

Nov. 24, 1953

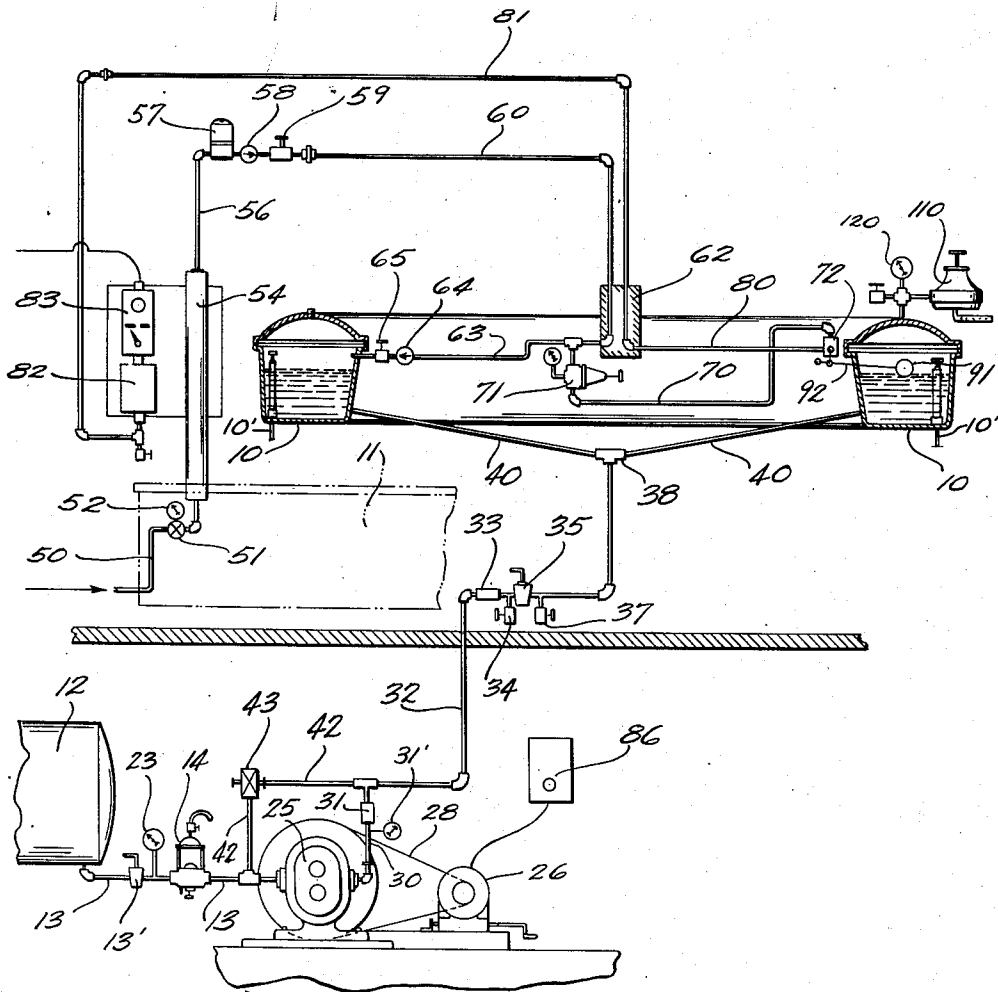
F. T. GRICAR, JR., ET AL.
METHOD AND APPARATUS TO SUPPLY A BEVERAGE TO A
FILLING MACHINE AND FILL CONTAINERS THEREBY

2,660,360

Filed Sept. 17, 1949

5 Sheets-Sheet 1

Fig. 1



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5 Sheets-Sheet 2

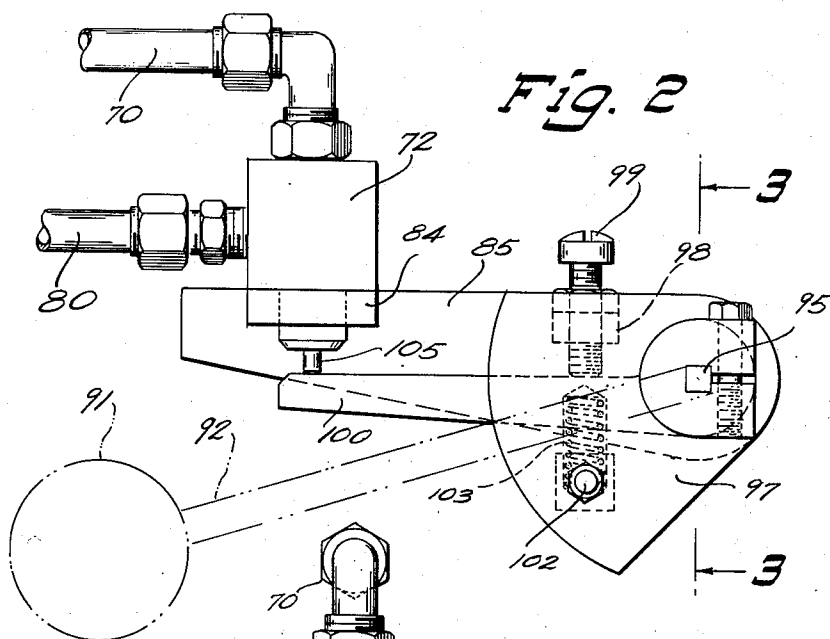


Fig. 3

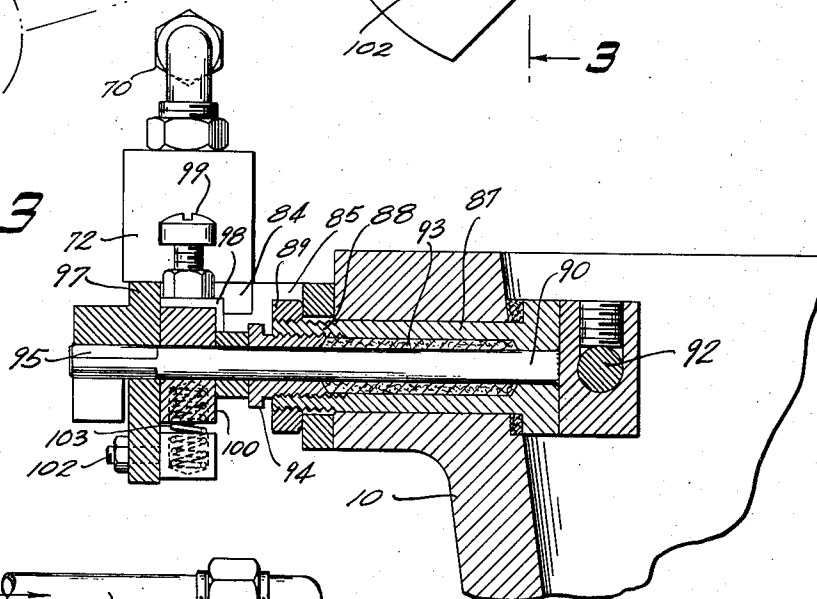
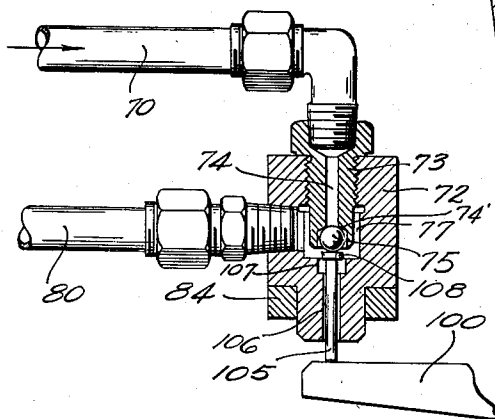


Fig. 4

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Fig. 5

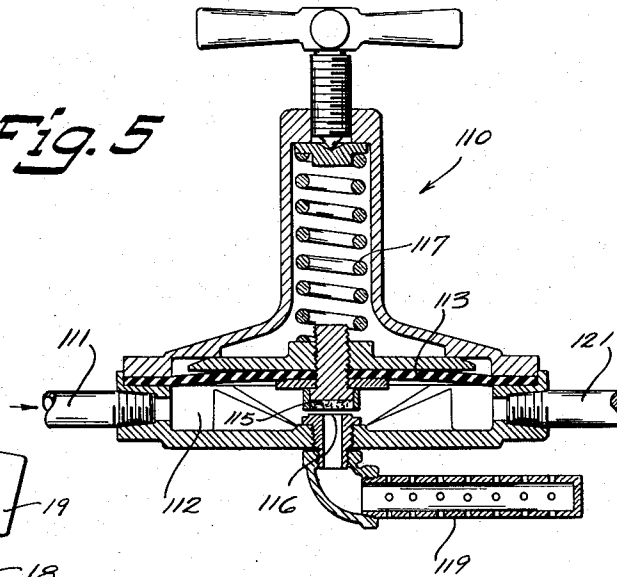
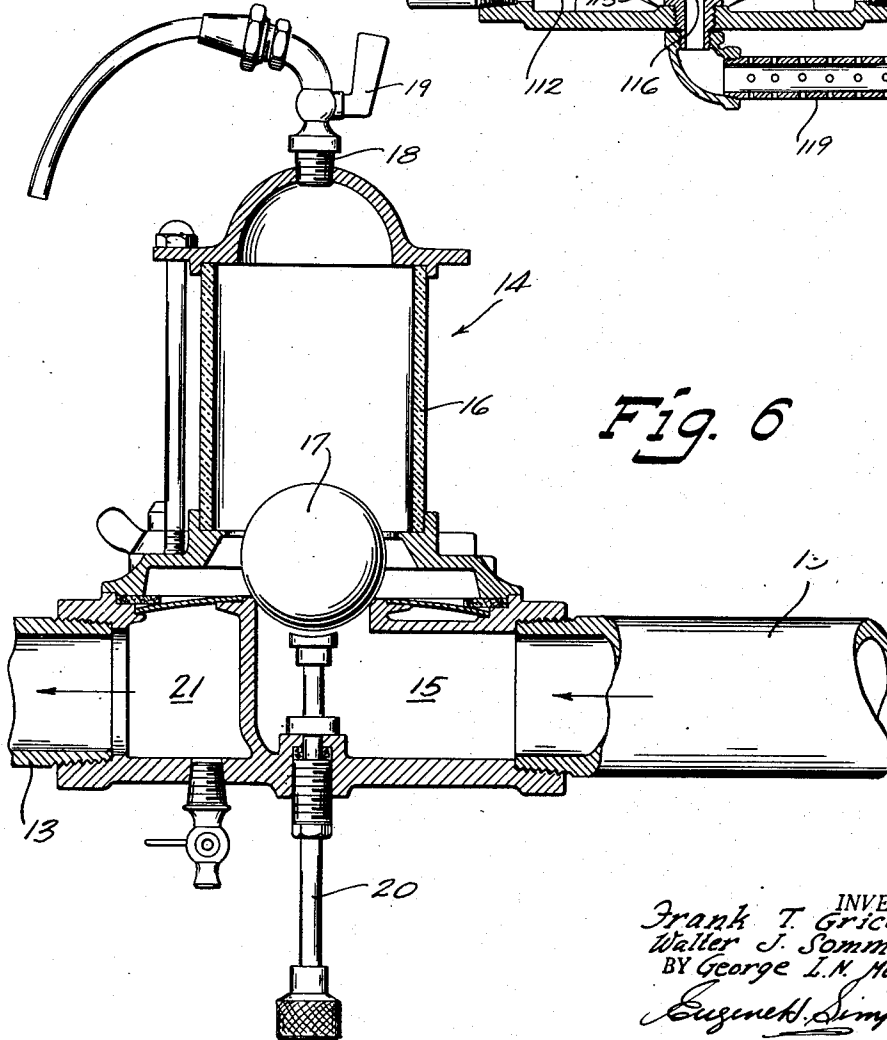


Fig. 6



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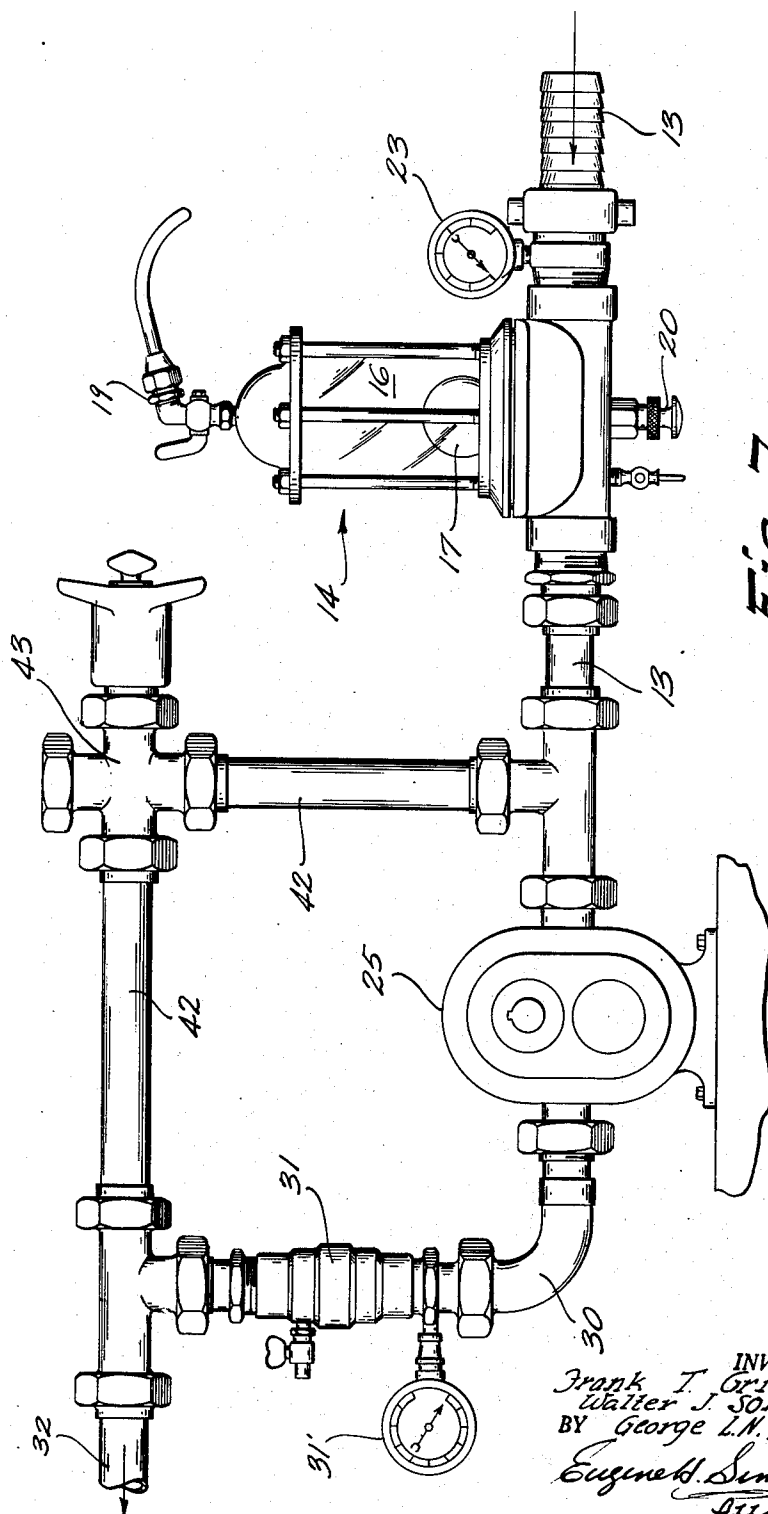


Fig. 7

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Fig. 8

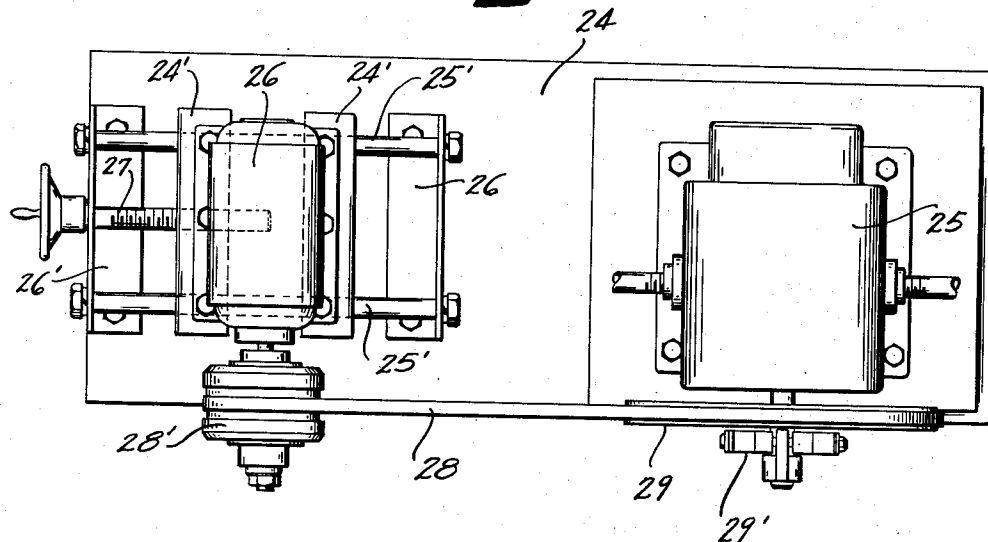
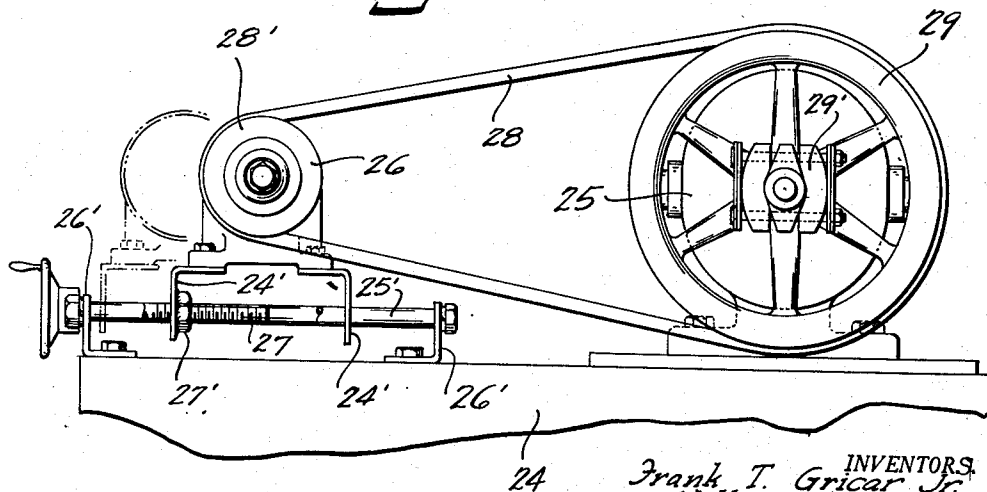


Fig. 9



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UNITED STATES PATENT OFFICE

2,660,360

METHOD AND APPARATUS TO SUPPLY A BEVERAGE TO A FILLING MACHINE AND FILL CONTAINERS THEREBY

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Application September 17, 1949, Serial No. 116,356

19 Claims. (Cl. 226—117)

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This invention relates to brewery equipment and more particularly to a method and apparatus to supply a beverage to a filling machine.

In supplying beer from government tanks to bottle filling machines, or the like, it has been customary heretofore to supply the filler bowl with counter-pressure and to pump the beer from the government tank by means of a centrifugal pump, venting the air from the filler bowl until the beer rises to a predetermined level in the bowl. The beer is then maintained in the filler by the centrifugal pump acting against a fixed counter-pressure in the filler bowl. Due to the low capacity of the filler bowl it has been impractical to stop and restart the pump, since the centrifugal pump requires time to build up to the desired pressure.

Hence when the filler is shut down due to mechanical or other causes, the centrifugal pump continues to run, churning the beer within the impellor and causing foaming or so called "wild beer." This effect is further aggravated upon restarting the pumping since the beer surges, causing further foaming.

The centrifugal pump also has a tendency to churn air into the beer and thus reduce its palatability.

It is an object of the present invention to provide a method of supplying filler bowls with beer, carbonated beverages, or the like, which will prevent undue absorption of air.

Another object is to provide an apparatus which will supply beer, carbonated beverages, or the like, from a supply tank to a filler bowl.

Another object is to provide a method and an apparatus to supply beer, carbonated beverages, or the like, to a filler bowl which will eliminate surging.

A further object is to provide an apparatus which will automatically vent free air from the beer line.

A still further object is to provide a method of supplying beer to a bottle or can filler which will maintain the level of beverage in the filler bowl at a constant height.

A still further object is to provide a method of supplying beer or other carbonated beverages to a filler bowl in a quiescent condition.

A still further object is to provide an apparatus which will deliver beer or other carbonated beverages from a supply tank to a filler bowl without undue agitation.

A still further object is to provide a method of supplying beer or other carbonated beverages from a tank to a filler bowl which will avoid sub-

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jecting the beverage to sudden surges of pressure.

A still further object is to provide an apparatus which will supply beer or other carbonated beverages from a supply tank to a filler bowl at substantially constant pressure.

A still further object is to provide means to maintain a constant bowl pressure, regardless of tank pressure.

A still further object is to provide an apparatus that will permit the regulation of bowl pressure in the filler to suit beverage conditions without change in tank pressure.

A still further object is to provide a method of supplying beer, or the like, to a filling machine, which will prevent the beer from foaming.

A still further object of the invention is to provide a method of supplying beer, or the like, to a filling machine, which will entrain a minimum of air in the beverage.

Still further objects will become apparent from the following specification which when taken in conjunction with the accompanying drawings, illustrate an apparatus adapted to carry the improved method into effect.

In the drawings:

Fig. 1 is a diagrammatic view of a filler bowl, the government tank, and the beverage supply system;

Fig. 2 is an elevational view of the air control valve for the filler bowl;

Fig. 3 is a cross-section taken on the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a transverse cross-section taken through the air valve shown in Figs. 2 and 3;

Fig. 5 is a cross-section through the automatic relief valve;

Fig. 6 is a longitudinal cross-section through the beer line and the bubble trap;

Fig. 7 is an elevational view of the beer pump and by-pass;

Fig. 8 is a plan view of the main pump and drive therefor, as shown in Fig. 1; and

Fig. 9 is a side elevational view of the pump drive shown in Fig. 8.

Referring to the drawings and particularly to Fig. 1, the bottle or can filler may comprise a filler bowl 10, which is shown in cross-section and which may be mounted on a column (not shown) from a base 11. The filler 10—11 may be located on any desired floor of a bottling plant, and is most conveniently placed adjacent the discharge end of a bottle washer. In the bottling of beer, the government tank 12 is usually located in the basement, due to the ease of main-

taining the low temperatures necessary to preserve the unbottled beer.

Since the bottle or can filler is usually somewhat remote from the government tank 12 and the pressure in the government tank is not an accurate control for rate of feed of the beverage to the filler 10 under all operating conditions, the beverage is pumped from the government tank 12 to the filler 10.

The filler bowl 10 contains a plurality of filler valves 10' which are mounted in apertures in the bottom of the bowl and supply the beverage to the containers. The valves 10' provide constant or continuous filling of the containers by starting the filling of subsequent containers while containers previously fed into the machine are being filled.

The beverage is supplied to the filler bowl 10 from the government tank 12 through a pipe line 13 which allows the beverage to flow through a shut-off valve 13' into a bubble trap 14. The trap 14, which is shown in detail in Fig. 6, receives the liquid from the pipe 13; in a chamber 15; and allows it to pass upwardly into a sight glass 16. A ball check valve 17 floats on the beverage and seats against a vent opening 18 containing a pet cock 19. The cock 19 is maintained open during operation of the system so that air above the level of the beverage can pass off through the vent 18. When there is no gas in the trap and the trap is filled with liquid, the ball 17 seats against the vent 18 to retain the liquid. Should free gas form in the beverage and rise to the surface, the level of the liquid in the trap would drop and the ball 17 would drop from the vent opening 18 to permit the gas to bleed off through the vent.

In its lower position the valve 17 seats on a seat over the chamber 15 to prevent gas from returning to the government tank. A valve lifter 20 is provided to manually lift the ball 17 from its seat.

From the sight glass 16 the beverage passes into a discharge chamber 24 from whence it continues the passage through the pipe 13.

A pressure gage 23 may be tapped into the pipe between the government tank 12 and the trap 14 to indicate the pressure in the tank 12.

The pipe 13 delivers the beverage to a valveless positive displacement pump 25 such as a gear or vane type pump shown which is driven by an electric motor 26 through a belt 28 and a variable speed drive. Such a pump is used because of its large capacity, its lack of valves and its substantially pulse-free characteristic.

The details of the motor and driving unit are shown in Figs. 8 and 9. Referring to those figures, the motor 26 and the pump 25 are mounted on a common base 24, the motor 26 being carried on a pair of angle irons 24'. The angle irons 24' have downturned legs with apertures there-through to receive guide rods 25'. The guide rods 25' are mounted in the upstanding legs of angle irons 26'.

A screw 27 mounted between the angles 26' passes through the downturned legs of the angles 24', and engages a nut 27' fixed to the angles 24' to adjust the position of the motor 26 on its base.

The motor 26 drives the V-belt 28 through an adjustable pulley 28'. The pulley is a "Hi-Lo" variable speed pulley which varies the driving ratio by the position of the motor on its mounting. That is, the further away from the pump, the motor is moved, the lower the speed of the pump.

The belt 28 drives a pulley 29 which is connected to the pump 25 through a friction drive 29', so that in case of overload, the friction drive will slip to prevent breakage of parts.

The beverage leaves the pump 25 through a pipe 30 which contains a check valve 31 to prevent back flow of the beverage when the pump stops, and a gage 31' to record the pressure in the line.

The beverage flows through a pipe 32, through a sight glass 33, past a line drain valve 34, through a beverage valve 35, and past a bowl drain valve 37, to a rotary stuffing box 38 where the beverage passes into a plurality of beverage supply lines 40 which deliver the beverage to the bowl 10.

A beverage by-pass 42 is provided around the pump 25 and is shown as connected between the pipe 13 and the pipes 30-32. The by-pass is closed by a cut-off valve 43.

Counter-pressure air or other gas is supplied to the bowl 10 from a source (not shown) through a pipe 50, through a pressure regulator 51, including a gage 52, to an air column 54 which forms a storage reservoir. From the air column 54 the air flows through a pipe 56, through an air filter 57, a check valve 58, and a valve 59, to a pipe 60 leading to a triple stuffing box 62.

From the stuffing box the air passes through a pipe 63, a check valve 64, and a globe valve 65, and into the upper part of the bowl 10 above the highest level of liquid therein.

A pipe 70 receives air from the pipe 63 and conducts it at a predetermined pressure from a pressure regulator 71 to a valve housing 72, best seen in Fig. 4. Referring to that figure the valve housing 72 contains a nipple 73 which is provided with a central vertical opening 74 terminating at its lower end in a downwardly facing valve seat adapted to receive a ball valve 75. The valve 75, when seated, shuts off the flow of air from the pipe 70 to a valve chamber 77.

When the valve 75 is off its upper seat in the nipple 73, air under pressure flows through the pipe 70, past the valve 75 through the chamber 77 and into a pipe 80. From the pipe 80 the air passes through the stuffing box 62 and through a pipe 81 to actuate a pressure switch 82. The pressure switch 82 is arranged to close and supply current to an automatic starter 86 which starts the motor 26.

A line switch 83 is provided in the circuit to cut off the flow of current from the switch 82 to the starter 86 when the switch 83 is in open position.

Referring again to Figs. 2, 3 and 4 the valve housing 72 is supported on a shelf 84 on a bracket 85. The bracket is held to the filler bowl by a packing gland 87 which has a threaded end 88 to receive the apertured end of the bracket 85, the apertured end being held on the threaded end by a nut 89.

The packing gland 87 receives a shaft 90 which is actuated by a float 91 and float rod 92 shown diagrammatically in Fig. 1, and shown in dotted lines in Fig. 2. Packing 93, held in place by a packing nut 94, prevents the escape of gas from the bowl 10.

The shaft 90 has a square end 95 on which is clamped an actuating lever 97 (Figs. 2 and 3). The lever 97 has a bracket 98 formed on one side thereof which receives an actuating screw 99.

The screw 99 contacts the upper side of a float-actuating lever 100 to move the lever counter-clockwise,

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as seen in Fig. 2, as the float 91 drops in the bowl 10.

The lower portion of the lever 97 has a screw 102 passing therethrough which screw has a cup on the inner side to receive the base of a spring 103. The upper end of the spring 103 is received in a recess in the floating lever 100 and constantly urges the lever upward, or clockwise, as seen in Fig. 2, against the action of the screw 99.

The floating lever 100 is loosely mounted on the shaft 90 and contacts a valve stem 105 which operates in an aperture 106 in the valve housing 72. The opening 106 has a valve seat 107 at the upper end thereof which is closed by the valve 75 in its lower position.

In moving upward under the influence of the spring 103, the stem 105 moves the valve 75 off its seat 107 permitting air in the chamber 77 and the pipe 80 to vent through the aperture 106, and at the same time moves the valve 75 onto its upper valve seat 74' at the lower end of the opening 74 thus closing off the air from the pipe 70 and opening the switch 82 to stop the motor.

In order to keep the pressure in the bowl 10 substantially constant, a relief valve 110 is provided. The relief valve 110, seen outlined in Fig. 1 and in detail in Fig. 5, may comprise an intake pipe 111 leading from the filler bowl to a pressure chamber 112. The chamber 112 has a spring pressed diaphragm 113 for one wall. The spring pressed diaphragm carries a valve 115 which seats on a valve seat 116 and is normally held thereon by a spring 117, which also urges the diaphragm into its lowest position in the chamber 112. When pressure builds up over a given amount above the desirable bowl pressure the pressure within the chamber 112 lifts the valve 115 off its seat 116 and permits excess air to blow off through a vent pipe 119. A gage 120 enables the relief valve to be set for any desired pressure.

A bracket 121 supports the relief valve 110 from the bowl 10.

Operation

To start the apparatus the valve 35 is closed and the bowl pressure regulator 51—52 is set for the desired bowl pressure. The valves 59 and 65 may then be opened, permitting air to flow from the source (not shown) through the pressure regulator 51 into the air column 54. From the air column 54 the air flows through the pipe 56 into an air filter 57 which cleanses it. From the filter 57 the air goes past the check valve 58, through the air valve 59, through the pipe 60, through the stuffing box 62, through the pipe 63, the check valve 64, and the valve 65 and fills the bowl 10 with air under a predetermined pressure.

After the bowl is filled with air under pressure, the relief valve 110 may be set, by means of the gage 120, to blow off at one pound above operating pressure.

As is well known in this art, the bottles or containers to be filled by the liquid supplied by the filler bowl through the many filler valves have air in them which is displaced by the liquid during the filling operation, and this air is vented into the space in the upper part of the filler bowl. Since the relief valve 110 has been set to blow off at one pound above operating pressure, and since air supply from the source through the pipe 50 is only fed through the reducer 51 at a pressure substantially identical with operating pressure, it is obvious that in the normal continuous operation of this filler bowl no air will be supplied through the pipe 50, but air scavenged from the

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bottles or cans being filled will accumulate so as to raise the pressure in the bowl until the relief valve 110 opens and exhausts it from the bowl. This, in combination with the positive displacement pump provides a markedly different operational condition from that heretofore provided in filler bowl operation.

The air pressure regulator 71 may then be set for seven pounds, the pressure necessary to actuate the pressure switch 82.

The line drain valve 34 and the by-pass valve 43 may then be opened permitting beer (where that beverage is being bottled) to flow from the government tank 12, under accumulated pressure in the tank, through the pipe 13, through the valve 13', through the trap 14, around the pump 25, through the by-pass 42, through the pipe 32, through the sight glass 33, and to flow out the valve 34. The beer is allowed to continue to flow from the valve 34 until solid beer appears in the sight glass 33. The valve 34 may then be closed.

It is not necessary to start the pump for this operation since the government tank 12 is under some pressure, sufficient to force the beer up through the valve 34.

The by-pass valve 43 is then closed and the beer valve 35 is opened.

After the beer valve 35 is opened, the pump 25 may be started by manually closing the switch 83, which permits the pressure switch 82 to function under the pressure from the line 80—81.

The pump 25 and motor 26 are adjusted to the speed of the filler 10 so that the pump runs a maximum amount of time. This is done by adjusting the motor on its base through the screw 27.

The pump continues to run, pumping the beverage into the filler bowl 10 until the float 91 rises to the desired level.

When the beverage in the filler bowl 10 reaches the desired level, the actuating lever 92 moves the floating lever 100 clockwise on the shaft 90 raising the stem 105 to move the ball valve 75 (Fig. 4) off the seat 107 and onto the seat 74'. Raising the valve 75 off the seat 107 and onto the seat 74' cuts off air from the pipe 70 and bleeds the air from the pipe 80 through the aperture 106. As the pressure drops in the pipe 80—81 (Fig. 1) the switch 82 opens shutting off the motor 26 stopping the pump 25. Since both the motor and the pump possess mechanical inertia, the pump does not stop instantly but slows down gradually when coming to a stop and speeds up gradually in starting. It is sudden changes in either pressure or velocity which cause the carbon dioxide gas to become less stable or unstable in the beverage and results in foaming and loss of control in filling.

When the level of the beverage drops the actuating lever 97 is rotated counter-clockwise and the screw 99 (Figs. 2 and 3) contacts the upper edge of the floating lever 100 permitting the stem 105 to drop and permitting the valve 75 to uncover the port 74 and close the port 106 thus allowing pressure to flow through the pipe 70, through the pipes 80—81, and close the pressure switch 82 to restart the motor 26.

Should the level of the beverage in the bowl 10 drop, the air pressure is maintained constant by the air column 54. As the level of the beverage rises again, excess air is drained off through the automatic blow-off valve 110.

To return the beverage to the government tank, the pump 25 is stopped by manually throwing the switch 83 to "off" position, thus disconnecting

it from the switch 82 and cutting off the current to the motor 26. The valve 43 is then opened and the pressure within the bowl forces the beverage back through the pipes 40, 32, 42 and 13 and into the government tank 12. When the sight glass 33 shows no beverage the valve 35 may be closed, thus preventing excess pressure in the government tank 12.

It will be realized that the hereinbefore described form of the invention is to be taken merely as a preferred embodiment thereof and that various changes in size, shape and arrangement of parts and steps may be taken without departing from the spirit of the invention or the scope of the sub-joined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. The method of supplying a carbonated beverage from a tank to a filler bowl, comprising, maintaining gas in the filler bowl at a predetermined, constant counter-pressure, venting gas in excess of said pressure, utilizing a valveless rotary positive displacement pump to supply beverage from the tank to the filler bowl and maintaining the level of the beverage in the filler bowl substantially constant by utilizing a portion of the pressure supplied to said bowl to control the pumping action.

2. A device to supply carbonated beverage from a tank to a filler bowl, comprising, a source of air under pressure, means to supply air from said source to the filler bowl, at a level above the maximum desired liquid level therein, means to preclude return of air from said bowl to said source, a valveless positive displacement pump adapted to supply beverage from the tank to the filler bowl, air pressure responsive means to control the movement of the pump, a valve on the exterior of the bowl adapted to control the flow of air to the control means, a float in the bowl adapted to continuously float on the surface of the beverage in the bowl, and means on the exterior of the bowl operable by said float to control the said valve to start the pump when the beverage level in the bowl falls below a desired minimum level and to stop the pump when the beverage level reaches a desired maximum level.

3. In a filling machine apparatus including a supply tank and a filler bowl having container filling valves in its lower portion for passage of liquid from the filler bowl to a container under control of said filling valve and for passage of scavenged air from the container into the filler bowl, connections for passage of liquid from the supply tank to the filler bowl, said connections including a valveless, rotary positive displacement pump, starting and stopping control connections for said pump including a control device responsive to the level of liquid in the filler bowl, means to supply counter-pressure gas to said filler bowl and means independent of the level of liquid in the filler bowl for control of gas pressure in the filler bowl.

4. The method of supplying a carbonated beverage from a tank to a filler bowl and thence to containers to be filled, comprising, maintaining gas in the filler bowl at a predetermined constant pressure above atmospheric, venting gas in excess of said pressure, utilizing a valveless rotary positive displacement pump to supply beverage from the tank to the filler bowl, controlling the pumping action according to the level of the liquid in the bowl, and filling containers from the beverage in the filler bowl.

5. The method of supplying a carbonated beverage from a tank to a filler bowl and thence to containers to be filled, comprising, maintaining gas in the filler bowl at a predetermined constant pressure, venting gas in excess of said pressure, utilizing a valveless rotary positive displacement pump to supply beverage from the tank to the filler bowl, utilizing a portion of the gas pressure supplied to said bowl to control the pumping action, and filling containers from the beverage in the filler bowl.

6. The method of supplying a carbonated beverage from a tank to a filler bowl and thence to containers to be filled, comprising, supplying gas to the filler bowl at a predetermined constant pressure, venting gas in excess of said pressure, utilizing a valveless rotary positive displacement pump to pump the beverage from the tank to the filler bowl, utilizing a portion of the gas pressure to control the pumping action in response to the level of liquid in said bowl, and filling containers with beverage from the filler bowl.

7. A device to supply a carbonated beverage from a tank to a filler bowl and thence to containers to be filled, comprising, means to supply gas to said bowl at a predetermined constant pressure above atmospheric, a valveless rotary positive displacement pump adjacent the tank, means to conduct the beverage from the tank to the pump and to deliver the beverage from the pump to the filler bowl, means including a float control in said bowl to govern the operation of the pump by the height of beverage in the bowl, and means to deliver the beverage from the filler bowl to containers to be filled.

8. A device to supply carbonated beverage from a tank to a filler bowl and thence to containers to be filled, comprising, a source of gas under pressure, means to supply gas from said source to the filler bowl at a point above the maximum desired liquid level, a valveless rotary positive displacement pump adapted to supply beverage from the tank to the filler bowl, a float in said bowl adapted to float on the surface of the beverage, means on the exterior of the bowl controlled by said float to control the pump to maintain the level constant, and filler valves in the bottom of said filler bowl to deliver the beverage to containers.

9. A filler system for carbonated beverages which comprises, a filler bowl, a source of beverage supply for said filler bowl, a pipe joining said source of supply with said filler bowl to conduct beverage therebetween, a valveless positive displacement pump having a substantially pulsation free discharge characteristic interposed in said pipe to regulate pressure and velocity within the pipe without substantial fluctuation in either pressure or velocity therein, means to supply counter-pressure above the liquid in said bowl and a plurality of filler valves on the bottom of said filler bowl to supply beverage from the filler bowl to containers to be filled.

10. The method of supplying a carbonated beverage from a tank through a filler bowl and thence through a series of filler valves to containers to be filled, comprising, passing the beverage through a valveless rotary positive displacement pump to supply the beverage from the tank to the filler bowl, continuously filling a series of containers through said valves, regulating the output of the pump to conform to the flow of the beverage into the containers and stop-

ping the pump in the event the supply to the filler exceeds the demand of the filler.

11. The method of supplying a carbonated beverage from a tank through a filler bowl to a series of valves for continuous filling of containers to be filled, comprising, passing the beverage through a valveless rotary positive displacement pump in supplying the beverage from the tank to the filler bowl, continuously filling a series of containers through said valves, regulating the output of the pump by varying the speed thereof to conform to the flow of the beverage into the containers, stopping the pump when the supply to the filler exceeds the demand by the filler valves and re-starting the pump when the demand returns to normal.

12. The method of supplying a carbonated beverage from a tank to a filler bowl, including a pipe line connecting the two which comprises, supplying counter-pressure gas to said bowl, controlling the flow of the beverage through the pipe line by passing the beverage through a motor actuated valveless rotary positive displacement pump whereby the inertia in starting and stopping the pump causes gradual changes in both pressure and velocity in the system, retaining the CO₂ gas in solution in the beverage.

13. The method of supplying a carbonated beverage from a tank through a filler bowl to containers to be filled, comprising, passing the beverage through a valveless rotary positive displacement pump in supplying the beverage from the tank to the filler bowl, continuously filling a series of containers from said bowl, regulating the output of the pump by varying the speed thereof to conform to the flow of the beverage into the containers, stopping the pump when the level of the beverage in the filler bowl rises above a predetermined level and re-starting the pump when the liquid level in the filler bowl drops below a predetermined minimum.

14. A device to supply a carbonated beverage from a tank to a filler bowl, comprising, means to supply gas to said bowl at a predetermined counter-pressure, a valveless rotary positive displacement pump, means to conduct the beverage from the tank to the pump and to deliver the beverage from the pump to the filler bowl, and means responsive to the level of liquid in said bowl to start the pump when the level of liquid falls below a desired minimum and to stop the pump when the level of the beverage rises above a desired maximum.

15. An apparatus to supply a carbonated beverage from a tank through filler valves in a filling machine to containers to be filled, comprising, a valveless rotary positive displacement pump adapted to receive the beverage from the tank and transmit the beverage to the filling machine, a filler bowl in said machine, means to supply gas under a predetermined counter-pressure to the filler bowl above the level of the beverage therein, pressure actuated means responsive to the level of beverage in the filling machine to control the flow of beverage from the pump to the filling machine in the manner to maintain substantially constant level in the filling machine, and a plurality of valves in said filling machine adapted to supply the liquid from the filling machine to containers to be filled.

16. A device to supply a carbonated beverage from a tank to a filler bowl, comprising, a valve-

less rotary positive displacement pump, conduit means to conduct the beverage from the tank to the pump and to deliver the beverage from the pump to the filler bowl, means to start and stop said pump responsive to the level of the liquid in the filler bowl, and means to maintain a predetermined constant counter-pressure on the beverage in the bowl.

17. An apparatus to supply a carbonated beverage from a tank to a filler bowl, comprising, a valveless rotary positive displacement pump adapted to transmit the beverage from the tank to the filler bowl, means to supply counter-pressure gas to said bowl, a float adapted to float on the surface of the beverage and indicate the level of the liquid in the filler bowl, and means actuated by said float to start or stop the pump to regulate the flow of beverage into the filler bowl, whereby the level of the liquid in the filler bowl remains substantially constant within predetermined limits.

18. An apparatus to supply a carbonated beverage from a tank to a filler bowl, comprising, a valveless rotary positive displacement pump adapted to transmit the beverage from the tank to the filler bowl, means to maintain a predetermined constant counter-pressure in said bowl above the beverage, a float adapted to float on the surface of the beverage within said bowl and indicate the level of the liquid therein, and means actuated by said float to start or stop the pump to regulate the flow of beverage into the filler bowl, whereby the level of liquid in the filler bowl remains substantially constant in the bowl.

19. A filler system for carbonated beverages which comprises: a filler bowl, a source of beverage supply for said filler bowl, means to supply counter-pressure gas to said bowl, a pipe joining the source of supply with the filler bowl to conduct beverage therebetween, and a valveless rotary positive displacement pump interposed in said pipe to regulate the pressure and velocity therein without substantial fluctuation in either pressure or velocity during the normal operation of the pump.

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Number	Country	Date
24,634	Great Britain	Oct. 30, 1913