March 29, 1949. L. M. MALLICK 2,465,894

BOTTLE CLOSURE

Filed Dec. 29, 1945

Fig. 1

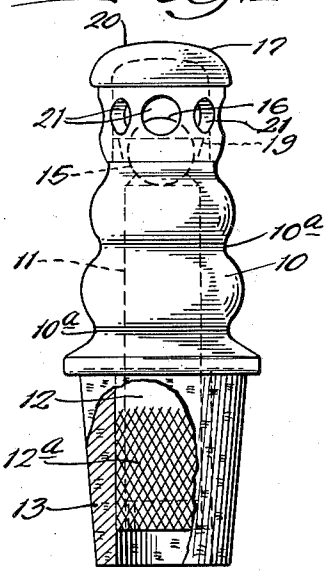


Fig. 2

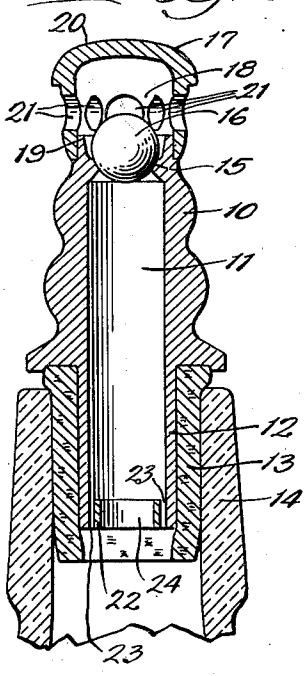


Fig. 3

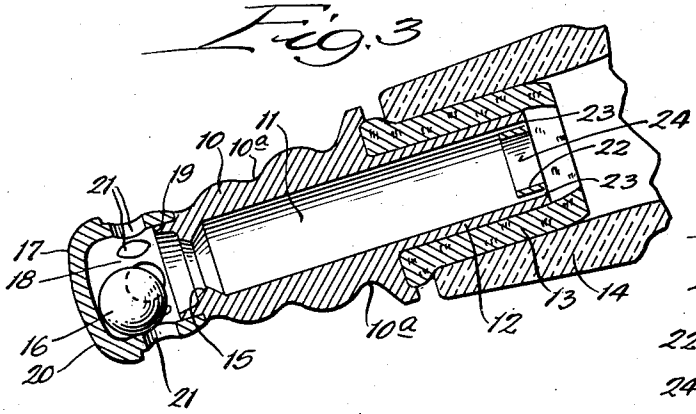
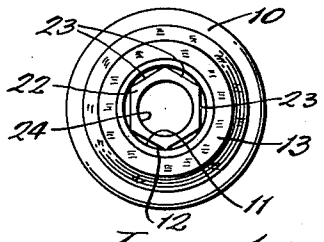


Fig. 4



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UNITED STATES PATENT OFFICE

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BOTTLE CLOSURE

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1 Claim. (Cl. 215—75)

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This invention relates to a bottle closure, and more particularly to a bottle closure which permits pouring of the contents of the bottle automatically upon the tilting of the bottle to pouring posiion. The invention will also be found applicable to other types of bottle closures and closures for containers.

This application constitutes a continuation-in-part of my co-pending application Serial No. 614,097, filed September 4, 1945, for Bottle closure, now Patent No. 2,437,882, dated March 16, 1948.

In the pouring of liquids from a bottle through a bottle closure having an automatic seal therein, it is found that bubbles collect in the outlet passage, and the bursting of the bubbles causes the liquid on reaching the outlet chamber to be splashed through a number of the outlet openings instead of flowing evenly and quietly out of the outlet ports. A further disadvantage with closures of the above type is that the cork around the inlet end of the fitting, which clings to the bottle after use, does not grip or hold the closure fitting itself so that there is a tendency for the fitting, which may be relatively heavy, to slip out of the cork sleeve during the pouring operation.

An object of the invention is to overcome the above disadvantages by providing a new type of bottle closure. Another object is to provide means for preventing the lateral splashing of liquid from the outlet ports of a bottle closure through the use of means in the inlet portion of the passage whereby bubbles are broken and a smooth even flow of liquid produced. A further object is to provide a bottle closure device equipped with means for locking the closure fitting tightly to the bottle neck through means of the resilient sleeve. Other objects and advantages will appear as the specification proceeds.

The invention is illustrated in a preferred embodiment by the accompanying drawing, in which—

Figure 1 is a side view in elevation of a bottle closure embodying my invention, a portion of the drawing being broken away around the cork or resilient sleeve; Fig. 2, a vertical sectional view of the closure fitting shown applied to the neck of a bottle; Fig. 3, a view similar to Fig. 2 but showing the bottle inclined to pouring position; and Fig. 4, an end view showing the inlet portion of the closure fitting.

In the illustration given, 10 designates a casing member formed of aluminum or other suitable material and provided with a drain passage 11 extending therethrough. The lower portion

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of the casing 10 provides a tubular member 12 receiving a sealing sleeve 13 of cork or any other suitable resilient or sealing material, the sleeve being effective in providing an airtight seal with the bottle neck 14.

In order to prevent fitting 10 from slipping out of the sleeve 13, I provide the outer portion of the member 12 with knurling 12a, as indicated in Fig. 1. With this structure, when the casing 10 is pressed to the position shown in Fig. 1, the sleeve 13 is pressed inwardly so that portions of it extend within the spaces or interstices provided by the knurling 12a and thus make it impossible for the member 12 to slip out of the sleeve 13. Preferably, the knurled portion 12a is slightly raised above the adjacent portions of the outer surface of member 12 and this increases the interlock described.

With the above-described structure, under the pressure exerted upon sleeve 13 it is substantially impossible to draw the member 12 outwardly without at the same time drawing the sleeve 13 out of the neck 14 of the bottle. When the assembled structure is completely out of the bottle, the cork or sleeve 13 may be removed with ease because there is no longer any inward pressure against the cork which interlocks it with the knurling 12a.

The upper part of the casing 10 provides a valve seat 15 adapted to receive a ball 16 of Monel metal, stainless steel, or any other suitable material, to provide an airtight seal with the seat 15.

A crown member 17 provides with the upper enlargement of casing 10 a valve chamber 18 in which the ball 16 may move to sealing and unsealing position.

Any suitable means for securing casing 10 and crown member 17 together may be employed. I have found that a press fit is very satisfactory, employing suitable pressure, say, for example, 600 pounds. It will be understood that any suitable means for securing the press together may be employed.

The casing member 10 provides at its top a shoulder 19 within the valve chamber member 17 and the shoulder cooperates with the ports 21 in providing a support for the ball 16 when the bottle is tilted to pouring position, as shown more clearly in Fig. 3.

The casing 10 is provided with a plurality of grooves 10a which enable the lip of the glass or container to be engaged during the pouring operation with the ports 21, thus at different distances from the lip.

In order to provide at all times a full flow from the bottle with a sufficient vent for the inflow of air, while at the same time enabling the bottle to be turned at any position during the pouring position, I provide the member 17 with pouring and vent apertures 21 which extend all the way around the structure. Thus, a vent 21 on the lower side of the structure, when tilted to pouring position, serves as a conduit for the outflow of liquid, while the vent diametrically opposed thereto is completely open to the atmosphere, and it, together with the adjacent openings, permits the full inflow of air into the bottle along the upper side of the drain passage 11.

The ports or openings 21 are arranged circumferentially and can receive the ball valve 16 no matter in what direction the bottle is tilted. At the same time, the shoulder 19, which extends above the openings 21, provides a raised rest against the ball 16 to steady it and hold it in position against fluctuating movements during the pouring operation.

In order to avoid the forming of bubbles within the passage 11, and thus to prevent the subsequent splashing of liquid laterally through the openings in the pouring operation, I provide a foam or bubble breaker member 22 which is preferably frictionally held within the inlet tube 12 of the casing and which provides air spaces 23 about a central liquid passage. The air spaces 23 permit the free flow of air into the bottle at the inlet and aid in preventing foam. The member 22 may be a simple hexagonal nut having its corner portions pressed tightly against the tubular inlet portion member 12 and having flow spaces 23 extending between such points of contact, as shown best in Fig. 4. The member 22 is provided with a large central opening 24 through which the main body of liquid may pass.

In the operation of the structure, when the bottle is turned to pouring position, as shown in Fig. 3, the liquid surges toward the opening of the tubular member 12, but the foaming bubbles are apparently broken down by the member 22 and a quiescent stream passes through the central opening 24 and no substantial splashing during the pouring of the liquid occurs.

What the complete scientific explanation of the operation in preventing the splashing of the liquid during the pouring may be, I am not sure, and I understand that such explanation is not required. It may be that the structure completely breaks down bubbles that would otherwise be formed in the passage and that this prevents the splashing which would otherwise occur as the liquid leaves the pouring chamber. It may be that the breaking up of the passage of the member 12 into separate passages reduces the friction between air and liquid and produces a quiescent flow. Whatever the explanation, the fact is that the structure described produces a quiescent flow of liquid through the closure and that substantially no splashing occurs as it leaves the outlet chamber 17.

After liquid has been poured from the bottle

and the bottle is restored to its normal vertical position, the ball 16 leaves the recess 19 or opening 21 and returns to the valve seat 15, thus closing off access of air to the contents in the interior of the bottle.

The fitting 22 may be secured within the inlet member 12 by any suitable means. I have found that an excellent combination can be provided by simply pressing the fitting 23 within the passage 12, the fitting 23 having its points, as shown best in Fig. 4, extending tightly against the walls of the passage and preferably cutting into the walls. By using an aluminum member 12 and an aluminum member 22, I find that the two parts, under pressure, form a scoring which provides a tenacious interlock between the two parts, preventing their separation.

While in the foregoing specification, I have set forth many details of structure as illustrative of one embodiment of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

In a bottle closure, comprising a casing having a passage therethrough and providing a valve outlet chamber communicating with said passage, said outlet chamber having a series of openings therein through which liquid may pass from the chamber, said casing providing also a valve seat at the outlet end of said passage, a ball valve in said valve seat, and a hexagonal ring secured within the end of said passage opposite said valve seat, said ring having a central circular flow passage and providing between it and the passage walls a series of spaced openings for the flow of liquid therethrough.

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