

PATENT SPECIFICATION

(11) 1 207 487

DRAWINGS ATTACHED

(21) Application No. 53701/66 (22) Filed 30 Nov. 1966

(23) Complete Specification filed 1 Nov. 1967

(45) Complete Specification published 7 Oct. 1970

(51) International Classification B 65 d 41/34

(52) Index at acceptance

B8T 20B 3B 7F1

(72) Inventors **WILLIAM HENRY HADLEY**
RONALD WILLIAM WILTON



(54) IMPROVED BOTTLE CLOSURE

(71) We, **METAL CLOSURES LIMITED**, a British Company, of Bromford Lane, West Bromwich, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to closures for externally threaded containers, such as screw-necked bottles, and in particular it relates to closures of the type which have a thin shell formed of a ductile metal, such as aluminium, such shell having a plain skirt, which is brought into threaded engagement with the thread on the container neck by a thread rolling operation, and a security band, connected to the skirt, by a series of spaced bridges in an interrupted peripheral slit line, for engagement under a peripheral rib on the bottle neck by a forming operation, carried out simultaneously with the thread rolling operation during the application of the closure to the container.

This type of closure was first described in British Patent No. 369,494, and may be made with skirts of varying length. For general economy the skirt is made as short as possible, so that the skirt length in such case is determined by the axial length of the thread and the axial length of the security band.

It has, however, been the practice for some years to provide much longer (deeper) closures of this kind, which simulate the tin-lead or aluminium foil seals, which have been used for many years on wine bottles. In such deep closures the portion for engagement with the bottle thread forms only a shallow portion at the top end of the skirt and the remaining portion of the skirt is intended to be left unthreaded and this portion is conveniently employed for decorative effect.

[Price 5s. 0d. (25p)]

Foil seals, either made from aluminium or tin-lead composition, are usually made to a conical form which can readily be dropped over the bottle and its primary closure, such as a cork or bung, and are then brought into close fitting contact with the primary closure and bottle neck, either by a spinning process or by the application of overall pressure using a fluid-operated rubber member. Despite the apparent fragility of a foil seal the all round support of the bottle does ensure considerable resistance to any damage during handling.

However, in the case of deep closures of the present type the considerable plain portion that exists between the termination of the thread and the line of perforation constitutes a special hazard, since it is in reality a thin walled tubular skirt, which is not a close fit to the glassware. In such deep closures the portion of the skirt for engagement with the bottle thread does not extend for more than about 40% of the entire length (depth) of the skirt.

The unthreaded closure must, of course, be an easy fit over the thread and over the portion of the bottle neck beneath the thread and since the glassware may have a diameter tolerance of 0.025" on the diameter, the unthreaded closures must be an easy fit in relation to the bottle neck to facilitate automatic feeding over all bottles within the diameter limits given in the glassware specification.

It follows from this that contact between the closure and glass after application of the unthreaded closure to a bottle can only be realised at the thread and at the security band, where engagement is produced by rolling. After application of the closure to a bottle a considerable state of stress must always be present in the bridges, since they are the only means of connecting the skirt to the security band and are placed under tension as a result

of the thread rolling operation. In the case of a closure having a long skirt, it is possible to cause bridge breakage by gripping the closure around its middle, as is natural when taking up a bottle from a shelf, and, in so gripping, the plain mid-section is squeezed and increased tension and breakage of the bridges may arise from this additional stressing.

In order to overcome this difficulty it is proposed, in accordance with the present invention, to provide a closure for an externally screw-threaded container, having a rib on the neck of the container at a substantial distance below the screw thread and of the type having a thin shell formed of a ductile metal, the skirt of said shell being connected to a security band connected by a series of spaced bridges in an interrupted peripheral slit line at the bottom margin of the skirt, said security band being adapted to be turned under said rib, said skirt comprising a cylindrical upper part to be brought into threaded engagement with a thread on the container and a convex lower part extending through substantially the whole length of the skirt between the bottom margin of the cylindrical upper part and the peripheral slit line, the axial length of said convex lower part being 25-50% of its maximum diameter. By the provision of a convex contour on the lower part, this portion, which remains unthreaded after application, is greatly strengthened and, in the event of it being subjected to any squashing or squeezing action the effect can only be to lengthen the skirt and thus avoid any additional tension in the bridges.

One construction of closure made in accordance with the present invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a partial section of a closure of the present invention in position on the neck of a bottle before thread rolling;

Figure 2 is a view corresponding to Figure 1 after the thread rolling operation.

It will be seen in Figure 1 that the bottle neck has a flat sealing surface 1 around its mouth, a threaded portion 2, a plain cylindrical portion 3 and a rib 4 for engagement by the security band of the closure.

The diameter of the neck on the apex of the threads of the threaded portion is substantially equal to the diameter of the cylindrical portion 3.

The threaded closure shown in Figure 1 comprises a shell 5 and a gasket 6 for holding in sealed relation with the surface 1. The shell 5 comprises a top 7 and a knurled grip portion 8, below which a shallow peripheral depression 9 is provided to retain the gasket 6 in the shell. Below the depression 9 is a plain cylindrical portion 10,

which is of such diameter that it is an easy

fit over the threaded portion 2 on the bottle, with which it is intended to be brought into engagement by a thread rolling operation in the known manner. As will be seen from Figure 2 the depression 9 virtually disappears during the thread rolling operation in which the cylindrical portion 10 is brought into engagement with the thread 2.

Below the cylindrical portion 10 the skirt is provided with an outwardly curved portion 11, the maximum diameter of which is preferably 2.5% greater than the diameter of the cylindrical portion 10 and the axial length of which is preferably 25-50% of its diameter. Below the portion 11 there is a very short cylindrical section 12, having substantially the same diameter as the portion 10.

The cylindrical section 12 serves to define one axial end of a convex bead 14. An interrupted slit line 16, which defines the bridges by which a security band 15 is connected to the skirt of the shell, is provided in the bead 14. The tapered portion 17 is dimensioned to conform to the profile of the rib 4, whilst the cylindrical portion 15 of the security band is intended to be turned under the rib 4 at the same time as the cylindrical portion 10 is brought into threaded engagement with the bottle thread 2. The disposition and shape of the cylindrical portion 10 and of the security band 15 before and after application to a bottle is indicated in Figures 1 and 2 respectively.

In addition to the resistance to crushing, which arises from the shape of the portion 11, it is found that the Vee form of the bead 14, which contains the perforation or slit line, provides substantial benefits.

Pressure applied directly to this area does not produce the damage to the perforations that can be experienced, under similar circumstances on known closures. Also when the perforations are broken at the time of unscrewing the closure, the upper portion, which will then be used as the reclosure, still retains overall rigidity. Moreover, the defined contour of the open end sets the raw edge of the perforation cut line within the maximum diameter of the bead 14.

WHAT WE CLAIM IS:—

1. A closure for an externally screw-threaded container, having a rib on the neck of the container at a substantial distance below the screw thread and of the type having a thin shell formed of a ductile metal, the skirt of said shell being connected to a security band by a series of spaced bridges in an interrupted peripheral slit line at the bottom margin of the skirt, said security band being adapted to be turned under said rib, said skirt comprising a cylindrical upper part to be brought into

of the thread rolling operation. In the case of a closure having a long skirt, it is possible to cause bridge breakage by gripping the closure around its middle, as is natural when taking up a bottle from a shelf, and, in so gripping, the plain mid-section is squeezed and increased tension and breakage of the bridges may arise from this additional stressing.

10 In order to overcome this difficulty it is proposed, in accordance with the present invention, to provide a closure for an externally screw-threaded container, having a rib on the neck of the container at a substantial distance below the screw thread and of the type having a thin shell formed of a ductile metal, the skirt of said shell being connected to a security band connected by a series of spaced bridges in an interrupted peripheral slit line at the bottom margin of the skirt, said security band being adapted to be turned under said rib, said skirt comprising a cylindrical upper part to be brought into threaded engagement with a thread on the container and a convex lower part extending through substantially the whole length of the skirt between the bottom margin of the cylindrical upper part and the peripheral slit line, the axial length of said convex lower part being 25-50% of its maximum diameter. By the provision of a convex contour on the lower part, this portion, which remains unthreaded after application, is greatly strengthened and, in the event of it being subjected to any squashing or squeezing action the effect can only be to lengthen the skirt and thus avoid any additional tension in the bridges.

One construction of closure made in accordance with the present invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a partial section of a closure of the present invention in position on the neck of a bottle before thread rolling.

Figure 2 is a view corresponding to Figure 1 after the thread rolling operation.

It will be seen in Figure 1 that the bottle neck has a flat sealing surface 1 around its mouth, a threaded portion 2, a plain cylindrical portion 3 and a rib 4 for engagement by the security band of the closure.

The diameter of the neck on the apex of the threads of the threaded portion is substantially equal to the diameter of the cylindrical portion 3.

The threaded closure shown in Figure 1 comprises a shell 5 and a gasket 6 for holding in sealed relation with the surface 1. The shell 5 comprises a top 7 and a knurled grip portion 8, below which a shallow peripheral depression 9 is provided to retain the gasket 6 in the shell. Below the depression 9 is a plain cylindrical portion 10, which is of such diameter that it is an easy

fit over the threaded portion 2 on the bottle, with which it is intended to be brought into engagement by a thread rolling operation in the known manner. As will be seen from Figure 2 the depression 9 virtually disappears during the thread rolling operation in which the cylindrical portion 10 is brought into engagement with the thread 2.

Below the cylindrical portion 10 the skirt 75 is provided with an outwardly curved portion 11, the maximum diameter of which is preferably 2-5% greater than the diameter of the cylindrical portion 10 and the axial length of which is preferably 25-50% of its diameter. Below the portion 11 there is a very short cylindrical section 12, having substantially the same diameter as the portion 10.

The cylindrical section 12 serves to define one axial end of a convex bead 14. An interrupted slit line 16, which defines the bridges by which a security band 15 is connected to the skirt of the shell, is provided in the bead 14. The tapered portion 17 is dimensioned to conform to the profile of the rib 4, whilst the cylindrical portion 15 of the security band is intended to be turned under the rib 4 at the same time as the cylindrical portion 10 is brought into threaded engagement with the bottle thread 2. The disposition and shape of the cylindrical portion 10 and of the security band 15 before and after application to a bottle is indicated in Figures 1 and 2 respectively.

In addition to the resistance to crushing, which arises from the shape of the portion 11, it is found that the Vee form of the bead 14, which contains the perforation or slit line, provides substantial benefits.

Pressure applied directly to this area does not produce the damage to the perforations that can be experienced under similar circumstances on known closures. Also when the perforations are broken at the time of unscrewing the closure, the upper portion, which will then be used as the reclosure, still retains overall rigidity. Moreover, the defined contour of the open end sets the raw edge of the perforation cut line within the maximum diameter of the bead 14.

WHAT WE CLAIM IS:—

1. A closure for an externally screw-threaded container having a rib on the neck of the container at a substantial distance below the screw thread and of the type having a thin shell formed of a ductile metal, the skirt of said shell being connected to a security band by a series of spaced bridges in an interrupted peripheral slit line at the bottom margin of the skirt, said security band being adapted to be turned under said rib, said skirt comprising a cylindrical upper part to be brought into



threaded engagement with a thread on the container and a convex lower part extending through substantially the whole length of the skirt between the bottom margin of the cylindrical upper part and the peripheral slit line, the axial length of said convex lower part being 25-50% of its maximum diameter.

2. A closure according to claim 1 in which said peripheral slit line lies in a convex bead below said convex lower part, a very short cylindrical portion, having substantially the same diameter as the upper part of the skirt, being provided between

the bead and the convex lower part.

3. A closure according to claim 1 or 2 in which the maximum diameter of said convex lower part exceeds the maximum diameter of said cylindrical upper part by 2-5%.

4. A closure for an externally screw-threaded container substantially as herein described and illustrated in Figure 1 of the accompanying drawings.

STEVENS, HEWLETT & PERKINS,

Chartered Patent Agents,

5 Quality Court,

Chancery Lane,

London, W.C.2.

Agents for the Applicants.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1970
Published at the Patent Office, 25 Southampton Buildings, London WC2A 1AY from which copies may be obtained.



* C L H S *