May 15, 1951 P. R. FECHHEIMER 2,553,447.

SEALING MEMBER FOR FILLING MACHINES

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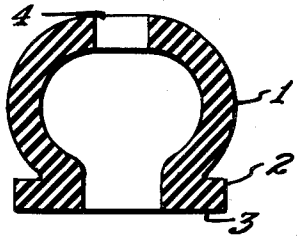


FIG. 2.

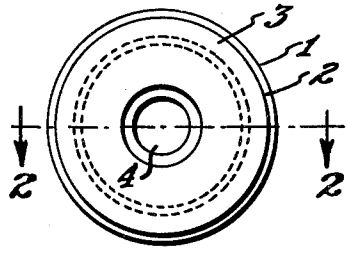


FIG. 1.

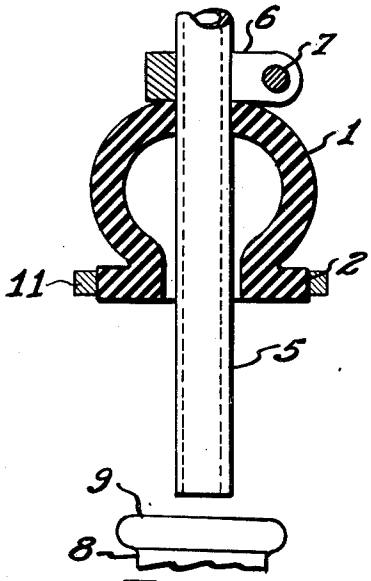


FIG. 3.

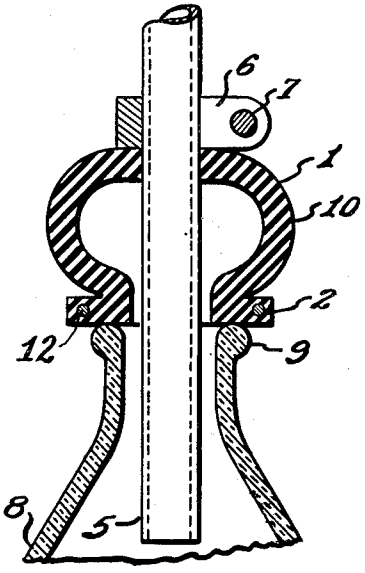


FIG. 4.

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SEALING MEMBER FOR FILLING MACHINES

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3 Claims. (Cl. 226—19)

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My invention has to do with filling machines, and particularly with that type of filling machine in which bottles or the like are filled by exhausting the air therefrom and creating a vacuum which causes the liquid to enter the bottle under atmospheric pressure. Machines of this class, for example the machine of U. S. Patent 1,763,240, comprise, in general, a base upon which is mounted a central, rotating, upright column having a table fixed thereon. Bottle platforms or lifting trays are mounted on the table for moving bottles into and out of contact with filling heads mounted at the top of the column and positioned centrally over each lifting tray, whereby a bottle, when placed on the tray, may be pressed upwardly into contact with the filling head for a filling operation and then lowered for removal from the machine. Each filling head includes a filling stem for insertion into the mouth of the bottle and a sealing means mounted on the filling stem to contact the mouth of the bottle and form a seal therewith during the filling.

In devices of this character it is essential to effect an airtight closure between the bottle being filled and the filling head, since otherwise the vacuum necessary to fill the bottle cannot be attained. This airtight closure is effected by the top of the bottle being thrust firmly against a rubber sealing means by the lifting tray and retained there until the filling operation is completed.

It is well known that bottles are not always of uniform height, and in order to fill bottles of slightly varying heights and still maintain a tight seal between the mouths of the bottle and the sealing means on the filling head it is necessary to compensate for the variation in height. This might be attempted by resiliently mounting the lifting trays, the elasticity so provided being sufficient to take care of any inequalities in bottle size. Another way of taking up the variation in individual bottle size is to provide a compressible rubber sealing member on the filling stem against which each bottle is pressed, the slightly shorter bottles compressing the seal to a lesser extent than the bottles of slightly greater dimension. In automatic filling machines of the rotary type, it is generally considered preferable to take up variations in bottle height by compressing the rubber sealing member rather than by placing the container being filled on resiliently mounted trays.

An exemplary rubber sealing member for use in the type of filling machine herein described is

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shown in Patent No. 1,572,150 issued February 9, 1926, to Karl Kiefer and entitled Filling Machines. It comprises a cylindrical member of rubber extending along the filling stem, its lower end forming an annular contacting area. However when such a sealing member is compressed radial expansion tends to occur at its bottom, and this radial expansion, within the limits of ordinary bottle variations can be so severe as to permit entry of the mouth of the bottle into the central hollow of the sealing member, which will prevent the bottle from being lowered away from the filling head at the conclusion of the filling cycle.

It is a principal object of my invention to provide, in a filling machine of the type described, a sealing member which will permit extreme compression of the sealing surface with minimum radial distortion.

In is an object of my invention to provide a sealing member of which the bottom, or sealing surface, will be raised by the bottle, and in which this action is resisted not by the rubber in compression, but rather by a resilient bending of the walls of the sealing member.

It is another object of my invention to provide a sealing gasket in which the sealing surface is movable vertically without radial distortion.

Another object of my invention is to provide a sealing member with a broad annulus as a sealing surface, which offers greater resistance to radial expansion than the upper walls do to bending.

These and other objects of my invention which will be apparent upon reading these specifications or will be pointed out hereinafter, I accomplish by that arrangement of parts of which I shall now describe an exemplary embodiment.

Reference is made to the drawings wherein:

Figure 1 is a plan view from beneath the sealing member.

Figure 2 is a cross-sectional view taken along line 2—2 of Figure 1.

Figure 3 is an elevational view illustrating the sealing member fitted to the filling stem prior to contact with the bottle.

Figure 4 is an elevational view showing the gasket in airtight contact with the mouth of the bottle.

Referring to Figures 1 and 2, I have shown a sealing member formed of rubber and comprising a hollow spherical body having walls 1 substantially circular in cross-section, open at the bottom, and forming a relatively heavy annulus 2 having a sealing surface 3. The heavy annulus

2 for contacting the necks of bottles may be shaped on its under or contacting surface in any way suitable for making a seal, and may have a lower surface which is either concave or convex. In commercial practice a flat annulus is ordinarily used. The top of the spherical body portion is provided with an opening 4 centered about the vertical axis of the sphere and of a diameter sufficient to engage the filling stem of the filling machine frictionally. The annulus forming the bottom of the sealing member is also centered on the vertical axis of the spherical body portion, but has an internal diameter greater than the outside diameter of the filling stem to permit movement of the sealing surface without friction against the stem.

The walls of the sealing member as well as the annulus are preferably of resilient rubber, the walls being relatively thin in comparison to the thickness of the annulus. In this way the walls of the sealing member will bend, permitting upward movement of the annulus without producing distortion of the annulus when the mouth of the container is forced against it.

In Figure 3 the sealing member is shown mounted frictionally on the filling stem 5 of an automatic filling machine, being held at a desired height by means of split collar 6 and with a clamp screw 7 through the split side, the split collar to keep the sealing member from riding upwardly on the filling stem. A bottle 8 with mouth 9 is shown in position beneath the filling stem prior to the lifting of the bottle mouth into contact with the sealing surface 2 of the annulus.

In Figure 4 the bottle is shown in lifted position with the filling stem inserted and the sealing member under vertical compression. As the bottom or sealing surface is raised by the bottle, the walls of the sealing member bend or fold as shown at 10.

I have thus eliminated an objectionable feature of prior devices which was their tendency to bell outwardly at the lower part of the seal, thus allowing the mouth of the bottle to enter the hollow interior of the sealing member. This condition cannot obtain in my device, for the relatively heavy annulus offers much greater resistance to radial expansion than the upper body walls do to bending. Therefore these upper walls will bend laterally under the pressure of the bottle while the annular ring contacting the mouth of the bottle rides vertically upward, retaining its original shape and diameter. When the filling operation is complete, the bottle will be lowered, and the gasket, being resilient, will return to its original shape, breaking the seal, ready to accept the next bottle.

The sealing ring or annulus at the bottom of the gasket can be further restrained from radial expansion by means of a metallic ring or collar 11 (see Figure 3) placed about the annulus after it has been molded; or, a metallic ring 12 (see Figure 4) may be molded directly into the annulus itself and become an integral part thereof.

While I have described my invention in connection with the automatic filling machine of the rotary type, it is obvious that a sealing member of the present invention may be employed in other types of filling machines, and I do not wish to be limited to the exemplary embodiment described herein.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A unitary sealing member for filling machines comprising a hollow spherical body terminating at its lower extremity in a broad annulus the lower surface of which constitutes a sealing surface for contact with the upper lip surface of a bottle, said sealing member being formed of resilient material with said spherical body characterized by relatively thin flexible walls and said annulus by a heavy substantially non-flexing wall structure adapted to offer greater resistance to radial expansion than said spherical body does to flexing, whereby when upward pressure is applied to the sealing surface of said annulus by the upper surface of a bottle pressed thereagainst, said spherical body will flex radially outward and said annulus will move bodily upward without substantial distortion.

2. The structure of claim 1 in which said annulus includes a metallic ring as an integral part thereof.

3. The structure of claim 1 in which a metallic ring is fitted about said annulus whereby distortion of said annulus is prevented.

PAUL R. FECHHEIMER.

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