

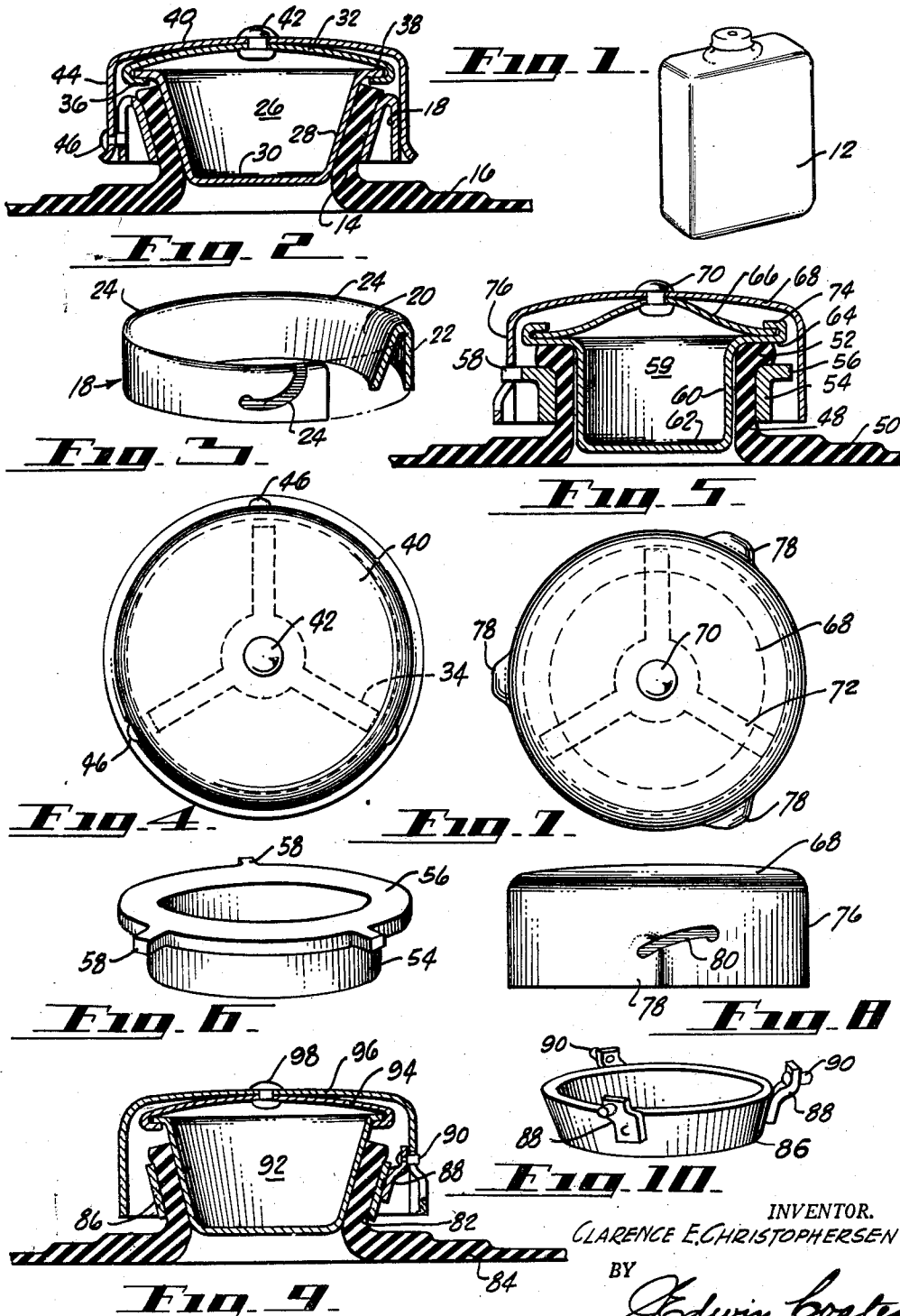
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CONTAINER CLOSURE

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CONTAINER CLOSURE

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This invention relates to closures for containers and more particularly to novel closure means for containers made of rubber-like material or having filler necks of rubber-like material.

The armed services have made a great deal of use of containers known as "blitz cans" which are generally containers of about five gallons capacity for transporting or storing gasoline, oil, or other bulk material. These containers are usually made of metal and are quite durable, but they have several disadvantages. If they bump against each other or against any hard object they make a noticeable noise. In a combat zone this is a serious hazard because it may reveal one's presence to the enemy. The metal closure fittings which are normally used are readily damaged, and thereafter will not properly seal a container against the loss of the contents.

A blitz can of neoprene or other rubber-like material is now available and overcomes the first mentioned difficulty as well as providing a container which will withstand rough handling without springing leaks. However, conventional types of closures have not been found suitable because they are difficult to attach in a leakproof manner and are still readily subject to damage.

The present invention provides a novel and highly satisfactory solution to the problem. It eliminates any necessity for bonding and makes use of the material of the container itself as a gasket in sealing the contents. In practicing the invention the neck of the container is formed with a flare or the outer free end of the neck may have an outward flange. A back up ring of metal or other hard strong material is slipped over the neck which may be deformed for that purpose. After the back up ring is in place, a combined cap and stopper is applied to the neck, the stopper being urged into sealing engagement with the neck by interlocking relative movement of the cap and the ring.

The cap and the ring may take various forms but the interlocking engagement is preferably obtained by the use of bayonet slots and pins. Since neoprene and similar materials have a very high coefficient of friction the ring will be prevented from rotating by its contact with the outer surface of the neck. The stopper will encounter similar frictional resistance and therefore the cap is made rotatable with respect to the stopper to facilitate locking and unlocking.

It will be apparent that the closure means may be applied to a container made of metal and provided with a filler neck of rubber-like material.

Other advantages and features of novelty will

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become apparent as the description proceeds. The presently preferred embodiments of the invention are illustrated in the accompanying drawing in which:

Figure 1 is a perspective view of a blitz can with the novel closure means in position;

Figure 2 is a sectional view in elevation of a portion of the container and neck with one form of closure mounted thereon;

Figure 3 is a perspective view of the reinforcing or back up ring of Figure 2 with a portion shown in section;

Figure 4 is a top plan view of the cap of Figure 2;

Figure 5 is a view similar to Figure 2 showing a modified form of the invention;

Figure 6 is a perspective view of the reinforcing or back up ring of Figure 5;

Figure 7 is a top plan view of the cap of Figure 5;

Figure 8 is a side elevational view of the cap of Figure 5;

Figure 9 is a view similar to Figure 2 showing another modified form of the invention; and

Figure 10 is a perspective view of the reinforcing or back up ring of Figure 9.

The container 12, as shown in Figure 1, may be of any desired shape and may be made entirely of neoprene or other rubber-like material, or it may be made of metal with only the filler neck and a small surrounding area formed of the rubber-like material.

The neck portion 14, as seen in Figure 2, extends outwardly away from the wall of the container and flares outwardly to provide a stopper opening having the general form of a frustum of a cone. The neck and the immediately adjacent area 16 of the container wall are elastically deformable and are not sufficiently rigid of themselves to resist deflection.

In order to reinforce or back up the neck, a ring 18 is provided. This ring, which is made of metal or other strong hard material, is V-shaped in cross section, having an inner wall 20 sloped to conform to the slope of the neck and an outer wall 22 which is substantially cylindrical. It may be slipped into position by temporarily deforming the filler neck but, because its opening is smaller than the neck, it resists removal. This construction makes it unnecessary to bond the ring to the neck or to fasten it mechanically thereto in any other manner. Hence, altho it is a snug fit, it may be described as loosely encircling the neck and this term is to be understood as meaning the construction described above.

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Bayonet slots 24 are formed in the cylindrical wall of the ring to receive cooperating fastenings elements carried by the cap.

The neck is sealed by an imperforate cup shaped stopper 26 having a conical side wall 28 and flat bottom wall 30. The stopper is retained by a spring element 32 which may take the form of a dished disk or may have portions cut away to leave a plurality of radial fingers 34 forming a spider as illustrated in Figure 4. In either form the periphery is provided with a reversely bent flange 36 loosely engaging a cooperating flange 38 on the stopper.

The spring element is pierced at its center to provide an opening in alignment with a central opening in the cap 40 for the reception of a rivet 42, completing the assembly of stopper, spring element, and cap. The engagement of flanges 36 and 38 is preferably loose enough to permit relative rotation. If more freedom is desired the rivet 42 can also be a slightly loose fit.

Cap 40, which may or may not be imperforate, is formed with a downwardly depending flange 44, near the margin of which are inserted a plurality of evenly spaced rivets 46, the shanks of which project inwardly to engage the bayonet slots 24. To seal the container, the cap and stopper are positioned as shown in Figure 2 with rivets or pins 46 entering the bayonet slots. Ring 18 and stopper 26 will have little tendency to rotate because of their direct engagement with the friction surface of the neck. Rotation of the cap with respect to the ring will draw the stopper and ring axially toward each other, compressing the material of the neck between them, the latter serving as a gasket to make a perfect seal.

In the modification illustrated in Figures 5 to 8 the rubber-like neck 48 extends substantially cylindrically outwardly from its associated wall area 50, the outer free end 52 diverging in the general form of a flange. The reinforcing or back up ring includes a cylindrical wall 54, the opening of which is smaller than the flange 52, and an integral planar flange 56, from which a plurality of integral fingers or bosses 58 extend radially. As in the first modification, the ring is slipped into position while the neck 48 and flange 52 are temporarily deformed.

The stopper 59 has a cylindrical side wall 60 and flat bottom wall 62 and fits loosely within the neck. The upper end of the stopper has an outwardly extending planar flange 64 which overlies and makes sealing engagement with flange 56. A spring element 66, similar to the one in the first modification, is attached to cap 68 by means of rivet 70, and may be formed with radial fingers 72 engaging flange 64 which is reversely bent as at 74 to complete the connection while permitting relative rotation.

The cap 68 is provided with a depending flange or side wall 76 which in turn is formed at its free marginal edge with a plurality of bulges 78. A bayonet slot 80 is formed in the side wall in communication with each of these bulges. If desired, the entire marginal edge may be enlarged instead of providing individual bulges. It will be seen that with the construction described the slots do not weaken the side wall as they would if they extended all the way to the marginal edge.

The operation of the closure is similar to that of the first modification except that the primary sealing is accomplished by direct axial engagement between flanges 52 and 64, the lower part of the stopper fitting loosely in the neck and guiding the parts into proper engagement.

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In the embodiment of the invention illustrated in Figures 9 and 10 the filler neck 82 is generally conical as in Figure 2 and extends outwardly from the container wall 84. The back up ring 86 is generally conical to conform to the outer surface of the neck and is provided with a plurality of offset, outwardly extending arms 88 spotwelded or otherwise attached thereto. Pins 90 extend radially outwardly from the arms.

The stopper 92 and spring element 94 are identical with those of Figure 2 and the cap 96, attached to the spring element by rivet 98, is identical with the cap 68 of Figure 8. The operation of the assembly in producing sealing engagement is the same as that described above.

It will be noted that with the construction above described the stopper is permanently and rotatably connected with the cap and yet no rivet or other fastening extends into any part of the stopper which serves to seal the contents. Consequently there is no danger of a connection gradually working loose in use and allowing liquid contents to seep out. It will be noted also that the cap and its flange completely surround the other parts of the assembly and protect them from damage thru rough handling. Since the filler neck is resilient it can be deformed sufficiently to push the metal parts of the closure therethru into the interior of the container when it is desired to ship the container empty.

It will be obvious to those skilled in the art that various changes and modifications may be made in the construction and arrangement of parts without departing from the spirit and intent of the invention, and it is intended that all such changes and modifications shall be embraced within the scope of the following claims.

I claim:

1. An article of the class described, comprising: a container having an opening in a wall thereof; an annular filler neck of rubber-like material diverging outwardly from said wall at said opening; a reinforcing ring loosely surrounding said neck and having an opening of less diameter than the maximum diameter of said neck; an imperforate stopper having a conical wall to fit into said neck; and interengaging means partially carried by said stopper and partially carried by said ring and cooperative when interengaged to urge said stopper axially toward said ring to clamp a portion of said neck therebetween.

2. An article of the class described, comprising: a container having an opening in a wall thereof; a conically flared neck of resiliently deformable material extending outwardly from said wall at said opening; a relatively rigid reinforcing ring circumscribing said neck, said ring being outwardly conically flared and dimensioned to seat snugly against a peripheral portion of said neck, at least a portion of said ring extending laterally beyond the outer margin of said neck; a stopper to fit into said opening, said stopper being outwardly conically flared to seat snugly against the same peripheral portion of the neck; and a cap enclosing said stopper and exerting an inward axial thrust against the stopper, said cap having means for releasable locking engagement with said laterally extending portion of the ring to exert outward axial pull on the ring thereby drawing the ring and stopper axially towards each other to clamp said neck portion therebetween with sealing pressure.

3. An article of the class described, comprising:

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ing: a container having an opening in a wall thereof; a filler neck of resiliently deformable material extending outwardly from said wall at said opening and having a greater lateral dimension at its outer free end than adjacent said wall; a relatively rigid reinforcing ring circumscribing said neck adjacent the outer end thereof, said ring having an opening smaller than the greatest lateral dimension of said neck, whereby outward axial thrust of the ring will exert pressure against a portion of said neck, at least a portion of said ring extending laterally beyond the outer margin of the neck; a stopper shaped and dimensioned to seat inside said neck, said stopper having greater lateral dimension at its outer end than the inner lateral dimension of said neck adjacent said wall whereby inward, axial thrust of the stopper will exert pressure against said portion of the neck; a cap fitting over said neck in releasable locking engagement with said laterally extending portion of the ring; and yielding means interposed between said cap and stopper for compression by inter-engagement of the cap with the ring thereby to exert yielding force to urge said stopper and ring axially towards each other to clamp said neck portion therebetween with sealing pressure.

4. A combination as set forth in claim 2 in which yielding means is interposed between said cap and stopper for compression by inter-engagement of the cap with the ring thereby to exert yielding force to urge said stopper and ring axially towards each other.

5. A combination as set forth in claim 4 in which said yielding means is a spider of spring-like material.

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6. A combination as set forth in claim 2 in which said cap releasably engages said ring by rotation relative thereto.

7. A combination as set forth in claim 6 in which said cap and said ring releasably engage each other by bayonet-and-slot means.

8. A combination as set forth in claim 2 in which said ring is V-shaped in cross section with an outer cylindrical wall and an inner conical wall.

9. A combination as set forth in claim 3 in which said yielding means is a spider of spring-like material.

10. A combination as set forth in claim 3 in which said cap releasably engages said ring by rotation relative thereto.

11. A combination as set forth in claim 10 in which said cap and ring releasably engage each other by bayonet-and-slot means.

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