

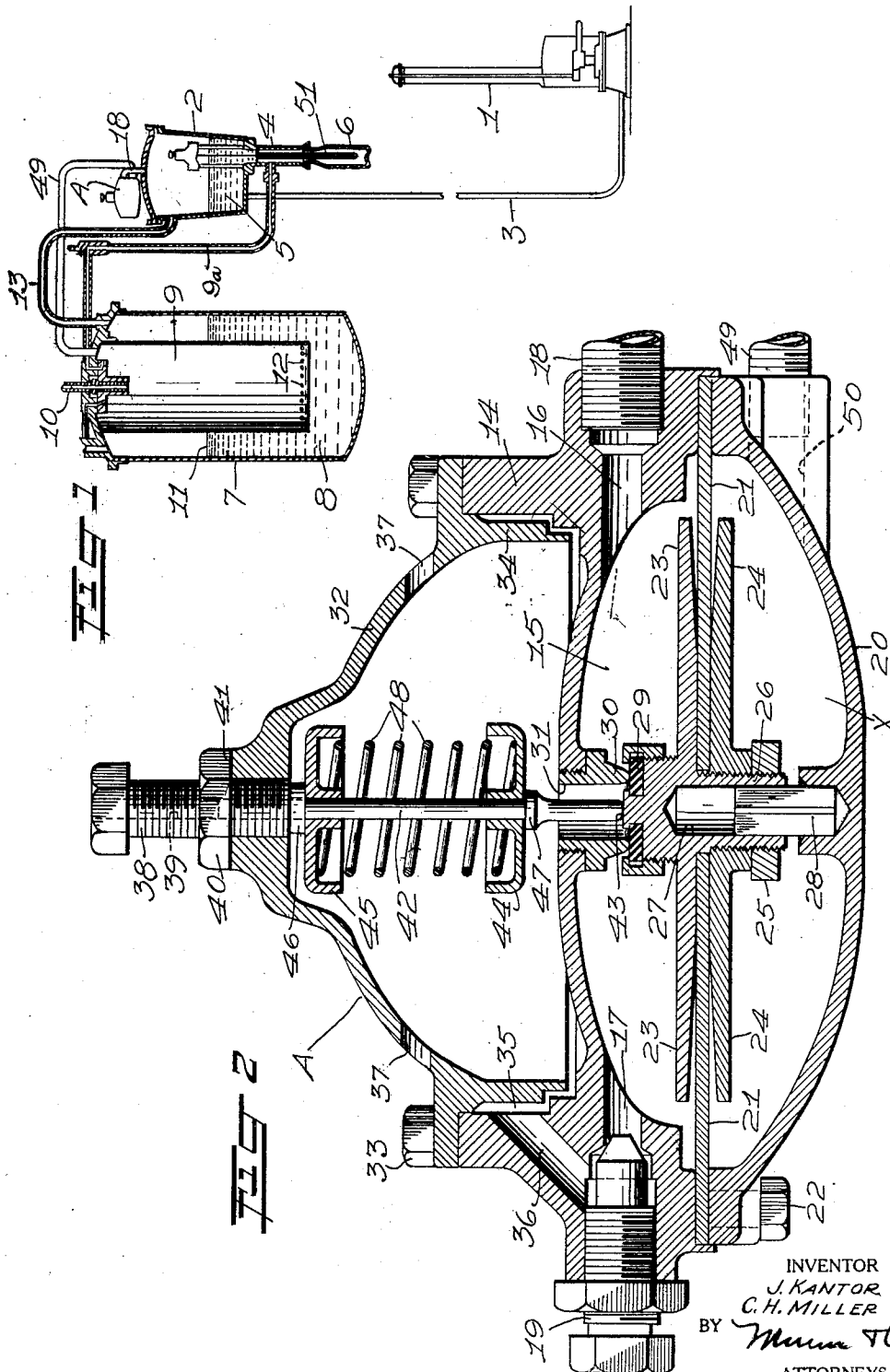
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PRESSURE REGULATOR FOR FILLING MECHANISMS

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PRESSURE REGULATOR FOR FILLING MECHANISMS

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Our invention relates to improvements in pressure regulators for filling mechanisms, and it consists in the combinations, constructions, and arrangements herein described and 5 claimed.

An object of our invention is to provide a filling mechanism in which a novel means is employed for maintaining a predetermined difference between the pressure in the liquid 10 tank and the pressure in the high pressure chamber, irrespective of the pressure in the latter.

A further object of our invention is to provide a device of the type described which will 15 permit a predetermined amount of liquid to pass to the bottles.

A further object of our invention is to provide a device of the type described which will fill all the bottles at an even height.

20 A further object of our invention is to provide a device of the type described which obviates the need of valves, pressure reducers, and other devices disposed between the carbonator and the filling machine which interfere with the general travel of the carbonated 25 water. When the travel of the carbonated water is interfered with, as when drawing the water through a wire mesh, the velocity of the water is increased and the water is substantially broken up, thus causing a portion 30 of the gas to escape therefrom.

A further object of our invention is to provide a device of the type described which has adjustable means for varying the amount of 35 liquid entering each of the bottles.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly 40 pointed out in the appended claims.

Our invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a side elevation of the device, portions thereof being shown in section, and 45

Figure 2 is an enlarged sectional view of a portion of the device.

In carrying out our invention, we provide a carbonator 1 in direct connection with a filler tank 2 by means of a pipe 3. Filling 50 valves 4 are carried by the filler tank 2

and are adapted to permit a liquid 5 which is in the filler tank to pass therethrough. Bottles 6 are disposed in communication with the valves 4 and adapted to receive the liquid 5 as it passes through the valves. 55

A water check tank 7 having a liquid 8 therein is provided with a high pressure chamber 9. Pipe lines 9a provide communication between the pressure chamber 9 and the filling valves 4. An inlet 10 is provided 60 for supplying the high pressure chamber 9 with air under pressure. As the air enters the chamber 9, the liquid 8 which is in the high pressure chamber 9 is forced downwardly, causing the liquid to rise in the water 65 check tank 7 to a point indicated at 11. Openings 12 are disposed in the high pressure chamber adjacent the lower edge thereof for permitting the liquid and the air to pass therethrough. It is obvious that the pressure 70 in the high pressure chamber 9 is greater than the pressure above the liquid in the water check tank 7, the difference being the weight of the liquid from the point indicated at 11 to a point in alignment with the openings 12. A pipe 13 permits communication 75 between the water check tank 7 and the filler tank 2, and the air pressure in the filler tank is equal to the air pressure in the water check tank. 80

A pressure release valve A consists of a body portion 14. The body portion 14 is provided with an arcuate-shaped compartment 15 which has an inlet opening 16 and an outlet opening 17. A pipe 18 is secured 85 at one end to the inlet opening 16 and at the other end to the filler tank 2. The pipe 18 permits the air within the filler tank 2 to pass therethrough and into the compartment 15. An adjustable set screw 19 is movably 90 disposed in the body portion 14 and adapted to limit the amount of air passing through the outlet opening from the compartment 15.

A bottom plate 20 and a diaphragm 21 are removably secured to the body portion 95 14 by means of screws 22. Diaphragm discs 23 and 24 are secured to the diaphragm 21 and to each other. The discs 23 and 24 are locked together by a lock nut 25 which is disposed upon a threaded extension 26 of the 100

disc 23. The extension 26 is provided with an opening 27 for receiving a guide 28 which is rigidly secured to the bottom plate 20.

The disc 23 is provided with a valve 29 which is adapted to engage with a valve seat 30. The valve seat 30 is provided with an opening 31 for permitting air to pass therethrough when the valve has been moved away therefrom.

A cup-shaped cover 32 is secured to the body portion 14 by screws 33. The cover 32 is provided with an annular flange 34 which is spaced away from the inner wall of the body portion 14 so as to provide a passageway 35. An outlet passageway 36 provides a communication between the passageway 35 and the outlet opening 17. Openings 37 are provided in the cover 32 for permitting air to pass outwardly therethrough.

A valve adjusting screw 38 is disposed in the center of the cover 32 and provided with an opening 39 extending longitudinally therethrough. The screw 38 is held in adjusted position by a lock nut 40 which contacts with the cover 32 at 41. A valve rod 42 bears upon the disc 23 at a point indicated at 43. The valve rod 42 extends upwardly through spring retainers 44 and 45, through a washer 46, and into the opening 39 within the adjustable valve screw 38. The valve rod 42 is provided with a shoulder 47 upon which the spring retainer 44 rests. A compression spring 48 is disposed concentric with the valve rod 42 between the spring retainers 44 and 45.

A tube 49 is provided having one end disposed in an opening 50 in the bottom plate 20, and the other end disposed in communication with the high pressure chamber 9.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. It will be observed that the air pressure in the filler tank is equal to the air pressure in the liquid check tank, and that the pressure in the bottle 6 is equal to the pressure in the high pressure chamber 9. It will also be observed that the height of the liquid 5 from the top of the bottle 6 is equivalent to the height of the liquid 8 from the openings 12. Therefore the air pressure in the filler tank 2, together with the weight of the liquid 5 from the top of the bottle 6 is equivalent to the air pressure within the bottle. To permit the liquid 5 to flow into the bottle, an extension valve 51 extends downwardly into the bottle to a point short of the bottom thereof, thus adding approximately $\frac{1}{4}$ pound pressure to the liquid 5. This permits the liquid 5 to flow within the bottle against the pressure therein. The added pressure of the liquid 5 diminishes as the liquid rises in the bottle 6 until it reaches a predetermined point where the pressure within the bottle and the air pressure within

the filler tank, together with the weight of the liquid 5, equalize.

The main purpose of the invention is to provide means for maintaining a difference of approximately five pounds of pressure between the air pressure in the liquid tank and the air pressure in the high pressure chamber. The means for doing this is the valve A. It will be noted that there is air pressure in the chamber, between the bottom plate 20 and the diaphragm 21, which is indicated generally at X. The air pressure in the compartment 15 is equivalent to the air pressure in the filler tank 2. When there are at least five pounds more pressure in the chamber X than in the compartment 15, the valve 29 is held against the valve seat 30 preventing the air from escaping through the opening 31. The adjustable screw 19 may be moved so as to permit any desired amount of air to continuously escape from the filler tank. The reason for this is that the liquid 5 is forced into the filler tank under pressure and this pressure might exceed the pressure in the high pressure chamber if some means were not provided for its escape. Therefore the valve A is so constructed that if the air pressure within the filler tank is equal to the air pressure in the high pressure chamber, the diaphragm 21, together with the discs 23 and 24 and the valve 29, will be moved away from the valve seat 30 and permit air to pass through the opening 31 and the openings 37.

The valve A may be so adjusted that it will be actuated when there is but a fraction of a pound less than five pounds difference between the pressure in the filler tank and the pressure in the high pressure chamber. As for instance, if there are thirty pounds of air pressure in the high pressure chamber, there should only be twenty-five pounds of air pressure in the filler tank, and the valve A could be adjusted so that if the pressure in the filler tank should rise to twenty-five and one-half pounds, the valve would be actuated so as to permit the additional air pressure to escape through the openings 31 and 37. This means includes the adjustable valve screw 38 which may be moved inwardly to increase the tension of the spring 48 so that it will take less air pressure to move the diaphragm 21, so that the valve 29 will be spaced away from the valve seat 30 and permit air to escape there-through. With this construction, the pressure upon the diaphragm 21, by means of the spring 48, may be varied so that the diaphragm 21 may be moved by the air pressure in the filler tank by an increase of anywhere from a fraction of one pound to five pounds of air pressure.

If the difference of five pounds pressure between the filler tank and the high pressure chamber is not maintained, it is impossible to fill the bottles uniformly owing to the air under pressure in the bottles. As for instance,

if the pressure in the filler tank and the pressure in the high pressure chamber were equal, the liquid would rush into the bottles due to gravity, and if there was more than five pounds difference between the pressure in the filler tank and the pressure in the high pressure chamber, the liquid in the filling tank could not flow into the bottles.

We claim:

1. A pressure controlled mechanism comprising a body portion, a plate member connected with said body portion, a diaphragm disposed between said plate member and body portion and connected therewith, said body portion and plate member having oppositely disposed concavities for respectively providing an upper compartment on one side of the diaphragm and a lower compartment on the other side of said diaphragm, means for providing communication between said lower compartment and a container, means for providing communication between the upper compartment and another container, a valve seat disposed on said body portion concavity and provided with an opening therethrough in communication with the atmosphere, and a valve mounted on said diaphragm and normally in engagement with said valve seat, said diaphragm being movable toward the plate member for moving the valve away from the valve seat.

2. A pressure controlled mechanism comprising a body portion, a plate member connected with said body portion, a diaphragm disposed between said plate member and body portion and connected therewith, said body portion and plate member having oppositely disposed concavities for respectively providing an upper compartment on one side of the diaphragm and a lower compartment on the other side of said diaphragm, means for providing communication between said lower compartment and a container, means for providing communication between the upper compartment and another container, a valve seat disposed on said body portion concavity and provided with an opening therethrough in communication with the atmosphere, a valve mounted on said diaphragm and normally in engagement with said valve seat, said diaphragm being movable toward the plate member for moving the valve away from the valve seat, said body portion having an outlet passageway, and valve means disposed in said passageway.

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