

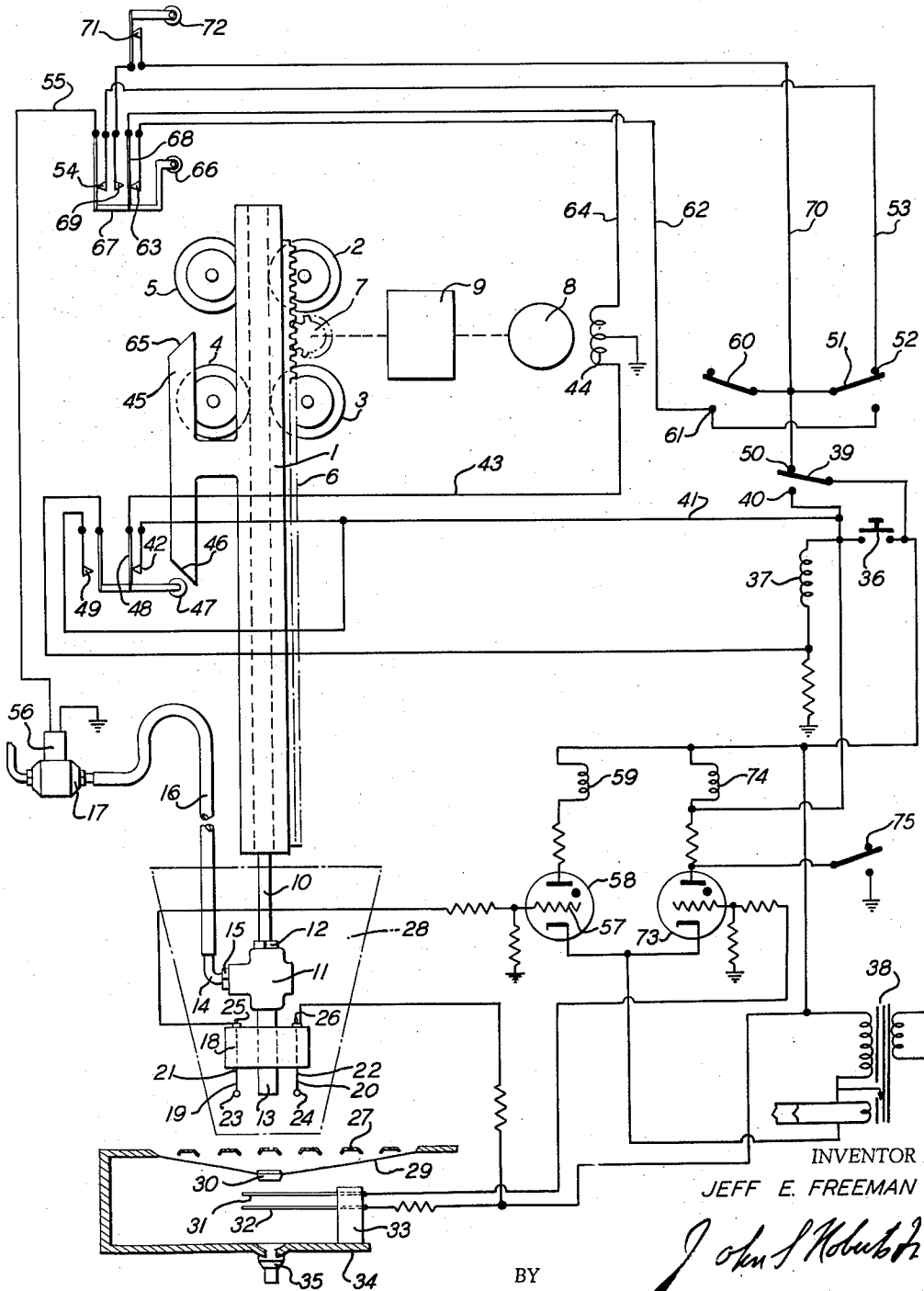
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J. E. FREEMAN

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AUTOMATIC CONTAINER FILLER

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INVENTOR  
JEFF E. FREEMAN

*John S. Kolubatz*

ATTORNEY

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**AUTOMATIC CONTAINER FILLER**

Jeff E. Freeman, Tarrant County, Tex.

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This invention relates generally to liquid dispensing machines for introducing liquid into an open top container and more specifically to a novel automatic mechanism for so controlling the dispensing of the liquid as to avoid undesirable features of the prior art.

In the standard coin or manually operated vending machines for dispensing beverages or other liquids into open containers the dispensing nozzle is situated somewhat above the upper rim of the receiving container. When liquids, particularly carbonated liquids, are dispensed from such a nozzle, a foaming action is caused within the container due to the impact of the liquid hitting the bottom of the container. This foaming action causes undesirable results, namely a decarbonization of the liquid with a resulting flat taste, and undue overflow of the container. Furthermore, due to changing pressure levels in the liquid storage tanks, dispensing from such nozzles causes undue splashing resulting in wetting of the exterior of the container, waste and inaccurate dispensing. The present invention overcomes these prior art problems by maintaining the nozzle closely adjacent the liquid level in the container during the complete dispensing cycle.

It is therefore the primary object of this invention to provide a liquid dispensing machine including a reciprocating dispensing nozzle which is automatically controlled to dispense liquids into open topped containers with a minimum foaming or splashing of the liquid in the container.

A more specific object of this invention is to provide a beverage dispensing machine including a reciprocating dispensing nozzle which during the actual dispensing cycle is automatically maintained closely adjacent the surface of the liquid in the container to avoid foaming and splashing of the liquid.

Another object of this invention is to provide a liquid dispensing machine including a reciprocating nozzle which is controlled during a dispensing cycle wherein liquid is dispensed into open containers by an automatic sequentially operative power system.

A still further object of this invention is to provide a beverage dispensing machine including a reciprocating dispensing nozzle in combination with a fluid level sensing device for delivering fluid into an open topped container, which nozzle is controlled by action of the sensing device in an automatic system to maintain the nozzle closely adjacent the liquid level during the complete dispensing cycle.

With the foregoing and other objects in view the invention resides in the following specification and appended claims certain embodiments and details of construction of which are illustrated in the accompanying drawing in which the figure is a fragmentary view in front elevation illustrating the portion of a dispensing machine embodying the invention together with schematic circuitry representing the electrical system utilized in conjunction therewith.

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Referring more specifically to the drawing a rack 1 is illustrated as being mounted for vertical reciprocating movement on guide rollers 2, 3, 4 and 5. Rack 1 is provided with teeth 6 along one side which mesh with a pinion drive gear 7. Gear 7 is actuated by a reversible motor 8 through a gear box 9. The supporting structure for the guide rollers is not shown nor is the cabinet of the machine proper as it forms no pertinent part of the present invention.

The rack 1 carries by any suitable means a rod 10 at its lower extremity. A manifold 11 is secured to the end of rod 10 as by a threaded connection which is locked in adjustment by a nut 12. Threaded into manifold 11 is a dispensing nozzle 13. Also threaded into a lateral opening in manifold 11 is a fitting 14 locked in a set position by a nut 15. A flexible tubing 16 leads from fitting 14 to an electromagnetically operated valve 17 which controls the flow of the beverage from a supply tank (not shown) to nozzle 13.

Attached to nozzle 13 by a pressed fit, or other means, is a terminal block 18 of suitable insulating material. Extending through said block 18 and secured thereto by any suitable means is a pair of sensing probes 19 and 20. As illustrated these probes have shank portions 21 and 22 terminating in bulbous end portions 23 and 24. The form of the probes may be varied; for example, they may be needle nosed. The material for the probes may be varied but preferably is highly polished stainless steel. The end portions 23 and 24 of the probes are substantially flush with the end of nozzle 13. The upper ends of probes 19 and 20 are utilized as terminals 25 and 26 respectively.

A cup supporting drain board 27 is positioned directly under the nozzle. When a cup 28 is placed on the drain board either manually or by automatic means, the nozzle may be reciprocated within the cup by means to be described. Any beverage fluid collected by the drain 27 is concentrated in its downward flow by a pan 29 having a center outlet 30. Flow from outlet 30 is directed across a pair of stainless steel probes 31 and 32 suitably secured to a terminal block 33 on the lower portion 34 of drain board 27. A final drain outlet is provided at 35.

With the structure as thus far described the invention further provides an automatic cycling control system which upon operating of a start button by either manual or coin means is active to lower the nozzle 13 into a cup 28 placed on the drain board 27; commence the dispensing of fluid at a point adjacent the bottom of the cup; to raise the nozzle out of the cup at a rate determined by the level of the beverage in the cup, and to shut itself off.

The specific electrical system to accomplish the generally described functions above is illustrated in the drawing as being activated when the start button 36 is depressed. Relay winding 37, in circuit with power supply 38, becomes energized to close contactor 39 against contact 40. Once closed the relay is held closed by a voltage reaching contactor 39 directly from the supply 38. A closed circuit is then established through line 41 and switch 42 through line 43 to energize the field 44 of motor 8 to rotate the motor in the downward driving direction for the rack 1. The rack 1 is provided with a switch operating bar 45 integrally formed thereon. When the rack has been driven downwardly sufficiently to place the nozzle 13 at the bottom of cup 28 the cam surface 46 engages a follower 47 which opens switch 42 against the bias of spring contact blade 48. The switch 42 thus acts as a lower limit switch since the opening of the same stops the motor 8.

With the opening of switch 42 a switch 49 is simultaneously closed. When switch 49 closes relay 37 is deenergized and contactor 39 moves to contact 50. This

places the circuit voltage on relay contactor 51 which is illustrated as engaging contact 52 connected to line 53. Line 53 is connected through normally closed switch 54 to line 55. Line 55 is connected to the electromagnet operator 56 of valve 17. Thus the valve 17 is opened and the fluid beverage is dispensed into cup 28. If a drink involving more than one fluid is involved then other valves similar to valve 17 would be energized at this point.

As the liquid level rises in the cup 28 contact is made through the liquid between probes 19 and 20, thereby closing a circuit from the power supply 38 to the grid 57 of a thyratron 58 causing the same to fire energizing the relay winding 59. When energized, winding 59 causes normally open contactor 60 to close against contact 61. Contact 61 is connected by line 62, a normally closed limit switch 63, and line 64 to the field 44 of motor 8. The field 44 is thus energized to drive the motor in a reverse direction to move the nozzle 13 upwardly in cup 28. The motor 8 will continue to drive the rack upwardly until the probes 19 and 20 cease to make contact with the beverage in the cup. In this manner the nozzle is maintained closely adjacent to or in contact with the liquid at all times during the dispensing cycle to avoid splashing and decarbonizing. The rack is driven upwardly under this liquid level control until the cam surface 65 of operating bar 45 engages follower 66 of switch operator 67. When this occurs switch 54 is opened and the electromagnet operator 56 for valve 17 is deenergized, thereby stopping the dispensing of the beverage.

Switch 63 is also disconnected and a switch blade 68 thereof closes against another contactor 69. The motor winding 44 is then reenergized through the following connections; from contact 50 and line 70, through an upper limit switch 71 and contact 69, and through blade 68 to the winding 44. The rack 1 is then driven to its completely retracted position out of the cup, which position is determined by operator cam surface 65 engaging a switch opening follower 72 on switch 71 to open the switch and deenergize the motor. At this point the cycle is complete, the cup is filled with beverage and the apparatus is in condition to begin another cycle.

If there is any spillage during the filling cycle, or other improper functioning of the machine which results in fluid being collected and drained by pan 29, the probes 31 and 32 are included as a safety stop device. Any liquid bridging probes 31 and 32 will cause thyratron 73 to fire to energize relay winding 74. When winding 74 is energized contacts 75 are closed and contactor 51 is opened to deenergize the circuit to the operator 56 of valve 17 thereby stopping the fluid dispensing operation. At the same time the motor 8 is energized to move the rack 1 to its fully retracted position. The relay 74 remains energized until the machine is reactivated by means of the operation of start button 36.

The limit switches may be adjustably mounted to control the length of traverse of the rack 1 to control the filling level and to accommodate cups of different sizes.

It is thus seen that the invention provides an automatic system for controlling the position of a dispensing nozzle during a liquid dispensing operation to avoid waste of beverage, splashing of liquids, wet cup exteriors and flat beverages which have been prevalent in drink dispensing machines of the prior art.

I claim:

1. In a dispensing machine for dispensing beverages into open containers the invention which comprises a dispensing nozzle, means to deliver a beverage to the nozzle, means to control the delivery of the beverage to the nozzle, reversible motor means to reciprocate the nozzle in both directions in the substantially vertical plane into and out of a container, means to control the

energization of the motor during the movement of the nozzle in the descending direction, means to energize the motor to drive the nozzle upwardly, means to limit the traverse of said nozzle in both directions, and sensing means connected to said nozzle and responsive to the liquid level in the container receiving the dispensed beverage to control the energization of the motor means during the ascent of the nozzle.

2. In a dispensing machine for dispensing beverages into open containers the invention which comprises a dispensing nozzle for delivering a beverage into a container, means to deliver a beverage to the nozzle, means to control the delivery of the beverage to the nozzle, reversible motor means to reciprocate the nozzle in both directions in the substantially vertical plane into and out of the container being filled, means to connect said motor means to a source of power, switch means to initiate actuation of said motor to drive said nozzle downwardly into the container, means to limit the traverse of said nozzle in the downward direction and to simultaneously actuate the beverage delivery control means, sensing means connected to the nozzle and responsive to the liquid level in the container to control the energization of the motor to determine the rate of ascent of the nozzle from the container, means to interrupt the traverse of said nozzle in the upward direction and simultaneously deenergize the beverage delivery control means, means to continue the upward traverse of said nozzle, and means to limit the traverse of said nozzle in the upward direction.

3. In a dispensing machine for dispensing beverages into open containers the invention which comprises a dispensing nozzle for delivering a beverage into a container, means to control the delivery of the beverage to the nozzle, rack means to carry the nozzle, reversible motor means to drive the rack in both directions in the substantially vertical plane to move the nozzle into and out of the container being filled, means to connect said motor to a source of power, switch means to initiate actuation of said motor means to drive said nozzle downwardly into the container, switch means to simultaneously limit the traverse of said nozzle in the downward direction and to actuate the beverage delivery control means, sensing means connected to the nozzle and responsive to the liquid level in the container to control the energization of the motor in a reverse sense to determine the rate of ascent of the nozzle from the container, means to limit the traverse of said nozzle in the upward direction, and means to deenergize the beverage delivery control means at a predetermined intermediate point in the upward nozzle traverse.

4. A container filling machine for dispensing liquids into open containers comprising a reciprocable nozzle means, means to deliver liquid to the nozzle means, means to control the delivery of liquid to the nozzle means, means to drive the nozzle means upwardly and downwardly relative to and into the container, means to limit the downward traverse of the nozzle means into the container, sensing means connected to the nozzle means and responsive to the liquid level in the container to control the driving means to determine the rate of ascent of the nozzle means from the container, means to limit the traverse of said nozzle means in the upward direction, and means to deenergize the liquid delivery control means at a predetermined intermediate point in the upward traverse of the nozzle means.

5. A container filling machine for dispensing liquids into open containers comprising a reciprocable nozzle means, means to deliver liquid to the nozzle means, means to control the delivery of liquid to the nozzle means, electric motor means to drive the nozzle means upwardly and downwardly relative to and into the container, means to limit the downward traverse of the nozzle means into the container, sensing probes connected to the nozzle means and acting to energize the motor

means in the reverse sense when said probes are in contact with the dispensed liquid in the container to determine the rate of ascent of the nozzle means from the container, means to limit the traverse of said nozzle means in the upward direction, and means to deenergize the liquid delivery control means at a predetermined intermediate point in the upward traverse of the nozzle means.

6. In a dispensing machine for dispensing beverages into open containers the invention which comprises a dispensing nozzle for delivering a beverage into a container, means to control the delivery of the beverage to the nozzle, rack means to carry the nozzle, limit switch actuating means integral with said rack, reversible motor means to drive the rack in both directions in the substantially vertical plane to move the nozzle into and out of the container being filled, means to connect said motor to a source of power, switch means to initiate actuation of said motor means to drive said nozzle downwardly into the container, limit switch means actuated by said rack mounted actuating means to simultaneously limit the traverse of said nozzle in the downward direction and to actuate the beverage delivery control means, sensing probes connected to the nozzle and acting to energize the motor means when said probes are in contact with the dispensed liquid in the container to determine the rate of ascent of the nozzle means from the container, means to limit the traverse of said nozzle means in the upward direction, and means to deenergize the beverage delivery control means at a predetermined intermediate point in the upward traverse of the nozzle.

7. A container filling machine for dispensing liquids into open containers comprising a reciprocable nozzle, means to deliver liquid to the nozzle, means to control the delivery of liquid to the nozzle, automatic motive means to drive the nozzle downwardly into a container and upwardly away from the container, means responsive to movement of the nozzle to its lower extreme to operate the liquid control means, and automatic sensing means responsive to the level of the liquid dispensed into the container for controlling the motive means when acting to drive the nozzle upwardly.

8. The invention according to claim 7 in which automatic means are provided to return the machine to its non-operating condition upon a spillage of liquid about the exterior of a container.

9. A container filling machine for dispensing liquids into open containers comprising a reciprocable nozzle, means to deliver liquid to the nozzle, means to control the delivery of liquid to the nozzle during one cycle of machine operation, automatic motive means to drive the nozzle downwardly into a container and upwardly away from the container, switch means to initiate actuation of the motive means, means responsive to movement of the nozzle to its lower extreme to operate the liquid control means, and automatic sensing means responsive to the level of the liquid dispensed into the container for intermittently modifying the action of the automatic motive means during upward traverse of the nozzle to maintain said nozzle closely adjacent the surface of the liquid during the liquid delivery cycle of the operation.

10. The invention according to claim 9 in which automatic means are provided to return the machine to its non-operating condition upon a spillage of liquid about the exterior of a container.

11. In a dispensing machine for dispensing beverages into open containers the invention which comprises a dispensing nozzle for delivering a beverage into a container, electromagnetic valve means to control the delivery of the beverage to the nozzle, rack means to carry the nozzle, limit switch actuating means integral with said rack, reversible motor means to drive the rack in both directions in the substantially vertical plane to move the nozzle into and out of the container being filled, means to connect the motor to a source of power, switch means to initiate actuation of said motor means to drive said nozzle downwardly into the container, first limit switch means actuated by said rack mounted actuating means to simultaneously limit the traverse of said nozzle in the downward direction by deenergizing the motor and to energize the beverage delivery control means, sensing probes connected to the nozzle and acting to energize the motor means in the reverse sense when said probes are in contact with the dispensed liquid in the container to control the upward traverse of the nozzle, second limit switch means engaged by said rack mounted actuating means to deenergize the motor drive prior to the nozzle clearing the top edge of the open container and to simultaneously deenergize the electromagnetic valve means, means conditioned by actuation of said second limit switch means to further energize the motor to move the rack mounted nozzle completely out of the container, and third limit switch means operable by said rack mounted actuating means to again deenergize the motor and thereby determine the upper limit of rack travel.

12. The invention according to claim 11 in which an automatic circuit deenergizing means responsive to beverage spillage is included in the system to deenergize the beverage delivery control valve and to energize the motor to return the rack to its upper limit.

13. A container filling machine for dispensing liquids into open containers comprising a reciprocable nozzle means, means to deliver liquid to the nozzle means, means to control the delivery of liquid to the nozzle means, drain board means to support a container beneath the nozzle means, electric motor means to drive the nozzle means upwardly and downwardly relative to and into the container, means to limit the downward traverse of the nozzle means into the container, sensing probes connected to the nozzle means and acting to energize the motor means in the reverse sense when said probes are in contact with the dispensed liquid in the container to control the ascent of the nozzle means within the container, means to interrupt the traverse of said nozzle means in the upward direction and to deenergize the liquid delivery control means, means to continue the upward traverse of said nozzle, means to limit the traverse of said nozzle in the upward direction, and means positioned beneath the drain board means to interrupt operation of the machine and to return the machine to its non-operating condition upon a spillage of liquid about the exterior of a container.

14. The invention according to claim 13 in which said interrupting means comprises a pair of probes adapted to be bridged by spilled liquid.

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