July 9, 1935. W. J. HAWKINS ET AL 2,007,369

MILK BOTTLE CAPPING

Original Filed Oct. 18, 1929

Fig.1

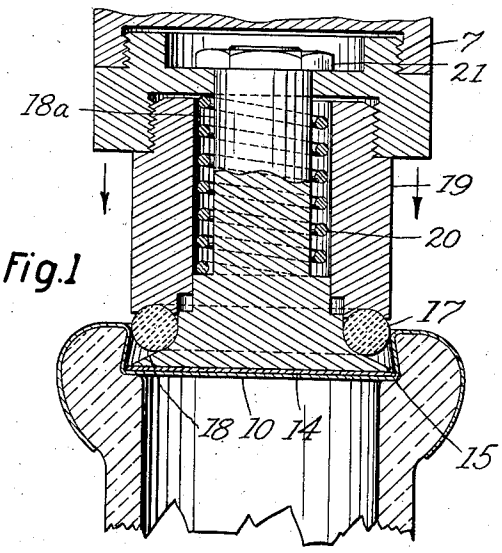


Fig.2

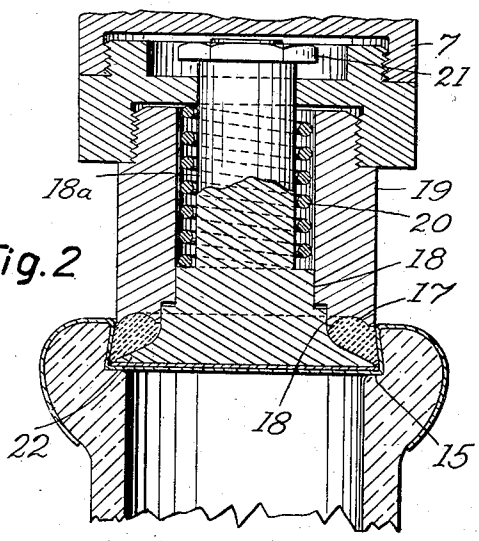


Fig.3

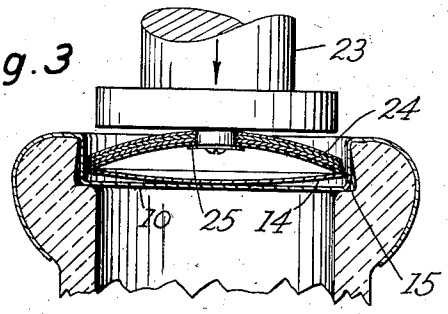


Fig.6

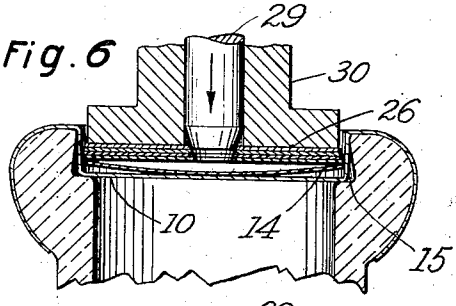


Fig.4

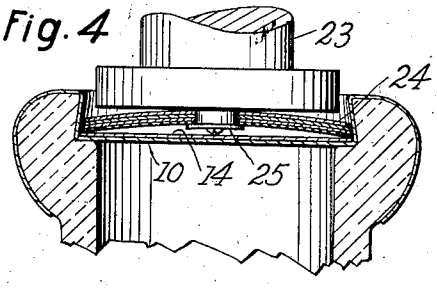


Fig.7

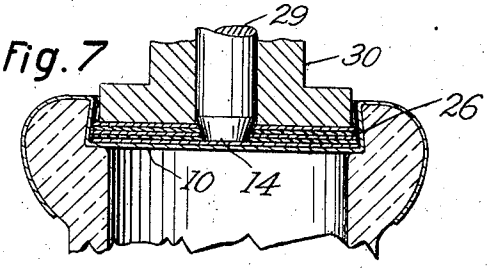


Fig.5

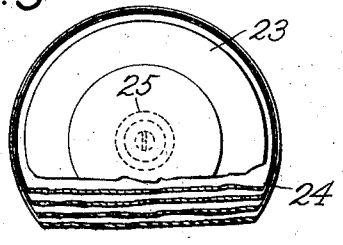
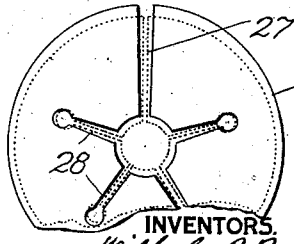


Fig.8



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MILK BOTTLE CAPPING

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Application October 18, 1929, Serial No. 400,699
Renewed March 9, 1933

20 Claims. (Cl. 226—81)

This invention relates to a method and apparatus for capping milk bottles and the like. The general purpose of the invention is to provide a cheap, yet strong and secure bottle seal of that type in which a cap having an upwardly extending lip protecting skirt is secured in the bottle mouth by means of a stiff closure disk, or plug, pressed into the mouth within the skirt. Milk bottles and the like are commonly recessed to provide a cap supporting ledge in the bottle mouth and an adjoining upstanding slightly inwardly inclined wall. The peripheral shoulder of a skirted cap of this type pushed into the recessed mouth of the bottle will not ordinarily enter fully into the angle or corner between the ledge and the seal of the recess. One reason for this is that the diameter of the shoulder must be small enough to go through the narrow part at the top of the recess. Another reason is that the cap tends to pull away from the extremity of the angle, especially when the skirt of the cap is molded, or otherwise operated on. For this reason the inward inclination of the recess wall does not lock the closure disk of the cap in place as it should and, consequently, a loose and insecure seal results; nor does the ordinary closure disk correct this, because the edge of the disk tends to curl up as it is pushed into the mouth of the bottle. It is, therefore, the main object of this invention to provide a simple and inexpensive capping method and apparatus in which the periphery of a skirted cap or closure disk, or an assembly of the two, is caused to enter fully into the angle between the ledge and wall. It is also an object of the invention to secure the above results without the necessity of using a special closure disk.

Thus, in carrying the invention into effect, the best method employed consists in positioning in the recess a cap having an upwardly extending lip protecting skirt and a stiff close fitting disk located within said cap, and then exerting pressure on the periphery of said disk downwardly against the ledge and on the adjoining skirt portions of the cap outwardly against the wall to tightly seat the cap and disk in the angle between the ledge and wall.

In the best construction of apparatus for carrying out the invention, there is provided a head reciprocable toward and away from the bottle mouth, together with expansible means on said head adapted to enter the recess, and mechanism acting on said means to cause the same to exert pressure downwardly against said ledge and outwardly against said wall to force the bottle closure into the angle between the ledge and wall.

With the above and other objects not specifically mentioned in view, the invention consists in certain methods and constructions which will be hereinafter fully described and then more particularly pointed out in the claims hereunto appended.

In the accompanying drawing in which like characters of reference indicate the same or like parts:

Fig. 1 is a sectional view of a device constructed in accordance with the invention;

Fig. 2 is a like sectional view of the device shown in Fig. 1, with the parts shown in another position;

Figs. 3 and 4 are sectional views of a modified construction in accordance with the invention, showing two positions of the parts during capping operation;

Fig. 5 is a plan view, from above, of the device shown in Figs. 3 and 4;

Figs. 6 and 7 are similar sectional views, showing the parts at different stages in the capping operation, of another modified construction designed in accordance with the invention; and

Fig. 8 is a plan view, from below, of the construction shown in Figs. 6 and 7.

Referring now to the drawing, there is shown in Figs. 1 and 2 a reciprocable head 7 on which is an expansible elastic ring 17, preferably of rubber. This ring is carried by a conical element 18 entering the central opening of the ring so as to have a wedging action on the ring, tending to expand the same when this member and the ring are moved relative to each other. The conical element 18 is provided with a shank 18a slidable within a compression element 19 secured to the head 7, and around the shank and between the head and the conical element is a spring 20 tending to push the conical element downwardly to inoperative position. A nut 21 threaded on the shank of the conical member and bearing on a shoulder of the head 7, limits the downward movement of the element 18. The compression element 19 is provided, along its lower face, with a concave annular surface which cooperates with the conical surface of the element 18, as shown in Figs. 1 and 2, to squeeze the elastic ring so that upon approaching movement of the head to a bottle mouth, the base or lower face of the conical element will engage a closure disk 14 on the ledge in the bottle mouth, and by engagement therewith, have a wedging action on the ring 17 and in cooperation with the concave surface of compression member 19 squeeze and deform the rubber ring, thereby forcing the ma-

terial of the ring downwardly against the ledge and outwardly against the wall, thus forcing the cap **15** into the angle between said ledge and wall, and firmly seating the same therein.

In the modification shown in Figs. 3 to 5, a reciprocating head **23** carries on its lower face a nest of arched spring disks **24** with their concave sides down, the disks being secured by means of a washer **25**. As will be seen from Fig. 3 which shows the operation of these disks when forced down on the bottle closure elements, the periphery of the lowermost disk sits on the periphery of the closure disk **14** and as the head is farther depressed, the periphery of the spring disks is expanded by the flattening of their arch. As a result, the skirt of the cap **15**, adjoining the cap **14**, is pressed outwardly against the wall of the recess at the same time that the periphery of the cap **14** is pressed down so that both are forced fully into the recess angle.

In Figs. 6 to 8 another modified construction suitable for carrying the invention into effect is illustrated. A pile of expansible disks **26** split radially at **27**, are provided with radial slots **28** so that they can expand their peripheries, as shown in Fig. 8. For the purpose of expanding these disks, a conical member **29** is provided within a bore in the head **30**, which element is arranged to be forced into a central opening within the disks after the head **30** has seated the disks in the bottom of the recess. With this form also there is produced downward pressure which extends clear to the periphery of the closure disk **14**, and at the same time outward pressure against the walls of the recess exerted on the portion of the skirted cap adjoining the closure disk **14**, thus forcing them into the recess angle, as shown in Fig. 4. In Fig. 8, the expanded and contracted positions of the disks **26** are shown in full and dotted lines respectively. The slots **27** in the several disks are offset with respect to each other, so that the periphery of the pile is unbroken. The showing in Figs. 6 to 8 is somewhat diagrammatic, no details being shown of the elements for securing the disks on the head **30**, since these would be within the ordinary skill of a mechanic, who would provide flat headed rivets passing loosely through the radial slots **28**, or any equivalent securing means.

It will thus be seen that applicant has provided a capping head having a capping element which is normally of a diameter such that it can be readily passed through the restricted portion of the recess and which is expanded when it has reached the bottom and generally wider portion of the recess, to fully seat the peripheral portion or edge of bottle closures in the recess, against the recess angle.

What is claimed is:

1. The method of capping a bottle having within its mouth a recess having a cap supporting ledge and an upstanding inner wall adjoining the same consisting in positioning in said recess a cap having an upwardly extending lip protecting skirt and a stiff close fitting disk located within said cap, and then exerting pressure on the periphery of said disk downwardly against said ledge and on the adjoining skirt portion of the cap outwardly against said wall to tightly seat said cap and disk in the angle between said ledge and wall.

2. The method of capping a bottle having within its mouth a recess having a cap supporting ledge and an upstanding inner wall adjoining the same consisting in positioning in said recess a cap having an upwardly extending lip protecting skirt and a stiff close fitting disk located within said cap, and then simultaneously exerting pressure on the periphery of said disk downwardly against said ledge and on the adjoining skirt portion of the cap outwardly against said wall to tightly seat said cap and disk in the angle between said ledge and wall.

3. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it to force a bottle closure into the angle between said ledge and wall, said deformable means including a radially expansible member having a central opening, and said mechanism including a wedge mounted in and movable in said head for engaging said member to expand it.

4. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall said mechanism including a compression element comprising a sleeve fixed on said head and adapted to engage said means from above, and a wedging device resiliently mounted on said head and cooperating with said sleeve to expand said means.

5. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said means being operated by the approaching movement of said head to said mouth, and said mechanism including a compression element adapted to engage said means from above and a wedging device resiliently mounted on said head and cooperating with said compression element to expand said means.

6. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said mechanism including a wedging device resiliently mounted on said head for expanding said means.

7. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head ar-

ranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said deformable means comprising a deformable ring having a circular cross-section and said mechanism including a compression element having a concave end adapted to engage said ring for deforming it to force a portion thereof into said angle.

8. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said deformable means comprising a radially expansible member having a central opening, and said mechanism including a wedge resiliently mounted on said head for operation in said opening and means for producing relative movement of the wedge and member.

9. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said mechanism including a wedge element resiliently mounted on said head and positioned to engage with its base a closure element in said recess and operated by said engagement to expand said means.

10. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of deformable means on said head arranged to enter the recess, and mechanism acting on said means to expand it downwardly to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said mechanism including a conical element resiliently mounted on said head and positioned to engage with its base a closure element in said recess, and operated by said engagement to expand said means.

11. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of expansible means on said head arranged to enter the recess, and mechanism acting on said means to cause the same to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said expansible means comprising an elastic ring and said mechanism including a wedge resiliently mounted on said head and a compression element fixed on said head for forcing said ring downwardly into said angle.

12. In a device for capping a bottle having within its mouth a recess provided with a cap supporting ledge and an upstanding inner wall adjoining the same, the combination with a head reciprocable toward and away from the bottle mouth, of expansible means on said head arranged to enter the recess, and mechanism acting on said means to cause the same to exert pressure downwardly against said ledge and outwardly against said wall to force a bottle closure into the angle between said ledge and wall, said expansible means comprising an elastic ring and said mechanism including a conical element resiliently mounted on said head and having its base positioned to the ledge and a cooperating compression member operating when the cone is pushed against a bottle closure on said ledge to squeeze said ring downwardly into said angle.

13. In a device of the character disclosed, the combination of a reciprocable head; deformable means on said head arranged to enter a bottle mouth; and mechanism associated with said means to expand the same downwardly and outwardly to force a closure into engagement with the bottle mouth, said mechanism including an elongated sleeve and a resiliently mounted wedging device cooperating therewith to expand said means.

14. In a device of the character disclosed, the combination of a reciprocable head; deformable means on said head adapted to enter a bottle mouth recess; and mechanism associated with said means to expand the same downwardly and outwardly to force a closure into engagement with said recess, said mechanism including a wedging device resiliently mounted on said head for expanding said means.

15. In a device of the character disclosed, the combination of a reciprocable head; a deformable ring of substantially circular cross-section carried by said head and arranged to enter the recess in a bottle mouth; and a wedging device resiliently mounted on said head for expanding said ring downwardly and outwardly to force a closure into engagement with the bottle recess.

16. In a device of the character disclosed, the combination of a reciprocable head; deformable means carried by said head arranged to enter the recess in a bottle mouth; and mechanism associated with said means to expand the same downwardly and outwardly to force a closure into engagement with the bottle recess, said deformable means including a ring of circular cross section, said mechanism including a wedging device resiliently mounted on said head for expanding said means.

17. In a device of the character disclosed, the combination of a reciprocable head; an expansible member having an opening therein carried by said head and arranged to enter the recess in a bottle mouth; and a wedging device resiliently mounted on and movable relative to said head to expand said expansible member to force a closure into engagement with the bottle recess.

18. In a device of the character disclosed, the combination of a reciprocable head; means normally circular in cross section on said head arranged to enter a bottle mouth; and mechanism associated therewith to deform the same to force a closure downwardly and outwardly into engagement with the bottle mouth, said mechanism including a sleeve engaging said means and a wedging device resiliently mounted on said head to co-

operate with said sleeve to expand said means.

19. In a device of the character disclosed, the combination of a reciprocable head; means normally circular in cross section on said head adapted to enter a recess in a bottle mouth; and mechanism associated therewith to deform the same and force a closure downwardly and outwardly into engagement with the bottle recess, said mechanism including a wedging device resiliently mounted on said head for expanding said means.

20. The method of capping a bottle having within its mouth a recess, consisting in positioning adjacent said recess a skirted cap having a disc associated therewith, and then exerting pressure outwardly against said cap and downwardly upon said disc to seat said cap tightly within said recess.

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