May 13, 1930. F. M. MARSHALL 1,758,574

CONTAINER CLOSURE

Filed Dec. 3, 1927

Fig. 1.

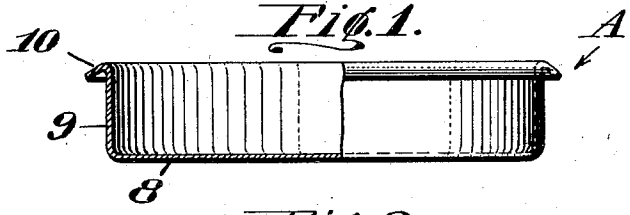


Fig. 2.



Fig. 3.

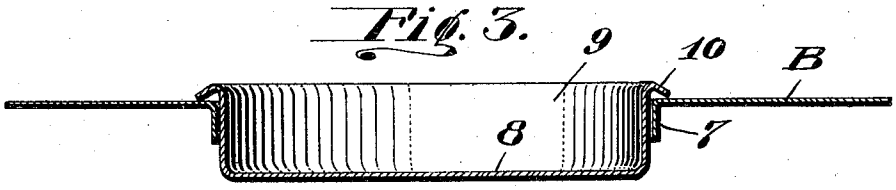


Fig. 4.

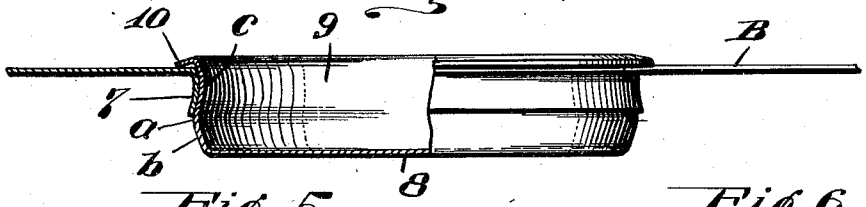


Fig. 5.

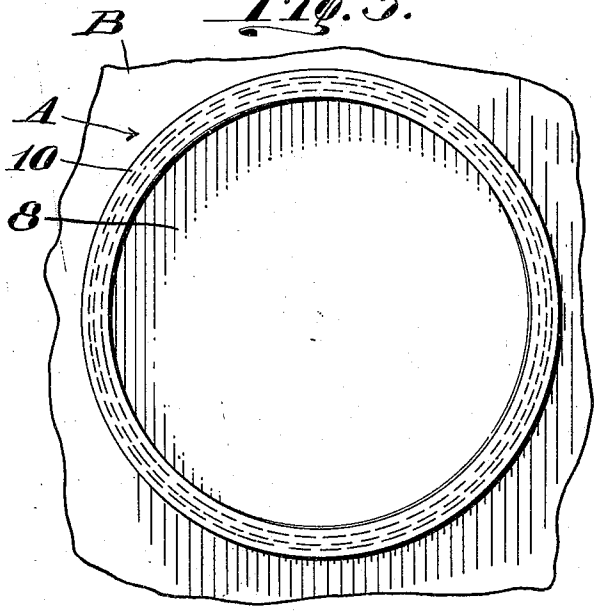
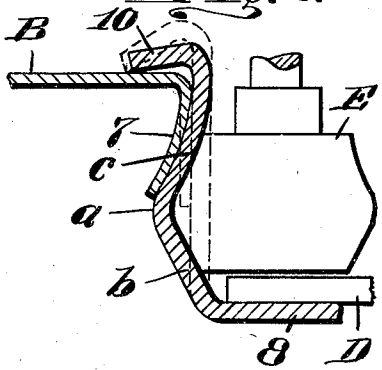


Fig. 6.



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UNITED STATES PATENT OFFICE

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CONTAINER CLOSURE

Application filed December 3, 1927. Serial No. 237,422.

This invention relates to a closure for containers in general and more particularly pertains to a closure for the filler openings of tin cans.

An object of the invention is to provide a means for closing the filler openings formed in the walls of containers whereby the major portion of the closure cap will be extended interiorly of the container, and connection between the cap and container so formed as to obviate any appreciable projection on the outer surface of the container due to such closure, and whereby the joint between the cap and the container wall may be readily rendered leakproof.

Another object is to provide a container closure which is rendered especially suitable for use on tin cans employed in the packaging of volatiles, particularly the various hydrocarbon products such as gasoline, naphtha, kerosene, and benzine, by reason of the closure being so formed that pressures within the container will tend to tighten the joint against leakage.

Another object is to provide a container closure of the type in which a cap is inserted in a filler opening in an inverted position and the side walls of the cap expanded to project beyond the margin of the filler opening interiorly of the container to cooperate with a lip on the cap extending over the margin of the opening exteriorly of the container to retain the cap in place; in which the material of the cap and container are collectively worked into intimate contact from the interior of the cap, and cooperating overlying and abutting converging walls formed between the cap and container interiorly of the latter tapering toward the exterior thereof, whereby the cap, though being put in place from the exterior of the container will seat outwardly from the interior thereof.

Another object is to provide a means whereby the cap will be maintained in a seated position under tension and whereby the cap will be held in such frictional engagement with the can top as to inhibit rotation of the cap and whereby a tight joint will be maintained between the cap and can top irrespective of any difference in expansion and contraction of the can and cap due to temperature changes, and which will also obviate loosening of the caps due to shocks imposed on the can during ordinary handling thereof.

With the foregoing objects in view together with such other objects and advantages as may subsequently appear, the invention resides in the features, and in the parts and combination, construction and arrangement of parts, hereinafter described and claimed and illustrated in the accompanying drawing, in which:

Fig. 1 is a view of the closure cap as seen in side elevation partly in section;

Fig. 2 is a view in cross section of a container wall taken through a filler opening;

Fig. 3 is a view in section showing the cap as initially positioned in the filler opening;

Fig. 4 is a view in section and elevation showing the complete closure;

Fig. 5 is a plan view of the completed closure;

Fig. 6 is an enlarged detail in section illustrating the manner of effecting inter-connection of the cap and container.

Referring to the drawing more specifically, A indicates the closure cap, and B designates the wall of a container which wall is formed with a filler opening C, the margin of which is provided with a flange 7 projecting into the interior of the container and normally extending substantially perpendicular to the wall B.

The cap A embodies a bottom wall 8 from the margin of which and extending perpendicular thereto is a side wall 9, the upper margin of which is formed with an outwardly extending and downwardly inclined lip 10. The outer periphery of the side wall 9 of the cap and the inner periphery of the flange 7 are normally conformable to each other; the cap being insertable through the opening C as shown in Fig. 3 in which position the outer face of the side wall 9 will lie in contact with the inner face of the flange. The side wall 9 is formed of a width between the bottom wall 8 and the lip 10 relatively to the width of the flange 7 such that when the cap is inserted in the filler opening with the outer edge of the lip 10 seating on the wall B, the lower edge

of the flange 7 will lie on a plane approximately midway of the width of the side wall 9.

In effecting inter-engagement of the cap and container wall, the cap A is placed in the filler opening C, as shown in Fig. 3, with the margin of the downwardly inclined lip 10 seating on the upper face of the wall B whereupon a suitable mechanism is inserted in the cap and operated to effect expansion of the side wall 9 of the cap to spread the side wall. For this purpose, a tool or mechanism is employed embodying a plate D, which seats against the bottom wall 8 of the cap to hold the latter against moving upwardly and it also embodies one or more expanding rollers E, the peripheries of which are crowned and are arranged to bear against the inner face of the side wall 9 in such position that, in the expanding operation, the material of the side wall 9 will be initially worked outwardly medially thereof contiguous the lower edge of the flange 7. This forms the side wall 9 with an enlarged diameter within the container as indicated at *a* in Figs. 4 and 6 from which enlargement the side wall converges toward the bottom wall 8, as indicated at *b*, and toward the lip 10 as indicated at *c* thus forming the side wall of obtuse angled cross-section, in this working of the material of the side wall 9, the flange 7 is worked outwardly together with the side wall portion *c* so as to extend at an acute angle relatively to the wall B of the container thus forming a tapered seat for the outwardly diverging portion *c* of the cap side wall as shown in Fig. 6.

In expanding the side wall 9, the upper portion thereof is drawn downwardly so as to bring the under side of the margin of the lip 10 into close contact with the outer surface of the wall B as clearly illustrated in Fig. 6; the lip 10 serving to prevent the cap from being depressed into the container.

By forming the lip 10 with the downward inclination, a clearance is provided between the margin of the lip and the wall 9 and a fullness of the cap material is afforded which is taken up at least in part in expanding the side wall.

In thus expanding the side wall 9 and bringing the margin of the lip 10 into contact with the can wall B, it is important that the underside of the lip 10 be not brought throughout into close contact with the outer surface of the wall B, as such would be liable to loosen the cap so that it would be free to turn relative to the wall B; an important feature of the present invention residing in forming the lip 10 with a downward inclination or projection so that when its margin is brought into contact with the wall B, and the side wall of the cap is drawn into the container, the lip 10 will be placed under tension so that it will then exert a spring action tending to pull the cap upwardly and thereby maintain the latter in intimate contact with the flange 7. This serves to hold the cap against turning and in cooperation with the taper of the cap and its seat will act to compensate for difference in expansion and contraction of the cap and container, and thereby serve to maintain a tight joint between the cap and the container wall.

It will now be seen that on completion of the connection between the cap and container, an intimate contact will be afforded between the flange 7 and the side wall of the cap and that by reason of the tapered joint thus formed, pressure interiorly of the container will tend to force the cap tightly against its seat.

The materials of which the cap and flange are formed may be of any suitable character adapted to be worked in the fashion described and to accomplish the desired result; sheet tin being particularly serviceable for the purpose.

While I have shown the filler opening and cap as circular, they may obviously be of any suitable shape which will permit effecting expansion of the cap and its cooperating flange.

I claim:

In a container closure, the combination with a container wall formed with an opening having a marginal flange projecting into the container; of a closure cap having a bottom wall, a side wall formed in continuation of the bottom wall, and an outwardly extending lip on the margin of said side wall; said side wall being expanded together with said flange to diverge outwardly from the inner side of the container wall, said lip extending downwardly at an inclination with its outer margin seating on the outer face of the container wall and being placed under tension.

In testimony whereof, I have affixed my signature.

FRANK M. MARSHALL.