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LIQUID FILLING MACHINE

Filed Sept. 3, 1935

Fig. 1

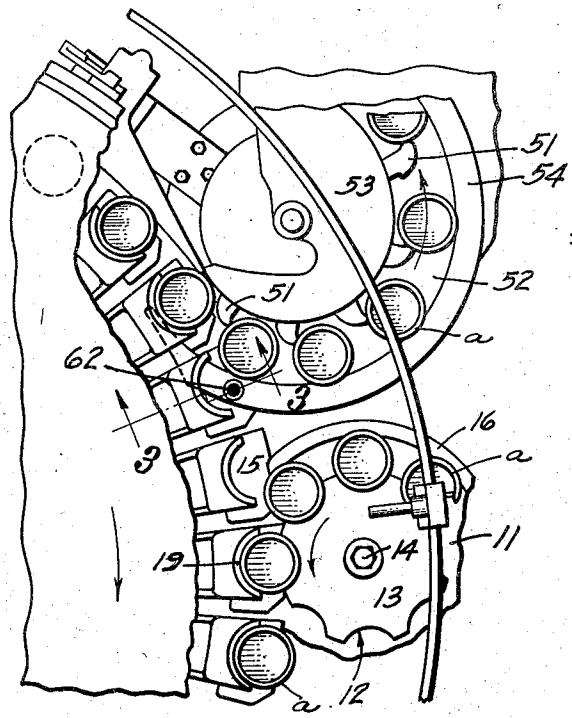


Fig. 2

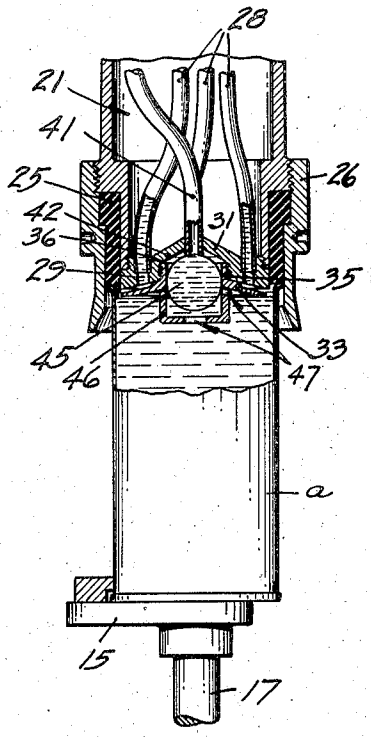
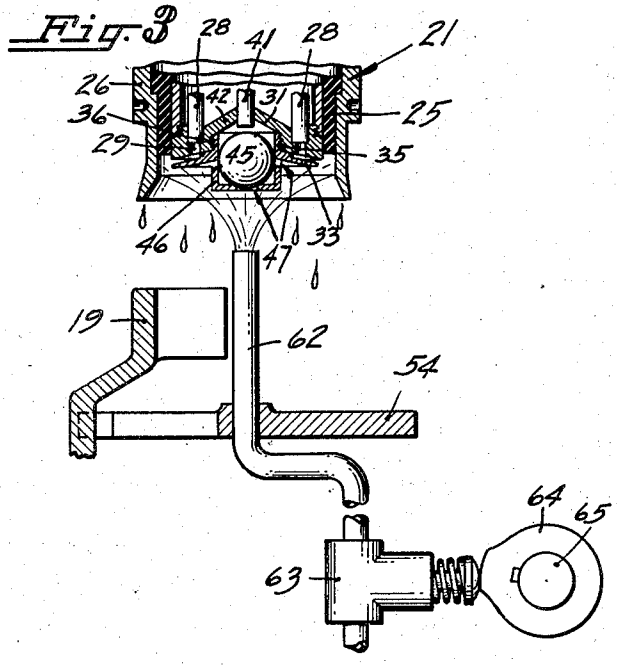


Fig. 3



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LIQUID FILLING MACHINE

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11 Claims. (Cl. 226—98)

The present invention relates to filling machines having one or more filling head units for filling liquids into cans or containers, and has particular reference to devices for flushing out or washing the filling head after a filling operation.

An object of the present invention is the provision of flushing devices for liquid filling machines, the filling heads of which may have movable parts which may become more or less sticky and gummed up when filling certain liquids such as beer, carbonated waters, syrups and the like, the flushing devices operating after each fill to flush or wash off the filling head and particularly its movable parts so as to insure continued free operation and to prevent the formation of foam in a can during a subsequent filling operation, by removing all adhering liquid and foam from the head just before introducing the liquid into the can.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a fragmentary top plan view of a liquid filling machine embodying the instant invention;

Fig. 2 is an enlarged fragmentary vertical section of the lower portion of a liquid filling head showing a filled can held in filling position in the head by suitable can supporting devices; and

Fig. 3 is an enlarged vertical section taken substantially along the broken line 3—3 in Fig. 1 and showing the flushing device in detail.

A preferred embodiment of the instant invention which is disclosed in the drawing is incorporated in a well known type of multiple head filling machine for filling liquids into cans and hence only sufficient of the filling machine is illustrated to impart a clear understanding of the relation of the invention in such a machine and to show the cooperation between associated parts.

Empty open mouth cans *a* are fed into the machine by a continuously rotating turret which places the cans in timed order on separate vertically movable lifter pads which carry the cans through a circular path of travel in the machine. While being thus carried, each can is lifted vertically by its associated pad so that its upper open end is clamped against the bottom of a suitable filling head. While so clamped the liquid is filled into the can.

During this filling operation the can is vented by way of a vent tube disposed in the filling head. The lower end of the tube is protected against the entrance of liquid or foam, as the liquid rises in the can, by a ball float valve confined in a cage and located adjacent the lower end of the tube. Thus it is when the liquid rises in the can and completely fills it that the ball is floated so that it moves against the end of the tube which is thereby closed, the ball being completely surrounded by liquid or substantially so and as long as it is in this condition it continues to block off the tube.

After filling, the supply of liquid is cut off by a suitable valve and the lifter pad is returned to lowered position. The can descending with the pad is thus removed from the filling head and is discharged from the machine by a suitable discharge mechanism. Descent of the can from the head removes the liquid which sustains the ball float and the latter drops down in its cage and away from the end of the vent tube.

When the liquid being filled into the can is of a sticky nature or of a nature which becomes that way in the air such as beer, carbonated water, syrup or the like, the film of liquid left on the ball may later cause trouble, if allowed to remain, by making the ball stick in the cage or against the end of the vent tube. Such a sticking prevents free movement of the ball and renders it inoperative as a float valve.

If the ball sticks against the end of the vent tube during a filling operation the can would be improperly vented. Sticking of the ball in the cage leaving the vent tube open would permit the liquid or foam on top of the liquid to enter and obstruct the tube. In the latter case, following the filling action and with the liquid or foam remaining in the tube such would be injected into an empty can just before the next filling. Such a foam already in a can would start an unnecessary foaming of the liquid during the filling operation.

In order to prevent this sticking action of the ball float in accordance with the present invention, the entire bottom of the filling head including the ball and its cage is flushed out or washed with a suitable cleaning agent such as water or steam to remove all traces of the accumulation of the filling liquid or its foam. This operation is preferably performed after each filled can has been removed from the filling head and before a subsequent can is moved up into it.

A preferred form of the invention is herein disclosed as being embodied in a filling machine which comprises in part a table 11 (Fig. 1) on

which the empty cans *a* are supported as they are individually received in pockets **12** of a continuously rotating turret **13**. This turret is carried on the upper end of a vertical shaft **14** which may be suitably journaled in bearings formed in the table. The turret advances the cans over the table and transfers each can onto a lifter pad **15** (see also Fig. 2) these pads being carried in a movable part of the machine. The cans are guided and held in the turret pockets **12** during this movement and prior thereto by a curved guide rail **16** which is secured to the top of the table **11**.

There are a plurality of lifter pads **15** in the present disclosure, these being arranged to move in a circle and each pad is secured to a vertically movable rod **17** (Fig. 2). The rods **17** may be carried in a suitable carrier frame which is moved continually and in proper time to advance the cans for proper filling. A can when positioned on its lifter pad is centralized and held by a bracket **19** which may be supported by the carrier frame or in other suitable manner.

The can *a* is raised by its lifter pad **15** into engagement with a tubular filling head unit **21** (Fig. 2). There are as many filling head units as there are lifter pads, a head being vertically disposed above its associated pad.

The lower end of the filling head unit **21** carries a rubber or other resilient ring **25** which is held in place by an encircling sleeve or collar **26**. This collar is threaded on to the head unit. The upper, preferably flanged edge of the can body wall engages against this rubber ring, when the can is brought into the head unit and this temporarily seals off the can interior for the liquid filling operation.

While the can is in this sealed off position and while it is being carried along its path of travel through the machine, liquid is filled into the can. The liquid may be introduced into the can by way of suitable filling tubes **28** (Fig. 2) the details of this feature being immaterial to the present invention. The lower end of each tube is confined in a bore **29** formed in a head bottom plate **31** which is threaded into the lower end of the tubular head unit **21**. The bores **29** communicate directly with the can interior.

Liquid entering the can by way of the tubes **28** and bores **29** is deflected against the can body side wall by a deflector disc **33** in such a manner as a minimize foaming of the liquid. This disc is located directly under and spaced away from the bottom plate **31**. At its center the disc is provided with a tubular hub **35** which is threaded into the side wall of a recess **36** formed in the bottom plate. This connection holds the disc in place.

While the liquid is being filled into the can, the latter is vented to permit the escape of any counterpressure or trapped air, introduced gas or whatever may be in the unfilled can. The venting is effected by way of a central tube **41**, the lower end of which communicates with the can interior. This end is confined in a bore formed in the bottom **31** and located at the apex of a conical ceiling or top wall **42** of the recess **36**.

To insure proper filling in a filling machine of this kind it is essential that the vent tube be kept unobstructed during venting and that the entrance of liquid or foam as it rises in the can be prevented. For this purpose a float valve having a ball float **45** is located directly under the lower end of the vent tube. The ball is confined against displacement but freely movable vertically in a cage **46** the walls of which are formed as a part of the deflector disc hub **35**.

The rising liquid entering the can during the filling operation reaches the level of the cage **46** and then enters through a plurality of openings **47** formed in its side wall and bottom. This liquid floats the ball and lifts it against the open lower end of the vent tube thereby sealing the tube against entrance of the still rising liquid or foam.

It should be understood that at this stage of the filling operation the can is nearly filled and further venting is unnecessary. The filling operation, however, continues until the can is completely filled and the liquid passes up into the filling head and completely covers the ball float.

When the can is completely filled, suitable valve devices stop further flow of the liquid. The can may then be lowered to its original position by descent of the lifter pad **15** as the liquid which has filled up in the filling tubes remains there and the displacement of the disc **33** and cage parts **46** in the liquid in the can is sufficient to prevent spilling over when the filled can is removed from the head.

The filled can is delivered adjacent a discharge device which carries it away to any suitable place of deposit. This in many installations would be to a double seamer or other type of closing machine. A combined double seamer receiving and a filler discharge device is shown in Fig. 1. This may comprise a cam actuated finger **51** which engages behind the can and transfers it from the lifter pad **15** to a stationary table **52** across which it is conveyed between guide rails **53, 54**.

Before a new can is brought into the filling head for subsequent filling, the ball **45**, its cage **46**, the disc **33** and the bottom plate **31** are washed off to remove the residual liquid and foam. To do this the filling head unit passes over the upper end of a vertical pipe **62** (Figs. 1 and 3) which is carried in the can guide rail **54**, and which connects with a suitable supply of cleaning fluid such as water, steam, etc. In the instant case water is graphically indicated, see Fig. 3.

A normally closed push valve **63** is connected in the pipe line **62** and is engaged and opened as the head passes over the pipe. When the valve is opened a spray of water is discharged against the ball and filling head unit thus cleaning off any of the liquid which may have adhered thereto after the filling operation. The valve may be actuated by a cam **64** carried on a shaft **65** which may be rotated in time with the other moving parts of the machine, the construction being such that the cam **64** opens the water valve **63** when there is no can under the filling head, and so as to wash the filling heads, one after another, at this time.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, means in said head for filling liquid into the container while in

the head, an upwardly and downwardly movable air-escape valve element in said head, and means disposed below the filling head and operative in an upward direction for removing liquid and foam adhering to said filling head and for releasing said valve element when obstructed, following each filling operation.

2. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, means in said head for filling liquid into the container while in the head, a valve element in said head, and means disposed below the filling head and operative in an upward direction for removing liquid and foam adhering to said valve element and the filling head parts adjacent thereto, and for releasing said valve element following each filling operation.

3. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, means in said head for filling liquid into the container while in the head, instrumentalities for venting the container as the liquid flows therein, a float valve associated with said venting instrumentalities and actuated by the liquid as it fills into the container for closing off said vent instrumentalities against entrance of liquid therein, and means disposed below the filling head and operative in an upward direction for removing liquid and foam adhering to said float valve and the filling head parts adjacent thereto, and for releasing said valve element following each filling operation.

4. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, a valve in said head for controlling the filling of liquid into the container while in the head, means for projecting a cleaning agent against said valve for removing liquid and foam adhering to the same following a filling operation, and elements associated with said liquid and foam removing means for controlling their operation after each filling operation.

5. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, a valve in said head for controlling the filling of liquid into the container while in the head, means for spraying a cleaning fluid against said valve for removing liquid and foam adhering to the same following a filling operation, a second valve associated with said liquid and foam removing means for controlling the operation thereof, and means for actuating said second mentioned valve after each filling operation.

6. In a machine for filling liquid into containers, the combination of a filling head adapted to receive a container to be filled, a valve in said head for controlling the filling of liquid into the container while in the head, means for spraying a cleaning fluid against said valve for removing liquid and foam adhering to the same following a filling operation, a second valve associated with said liquid and foam removing means for controlling the operation thereof, a conveyor for moving said filling head along a path of travel including the zone of said liquid and foam removing means, and means for actuating said second mentioned valve.

7. In a can filling machine the combination of elevating pads for cans to be filled, a filling head having a movable valve for the exit of air from the can as it is filled, means for washing said valve after each filling operation to prevent the subsequent sticking of the valve, and means for operating said washing means when it and the filling head are in registry after the removal of the filled can.

8. In a can filling machine the combination of a carrier for cans to be filled, a filling head having a movable valve for the exit of air from the can as the can is filled, means for washing said valve after a filling operation to prevent subsequent sticking of the valve, and means for operating said washing means when it and the filling head are in registry after the removal of the filled can.

9. In a can filling machine the combination of a carrier for cans to be filled, a filling head having a confined, gravitating valve for the exit of air from the can as the can is filled, means for washing said valve after a filling operation to prevent the subsequent sticking of the valve, and means for operating said washing means when it and the filling head are in registry after the removal of the filled can.

10. In a can filling machine the combination of a carrier for cans to be filled, a filling head having a cage containing a gravitating ball valve for the exit of air from the can as the can is filled, means for washing said cage and valve after a filling operation to prevent the subsequent sticking of the valve, and means for operating said washing means when it and the filling head are in registry after the removal of the filled can.

11. In a can filling machine the combination of a carrier for cans to be filled, a filling head having a cage provided with an aperture in its bottom and a ball in said cage to open said aperture for the exit of air from the can as the can is filled, means for washing said valve after a filling operation to prevent the subsequent sticking of the valve, and means for operating said washing means when it and the filling head are in registry after the removal of the filled can, said washing means acting on the cage and on the bottom of the ball through said aperture to loosen said ball.

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