



PATENT SPECIFICATION

DRAWINGS ATTACHED

1,033,135

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COMPLETE SPECIFICATION

Improvements in or relating to the Closing of Containers

5 We, THE METAL BOX COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of 37, Baker Street, London, W.1, England, 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:—

10 This invention relates to the closing of containers and in particular to a closing head for securing to the mouth end of a container, for example a bottle or a jar, a closure cap consisting of a flat crown and a depending annular skirt.

15 According to the invention there is provided a closing head for the purpose mentioned above, wherein the head is connectable with actuating means operable to effect axial movement of the head relative to the container stationary on a support therefor and having the cap loosely applied to the mouth end thereof, said head including means movable therewith and only in the direction of movement thereof and which during axial movement thereof towards the support engage the skirt to effect mechanical engagement of the skirt with the exterior side of the mouth end of the container and means movable therewith and axially relative thereto during said axial movement thereof to deform the crown about the mouth rim of the container into a panelled depression which is of lesser diameter than the internal diameter of the mouth rim and extends into the mouth of the container.

35 The closing head may comprise a hollow housing one end of which is connectable with said actuating means, a closing sleeve connected to said housing for movement therewith and having the free end thereof formed as a ring arranged to effect said mechanical engagement between the skirt and the exterior side of the mouth end of the container, a cap crown deforming member located in the closing sleeve for axial movement therewith and relative thereto, said member having a stop

face to determine the extent of movement of said member into said mouth end, and a spring located in said housing and sleeve and acting on said member to effect the deformation of the cap crown. Said member may be provided with an annular rib to effect said deformation of the crown.

The spring may act on said member through a pad element and a rigid ball located between said member and pad element.

55 Mechanical engagement between the skirt and the mouth end of the container may be effected between a projection or projections extending from the exterior side of the mouth end of the container and a continuous curl formed at the free edge of the cap skirt and said ring may have an interior surface including a tapering leading end portion to engage a part at least of the free edge of the skirt and to move it into engagement with the underside or undersides of the projection or projections.

The mouth end of the container may be provided with an annular bead which is spaced from the mouth rim end from which emanate multi-start screw-threads which extend towards the mouth rim and said ring may be arranged to cause contiguous portions of the curl respectively to be compressed against the faces of said threads and to be engaged beneath the threads.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the drawings accompanying the Provisional Specification, in which:—

80 Figure 1 is a sectional elevation of a closing head according to the invention;

Figures 2 and 3 illustrate the mode of operation of the closing head; and

85 Figure 4 illustrates the top of one form of jar to which a closure cap can be secured by the closing head.

Referring to the drawings, the closing head comprises a hollow housing 1 to one end of which is screwed an adaptor 2 for connection

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to a closing machine, (not shown but of any suitable known kind), which includes actuating means operable to effect axial movement of the closing head relative to a container, for example a jar 3, stationary on a support 4, Figure 2, and having a cap 5 loosely applied to the mouth end thereof. A closing sleeve 6 is connected to the housing 1 for movement therewith and only in the direction of movement thereof, and the free end of the sleeve is formed as a ring 7 which is arranged to effect mechanical engagement between the skirt 8 of the cap and the side of the mouth end of the container.

A cap crown deforming member 9 is located in the sleeve 6 for axial movement therewith and relative thereto and has an annular rib 10 to effect deformation of the flat crown 11, Figure 2, of the cap about the mouth rim 12 of the container into a panelled depression 13, Figure 3, which extends into the mouth of the container and is of a diameter less, preferably only slightly less, than the internal diameter of the mouth rim 12. A stop face 14 extends laterally from the rib 10 to determine the extent of movement of the rib 10 into the mouth end of the container, and the stop face 14 preferably slopes slightly in a downward direction from the rib 10 towards the tapering leading end portion 15 provided on the interior surface of the ring 7. A spring 16 located in the housing and sleeve acts on the deforming member 9 to effect deformation of the cap crown. In the preferred embodiment of the closing head the spring 16 acts on the member 9 through a pad element 17 and a rigid ball 18, for example a steel ball, which is located between the member 9 and the pad element 17 and is engaged in recesses 19, 20 formed respectively in the member 9 and pad element 17. The provision of the pad element 17 permits the predetermined pressure exerted by the spring 16 to be evenly applied to the member 9 even though the member 9 may be caused to wobble by irregularities in the mouth rim of the container.

The container shown as being closed in Figures 2 and 3 is of the kind illustrated in Figure 4. This container has a mouth end provided with an annular bead 21 which is spaced from the mouth rim 12 and from which emanate multi-start screw-threads 22 which extend towards the mouth rim 12. The closure cap has a continuous curl 23 formed at the free edge of the skirt. The container as just described is that which is illustrated in Figure 5 of our British Specification No. 816,995 and the closure cap, which is preferably made of aluminium, is loosely applied thereto, either manually or mechanically, and may be any one of the caps illustrated in Figures 2 to 4 of the said earlier specification.

In operation, a container 3 with a closure cap 5 loosely applied to the mouth end there-

of is stood on the support 4 beneath the closing head and the head is then moved axially downwards towards the support 4. As the head moves downwards the cap crown deforming member 9 moves therewith until the rib 10 is engaged with the flat crown of the cap Figure 2. During continued downward movement of the head the spring 16 causes the rib 10 to deform the crown about the mouth rim 12 of the container to form the panelled depression 13, Figure 3, and the depth of the panelled depression is determined by the engagement of the stop face 14 with that portion of the cap crown which is disposed directly above the mouth rim 12, Figure 3. As the head continues to move downwards the tapering leading end portion 15 of the ring 7 causes contiguous portions of the curl 23 respectively to be compressed against the faces of the multi-start screw threads 22 and to be engaged beneath the threads as described in the above-mentioned Specification No. 816,995. Holes 24 are provided in the member 9 to prevent the possibility of suction between the crown of the cap and the face of member 9.

The container illustrated in Figure 4 is an example of a container in which mechanical engagement between the cap skirt and the mouth end of the container is effected between a plurality of projections, being the threads 22, but it is to be understood that in some instances the container may have a single continuous projection, such as a rib or bead, extending around the exterior of the mouth end and with which the cap skirt is caused to make mechanical engagement.

In the foregoing description the cap crown deforming member 9 has been described as provided with an annular rib 10 for effecting deformation of the crown but if desired the deformation may be effected by a projection extending from the member 9 and having a flat face into which the holes 24 extend.

By deforming the crown of the cap about the mouth rim of the container in the manner herein described it is possible to effect a considerable intimacy of seal between the cap and the mouth rim of the container and to seal off greater container irregularities than has hitherto been possible. This facility is increased in instances in which the cap contains a sealing compound because the compound tends to be wrapped round the rim by the closing process.

In some instances containers are, in known manner, subjected to vacuum processing after the caps have been fully applied to the containers and this has necessitated the use of caps specially designed to valve or vent during the heat-treatment process so as to allow the cap to fractionally lift to permit gases to be driven off from the product for the purpose of improving shelf-life. By deforming the crown of the cap during the closing opera-

tion as herein described, the panelling of the crown relieves the stress in the material of the cap and the removal of this stress allows the cap to "valve" during vacuum processing for the purpose above mentioned. It will accordingly be understood that by using a closing head as herein described it is possible to effect vacuum processing of closed containers by the known methods without the necessity of providing caps specially designed for this purpose as heretofore. When the closed container is to be subjected to vacuum processing it is preferred that the depth of the rib 10 be within the range of from 0.015 inch to 15 0.030 inch.

WHAT WE CLAIM IS:—

1. A closing head for securing a closure cap consisting of a flat crown and a depending annular skirt to the mouth end of a container, for example a bottle or a jar, wherein the head is connectable with actuating means operable to effect axial movement of the head relative to the container stationary on a support therefor and having the cap loosely applied to the mouth end thereof, said head including means movable therewith and only in the direction of movement thereof and which during axial movement thereof towards the support engage the skirt to effect mechanical engagement of the skirt with the exterior side of the mouth end of the container and means movable therewith and axially relative thereto during said axial movement thereof to deform the crown about the mouth rim of the container into a panelled depression which is of lesser diameter than the internal diameter of the mouth rim and extends into the mouth of the container.

2. A closing head according to Claim 1, comprising a hollow housing one end of which is connectable with said actuating means, a closing sleeve connected to said housing for movement therewith and having the free end thereof formed as a ring arranged to effect said mechanical engagement between the skirt and the exterior side of the mouth end of the container, a cap crown deforming member located in the closing sleeve for axial movement therewith and relative thereto, said

member having a stop face to determine the extent of movement of said member into said mouth end, and a spring located in said housing and sleeve and acting on said member to effect the deformation of the cap crown.

3. A closing head according to Claim 2, wherein said member is provided with an annular rib to effect said deformation of the crown.

4. A closing head according to Claim 2 or Claim 3, wherein the spring acts on said member through a pad element and a rigid ball located between said member and pad element.

5. A closing head according to Claim 2 or Claim 3 or Claim 4, wherein the mechanical engagement between the skirt and the mouth end of the container is effected between a projection or projections extending from the exterior side of the mouth end of the container and a continuous curl formed at the free edge of the cap skirt and said ring has an interior surface including a tapering leading end portion to engage a part at least of the free edge of the skirt and to move it into engagement with the underside or undersides of the projection or projections.

6. A closing head according to Claim 5, wherein the mouth end of the container is provided with an annular bead which is spaced from the mouth rim and from which emanate multi-start screw-threads which extend towards the mouth rim and said ring is arranged to cause contiguous portions of the curl respectively to be compressed against the faces of said threads and to be engaged beneath the threads.

7. A closing head for securing a closure cap consisting of a flat crown and a depending annular skirt to the mouth end of a container, for example a bottle or a jar, substantially as herein described with reference to and as illustrated in the drawings accompanying the Provisional Specification.

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member having a stop face to determine the extent of movement of said member into said mouth end, and a spring located in said housing and sleeve and acting on said member to effect the deformation of the cap crown.

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6. A closing head according to Claim 5, wherein the mouth end of the container is provided with an annular bead which is spaced from the mouth rim and from which emanate multi-start screw-threads which extend towards the mouth rim and said ring is arranged to cause contiguous portions of the curl respectively to be compressed against the faces of said threads and to be engaged beneath the threads.

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