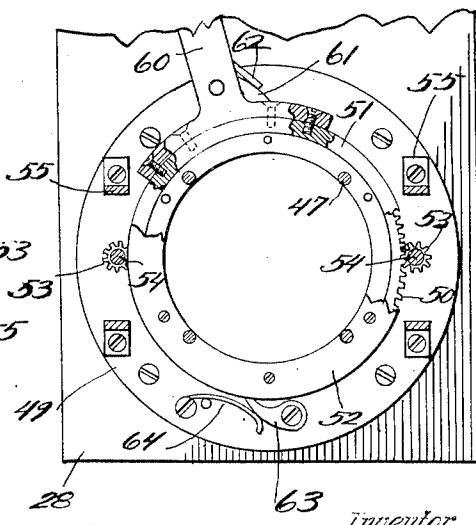


Fig. 16

Witness:

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UNITED STATES PATENT OFFICE.

EDWARD J. LIND, OF EMPORIA, KANSAS.

LIQUID-DISPENSING MACHINE.

Application filed April 17, 1922, Serial No. 553,452. Renewed May 10, 1926.

The present invention relates to vending or dispensing apparatus, and aims to provide a novel form of vending machine, preferably of the coin-controlled type, adapted for the dispensing of liquid, such as soda water, with additional provision for the feeding of a suitable cup into filling position.

Accordingly, I have devised an improved machine by the operation of which, in response to an appropriate coin control, a cup is fed into filling position, and thereafter a suitable mixture of soda water ingredients is discharged into the cup by the soda water dispensing mechanism forming a part of the apparatus and also subject to the coin-controlled mechanism.

The operation of the soda water vending mechanism is so timed as to feed the syrup or equivalent material into the cup prior to the feeding of the carbonated water, and for this purpose the action of the syrup feeding means is arranged to take place in response to the operation of the means for dispensing the carbonated water whereby a proper time relation is secured as regards the sequence of operation of these dispensing means.

With these general objects in view, the invention will now be described by reference to the accompanying drawings, illustrating one form of apparatus which I have devised for embodying the proposed features of improvement and effecting the desired functions, after which the novel points therein will be particularly set forth and claimed.

In the drawings—

Figure 1 is a perspective view showing an apparatus constructed in accordance with the present invention;

Figure 2 is a plan view of the same on a larger scale, and with the top removed;

Figure 3 is a vertical section taken on the line III—III of Figure 2;

Figures 4 and 5 are sections taken on the lines IV—IV and V—V, respectively, of Figure 2, but on a still larger scale;

Figure 6 is a sectional view similar to that shown in Figure 5, but illustrating the parts in different operative relation;

Figure 7 is a sectional detail of the valve structure at one end of the carbonated water cylinder, illustrating the position of the valve on the intake stroke;

Figure 8 is an enlarged sectional detail view of the opposite end of the carbonated water cylinder, showing the supplementary

vent valve used for regulating the action of said cylinder;

Figures 9 and 10 are enlarged detail sections taken on the lines IX—IX and X—X, respectively, of Figure 4;

Figure 11 is a horizontal sectional view showing portions of the coin-controlled mechanism;

Figure 12 is a side elevation of the parts shown in Figure 11;

Figure 13 is an enlarged vertical sectional view of the magazine for the soda water cups, with the mechanism for vending or dispensing said cups;

Figure 14 is a similar view, showing the cup dispensing mechanism operated and about to discharge a cup; and

Figures 15 and 16 are sections taken on the lines XV—XV of Figure 13, and XVI—XVI of Figure 14, respectively.

Referring now to the drawings in detail, these illustrate an apparatus comprising a cabinet 20 having a door 21 opening into a compartment 22, a waste compartment 23, a cup delivery compartment 24 and an upper compartment 25 for accommodating the cup magazine and liquid and cup dispensing mechanism, as shown in Figure 3, these compartments being separated by means of a vertical partition 26 and suitable horizontal partitions or platforms 27 and 28. The compartment 22 accommodates a suitable carbonated water tank 29 of ordinary form for furnishing a supply of soda water under pressure to the liquid dispensing mechanism, for which purpose the outlet from the tank is connected by means of a hose 30 attached to a refrigerating coil 31 arranged within an ice compartment 32 at the top of the cabinet 20, which coil 31 terminates in a pipe connection 33 forming the inlet connection to the carbonated water dispensing cylinder 34 (see Figure 5). Occupying one side of the ice compartment 32 is a syrup tank 35 provided with an outlet pipe connection 36 forming the intake to a syrup dispensing cylinder 37, as shown in Figures 3 and 5. The cylinder 34 is provided with an outlet pipe 44 extending downwardly through the platform or partition 28 in position to discharge into one of the cups 38 as vended by mechanism hereinafter referred to, the cup dropping down a chute 39 into filling position where it occupies a suitable opening 40 in the partition 27, as illustrated in Figures 1 and 3. The purchaser has access through an opening 41

in the door 21 to the cups 38 as delivered into the compartment 24. The door 21 is further provided with an opening 42 to the waste compartment 23 into which the cups 38 may be thrown after the same have been used.

The cup dispensing mechanism comprises a cup magazine chamber 45 of substantially cylindrical form into which a supply of the cups 38 may be stacked in nested relation as illustrated in Figures 13 and 14, the said chamber being provided with a ring member 46 having a plurality of depending rods 47 adapted to engage the rims 38' of the cups 38 to hold the same in even alinement while at the same time maintaining the cup rims out of engagement with the interior face of the chamber 45. The platform 28 is provided with a discharge opening 48 registering with the top of the chute 39 and also with the interior of a flanged collar 49 carried by the platform 28 and serving as a support for the magazine 45. Upon the vertical flange portion of the collar 49 is journaled a toothed ring 50 maintained in place by means of a suitable spacing collar 51 and a retaining ring 52. At diametrically opposite points, the toothed ring 50 meshes with a pair of pinions 53 secured to the lower ends of posts 54, for the lower ends of which are provided step bearings in the collar 49, while the upper ends of said posts 54 are retained in bearings provided in a pair of U-brackets 55 (see Figure 3). The upper ends of the posts 54 carry a pair of spool elements 56 formed with screw threads 57 adapted for feeding engagement with the rims 38' of the cups 38 as shown in Figures 13 and 14, these spools 56 being partly accommodated within openings 58 at the base of the magazine 45. The lower ends of the screw threads 57 terminate in somewhat abruptly thickened or expanded portions 57' (see Figure 14), whereby the rotation of the spools 56 is adapted to impart a final separating movement to the lowermost cup 38 so as to completely disengage the same from the stack and allow it to drop down the chute 39. The spools 56 are rotated by the rotation of the pinions 53 from the toothed ring 50, which latter is rotated by corresponding rotation of the collar 51 to which is attached a handle member 60 carrying a pawl 61 actuated by a spring 62 into engagement with the teeth of the ring 50. A similar pawl 63 actuated by a spring 64 is carried by the collar 49 and acts to permit the rotation of the toothed ring 50 by means of the pawl 61 in a clockwise direction in Figures 15 and 16, but serves to prevent any rotation of said ring 50 in the opposite direction. The free end of the handle 60 is accommodated in an opening 65 in a lever 66 constituting the main operating member of the apparatus, said lever being fulcrumed

upon a pivot bolt 67 carried by the interior vertical partition 26 (see Figure 3). This lever is provided with a handle element 68 projecting through a slot 69 in said partition 26 into an interior compartment 70 to which access is had through an opening 71 in the door 21 for the purpose of operating said lever. The throw of said lever 66 and movement imparted thereby through the handle 60 to the toothed ring 50 are sufficient to turn the spools 56 through one complete revolution, with the expanded portions 57' of the threads 57 stopping in the position illustrated in Figure 14 for disengaging and discharging the lowermost cup 38.

The liquid dispensing cylinders 34 and 37 are supported by means of brackets 75 from an intermediate vertical partition 76 carried by the platform 28, the dispensing operations of these cylinders being subject to coin-controlled mechanism presently to be described. The cylinder 34 is provided with an intake valve 77 controlling the flow of carbonated water into said cylinder from the intake connection 33, and a similar valve 78 controls the outlet from said cylinder to the discharge conduit 44 (see Figures 5 and 6). The syrup flows by gravity from the container 35 to the syrup cylinder 37 which is provided with a spring-actuated check valve 79 adapted to open under suctional action produced in said cylinder 37, the same being also provided with a spring-actuated check valve 80 controlling the outlet connection 81 from said cylinder leading to the discharge conduit 44, this conduit being provided with an injector element 82 (see Figure 6) at the point of communication between the pipes 44 and 81 for the purpose of exerting an injector feeding action upon the syrup as it flows into the discharge conduit at this point, as will be readily understood. The arrangement of the check valve 80 is such as to maintain the outlet from the cylinder 37 normally closed, but adapted to open in response to the discharge action of said cylinder, as will be later explained.

Operating within the carbonated water cylinder 34 is a plunger structure 84 connected to a plunger rod 85 carrying a transverse bar 86 to which is attached a pair of coil springs 87, the arrangement being such that when the inlet valve 77 is opened the cylinder 34 is filled with a charge of the carbonated water admitted from the tank 29 under a pressure sufficient to drive back the plunger 84 in opposition to the action of the springs 87; the combined strength of these springs 87, is therefore, of a degree adapted to yield under the pressure exerted in the filling of the cylinder 34, and yet sufficient to expel the contents of said cylinder 34 whenever the valve 77 is closed and the discharge valve 78 opened, as illustrated in Figure 6, and in addition to operate the plunger of

the cylinder 37 for the purpose of filling the latter as hereinafter described. As will be noted by reference to Figure 8, one end of the cylinder 34 is provided with a suitable vent passage 88 fitted with a valve 89, by the adjustment of which the pressure conditions produced within the cylinder 34 at the rear of the plunger 84 may be conveniently regulated and hence the speed of charging movement of said plunger correspondingly varied.

The syrup cylinder 37 is also fitted with a plunger structure 90 connected with a plunger rod 91, the outer end of which is pivotally connected with a lever 92 fulcrumed at 93 (upon the partition 76); this lever 92 is provided with an operating connection comprising an adjustable turnbuckle rod 94, one section of which is pivoted to the lever 92, while the other section of said turnbuckle rod 94 is pivotally connected to a lever 95 having its lower end carried on a fulcrum 96 supported by the partition 76, and the upper end of said lever being formed with a slot 97 engaging a pin 98 carried by the rear end of the plunger rod 85. By this arrangement of operating connections between the cylinders 34 and 37, it will be seen that the rearward movement or retraction of the plunger 84, in the filling of the cylinder 34, will produce an advance movement of the plunger 90 in the cylinder 37, which operates automatically to close the inlet valve of said latter cylinder and open its discharge valve, thereby expelling the contents from the cylinder 37. In the reverse movement of the plunger 84, in response to the action of its springs 87, permitted by the closing of the valve 77 and opening of the valve 78, will produce a movement of the plunger 90 in the opposite direction, as noted in Figure 6, these movements corresponding to the discharge of the contents of the cylinder 34 and the filling of the cylinder 37, attended by the automatic opening of the valve 79 and closing of the valve 80 of the latter cylinder.

The mechanism whereby the liquid dispensing means is rendered responsive to the operation of the coin controlled means will now be described. The stems of the valves 77 and 78 are provided with operating arms 101 having their ends connected by a tie bar 102 for causing the said valves to operate in unison, and in such a manner that the valve 77 will open as the valve 78 closes, and vice versa. To the midpoint of the bar 102 is pivotally connected one arm of a bell crank lever 103 which is fulcrumed as at 104 and actuated by a coil spring 105 normally into a position corresponding to the closed position of the valve 77 and open position of the valve 78, as represented in Figure 5. To the lower end of the long arm of the bell crank lever 103 is pivotally connected a latch member 106 provided with a bevelled catch lug 107, this latch member 106 being actu-

ated by a coil spring 108 into a position presenting said catch lug 107 normally in the path of movement of a corresponding catch lug 109 (see Figure 3) carried by the operating lever 66. The movement of the latch member 106 in response to the spring 108 is limited and regulated by a tripping device comprising a lever 110 having a forked portion slidably engaging said member 106, and provided with a rod 111 having its other end pivotally connected to a pivot dog 112 mounted on the partition 76 in position for the free end thereof to be engaged by a collar 113 adjustably secured to the plunger rod 85, whenever the latter is actuated into the position illustrated in Figure 4 by the filling of the cylinder 34. This engagement of the collar 113 with the dog 112 operates to depress the latch 106 and thereby trip the lug 107 from engagement with the lug 109 on the lever 66, and thereby allow the spring 105 to actuate the lever 103 for the purpose of returning the valves 77 and 78 to their normal position.

To the upper portion of the lever 66 is pivotally connected, as at 114, a ratchet bar 115 which slidably engages a lug 116 projecting from the lower horizontal portion of a coin chute 117 extending downwardly from a coin slot 118 provided at the upper front portion of the cabinet 20 (see Figure 1). A coin 119 dropped into the chute 117 descends to the juncture between the downwardly extending and horizontal portions of the chute, as illustrated in Figure 4, where it is adapted to be prevented from further movement by a lug 120 projecting laterally from a pivoted detent member 121 having the forward free end thereof provided with a detent lug 122 extending in position for engagement with a catch lug 123 projecting upward from the ratchet bar 115 in advance of the lug 122. Projecting laterally from the ratchet bar 115 is a pin 124 adapted to move along the slot 125 of the coin chute 117 for the purpose of moving the coin 119 to the discharge point of the coin chute, as illustrated in broken lines in Figure 4; this movement of the coin 119 causes the same to engage the lug 120 and thereby lift the detent 121 and its detent lug 122 above the path of the catch 123 of the bar 115, thus permitting the bar to be advanced by means of the lever 66. The teeth of the bar 115 are engaged alternately by the oppositely projecting teeth of a double-acting pawl 127 rocking upon a horizontal pin 128 projecting from the partition 76, said pawl being adapted to be maintained yieldingly in either of its operative positions by a coil spring 129 so connected to the arm of the pawl 127 as to swing past the center of the pin 128 as the pawl is shifted in either direction. In the position of the pawl illustrated in Figure 4, its rear tooth is adapted

to ratchet along the teeth of the bar 115 for permitting the rearward movement of said bar, while obviously preventing any forward movement of the bar until it has completed its rearward stroke; at the end of this stroke, as illustrated by the broken lines in Figure 4, the catch lug 123 engages the forward tooth of the pawl 127 and shifts it to the position illustrated by the dotted lines, in which reversed position the forward tooth of the pawl is adapted to ratchet over the teeth of the bar 115 and thus allow the latter to be moved freely forward into its initial position. The pawl 117 is then again reversed by the action of a lug 130 projecting upward from the rear end of the bar 115 in position for engagement with the rear tooth of the pawl 127, as shown in Figure 4, thus again permitting the operative movement of the bar 115 in a rearward direction.

The operation of the apparatus has been indicated in a general way in the foregoing description, but may be briefly summarized as follows:—A coin is inserted in the slot 118, dropping to the position shown in Figure 4, whereupon the lever 66 may be advanced, its movement being permitted by the lifting of the detent member 121 by the advance of the coin 119, and raising of the detent lug 122 above the path of movement of the lug 123 on the bar 115. As the bar 115 moves forward, the rear tooth of the pawl 127 simply ratchets over the teeth of said bar. As the lever 66 moves forward, its catch lug 109 slips forward over the lug 107 of the latch member 106, the spring 108 permitting a slight depression of said member 106 and thereafter immediately returning said member 106 into engagement with the tripping lever 110. The forward movement of the lever 66 swings the arm 60 to the position indicated by the dotted lines in Figure 4, and thereby operates the cup dispensing means in the manner above explained, one of the cups 38 being thus disengaged and released for passage down the chute 39 into cup-filling position as shown in Figure 3. While this cup dispensing mechanism has been illustrated and described in the present application, no claims are directed thereto in this case, the improvements involved in said cup dispensing mechanism being made the subject matter of a separate co-pending application Serial No. 553,453 filed April 17, 1922. At the end of the rearward stroke of the lever 66, the catch lug 123 is brought into engagement with the pawl 127 for reversing the same, and allowing the ratchet bar 115 to be advanced by the lever 66 in a forward direction. In this forward movement, the lug 109 of said lever is brought into operative engagement with the lug 107 on the latch member 106, whereby the completion of the forward movement of the lever 66

operates the bell crank lever 103 to open the intake valve 77 and close the outlet valve 78 of the carbonated water cylinder 34, as illustrated in Figure 6. In this connection, it may be explained that the plunger 90 of the cylinder 37 is in its retracted position at the rear end of said cylinder, having been operated by the last preceding operation of the apparatus, for the purpose of filling said cylinder 37 with a charge of syrup from the container 35. The charge of carbonated water being now admitted to the cylinder 34 under pressure, the plunger 84 in said cylinder is actuated by such pressure into retracted position in opposition to the action of the spring 87, as shown in Figure 5, which operation simultaneously actuates, through the described connection, the plunger 90 in the cylinder 37 to discharge the charge of syrup therein into the conduit leading to the cup 38. This feeding of the syrup into the discharge conduit in advance of the carbonated water is of advantage, since it is well known that the syrup is of a viscous consistency and sluggish in its movement, and the flow thereof is accelerated by the action of the carbonated water flow following up the movement of the syrup material, producing an injector action at the point 82, and in effect completely washing out the conduit below said point 82. The discharge movement of the plunger 84 has simultaneously operated the plunger 90 of the cylinder 37 in the opposite direction for filling the latter cylinder with a charge of syrup, ready for the next succeeding operation. It will also be recalled that the retraction of the plunger 84 and its rod 85 into position for filling the cylinder 34, as represented in Figure 5, has caused the collar 113 to engage and operate the tripping device including the dog 112, and effecting disengagement of the lugs 107 and 109, releasing the bell crank lever 103 to the action of its spring 105, and thereby resulting in the return of the valves of the cylinder 34 to their initial position, as required for permitting the discharge movement of the plunger 84 and the return movement of the plunger 90 for the filling of the syrup cylinder 37. On completion of the forward movement of the lever 66, the lug 130 on the bar 115 engages the rear tooth of the double-acting pawl 127, and reverses the position of said pawl for allowing the next rearward movement of the lever 66, whenever a new coin has been inserted into the coin chute 117.

As already stated, the adjustment of the valve 84 regulates the speed of the plunger 89 in response to the carbonated water pressure, and the faster the plunger movement the greater will be the gaseous content of the charge admitted to the cylinder 34, whereas the slower the plunger movement (due to a

more nearly closing of the valve 89) the smaller will be the percentage of gas admitted,—so that the proper or desired extent to which the mixture is charged with the gas may be readily secured by the manipulation of said valve. The quantity of the charge admitted to the cylinder 34 can also be varied by simply adjusting the position of the collar 113 on the plunger rod 85, since it is of course obvious that the tripping of the valve operating lever mechanism will take place earlier or later according as the collar 113 is adjusted toward or away from the cylinder 34. It will be further understood that the amount of charge dispensed by the syrup cylinder 37 may be correspondingly varied, by adjustment of the turnbuckle rod connection 94 and thus varying the stroke of the plunger 90 in response to the movements of the plunger 84.

It will thus be apparent that I have devised a practical and efficient apparatus for carrying out the desired objects of the invention and while I have illustrated and described what I now regard as the preferred form of construction for embodying the proposed improvements, I desire to reserve the right to make all changes and modifications which may fairly fall within the scope of the appended claims.

What I claim is:

1. In an apparatus of the character described, an operating member, cup dispensing means actuated by said member to feed a cup into filling position, means actuated by the movement of said member for feeding a liquid into said cup, and means set in operation by the action of said feeding means for feeding a second liquid into said cup in advance of said first liquid.

2. A liquid dispensing machine comprising an operating member, a cylinder provided with a plunger and with a liquid dispensing conduit, valves controlled by the movement of said member for regulating the admission and discharge of liquid from said cylinder, a second cylinder in communication with said conduit and also with a separate liquid supply, automatically acting means associated with said plunger for advancing the same to expel the liquid from said first cylinder when the latter is opened to communication with said conduit, and means responsive to the retracting movement of said plunger for driving the charge in said second cylinder into said conduit in advance of the charge from said first cylinder.

3. A liquid dispensing machine comprising a cylinder provided with a plunger and a liquid dispensing conduit, valves controlling the admission and discharge of liquid from said cylinder, a second cylinder provided with a plunger actuated by and in opposite directions to the movements of said first plunger, said second cylinder having an

independent source of liquid supply and a discharge connection communicating with said conduit, and means for intermittently operating said valves.

4. A liquid dispensing machine comprising a cylinder provided with a plunger and a liquid dispensing conduit, a plunger operating within said cylinder and provided with means for yieldingly advancing the same to expel a charge from the cylinder, an intake connection for supplying a liquid under pressure to said cylinder in opposition to the action of said yielding means, a second cylinder provided with a plunger actuated by and in opposite directions to the movements of said first plunger, said second cylinder having an independent source of liquid supply and a discharge connection communicating with said conduit, and valve means for regulating the admission and discharge of liquid from said first cylinder.

5. A liquid dispensing machine comprising a cylinder provided with a plunger and a liquid dispensing conduit, a second cylinder provided with a plunger actuated by and in opposite directions to the movements of said first plunger, said second cylinder having an independent source of liquid supply and a discharge connection communicating with said conduit, automatic inlet and outlet check valves controlling the admission and discharge of liquid from said second cylinder, and valve means for regulating the admission and discharge of liquid from said first cylinder.

6. An apparatus of the character described comprising a liquid dispensing cylinder having an intake valve and a discharge valve, means for actuating said valves in unison for regulating the admission and discharge of liquid from said cylinder and acting to maintain said inlet valve normally closed and the discharge valve normally open, an operating member movable to engage and operate said valve actuating means to open said inlet valve and close the discharge valve, and means acting automatically at the end of the filling operation of said cylinder to release the engagement between said operating member and valve actuating means and thereby allow the latter to return said valves to normal position.

7. An apparatus of the character described comprising a liquid dispensing cylinder provided with a plunger and having an intake valve and a discharge valve, means for actuating said valves in unison for regulating the admission and discharge of liquid from said cylinder and acting to maintain said inlet valve normally closed and the discharge valve normally open, an operating member movable to engage and operate said valve actuating means to open said inlet valve and close the discharge valve, and means actuated by the movement of said

plunger at the end of the filling stroke to release the engagement between said operating member and valve actuating means and thereby allow the latter to return said valves to normal position.

8. An apparatus of the character described comprising a liquid dispensing cylinder provided with a plunger and with an intake valve and a discharge valve, yielding means for advancing said plunger to expel a charge from the cylinder, a liquid supply connection for admitting liquid under pressure to said cylinder in opposition to the action of said yielding means, means for actuating said valves in unison for regulating the admission and discharge of liquid from the cylinder and acting to maintain said inlet valve normally closed and the discharge valve normally open, an operating member movable to engage and operate said valve actuating means to open said inlet valve and close the discharge valve, and means actuated by the movement of said plunger at the end of the filling stroke to release the engagement between said operating member and valve actuating means.

9. An apparatus of the character described comprising a liquid dispensing cylinder having an intake valve and a discharge valve, means for actuating said valves in unison for regulating the admission and dis-

charge of liquid from said cylinder and acting to maintain said inlet valve normally closed and the discharge valve normally open, a spring-actuated latch carried by said valve actuating means, an operating member movable to engage said latch and thereby operate said valve actuating means to open said inlet valve and close the discharge valve, and means acting automatically at the end of the filling operation of said cylinder to trip said latch from engagement with said operating member and thereby allow said actuating means to return said valves to normal position.

10. A liquid dispensing machine comprising a cylinder provided with a plunger and a liquid dispensing conduit, valves controlling the admission and discharge of liquid from said cylinder, a second cylinder provided with a plunger having adjustable operative connections adapted to be actuated by and in opposite directions to the movements of said first plunger, said second cylinder having an independent source of liquid supply and an outlet communicating with said plunger, and coin-controlled mechanism for intermittently operating said valves.

In witness whereof I hereunto affix my signature.

EDWARD J. LIND.