Dec. 27, 1949 J. COYLE ET AL 2,492,847

CONTAINER NOZZLE CLOSURE

Filed Nov. 4, 1946

Fig. 1

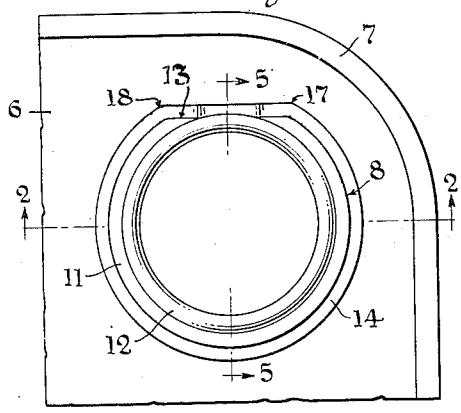


Fig. 2

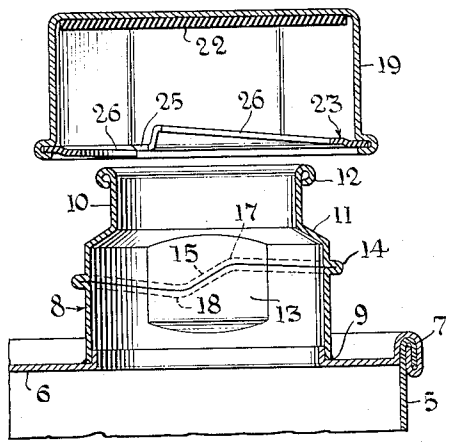


Fig. 3

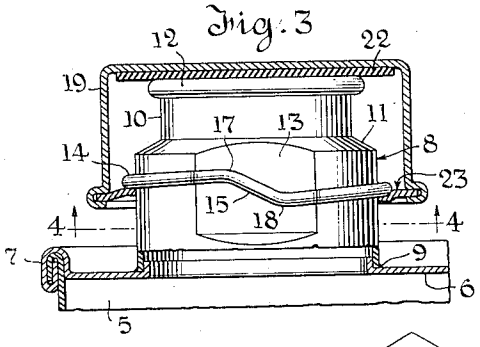


Fig. 4

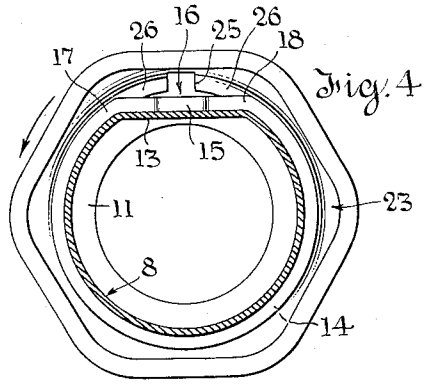


Fig. 7

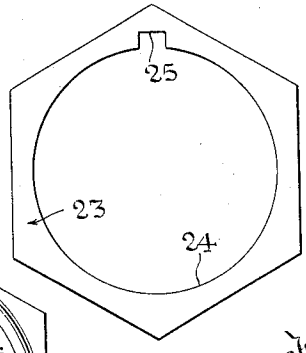


Fig. 5

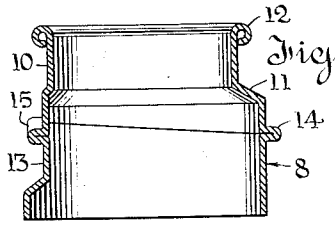


Fig. 8

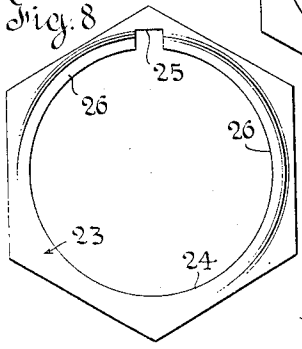


Fig. 9

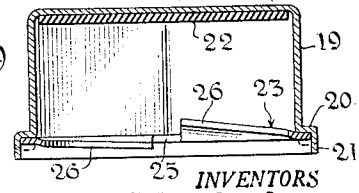
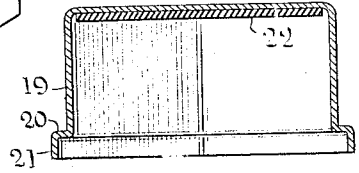


Fig. 6



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CONTAINER NOZZLE CLOSURE

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8 Claims. (Cl. 220—39)

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The invention relates generally to metal containers and primarily seeks to provide a novel nozzle or pouring neck closure for such containers which can be economically manufactured and includes a threadably mounted cap capable of providing an efficient seal and also of being mounted and removed with great facility.

In the manufacture of nozzle or pouring neck closures considerable difficulty has been experienced in providing satisfactory closures of the threadably mounted type. Rolled threads on screw necks have not been satisfactory for the reason that when locked down the wedging engagement of the threads of the cap and neck is such that it is often impossible to remove the cap without the use of pliers or wrench. This is thought to be due, at least in part, to the small angle of the thread and the fact that the surfaces of the metal disturbed incidental to drawing, both in the neck and the screw cap, seem to freeze under the applied screw pressure. This objectionable condition appears to be aggravated by long standing of the closure in the threadably secured state. It is a purpose of the present invention to provide a closure which is exceedingly simple in construction and devoid of the objectionable features referred to.

It is an object of the invention to provide a novel closure of the character stated in which the closure cap and the container nozzle are provided with cooperating threads of novel form presenting substantially flat cooperatively engaging helical surfaces of low pitch permitting the application of efficient sealing pressure upon the cooperating sealing surfaces of the cap and nozzle and the mounting and removal of the cap with a minimum of effort.

Another object of the invention is to provide in a closure of the character stated a novel nozzle or neck structure comprising a generally cylindriform body having a flattened portion at one side and a thread rib extending about and a like distance from the whole circumference of the body including said flattened portion, said rib being disposed in the form of a helix except at said flattened portion where it includes an angular offset connecting the ends of the helix, thereby to cooperate with said flattened side in forming a recess in which to receive the lead end of a screw cap thread.

Another object of the invention is to provide a nozzle or neck structure of the character stated in which the thread rib is formed as an integral part of the nozzle or neck by an outward bending of the body metal to present two thicknesses

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in face contact with the rib extending perpendicular to the nozzle or neck axis throughout the circumference thereof.

Another object of the invention is to provide a closure cap of the character stated comprising a cup-like body having a closed top and open bottom and shoulder means disposed perpendicular to the axis of the body adjacent the open bottoms thereof, and a thread ring secured against the shoulder means and having an aperture therein for surrounding a nozzle, the edge defining said aperture being notched and shaped in the form of a helix having a lead end beginning at said notch and a trailing end ending at said notch.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is an enlarged fragmentary plan view illustrating a nozzle structure embodying the invention.

Figure 2 is a detail vertical cross section taken on the line 2—2 on Figure 1, a closure cap being shown above and adjacent to the nozzle.

Figure 3 is an enlarged fragmentary vertical cross section illustrating the cap tightly threaded onto the nozzle.

Figure 4 is a detail horizontal section through the nozzle, the cap being in place thereon with its thread lead opposite the recessed portion of the nozzle prior to the turning of the cap to its sealing position, and the section being taken as on the line 4—4 on Figure 3.

Figure 5 is a detail vertical cross section taken on the line 5—5 on Figure 1 illustrating the nozzle per se.

Figure 6 is a detail vertical cross section illustrating the cap shell per se prior to assembly of the thread ring therein.

Figure 7 is a plan view of the thread ring blank.

Figure 8 is a view similar to Figure 7 after the shaping of the inner edge of the thread ring.

Figure 9 is a view similar to Figure 6 showing the final step of assembling the thread ring in the cap.

In the drawings in which like numerals of reference indicate like parts in all of the figures, 5 designates a can body and 6 the top thereof. The top may be secured to the body in any approved manner, as by the conventional double seam 7. The nozzle or pouring neck comprises

a generally cylindrical body 8 which may be secured over an aperture in the top 6 in any approved manner, as by a solder joint generally designated 9. It is to be understood that while the nozzle or pouring neck is shown attached to the container top 6, the invention resides in the provision of the novel form of closure disclosed herein, without limitation to any particular placement of the nozzle or pouring neck.

The nozzle or pouring neck body includes a reduced diameter pouring neck extension 10 providing a shoulder 11, said neck extension terminating in an outwardly turned curl 12 adapted to engage in sealing contact with a cap gasket in a manner to be described in detail hereinafter. Below the neck extension 10, the body is provided with a side recess which in this particular disclosure comprises a flattened portion 13. Extending about the whole circumference of the body, including the flattened portion 13, and spaced a like distance from the body throughout said circumference is a thread rib 14, said rib being disposed in the form of a helix except at said flattened portion where it includes an angular offset 15. The offset 15 cooperates with the flattened portion 13 of the nozzle or neck body in providing a recess or clearance, as at 16, in which to receive the lead end of a screw cap thread in a manner to be described hereinafter. It will be apparent by reference to Figures 2, 3 and 4 of the drawings that the angular offset 15 of the continuous rib and the recess provided thereby serves to provide the helical portion of the rib with a lead end 17 and a trailing end 18. The shape of the nozzle or neck is best illustrated in Figures 1 to 5 of the drawings.

While the invention comprehends the provision of a nozzle or neck structure of the novel form hereinabove described without limitation to the particular manner of forming and attaching the continuous thread rib 14, 15, it is preferred that said rib be formed by outwardly bending an intermediate portion of the nozzle body circumference about the line of the rib position and the moving of the ends of the body toward each other so as to make the rib an integral part of the body composed of two thicknesses of body metal engaging in face contact in the manner clearly illustrated in Figures 2, 3 and 5 of the drawings. An alternative mode of construction would be that of preforming the rib and attaching the same to the nozzle or neck structure by brazing or soldering.

The structure and manner of forming the closure cap adapted for cooperation with the previously described neck or nozzle structure is best illustrated in Figures 6 to 9 of the drawings. The cap comprises a hollow, cup-like body 19 which preferably, but not necessarily, includes hexagonal side wall portions. The cap body is provided with an outwardly directed shoulder 20 near its open bottom and has a short skirt portion 21 extending below said shoulder. In the formation of the closure cap a gasket 22 is placed in the top thereof in position for engaging in sealing contact with the seat curl 12 at the extended end of the body when the closure cap is applied in the manner illustrated in Figure 3. The formation of the closure cap and mounting of the gasket comprise steps in the method of formation of the complete closure cap.

As another step in the method of forming the closure cap, a thread ring 23 is formed, preferably hexagonal in shape, and with a center aperture 24 of a size for fitting over the outside diameter

of the nozzle or neck body 8. The edge defining the aperture 24 is notched at 25 at one point in the circumference thereof and is shaped to provide a helix 26 interrupted by said notch and having a lead end commencing at said notch and a trailing end ending at said notch.

In completing the closure cap, the thread ring shown in detail in Figures 7 and 8 is mounted in the cap shown in Figure 6, one face thereof being in contact with the shoulder 20. With the thread ring thus inserted in the cap, the skirt 21 is upset in the manner indicated in dotted lines in Figure 9 to secure the thread ring in place. It will be apparent that the mounting of the thread ring also serves to retain the gasket 22 against removal from the closure assembly.

It will be apparent that when the closure is mounted in the manner illustrated in Figure 4 with the helical edge 26 of the thread ring in flat surface contact with the helical portion of the continuous rib 14 and with the notch 25 opposite the flattened portion 13 of the body 8 and the recessed portion 16 of the continuous thread rib, said thread ring and rib may be caused to threadably cooperate by turning the closure cap in the direction indicated by the arrow on Figure 4. By thus rotating the cap the leading end of the thread ring helix 26 will pass over the recessed angular offset 15 of the continuous thread rib and will pass under the lead end 17 of said thread rib. By continuing the rotation of the cap, the cooperative engagement of the helical surfaces of the thread ring and the thread rib will secure the cap on the nozzle or neck and tightly draw the sealing gasket 22 into tight sealing contact with the seat curl 12.

The cooperating helical surfaces of the thread ring of the closure cap and the thread rib of the nozzle or neck are comparable to square threads in that they present flat surfaces in cooperative engagement which are substantially perpendicular to the axis of the nozzle, thereby assuring against binding in the threadable engagement. Also, by reason of the low pitch of the cooperating helical surface of the thread ring and the thread rib, the closure cap can be readily secured in position and readily removed from its efficient sealing contact with the nozzle or neck with a minimum of effort.

While one form of closure is illustrated and described in detail herein, together with one manner of forming and assembling the closure cap, it is to be understood that the specific structure of the closure and the manner of forming and assembling the parts can be variously modified without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. A container nozzle adapted to be closed by a screw cap and having a generally cylindriform body and a thread rib extending continuously thereabout in the form of a helix except for a recessed portion of short length spaced a lesser distance from the axis of the nozzle than the outside diameter of the helical part of said rib, so as to be effective to permit the lead end of a screw cap thread to pass under and threadably engage said thread rib as the cap is turned on the nozzle.

2. A nozzle structure as defined in claim 1 in which the thread rib comprises an integral part of the nozzle body and is formed by outward bending of the nozzle body metal to form the continuous rib of two thicknesses of said metal in face contact with the rib extending in a direc-

tion substantially perpendicular to the nozzle axis throughout its circumference.

3. A nozzle structure as defined in claim 1 in which the thread rib projects a like distance from the external surface of the nozzle body throughout its circumference and the recessed portion of the rib is provided by recessing a portion of the external surface of the nozzle body to a depth at least slightly greater than the extent of overlap of the thread rib and cap thread and connecting the ends of the helical portion of the rib by an offset angular portion within said recessed portion.

4. A nozzle structure as defined in claim 1 in which the thread rib projects a like distance from the external surface of the nozzle body throughout its circumference and the recessed portion or the rib is provided by flattening a portion of the external surface of the nozzle body and connecting the ends of the helical portion of the rib by an offset angular portion within said recessed portion.

5. A container nozzle adapted to be closed by a screw cap and including a generally cylindriform body having a flattened side portion and a thread rib extending about and a like distance from the whole circumference of said body including said flattened side portion, said rib being disposed in the form of a helix except at said flattened side portion where it includes an angular offset connecting the ends of the helical portion thereof thereby to cooperate with said flattened side portion in forming a recess effective to permit the lead end of a screw cap thread to pass under and threadably engage said thread rib as the cap is turned on the nozzle.

6. A container nozzle adapted to be closed by a screw cap and including a generally cylindriform body having a flattened side portion and a thread rib extending about and a like distance from the whole circumference of said body including said flattened side portion, said rib being disposed in the form of a helix except at said flattened side portion where it includes an angular offset connecting the ends of the helical portion thereof thereby to cooperate with said flattened side portion in forming a recess effective to permit the lead end of a screw cap thread to pass under and threadably engage said thread rib as the cap is turned on the nozzle, said rib comprising an integral part of the nozzle body and being formed by an outward bending of the nozzle body metal to present two thicknesses of said metal in face contact with the rib extending in a direction substantially perpendicular to the nozzle axis throughout its circumference.

7. In a container, the combination of a nozzle including a seat engageable by the sealing gasket of a screw cap and a generally cylindriform body having a flattened side portion and a thread rib

extending about and a like distance from the whole circumference of said body including said flattened side portion, said rib being disposed in the form of a helix except at said flattened side portion where it includes an angular offset connecting the ends of the helical portion thereof thereby to cooperate with said flattened side portion in forming a recess effective to permit the lead end of a screw cap thread to pass under and threadably engage said thread rib as the cap is turned on the nozzle, and a screw cap mountable on said nozzle and having a sealing gasket engageable with said seat and a thread disposed to cooperate with the nozzle thread rib in securing the cap on the nozzle and the gasket in sealing contact against said seat.

8. In a container, the combination of a nozzle including a seat engageable by the sealing gasket of a screw cap and a generally cylindriform body having a flattened side portion and a thread rib extending about and a like distance from the whole circumference of said body including said flattened side portion, said rib being disposed in the form of a helix except at said flattened side portion where it includes an angular offset connecting the ends of the helical portion thereof thereby to cooperate with said flattened side portion in forming a recess effective to permit the lead end of a screw cap thread to pass under and threadably engage said thread rib as the cap is turned on the nozzle, and a screw cap comprising a hollow body mountable on said nozzle and having a sealing gasket engageable with said seat and a thread ring secured to said body and having an aperture through which to receive the nozzle body, the edge of said ring aperture being notched and having the unnotched portion thereof shaped to form a helical thread having a lead beginning at said notch and a trailing end ending at said notch and disposed to cooperate with the nozzle thread rib in securing the cap on the nozzle and the gasket in sealing contact against said seat.

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WILLIAM F. PUNTE.

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