May 20, 1958 G. E. FORD ET AL 2,835,093

BOTTLE CAPPING APPARATUS

Filed July 11, 1955

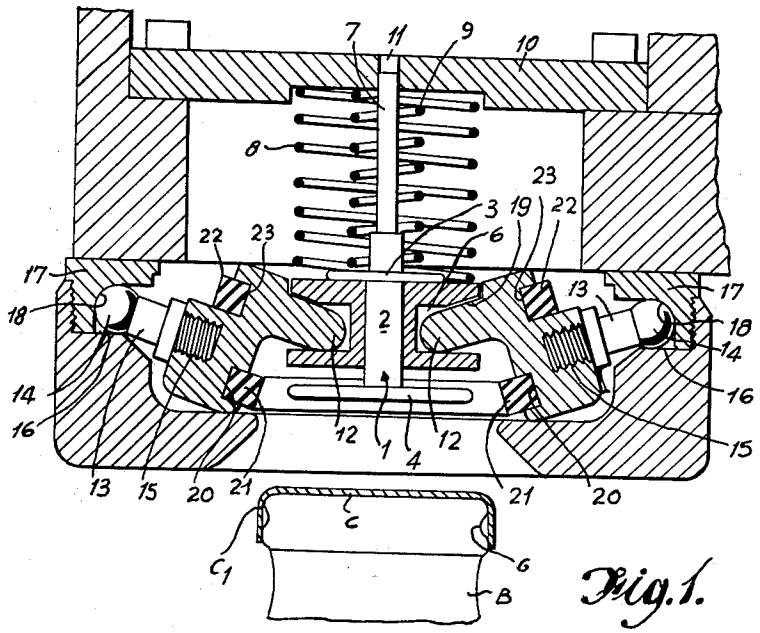
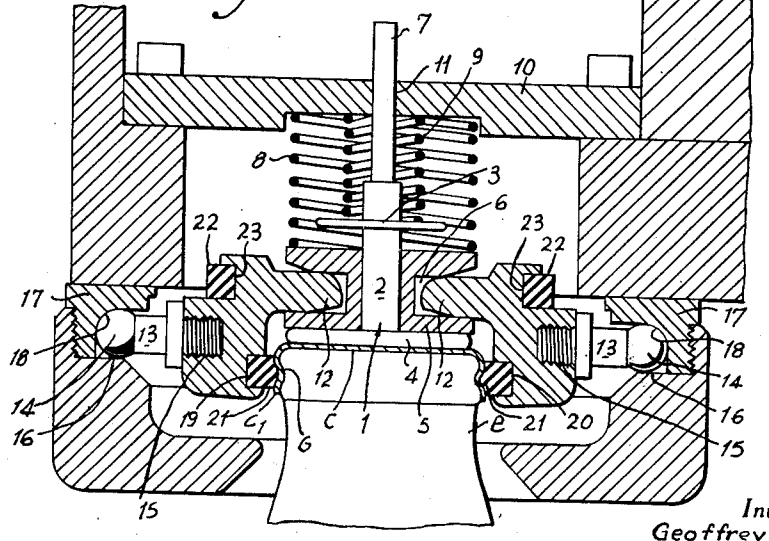


Fig. 1.

Fig. 2



Inventor
Geoffrey E. Ford
Phillip S. Waite
By
Holcomb, Wetherill & Brisebois
Attorneys

United States Patent Office 2,835,093
Patented May 20, 1958

2,835,093

BOTTLE CAPPING APPARATUS

Geoffrey Ewart Ford and Philip Sidney Waite, Bedfordshire, England, assignors to Fords (Finsbury) Limited, Kempston, England, a British company

Application July 11, 1955, Serial No. 521,351

7 Claims. (Cl. 53—345)

The present invention relates to apparatus for capping bottles or the like.

According to the invention there is provided apparatus for closing a light-weight foil cap over the mouth of a bottle or the like, comprising a segmented ring assembly, the segments of which each have a lever arm projecting radially outwards to be supported by a relatively fixed pivot bearing, said segments being adapted to be moved together as an assembly by means of a pressure member that is adapted to be moved in a longitudinal direction by a bottle or the like, a ring of elastic material being connected to said segments so that said pivotal movement compresses said elastic ring radially inwards and causes it to expand radially outwards in dependence upon the sense of the said longitudinal movement, said radially-inward movement of the elastic ring causing it to contact the flange of a cap placed over the bottle mouth thus to close same thereover.

The closing action referred to is preferably arranged to take place against spring pressure so that when the bottle or the like is moved out of contact with the pressure member, the segments automatically revert to their normal "open" position. Conveniently this may be effected by providing the segments each with a groove in which is located part of an elastic ring such as a rubber ring or a garter spring.

The segments may each be provided with a second lever arm which projects radially inwards to be accommodated within a deep annular groove in the pressure member.

In order that the invention may be more clearly understood reference will now be made to the accompanying drawings which show one specific embodiment thereof by way of example and in which:

Fig. 1 shows a section from the apparatus in the open position, and

Fig. 2 shows a corresponding section in the closed or capped position.

In the drawings the apparatus comprises a pressure member **1** adapted to be contacted by bottle B arranged to be moved in a substantially vertical direction by any means known in this art and which is not illustrated. The pressure member comprises an inner member in the form of a cylinder or rod **2** with upper and lower flanges **3**, **4** respectively and an outer member **5** located axially between the flanges **3** and **4**. The axial length of the member **5** is less than the axial distance between the flanges **3** and **4** so as to provide free play between the members **1** and **5**.

The outer member **5** is in the form of annulus with a deep and wide groove **6** and the inner member is provided with an upper extension **7** in the form of a central stem or the like as shown for guiding the pressure member in a relatively fixed part of the apparatus. Two springs **8** and **9** are provided between the inner and outer members of the pressure member and the said relatively fixed part of the apparatus which in the example shown is

in the form of a bridge-piece **10** or the like suitably accommodated over the pressure member and having an aperture **11** in which the stem or rod **7** is located.

The segments hereinabove referred to are made from metal and each of them has two projecting lever arms, one extending radially inwards at **12** and the other radially outwards at **13**. The outer arms **13** are all terminated by a ball tip **14** and conveniently the outer arms may comprise a ball tip stem which may be screwed into its segment as shown in the drawings at **15**. The said ball tips **14** locate upon an annular relatively fixed pivot bearing **16** and are retained in position for pivotal movement by means of cover plate **17** having small recesses **18** therein which fit over the said ball tips **14** as shown. The radially inwardly-projecting arms **12** engage in the groove **6** in the outer part of the pressure **5**.

The pressure member is moved in a vertical direction by an upward vertical movement of the bottle B to cause each segment to pivot about its fixed pivot bearing **16**, **18** since the ouwardly-directed arms **13** remain on the fixed part bearing and the inwardly-directed arms **12** move on movement of the pressure member. The groove **6** in the outer part of the pressure member allows freedom of movement of the inwardly-directed lever arms **12** of the segments so that the arcuate movement of the segments during travel of the pressure member may be accommodated. This accommodation is facilitated by the bevelled edge **19** on the upper part of the outer member.

At the lower part of each segment is a groove **20**, all the grooves **20** in the segment being located in the same relative position whereby an elastic ring **21**, for example of rubber, may be accommodated in said grooves in which it is a tight fit. Therefore during upward movement of the pressure member and consequent upward movement of the outwardly-directed lever arms **12** the segments pivot about their fixed bearings **16**, **18** to cause the elastic ring **21** to be compressed radially inwards to the position shown in Fig. 2 and this inward movement is preferably against spring pressure which may conveniently be arranged by a second flexible e. g. rubber, ring **22** located in a second groove **23** on the outer parts of the segments towards the upper ends thereof as shown.

In operation, the bottle B with cap C placed over its mouth is presented to the apparatus and moved upwardly so that it contacts the lower flange **4** of the pressure member. The initial vertical movement causes no pivoting of the segments about their fixed pivot bearings but merely acts to keep the cap C on the bottle B until the outer part **5** of the pressure member is contacted by flange **4** whereupon the pressure member is moved further vertically upwards to effect pivoting of the segments about their pivot bearings until the position of Fig. 2 is reached by which time the flexible ring **21** has been compressed radially inwards to contact the depending flange C_1 of the battle cap C to compress this flange C_1 into the groove G as commonly provided on the outer side wall of the mouth of the bottle B.

During this upward vertical movement the springs **8** and **9** are compressed and after the sealing operation the bottle B is caused to move vertically downwards thereupon the pressure member also moves downwards and the segments return to their normal lower position of Fig. 1 assisted by the influence of the upper flexible ring **22**.

Although specifically in the example given the bottle B is caused to move relatively to the sealing head it will be apparent that if desired the bottle could be held stationary and the sealing head moved in relation thereto.

We claim:

1. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of

segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves, a second longitudinal groove in each of said segments and located in the outer face thereof, and a rubber ring located in said grooves.

2. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves, spring means to revert said segments automatically to their normal position on movement of the bottle out of contact with said pressure member after the closing action and said pressure member comprising an inner cylindrical member having upper and lower flanges and an outer member arranged concentrically therewith and located axially between said flanges, the axial length of said outer member being less than the axial distance between the said two flanges.

3. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves, spring means to revert said segments automatically to their normal position on movement of the bottle out of contact with said pressure member after the closing action and said pressure member comprising an inner cylindrical member having upper and lower flanges and an outer member arranged concentrically therewith and located axially between said flanges, the axial length of said outer member being less than the axial distance between the said two flanges and said outer member being in the form of an annulus with a deep and wide groove.

4. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves, spring means to revert said segments automatically to their normal position on movement of the bottle out of contact with said pressure member after the closing action and said pressure member comprising an inner cylindrical member having upper and lower flanges and an outer member arranged concentrically therewith and located axially between said flanges, the axial length of said outer member being less than the axial distance between the said two flanges, an upper extension on said inner member and a fixed apertured member located above said pressure member, said upper extension locating in said aperture.

5. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves, spring means to revert said segments automatically to their normal position on movement of the bottle out of contact with said pressure member after the closing action and said pressure member comprising an inner cylindrical member having upper and lower flanges and an outer member arranged concentrically therewith and located axially between said flanges, the axial length of said outer member being less than the axial distance between the said two flanges, an upper extension on said inner member, a fixed apertured member located above said pressure member, said upper extension locating in said aperture and two helical spring members between said pressure member and said fixed part above said pressure member.

6. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said grooves and a ball tip at the outer ends of said projecting lever arms, said relatively fixed bearing comprising an annular bearing surface to locate said ball tips and a cover plate secured to said annular bearing surface to retain said ball tips.

7. An apparatus for closing a lightweight foil cap over the mouth of a bottle, comprising a plurality of segments located to form a segmented ring assembly, a lever arm projecting outwardly from each of said segments, an annular fixed pivot bearing located for supporting said projecting lever arms, a pressure arm projecting inwardly from each of said segments, each of said pressure arms being substantially parallel to but laterally displaced from said outwardly projecting lever arm on its own segment, a pressure member engaging the inner ends of said pressure arms and mounted for movement in a vertical direction by the bottle to be capped, a longitudinal groove in the inner face of each of said segments, a ring of elastic material tightly accommodated in and by said

grooves, spring means to revert said segments automatically to their normal position on movement of the bottle out of contact with said pressure member after the closing action and a ball tipped stem screwed into the outer end of said outwardly projecting lever arms, said relatively fixed bearing comprising an annular bearing surface to locate said ball tips and a cover plate secured to said annular bearing surface to retain said ball tips.

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