Nov. 25, 1952 E. A. FUCHS 2,619,253

CLOSURE FOR CONTAINERS

Filed July 5, 1949 2 SHEETS—SHEET 1

FIG. 1.

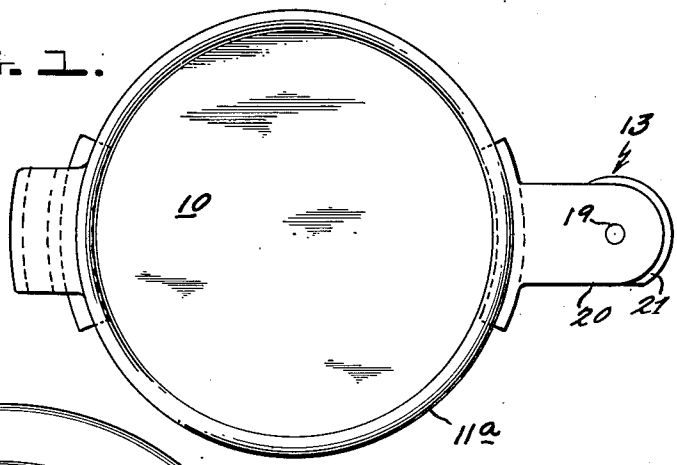


FIG. 2.

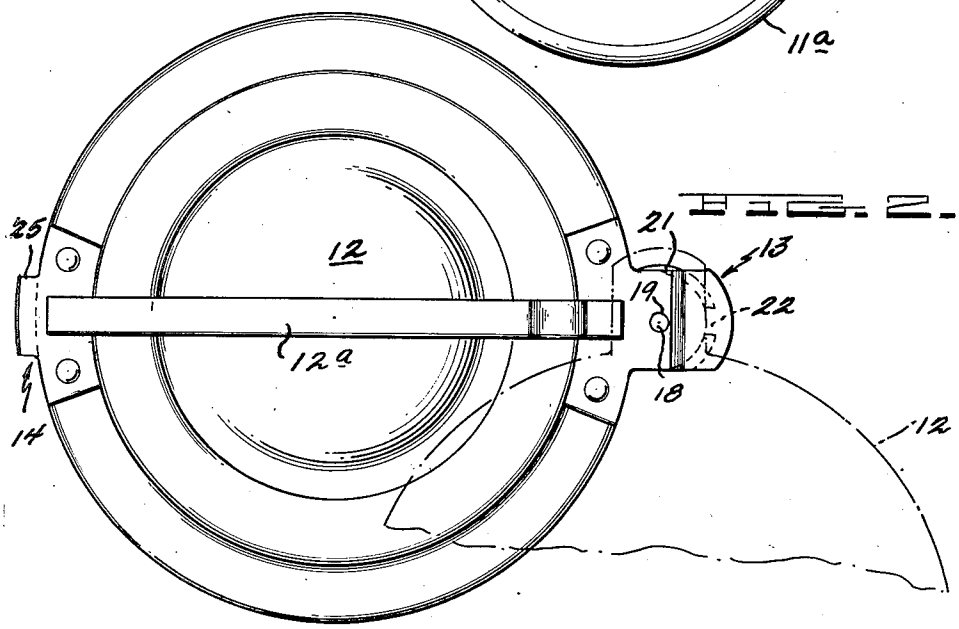
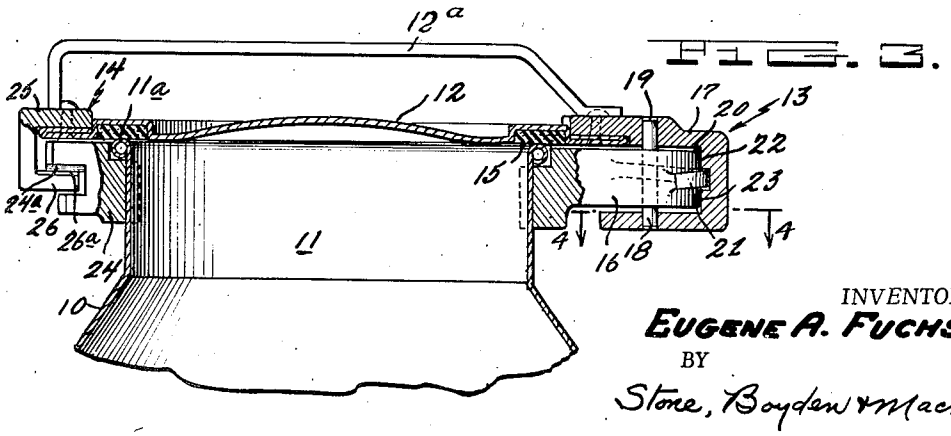


FIG. 3.



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FIG. 8.

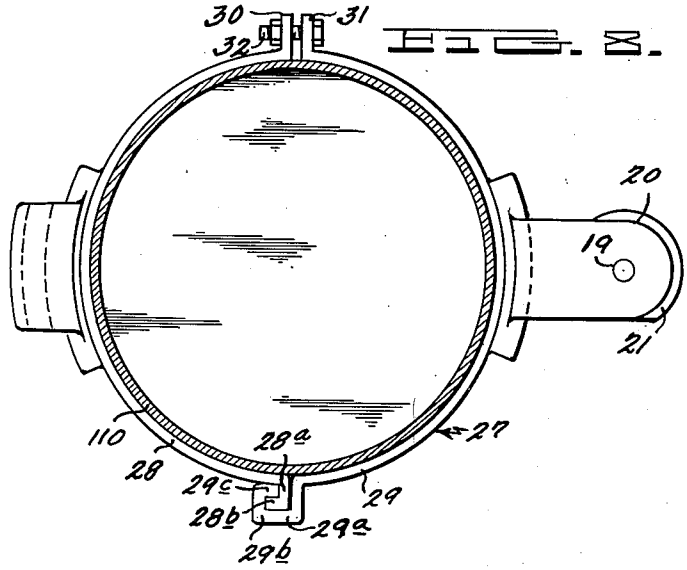


FIG. 4.

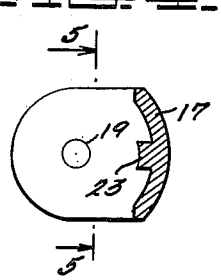


FIG. 5.

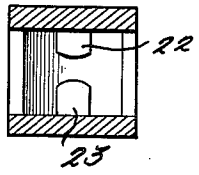


FIG. 9.

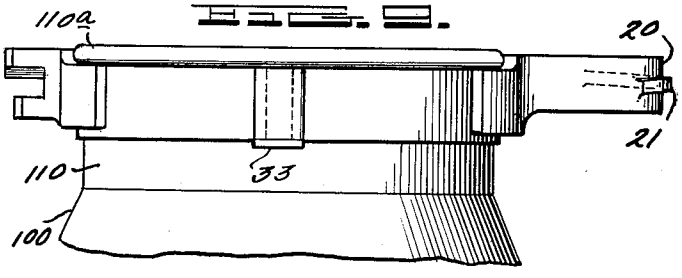


FIG. 10.

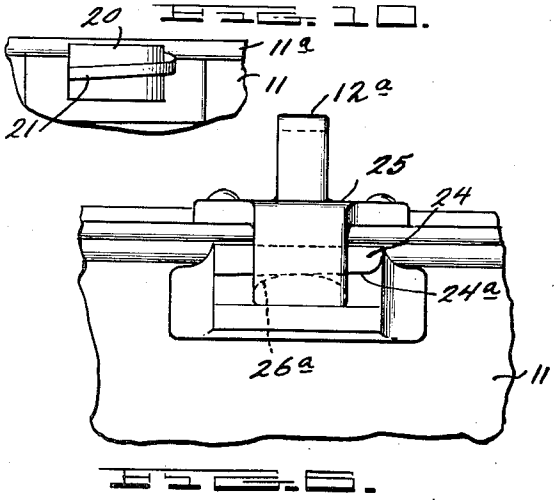


FIG. 7.

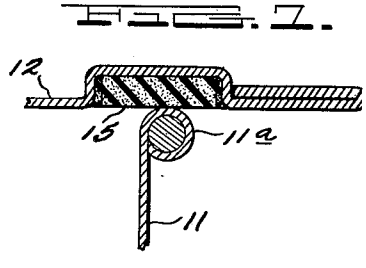


FIG. 6.

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CLOSURE FOR CONTAINERS

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Application July 5, 1949, Serial No. 103,151

2 Claims. (Cl. 220—33)

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This invention relates to closure means for containers, and more particularly to that type of closure which is pivotally secured to the container so as to swing transversely into open and closed position with respect to an opening in the container.

The general object of the invention is to provide an improved closure device of this type which shall consist of a minimum number of parts, so that it will be exceptionally cheap to manufacture, and which at the same time will be simple and convenient to use and efficient in operation, affording a tight seal.

The invention is designed especially for use with a milk can or container of the usual type but it is not of course restricted to such use. In fact, it is applicable to containers of many different types such as powder cans, storage batteries, gasoline tanks, jars, oil cups, inlets on oil lines and the like. Furthermore, while the device is shown as made of sheet metal, it may be fabricated from many other different materials, including the various plastics, and may be formed by stamping, casting, welding, or by other methods well known in industry and commerce.

Devices of this general type are known, wherein a container is provided with an open neck portion to which is pivotally attached a closure cap which may be swung about an axis generally at right angles to the plane of the edge of the opening. However, with this arrangement, difficulty has been experienced in obtaining a tight seal when closed because if the cap is made to fit the opening tightly in the closed position, the frictional resistance to pivotal movement is too great for satisfactory operation, and produces detrimental wear on the closure seal.

Attempts have been made to reduce this frictional resistance by slightly displacing the axis of pivotal movement with respect to the plane of the edge of the opening so that the sealing face of the cap is moved angularly with respect to the edge of the opening when it is swung into and out of its closed position. This construction necessitates exceptional care in the forming of the pivot means inasmuch as the angular displacement of both elements must match, and where a hole is to be drilled, or a pin inserted, it cannot be done at right angles, but requires a special setting of the press or drill. Furthermore, this type of arrangement introduces excessive shearing forces into the pivot pin, resulting in premature wear on the pin with resultant misalignment and loss of effective sealing.

In my present improved form of closure cap the hinge means is so constructed as to allow the cap to be swung into and out of its closed position about an axis which is substantially normal to the plane of the edge of the opening, and the frictional drag is eliminated by providing means in the hinge which gives the cap a slight movement in a direction parallel with the pivotal

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axis while swinging about its pivot, causing the cap to be lifted off from the edge of the opening as it is swung toward open position, the cap meanwhile remaining in all positions in substantially parallel relationship to the plane of the opening.

It is also an object of my invention to provide an attaching means for pivotal closure of this nature which will enable such a closure to be readily secured to an existing container, in place of the original closure means.

In order that the invention may be readily understood, reference is had to the accompanying drawings, forming part of this specification, and in which:

Fig. 1 is a plan view of the upper end of a container showing means for mounting my improved swingable cap, but with the cap omitted;

Fig. 2 is a plan view of the upper end of a container with the closure cap shown thereon in the closed position;

Fig. 3 is a fragmentary vertical section through the upper portion of the container, parts being in elevation;

Fig. 4 is a detailed sectional view of the hinge member carried by the cap taken on the line 4—4 of Fig. 3;

Fig. 5 is a detailed sectional view of such hinge member taken on the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is an enlarged elevation of a portion of the neck of a container showing details of the cap clamping means;

Fig. 7 is an enlarged sectional view showing the sealing gasket carried by the cap;

Fig. 8 is a plan view similar to Fig. 1 but illustrating a modified form of the device, and with the neck of the container shown in section;

Fig. 9 is an elevation of the modified form of device shown in Fig. 8; and

Fig. 10 is an end elevation of the hinge member shown in side elevation in Fig. 9.

Referring to the drawings in detail, reference numeral 10 indicates a can or container provided with an upstanding neck portion 11 which defines an opening terminating in the rolled edge 11a. A closure means for this opening includes a cap 12 which may be pivotally secured to the container by a hinge means indicated generally at 13, and held closed by a clamping means indicated generally at 14. In the closed position both the clamping means 14 and the hinge means 13 act to press the underside of the cap 12 against the edge 11a, and a gasket 15 of soft material may be provided on the cap to insure a tight seal, as shown in Fig. 7. A handle 12a is secured to the cap for manipulating the same.

The hinge means 13 includes a member 16 extending outwardly from the side of the neck 11, and secured thereto, as by welding, and a member 17 attached to the edge of the cap 12. The member 17 is formed of rigidly connected upper and lower elements disposed substantially paral-

lel with each other, and spaced apart sufficiently to allow the member 16 to be received between them with a certain amount of vertical clearance, the purpose of which will hereinafter appear. The member 16 is provided with a pivot pin 18 which extends beyond the faces of said member and enters suitable journal openings 19 provided in the upper and lower elements of the member 17. As shown in Fig. 2 the pin 18 is disposed so as to allow the cap 12 to swing across the neck of the container 11 on an axis which is normal to the plane of the edge 11a, defining the opening in the container 10, and located outside of said opening from the closed position (shown in solid lines) to its open position (shown by the broken lines). The outer face 20 of the member 16 is preferably formed with an arcuate contour which is substantially concentric with the pivot pin 18, and a helically disposed element or cam rib 21 projects from and partially surrounds the same. For cooperative engagement with the element or rib 21 there is provided on an inner face of the member 17 slotted guide means comprising a pair of vertically spaced abutments 22 and 23, between which the cam rib is loosely received. It will thus be seen that as the cap 12 swings about the pin 18, from closed toward open position, the abutment 22 bearing against the upper face of helical element or rib 21 will cause the cap to be lifted vertically, thus clearing the edge of the opening, whereas, when the cap 12 is swung back into its closed position so that the gasket 15 registers with the edge 11a, the abutment 23 will engage the under side of the helical element 21, producing a downwardly directed force during the last part of the travel tending to press the cap 12 down tightly.

The clamping means 14 also assists in tightly sealing the cap or closure and includes a lug 24 extending laterally from the side of the neck 11 and secured thereto as by welding, and a keeper 25 attached to the edge of the cap 12. The keeper 25 is formed with a downwardly and inwardly extending portion 26, the upper surface 26a of which engages with the lower surface 24a of the lug 24. Either one, or both of the surfaces 24a and 26a may be vertically inclined slightly to produce a wedging action, but in the preferred embodiment shown, the surface 24a is inclined slightly, and surface 26a is somewhat arcuate in vertical section, as shown in Fig. 6.

It will thus be seen that the hinge means 13 and clamping means 14 co-operate in pressing the underside of the closure evenly against the sealing surface of the container around its entire periphery, when the closure is in closed position. The angle of the rib 21 of the hinge member may be of any degree desired, but the inclination of the surface of lug 24 of the clamping means must be such as to work in conjunction with the angle of the rib so as to insure movement of the closure parallel with itself to produce the desired sealing action. Due to the relation and co-operation between the hinge means and clamping means there will always be an even sealing pressure around the periphery of the closure.

In Figs. 8 and 9 there is shown a modified form of the invention which is suitable for use with existing containers to which it is desired to apply a closure means of the type just described. In this modification an attachment generally indicated at 27 comprises a pair of elongated members 28 and 29 shaped to snugly encircle the neck 110 of a container 100. One end of the member 28 may be turned outwardly as at 28a, and thence backwardly as at 28b, while one end of the member 29 may be offset as at 29a, then turned inwardly as at 29b, thence backwardly as at 29c, the two ends thus formed thereby being capable of an interfitting slidable engagement with each other which will resist the reactive tensional force set up when the other abutting end portions 30 and 31 are drawn up as by the bolt-and-nut arrangement 32, yet at the same time may be quickly slid laterally out of engagement when the tensioning force is removed. To prevent accidental disengagement of the members 28 and 29, a stop plate 33 may be secured beneath the end portions of one of the members. For the purpose of supporting the cap 12 in operative engagement with the edge 110a, the previously described hinge means 13 is permanently secured to one of the encircling members, as 29, and the clamping means 14 is secured to the other of the encircling members as 28.

Where in the following claims, I speak of a supporting member or lug projecting laterally or radially "of the side of the container" or "of the side of the neck" I mean to include either the arrangement shown in Figs. 1–3, in which the supporting member is permanently attached to the container, or the arrangement shown in Figs. 8 and 9, in which the member is carried by a band encircling the container.

I claim:

1. Hinge means for a pivotal closure means for a container provided with an opening comprising a member extending outwardly from said opening, a pivot pin extending through said member and projecting above and below the same in a direction normal to the plane of the opening in the container, the outer face of said outwardly extending member having an arcuate surface substantially concentric with said pivot pin, a bearing member for said closure means having spaced substantially parallel elements journalled to receive said pivot pin, the thickness of said outwardly extending member being less than the distance between said parallel elements in order to permit axial as well as pivotal movement of the closure means, a helically disposed rib on said arcuate surface, and abutment means on said bearing member for slidable engagement with the rib.

2. In a container having an open ended cylindrical neck, a closure member for sealing said neck, a fixed member projecting laterally of the side of the neck, a pivot pin passing through said fixed member in a direction normal to the plane of the open end of the neck for supporting said closure member for rotation about the axis of said pin, the outer face of said fixed projecting member having an arcuate surface substantially concentric with said pivot pin, a helically disposed rib on said arcuate surface, and abutment means on said closure member for slidable engagement with said rib.

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