

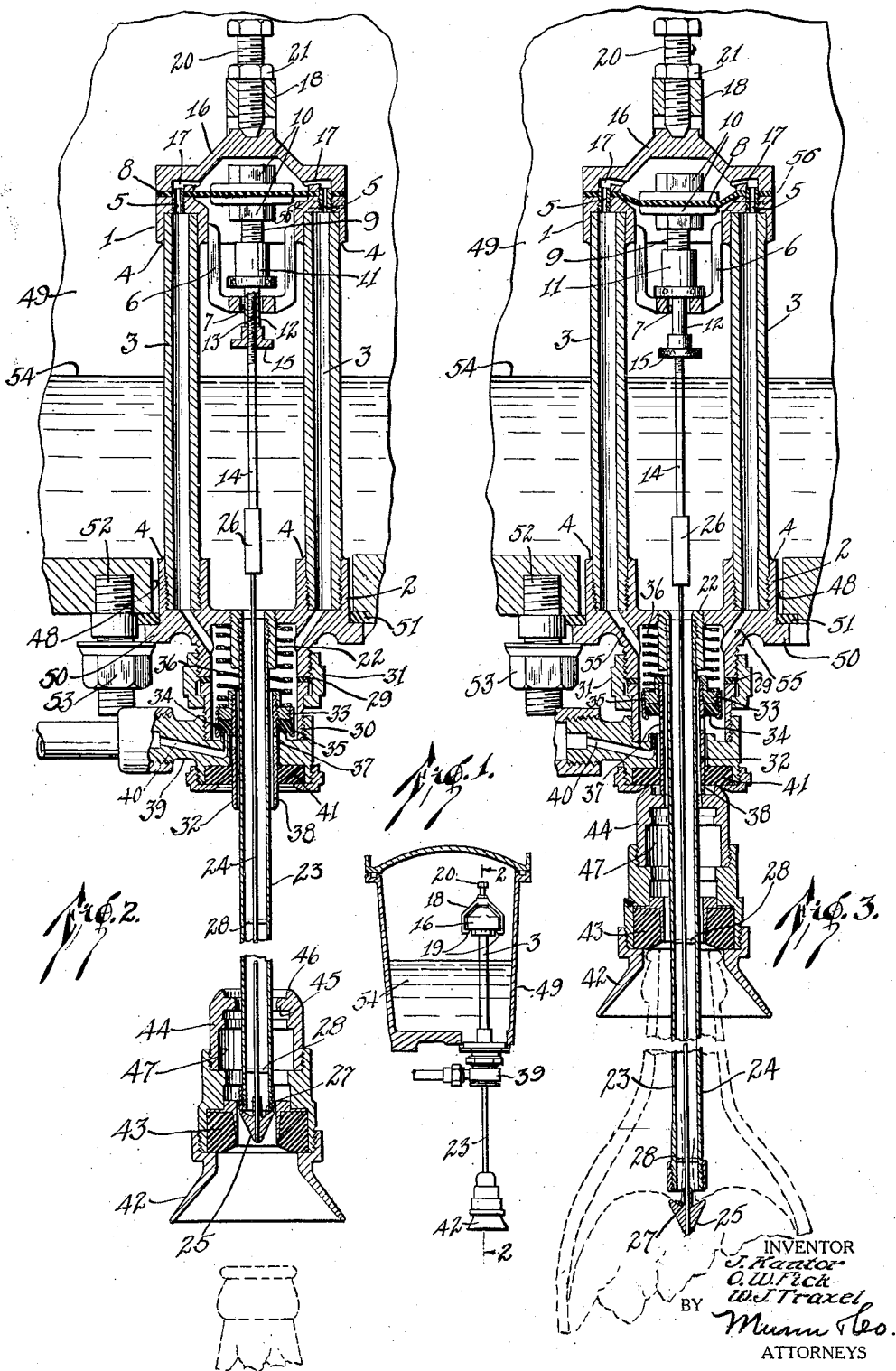
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FILLING MACHINE

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FILLING MACHINE

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Our invention relates to improvements in filling machines, and it consists in the combinations, constructions, and arrangements herein described and claimed.

5 An object of our invention is to provide a filling machine which will fill bottles with charged liquids without the loss of gas, or the production of foam in the bottles.

10 A further object of our invention is to provide a device of the type described which will provide a counter-pressure in the bottle before the liquid valve is opened, the valve being so constructed that when it is opened, the liquid will flow down the inside wall of the bottle without disturbing the substance, such as syrup, which happens to be within the bottle.

15 A further object of our invention is to provide a device of the type described which has means for adjusting the movement of the liquid valve externally.

20 A further object of our invention is to provide a device of the type described which has means for receiving foam, thus permitting the bottle to be filled with the natural liquid when the device is used for bottling heavily charged liquids.

25 A further object of our invention is to provide a device of the type described which will allow the pressure within the bottle to release gradually, thus obviating the disturbance of the liquid which would tend to produce foam as this is a general result from releasing the pressure instantly.

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

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

40 Figure 1 is a front elevation of the device as applied to a liquid tank,

45 Figure 2 is an enlarged section along the line 2—2 of Figure 1, and

Figure 3 is a view of the mechanism shown in Figure 2, showing the device in operation.

50 In carrying out our invention, we provide an upper cage casting 1 and a lower cage

casting 2 connected by tubes 3. The tubes 3 are silver plated on the inside and outside, and are brazed at 4. Vent screws 5 are disposed within the upper cage casting 1 and in communication with the openings in the tubes 3. The upper cage casting is provided with a downwardly extending bracket 6 having an opening 7 therein. A rubber diaphragm 8 having openings therein is placed upon the upper surface of the upper cage casting 1, the vent screws 5 extending through the openings in the diaphragm. A threaded stem 9 is passed through a center opening in the diaphragm and is rigidly secured thereto by clamp nuts 10. An adjusting nut 11 is screwed upon the lower end of the stem 9. The stem 9 is provided with a reduced portion 12 having a threaded opening 13 therein. A rod 14 having both ends threaded is provided with an adjusting lock nut 15 disposed upon the upper end thereof. The upper end of the rod 14 is screwed into the opening 13 and locked in place by means of the nut 15. A cap 16 having angular openings 17 therein is placed upon the diaphragm 8 in such a manner that the free ends of the vent screws 5 will project a short distance within the openings. The openings 17 extend inwardly and downwardly toward the diaphragm 8. The cap 16 is rigidly held in close contact with the diaphragm 8 so as to form an air-tight connection by means of a yoke 18. The yoke 18 is provided with inwardly turned hook portions 19, see Figure 1, which are adapted to extend beneath the lower surface of the upper cage casting 1. A set screw 20 disposed in the upper portion of the yoke is in contact with the cap 16 and locked in any desired position by a lock nut 21.

90 The lower cage casting 2 is provided with a bushing 22 which is threaded to receive the upper end of a filling tube 23. A relatively small rod 24 having a valve 25 disposed on the lower end thereof is passed through the filling tube 23, and is connected to the rod 14 by means of a reducing coupling 26. The valve 25 has an upwardly extending surface 27. The rod 24 has integral guide pins 28 extending outwardly therefrom which hold the 100

rod 24 against lateral movement, and cause the valve 25 to seat perfectly when closed.

A rubber washer 29 is placed upon the under surface of the cage casting 2, and a tail piece 30 is placed adjacent the washer 29 and is rigidly held in place by means of a coupling nut 31 which is screwed upon the threaded portion of the lower cage casting 2. A counter-pressure shut-off valve consisting of a tube 32, a head 33, a rubber seat 34, and a retainer ring 35 is disposed upon the filling tube 23, the head 33 thereof being in communication with a compression spring 36. The tube 32 is provided with relatively large openings 37 and a smaller pressure release opening 38. A filling valve body 39 having an opening 40 therein is screwed upon and soldered to the lower end of the tail piece 30. A rubber seat 41 is disposed within the lower portion of the body 39.

A bottle centering bell 42 carrying a rubber seat 43 is disposed upon the lower portion of the filling tube 23. The bell top 44 is provided with an annular flange 45 and a head 46. The bell top has a relatively large foam chamber 47.

The device is passed upwardly through an opening 48 in a liquid tank 49 until the integral flanges 50 of the lower cage casting 2 abut the lower surface of the tank or a rubber washer 51, and is rigidly held in place by means of studs 52 and nuts 53. The tank 49 is adapted to contain a charged liquid 54. A predetermined amount of air pressure is placed within the tank 49. The opening 40 in the body 39 is in communication with an air pressure cylinder, not shown, which has a relatively greater air pressure therein than the air pressure in the tank 49.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. In Figure 2, we have shown the device in normal position. When a bottle is placed beneath the bell 42 and moved upwardly, the bell is raised until the annular flange 45 strikes the lower surface of the sleeve 32. By continued movement upwardly, the counterpressure shut-off valve is raised to the position shown in Figure 3. The counterpressure air which is in communication with the opening 40 is allowed to pass through the openings 37 in the tube 32, and downwardly between the tube 32 and the filling tube 23, through the chamber 47, and into the bottle. The counterpressure air is also allowed to pass upwardly through the openings 55 in the lower cage casting 2, through the tubes 3, the vents 5, the openings 17, and into the compartment between the diaphragm 8 and the cap 16.

When the air pressure above the diaphragm 8 overcomes the air pressure within the tank 49, the diaphragm is forced downwardly until the adjusting nut 11 strikes the bracket 6. By this movement, the valve 25

is opened, allowing the liquid 54 to pass downwardly through the filling tube 23. As the liquid strikes the surface 27 of the valve 25, the liquid is thrown upwardly and outwardly against the inner wall of the bottle. The filling tube extends far enough into the bottle so that the valve 25, when opened, is just above the syrup which is already in the bottle. By this construction, the distance through which the charged liquid drops is decreased to a minimum, thus greatly helping to prevent undue agitation, and hence foam. The liquid contacts with the inner wall of the bottle in such a manner that it will flow downwardly in a relatively slow stream under a pressure of only one-quarter of a pound, due to the frictional contact with the wall of the bottle and the counter air pressure within the bottle. In this manner, the liquid or syrup already in the bottle is not disturbed in any way so as to create foam. When the bottle is filled with liquid, the bottle is moved downwardly slowly. By a slight movement, downwardly, the head 46 of the bell top is released from the rubber seat 41, thus allowing the counterpressure air which has accumulated on top of the liquid to escape through the opening 38 in the tube 32. This is a means for permitting the counterpressure air to escape gradually. If the counterpressure air was released instantly from the bottle, it would tend to disturb the liquid therein and cause foaming.

A continued downward movement of the bottle causes the counterpressure valve 33 to seat, and thus shut off the counterpressure air, after which the air on top of the diaphragm 8 is released. In this manner, the diaphragm is forced upwardly into normal position by the pressure in the tank, thus closing the valve 25. The counterpressure air shut-off valve is forced downwardly by means of the spring 36, thus closing the opening 40.

If the device is used for filling bottles with heavily charged liquids, it is very difficult to pass the liquid into the bottle without a small amount of foam being created therein. To allow for this, we have provided a foam chamber 47 to permit the foam to pass into and allow the bottle to be filled to a desired height with the liquid.

When the device is used for bottling heavy beer, a heavy foam accumulates in the filling tank of the machine until it reaches the diaphragm 8, or rather the lower surface of the upper cage casting 1. When this happens, there is somewhat of an air cushion formed in the chamber beneath the diaphragm which tends to limit the downward movement of the diaphragm, thus reducing the opening of the valve 25. To dispense with this air cushion, we place an opening 56 within the upper cage casting, extending horizontally

therethrough. This opening permits the air to escape from beneath the diaphragm 8.

We claim:

1. In a device of the type described, a liquid tube, a liquid valve arranged to engage with said tube for stopping the flow of a liquid under pressure therethrough, a counterpressure air inlet, a valve for said inlet, a valve sleeve having an inlet and an outlet opening therethrough, shiftable means arranged to be actuated by a bottle for moving said sleeve and said valve, whereby the counterpressure air may pass from said inlet through said inlet opening in said valve sleeve and into the bottle, the outlet opening in said sleeve being positioned to allow a portion of the air pressure to pass there-through from said bottle for gradually releasing the pressure from the liquid after a portion of the liquid has passed through said liquid tube, and a foam chamber carried by said shiftable means for receiving and removing any foam formed during the filling operation.

2. In a device of the type described, a liquid tube, a liquid valve arranged to engage with said tube for stopping the flow of a liquid under pressure therethrough, a counterpressure air inlet, a valve for said inlet, a valve sleeve having an inlet and an outlet opening therethrough, and means arranged to be actuated by a bottle for moving said sleeve and said valve, whereby the counterpressure air may pass from said inlet through said inlet opening in said valve sleeve and into the bottle, the outlet opening in said sleeve being positioned to allow a portion of the air pressure to pass there-through from said bottle for gradually releasing the pressure from the liquid after a portion of the liquid has passed through said liquid tube, said liquid valve having an upwardly extending outer edge for directing the liquid upwardly and outwardly in all directions to contact with the walls of the bottle.

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