April 7, 1942. J. M. MONTELIONE 2,278,462

CLOSURE

Filed Oct. 12, 1934 2 Sheets-Sheet 1

FIG. 1.

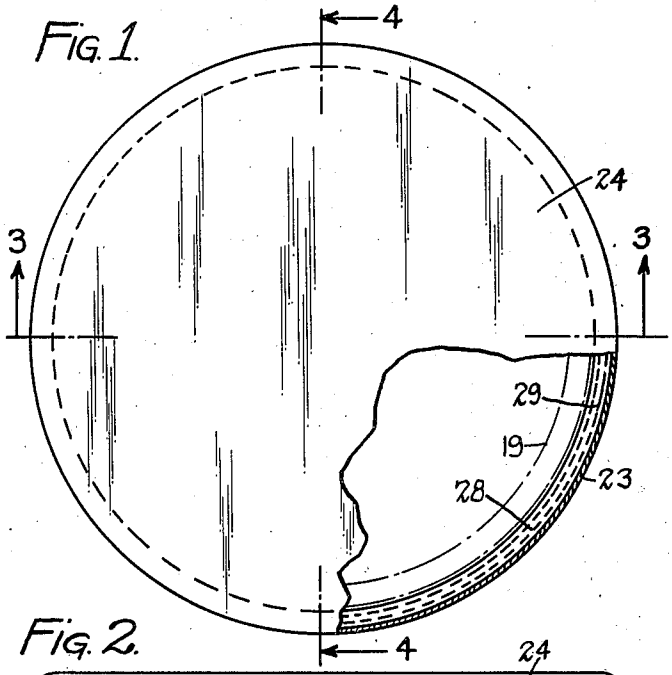


FIG. 5.

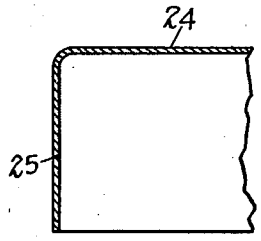


FIG. 2.

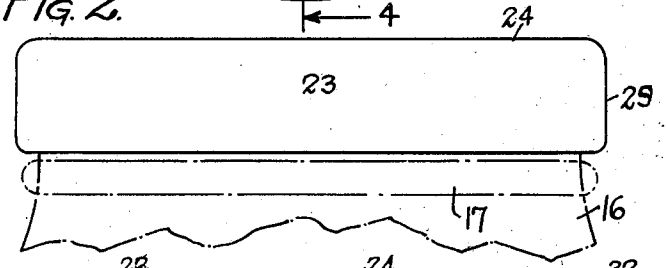
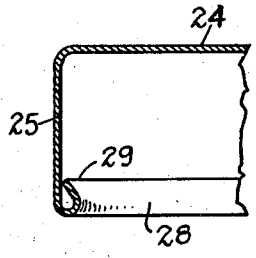


FIG. 6.



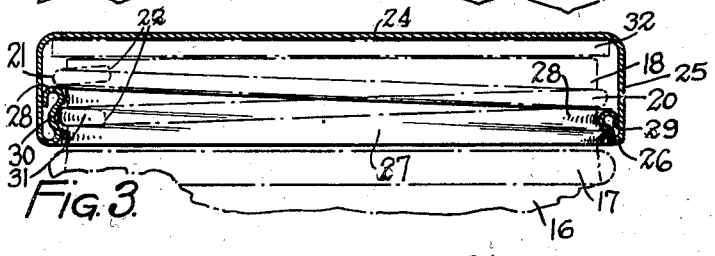
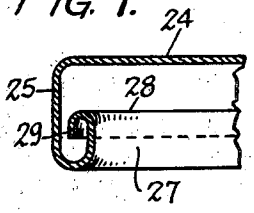


FIG. 3.

FIG. 7.



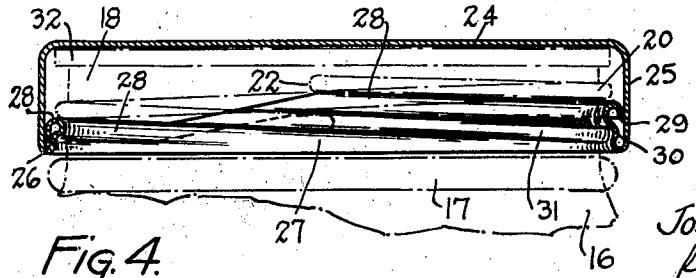


FIG. 4.

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April 7, 1942. J. M. MONTELIONE 2,278,462

CLOSURE

Filed Oct. 12, 1934 2 Sheets-Sheet 2

Fig. 8.

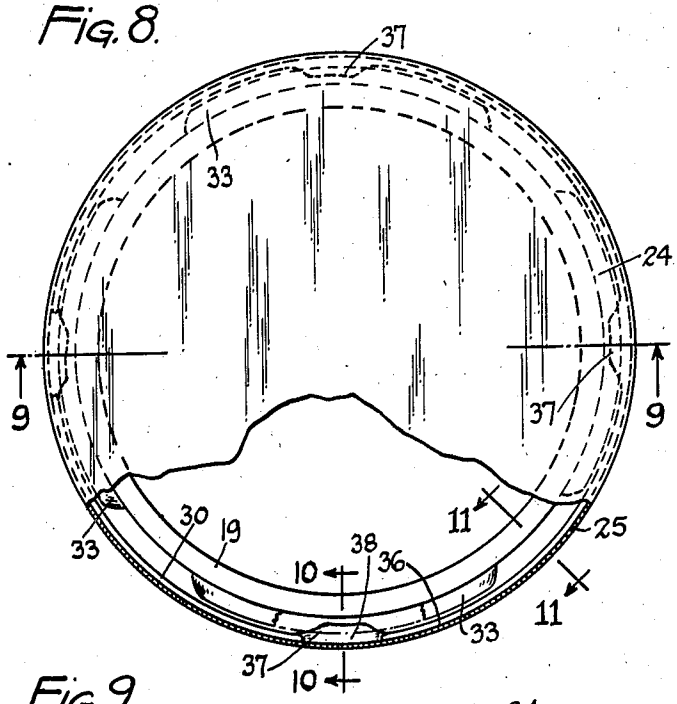


Fig. 9.

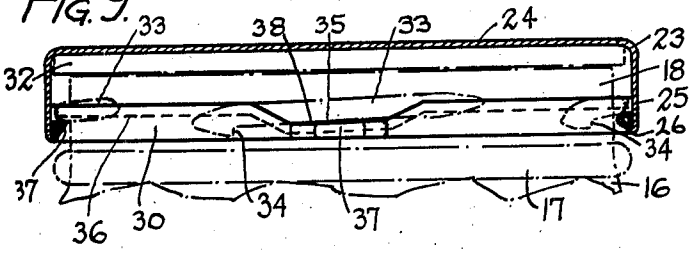


Fig. 13.

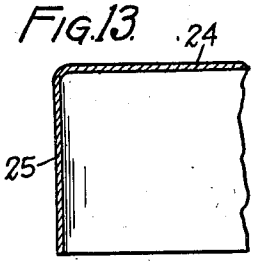


Fig. 14.

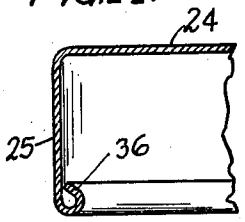


Fig. 15.

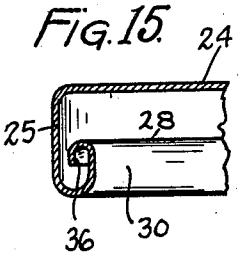


Fig. 10.

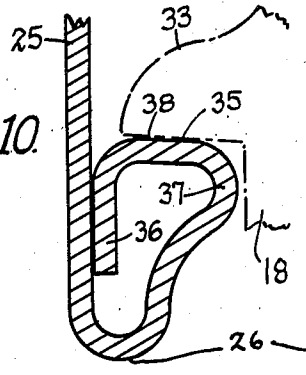


Fig. 12.

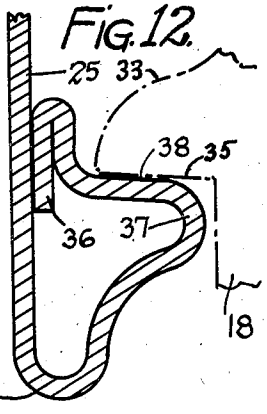
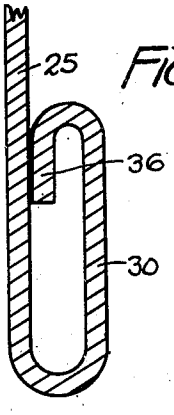


Fig. 11.



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UNITED STATES PATENT OFFICE

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CLOSURE

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Application October 12, 1934, Serial No. 748,030

2 Claims. (Cl. 215—44)

My invention relates to closures used for sealing the openings in containers, jars, cans or bottles, in which the closure tightly seals the container orifice when affixed and locked in sealing position, and more particularly relates to an improved closure locked outside the contour of the nozzle of the container through which the contents, usually in liquid form, are poured.

While my invention relates broadly to closures, it is especially adapted to closure caps of the screw thread type in which the skirt of the cap is provided with embossed screw threads that may be either continuous or divided. These threads, whether continuous or divided, have been usually formed by embossing inwardly portions of the skirt to provide the screw-threaded locking projections for engaging suitable threads or lugs on the neck of the container.

Present commercial requirements for such screw-thread cap closures formed of a single piece of sheet metal are, (1) that the outer depending skirt shall be uniformly cylindrical and also present a smooth exterior surface throughout its entire area to allow for lacquering of the sheet metal without showing any indentations resulting from the embossing of the inner screw threads; (2) that the lower edge of the skirt be formed with a rounded bead that lies in the same horizontal plane throughout its circumference in mutual parallelism with the top or crown of the cap; and (3) that the rounded screw threads be formed on an inner cylindrical shell integral with the cap skirt without any raw edges of the sheet material comprising this inner shell carrying the screw threads projecting anywhere inside the cap, and also without injuring the lacquer coating applied to the sheet metal before it is formed into the completed cap.

The objects of my invention are, among other things, to provide an improved cap closure of this type to fit outside and around the neck of the container nozzle, whereby a secure and perfect sealing is obtained; to provide a cap closure formed integrally from a single piece of sheet metal having a straight circular flange or depending skirt with the lower rim turned or rolled over to form a rounded bead around the perimeter of the bottom edge of the skirt; to provide a reentrant inner shell formed with the screw-threads integral with the skirt and bead around the inner wall of the skirt with the upper edge of the shell turned outwardly to form a roll that is in contact with the inner surface of the skirt, that portion of the inner shell between the bead and roll to carry the spiral convolutions forming the screw threads which are invisible from the exterior of the cap while engaging the threads or lugs on the neck of the container.

A further object of my invention is to provide an improved cap-closure of the continuous thread type on the inner shell, which thread is continuous around the entire circumference of the inner shell of the cap, so that the liner carried in parallelism with the top or crown of the cap is firmly held at all points upon the mouth of the container. In my cap the liner is always retained inside such cap; should such liner adhere to the container mouth, the removal of the cap peels the liner off the container, and it is impossible to shake out the liner from the cap when used in a hopper feed device.

Such liner also has a loose fit inside the cap so as to allow the latter to rotate when the liner is frozen or fastened to the sealing surface of the container. This feature is of great advantage when the contents of the container are packed in a heated state thereby causing a slight vacuum pressure, or when such contents are of a sticky nature, since my improved closure permits the cap always to turn freely irrespective of the condition of the liner interposed between the cap crown and mouth of the container.

If required the depending skirt of my improved cap may be corrugated or knurled on the outside to meet specified requirements.

With the above and other objects in view, my invention comprises the novel construction, combination and arrangement of parts hereinafter described, and then particularly pointed out in the appended claims.

In the accompanying drawings, Fig. 1 is a top plan view partly broken away, of my improved closure having continuous screw-threads to engage complementary threads formed on the outer surface of the neck of the container;

Fig. 2 is a side elevation of the cap shown in Fig. 1 as secured to the container;

Fig. 3 is a section taken on the line 3—3 of Fig. 1;

Fig. 4 is a section taken on the line 4—4 of Fig. 1;

Figs. 5, 6, and 7 are detail sectional views of the sheet metal comprising the cap during the process of formation before the screw-threads are formed therein as shown in Figs. 3 and 4;

Fig. 8 a top plan view, partly broken away, of another form of my improved closure having a plurality of inturned lugs (four being shown) to engage divided or multiple threads on the outer nozzle of the container;

Fig. 9 is a section taken on the line 9—9 of Fig. 8;

Fig. 10 is an enlarged section on the line 10—10 of Fig. 8;

Fig. 11 is an enlarged section on the line 11—11 of Fig. 8;

Fig. 12 is an enlarged section, similar to Fig. 10, showing a modified form of inturned lug; and

Figs. 13, 14 and 15 are like Figs. 5, 6, and 7 respectively showing detail sectional views of the sheet metal comprising the cap shown in Figs. 8 and 9 before the inturned lugs are formed therein.

Similar numerals refer to similar parts throughout the several figures.

Referring to Figs. 1–7 of the drawings, the container or jar 16 is preferably made of glass or other friable material, and has the circular bead 17 above which is the upwardly projecting neck or nozzle 18 terminating in the circular mouth 19 that forms the sealing surface for the cap or closure. Encircling the neck 18 are the spiral screw threads 20 (Figs. 3 and 4) integral with the outer surface of the neck or nozzle 18, such threads 20 having rounded surfaces 21 and rounded ends 22 as shown in Figs. 3 and 4.

The cap or closure 23 is formed or stamped integrally of a single piece of sheet metal, and comprises the flat circular top or crown 24 with the depending circular skirt 25 having a smooth straight side or exterior surface as shown in Figs. 2–4. The lower edge of the skirt 25 is rolled over inwardly to form a rounded circular bottom edge or bead 26 that lies in a plane substantially parallel with the crown 24 throughout the perimeter of the bead 26. Integral with the bead 26 is the inner shell 27 that extends upwardly adjacent the skirt 25 with the upper edge of the shell 27 rolled outwardly adjacent the inner side wall of the skirt 25 (Fig. 7), such roll 28 at its extremity 29 bearing against the skirt 25 as shown in Figs. 3 and 4.

The portion 30 of the inner shell 27 between the bead 26 and roll 28 carries the continuous inclined screw-threads 31 that are formed by stamping or rolling the shell portion 30 outwardly as shown in Figs. 3 and 4. These screw-threads 31 coact with the container threads 20 when the cap 23 is screwed home on the container 16, with the bead 26 and roll 28 forming resilient abutments for the shell portion 30 in which the screw threads 31 are formed. The inner side of the crown 24 carries the liner 32 that is loosely held in the cap between the crown 24 and the roll 28, such liner 32 enabling the closure to make an effective seal with the container mouth 19 (Figs. 3 and 4).

In Fig. 5 I have shown a detail section of the cap comprising the crown 24 and skirt 25; in Fig. 6 the first bending of the sheet metal is shown to form the roll 28; and in Fig. 7 the inner shell 27 is formed with the bead 26 and inner shell portion 30 in which shell portion 30 the screw threads 31 are thereafter produced by rolling or stamping of the metal as shown in Figs. 3 and 4.

In this construction the inner shell portion 30 has a yielding action in respect to the skirt 25 so that in applying the cap 23 to the container a smooth, quick-tightening action is secured between the coacting threads 20 and 31 in forcing the liner 32 into sealing position during the rotative locking movement of the cap, as well as a smooth, quick-releasing action when the cap is oppositely rotated for its removal.

Referring to the constructions shown in Figs. 8–15, the container neck or nozzle 18 carries a plurality of spaced-apart, inclined, rounded threads 33 formed at their lower ends with the stops 34 (Fig. 9) and flat inclined under surfaces 35 (Figs. 10 and 12), four of such spaced-apart threads 33 being shown in Fig. 8.

The cap or closure 23 itself comprises substantially the same parts as that already described in conjunction with Figs. 1–7, with the flat crown 24, the smooth, straight depending skirt 25, rolled over bottom edge or bead 26, and liner 32. However in the Figs. 8–15 construction, the inner shell 27 having upper roll 28 with its inner edge bent downwardly to form a flat abutment 36 against the inner side wall of the skirt 25 (Fig. 11) has a plurality of complementary, reinforced, inwardly-projecting lugs 37 formed at spaced-apart points in the inner shell 27 (four being shown in Fig. 8), which lugs 37 are adapted to coact with the inclined under surfaces 35 of the threads 33 as shown in Figs. 9, 10 and 12. The rounded lugs 37 have substantially flat top surfaces 38 that bear against the thread surfaces 35 in a surface-to-surface contact (Figs. 10 and 12) to ensure a firm frictional grip between the threads 33 and lugs 37 to hold the cap 23 securely to the container 16. As shown in Figs. 10 and 12, the top surfaces 38 of the lugs 37 are supported and braced by the bead 26 and the abutments 36 bearing against the skirt. In Fig. 10 this abutment 36 is below the plane of the top surface 38 while in Fig. 12 the abutment 36 is folded over to be substantially coincident with the surface 38. Both forms provide a strong and firmly supported inwardly-projecting lug structure that engages the threads 33 when the cap is screwed home as shown in Fig. 9, the stops 34 preventing the lugs 37 from passing out from beneath the threads 33 when the cap 23 is rotated into locking position.

Figs. 13, 14 and 15 show the successive steps in forming the cap of this Figs. 8–12 modification in the same manner as Figs. 5–7 respectively. Fig. 11 shows the structure of this cap intermediate the lugs 37 (Figs. 10 and 12), all of which is a development of Fig. 15 which shows the inner shell 27 before the lugs 37 are rolled or stamped in the sheet metal.

In both forms shown, the operation of affixing the closures 23 to the container 16 is substantially the same in that the locking devices on the cap engage the spiral threads on the container when the closure is forcibly turned into locking and sealing position with the liner 32 pressed firmly on the container mouth 19. In the Figs. 8–12 construction the lugs 37 pass downwardly in the gaps or openings between the threads 33 (Fig. 9), until such lugs are in position to slide beneath the forward upper ends of the threads 33 when the closure is rotated into locking position as shown in Figs. 8, 9, 10 and 12.

In both forms my improved single-piece closure embodies in itself a simple and economically formed cap that meets all the commercial requirements I have hereinbefore mentioned, with smooth surfaces of metal exposed to view both inside and outside the cap, thereby enabling the outer surfaces to be painted or decorated in any way desired, while the locking members that engage the container are fully concealed from view and are integral with the cap with no raw edge of metal exposed. Furthermore the inner shell portion carrying the spiral threads or inturned lugs is resiliently braced or supported against the

side wall of the skirt at its upper margin; the rounded bead 26 at the bottom forms an equalized reenforcement for the inner shell throughout its circumference, while rendering the lower rim of the closure symmetrical throughout its perimeter.

Other economies and advantages derived from these closure forms have been hereinbefore described, and various changes or alterations may be made in the specific structures shown without departing from the invention or sacrificing the advantages obtained from their use.

I claim as my invention:

1. A single shell cap closure for a container comprising a flat crown, a cylindrical skirt depending therefrom having its lower edge rolled inwardly to form a uniformly rounded bead extending around the entire circumference of said skirt in substantial parallelism with said crown, and inwardly projecting locking lugs formed integrally on said bead at spaced-apart points and having flat top surfaces, but otherwise cross-sectionally rounded, the outer raw-edge margins of said lugs being bent downwardly toward said bead to bear with a surface-to-surface contact against the side walls of the skirt to act as abutments for said lugs, said top surfaces engaging the under sides of spaced-apart threads on the container.

2. A single shell cap closure for a container comprising a flat crown, a cylindrical skirt depending therefrom having its lower edge rolled inwardly to form a uniformly rounded bead extending around the entire circumference of said skirt in substantial parallelism with said crown, and inwardly projecting locking lugs formed integrally on said bead at spaced-apart points and having flat top surfaces, but otherwise cross-sectionally rounded, the outer raw-edge margins of said lugs being bent downwardly toward said bead to bear with a surface-to-surface contact against the side walls of the skirt to act as abutments for said lugs, said top surfaces engaging the under sides of spaced-apart threads on the container, and said container threads having stops to limit the rotation of said cap closure in its locking movement.

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