Aug. 11, 1942. W. I. GLADFELTER 2,292,754

FILLING MECHANISM

Original Filed Nov. 23, 1935

Fig. 1.

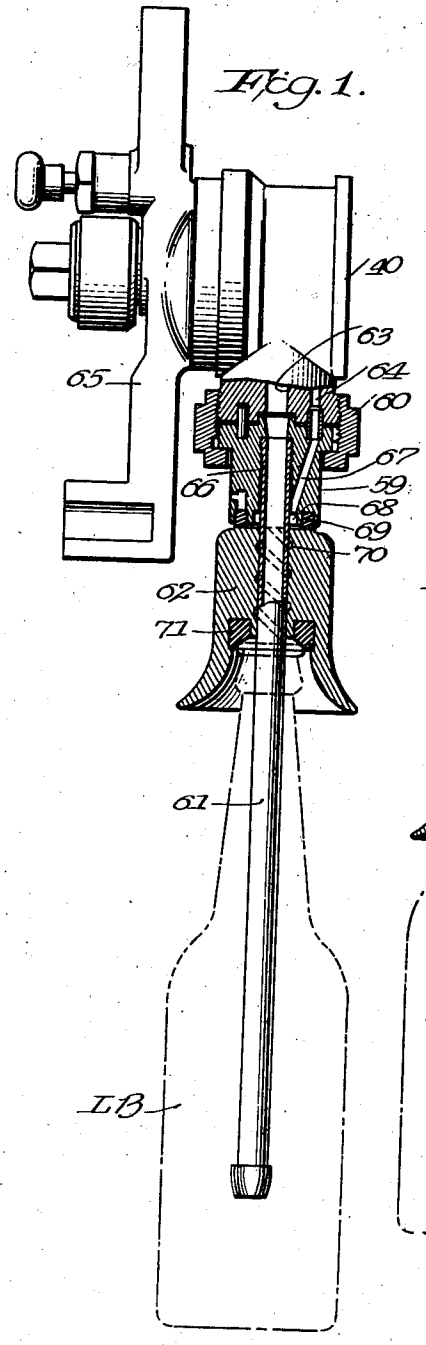


Fig. 2.

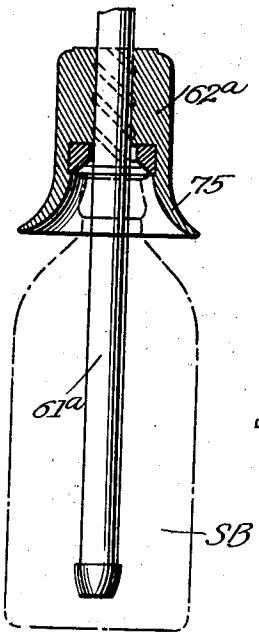
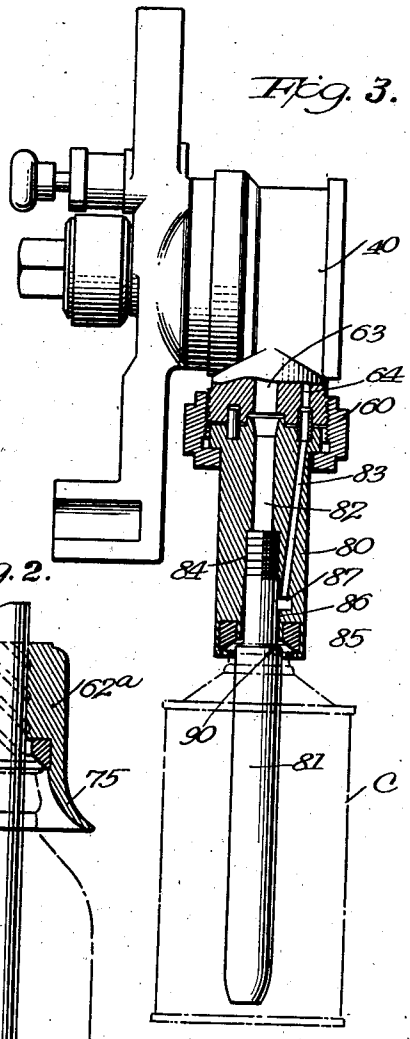


Fig. 3.



Inventor:

Wiltie I. Gladfelter,

By Cushman, Darby & Cushman

Attys.

Patented Aug. 11, 1942

2,292,754

UNITED STATES PATENT OFFICE

2,292,754

FILLING MECHANISM

Wiltie I. Gladfelter, Philadelphia, Pa., assignor to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Original application November 23, 1935, Serial No. 51,291. Divided and this application May 19, 1939, Serial No. 274,645

4 Claims. (Cl. 226—129)

The present invention relates to filling mechanisms, and, more particularly, to mechanisms for filling either bottles or cans. The application is a division of my application for Filling and crowning mechanisms, Serial No. 51,291, filed November 23, 1935.

Filling machines now in use are not capable of filling all of the various types of containers used for beer, viz., long-necked bottles of the well known form, short-necked bottles, and cans, because of the marked differences in the shapes of these various types of containers.

Different problems are presented in the filling of each of the types of containers mentioned, both because of the differences in the shapes of the three types, and also because of the fact that they are formed of different materials.

Bottles cannot always be molded with their mouths uniformly concentric with the axis of the body portion of the bottle. Therefore, some means must be provided upon the lower portion of a filling head for bottles to insure that the mouths of the same will be accurately centered with respect to such heads. Since the mouths of the bottles are not necessarily perfectly concentric with the axis of the body portion, and also because the body portions are not of perfectly uniform diameter, the spider or other member which presents the bottle to the filling head cannot be of such shape as to have a perfect fit about each bottle and cannot be relied upon, alone, to center the mouth of the bottle with respect to the filling head.

All of the above-mentioned irregularities with regard to bottles particularly apply to long-necked beer bottles, some of which were molded perhaps twelve years ago, at which time bottle molding apparatuses had not reached the present degree of perfection. The new short-necked bottles, made with present day improved apparatus, do not lack uniformity to such a substantial degree.

In the filling of cans, since these are formed of metal, and with present day improved apparatus, they can be produced with substantially uniform dimensions and therefore can be readily centered with respect to the filling head by spiders or other means having pockets of uniform shape and without the necessity of any centering means upon the filling heads themselves.

Various problems arise in the filling of the three types of containers referred to above, because of the fact that they are of different shapes. That is to say, the well known type of beer bottle is provided with a long neck, whereas the new type bottle, and also the can, are provided with extremely short necks. This difference in shape is particularly important in connection with the flowing of counterpressure gas to the containers during the filling cycle. Quite frequently during the filling stage of the filling cycle, when the counterpressure gas is being vented from the container to permit liquid to flow into the same, a small amount of liquid will flow upwardly into the counterpressure passage. Such liquid will remain in the passage until a second container is placed beneath the filling head and the filling valve is actuated to cause gas to flow downwardly through the counterpressure passage. When this flow occurs, the liquid will initially flow from the passage. If the counterpressure passage is so designed that the gas and any liquid which may precede the same can drop directly downwardly into the container, the impact of the liquid with the bottom of the container will cause foaming and such foaming may continue after the flow of liquid during the filling stage has started. It is therefore desirable to so form the counterpressure passage that it will direct counterpressure flow outwardly against the side walls of the bottle so that any liquid in the passage may flow quietly downwardly along the walls of the container.

It is usual to have the counterpressure passages provided in the centering bell used for filling beer bottles, but since a centering bell cannot be used with a can, due to the shortness of its neck, it is necessary to provide other arrangements to insure that liquid in the counterpressure passage will be directed against the inner wall of the can mouth.

It will be appreciated from the foregoing that even the above-mentioned differences between the three types of containers now used for beer would make it necessary for a bottling plant desiring to use all three types of containers, or any two of them, to install separate machines or units to handle each type. In view of the present demands of the consuming public, each plant must be able to market beer in containers of at least two, if not all three, of the types referred to, and it is therefore highly desirable that a machine be provided which will be universally applicable.

The principal object of the present invention is to provide a filling mechanism which will be readily adapted for the filling of various types of containers, of both glass and metal, and which

will also be adjustable to operate upon a wide size range of containers.

Another important object of the invention is to provide a filling head which will be readily adaptable for the filling of either long or short-necked containers.

Other objects and advantages of the present invention will be apparent from the following specification and drawing, wherein—

Figure 1 is a side view, partly in section, showing the elements used for filling a long-necked bottle;

Figure 2 is a view similar to Figure 1 showing the elements used in filling a short-necked bottle, and

Figure 3 is a view similar to Figure 1 showing the elements used for filling a can.

It will be understood that throughout the present description of the invention, the operation is described for a long-necked bottle, short-necked bottle and can, each of like capacity, and that the sizes of the various elements may be suitably changed, and the machine likewise adjusted to accommodate a series of long-necked bottles, short-necked bottles and cans of other capacities.

The filling heads **40** shown in the drawing are generally similar to those disclosed in the divisional application of Robert J. Stewart and myself for Filling machine, Serial No. 128,300, filed February 27, 1937, and when a long-necked beer bottle LB of the well known type is to be filled, the filling head **40** is fitted with a nozzle supporting collar **59** shown in Figure 1 and secured to the lower surface of the head by a ring-nut **60**. The collar **59** carries a filling nozzle **61** with a centering bell **62** slidable thereon, all of these elements being identical with those disclosed in the last-mentioned application, and, as explained in that application, the filling head is provided with a liquid passage **63** and a counterpressure passage **64**, flow through which is controlled by a filling valve **65**. The collar **59** is provided with a bore **66** into which the upper end of the filling nozzle **61** is threaded, this bore and the filling nozzle being aligned with the liquid passage **63** of the filling head body. The collar **59** is also provided with a passage **67** having its upper end aligned with the lower end of the counterpressure passage **64** of the filling head body, the lower end of the passage **67** opening to a counterbore **68** concentric with the bore **66**.

As is shown in Figure 1, when the centering bell **62** is in upward position with its upper end bearing upon the resilient packing member provided on the underside of the collar **59** concentric with the counterbore **68**, the counterbore **68** comprises a chamber into which opens the upper end of a spiral passage **70** extending through the centering bell around the outer wall of the filling nozzle **61**. By the above arrangement, when a long-necked bottle LB is positioned upon a container supporting platform, not shown, beneath the head, it will be moved upwardly about the filling nozzle **61** in the usual manner by the rise of the container supporting platform as the latter is rotated away from the stationary table, and the contact of the mouth of the bottle with the underside of the centering bell will cause the centering bell to properly center the bottle with regard to the filling nozzle **61**. The continuing upward movement of the bottle about the centering nozzle will result in contact of the centering nozzle against the packing **69** of collar **59** and the sealing of the mouth of the bottle against the resilient insert **71** in the bell.

When the filling valve **65** is actuated to cause counterpressure gas to flow into the bottle through the passages **64**, **67** and spiral passage **70**, the conformation of the latter passage will cause this gas to flow tangentially outwardly and downwardly from the centering bell and against the inner wall of the neck of the bottle. The provision of the spiral passage **70** is important because during the filling of a bottle, beer may flow upwardly from the bottle into the lower portion of the counterpressure passage and such beer will be retained in this passage until the filling valve is actuated to flow counterpressure gas into the next succeeding container. If such liquid were free to drop straight downwardly into a bottle, some foaming might occur and foaming of the beer flowed into the bottle during the subsequent filling stage might be initiated. The provision of a spiral outlet passage for the counterpressure gas to direct such gas or any liquid which may be in the passage outwardly against the inner wall of the container will obviate the possibility of the foaming referred to.

As shown in Figure 2, in the filling of a short-necked bottle SB, the filling nozzle **61** and centering bell **62** shown in Figure 1 for filling a long-necked bottle would be replaced by a filling nozzle **61***a* and centering bell **62***a*. The filling nozzle **61***a* would be threaded in the collar **59** and is identical in construction with the filling nozzle **61** but is somewhat shorter than the latter, though of sufficient length to permit the beer to flow into the bottle from a point closely adjacent the bottom of the bottle to prevent foaming. The nozzle is also of such diameter as to displace a predetermined quantity of beer so that when the nozzle is drawn from the entirely filled bottle, the level of the beer will be at the proper point. The centering bell **62***a* is exactly similar to the centering bell **62** except that its skirt **75** is shorter than the skirt of the bell **62** and flared to a slightly greater extent, this construction permitting the bell to properly accommodate the short-necked bottle without contacting with the upper shoulder of the body portion of the bottle.

In the filling of cans C as shown in Figure 3, the filling nozzle supporting collar **59** and the filling nozzles and centering bells illustrated in Figures 1 and 2 would be replaced by the filling nozzle supporting collar **80** and filling nozzle **81** illustrated in Figure 3. As is shown in the latter figure, the collar **80** is secured to the lower portion of the filling head **40** by the ring-nut **60** so that a central bore **82** and an inclined bore **83**, both in the collar, will have their upper ends aligned with the liquid flow passage **63** and counterpressure gas passage **64**, respectively, of the filling head body portion. The center passage **82** of the colllar **80** is counterbored as indicated at **84** to a point substantially midway of the latter and the upper end of the filling nozzle **81** is threaded into this counterbore, as shown. A packing or sealing ring **85** is secured in the lower end of the collar **80** so that when a container is in filling position, its mouth will be sealed to the collar as shown in Figures 1 and 2. A counterbore **86** extends upwardly from the lower end of the collar, within the packing ring **85**, and opens to the lower end **87** of the counterpressure passage **83**.

When the filling nozzle **81** is threaded into the counterbore **84**, the provision of the counterbore

86 will provide a relatively narrow annular passage 86 about the exterior of the filling nozzle within the collar 80 and concentric with the nozzle. The provision of this narrow passage will enable counterpressure gas to flow downwardly from the collar 80. In order that such gas, and also any liquid which may be present in the passage, will be directed outwardly and against the inner wall of the mouth of the can C, a shoulder 90, preferably concavely arcuate in vertical cross-section, as shown in Figure 3, is provided upon the filling nozzle 81. Gas or liquid flowing downwardly from the passage 86 will abut against the shoulder 90 and be deflected outwardly so that liquid will flow quietly down the inner wall of the container. It is of course important that the shoulder 90 be properly positioned with respect to the mouth of the can, but the provision of the counterbore 84 in the collar 80 provides a shoulder against which the upper end of the filling nozzle may abut when it is threaded into the collar, thereby fixing the position of the shoulder 90 with respect to the lower end of the collar 80.

The filling nozzle 81 is of shorter length than the filling nozzle 61*a*, but is of sufficiently large diameter to displace enough liquid that, when the filling is completed, a space will be left about the level of the beer in the can to allow for expansion of the beer during subsequent pasteurization.

For filling long-necked bottles LB, the upper portion of the filling mechanism would be adjusted to the proper height with respect to the filling table 32 and each filling head 40 fitted with a collar 59, filling tube 61 and centering bell 62 as illustrated in Figure 1. As the filling mechanism rotates, each bottle will be filled with counterpressure gas through the passages 64, 67 and 70 and liquid will be subsequently flowed into the bottles through the nozzle 61.

In order to fill short-necked bottles, as shown in Figure 2, each collar 59 would have the filling nozzle 61 and centering bell 62 removed therefrom and replaced with a nozzle 61*a* and centering bell 62*a*. The upper portion of the filling mechanism would be lowered to the proper height for the shorter bottles and the mechanism would then be ready for operation. As the bottles move about the table, counterpressure gas would flow downwardly into each bottle through the passages 64, 67 and 70 and against the inner wall of the neck of the bottle. Subsequently, beer would flow downwardly into the bottle through the nozzle 61*a*.

For filling cans C, as shown in Figure 3, the filling heads would be equipped with the collars 80 and nozzles 81 and the upper portion of the filling mechanism would be lowered to the proper extent to have the mouths of the cans contact with the sealing ring 85 in each collar. In filling, counterpressure gas would flow downwardly into the cans through the passages 64, 83 and 86 into contact with the shoulder 90 on nozzle 81, the shoulder deflecting any liquid which may be in the passages against the inner wall of the neck of the bottle. Subsequently, beer would flow downwardly into the bottle through the nozzle 81.

It will be understood that the invention is not limited to the details of construction shown in the drawing and that the phraseology employed in the specification is for the purpose of description and not of limitation.

I claim:

1. The combination in a filling head, of a body portion provided with a counter-pressure flow and return passage, a filling nozzle carried by the body portion, the outlet of the counter-pressure passage being positioned adjacent the filling nozzle, and means on the filling nozzle to deflect fluid outwardly from the nozzle.

2. The combination in a filling head, of a body portion provided with a counter-pressure flow and return passage, a filling nozzle carried by the body portion, the outlet of the counter-pressure passage being positioned adjacent the filling nozzle, and the filling nozzle having an exterior shoulder adjacent the passage outlet against which fluid will contact to be deflected outwardly from the nozzle.

3. The combination in a filling head, of a body portion, a filling nozzle, a member to support the filling nozzle on the body portion, said body portion and member having two aligned passages therein, one for the flow of liquid and the other for the flow and return of counterpressure gas, the member and filling nozzle being formed to provide a space between the same at the lower portion of the member and to which the counterpressure passage of the member opens, and a shoulder about the filling nozzle adjacent the lower portion of such space to direct the counterpressure fluid outwardly from the filling nozzle.

4. The combination in a filling head, of a body portion, a filling nozzle, a member to support the filling nozzle on the body portion, said body portion and member having two aligned passages therein, one for the flow of liquid and the other for the flow and return of counterpressure gas, the member and filling nozzle being formed to provide a space between the same at the lower portion of the member and to which the counterpressure passage of the member opens, a shoulder about the filling nozzle adjacent the lower portion of such space to direct the counterpressure fluid outwardly from the filling nozzle, and means to contact with the mouth of a container carried by said member above the shoulder on the filling nozzle.

WILTIE I. GLADFELTER.