June 5, 1956 R. H. RICHMOND, SR 2,748,997

SPOUT CLOSURE CAP AND OPERATING MECHANISM FOR SAFETY GASOLINE CANS

Original Filed June 23, 1951 3 Sheets-Sheet 1

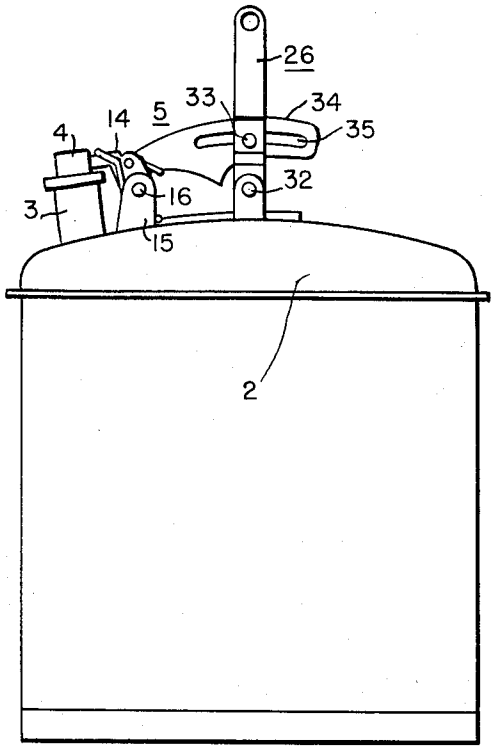


Fig. 1.

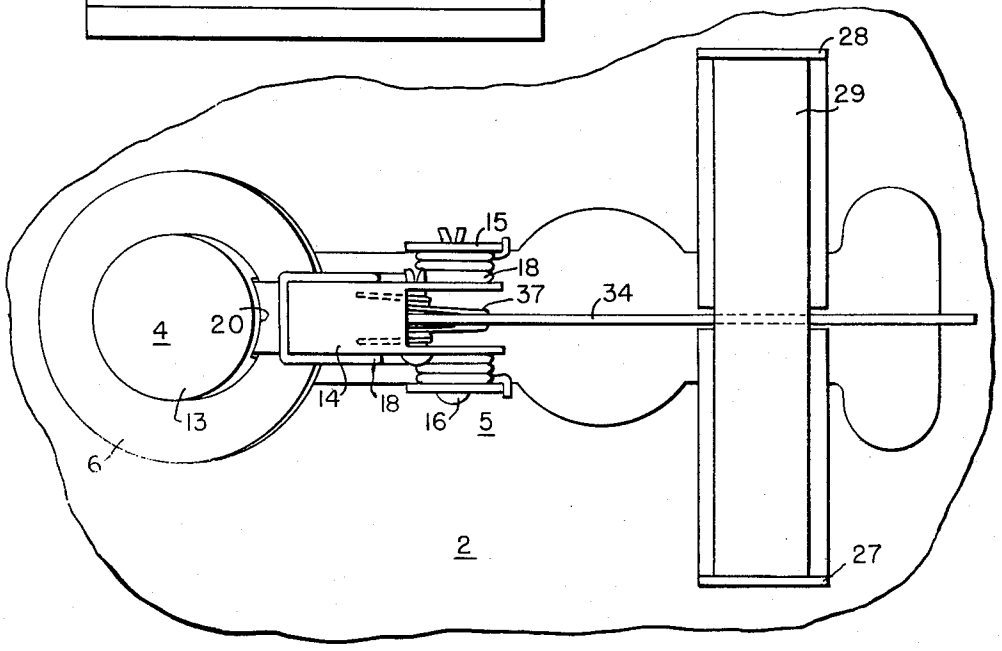


Fig. 2.

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Fig.3.

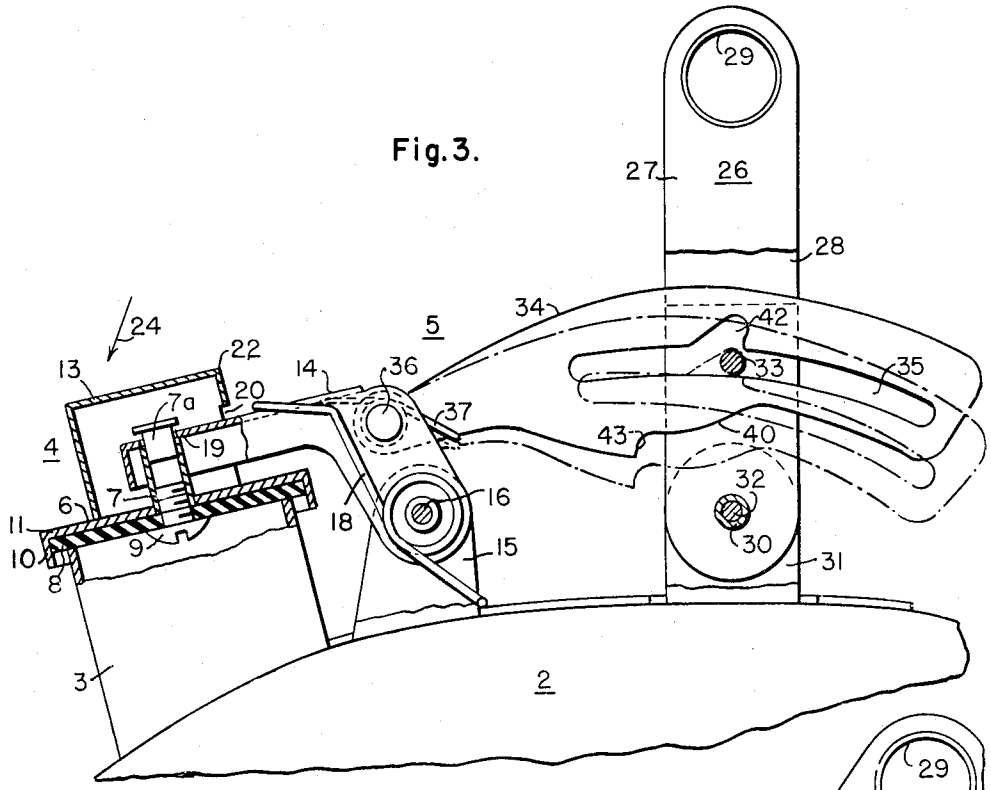
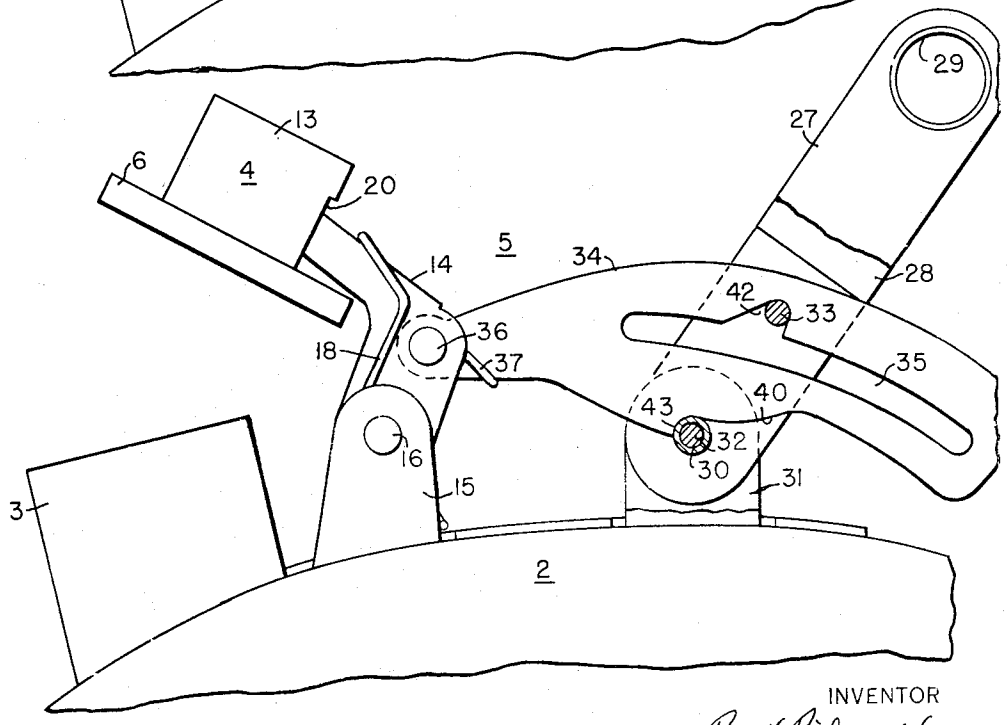


Fig.4.



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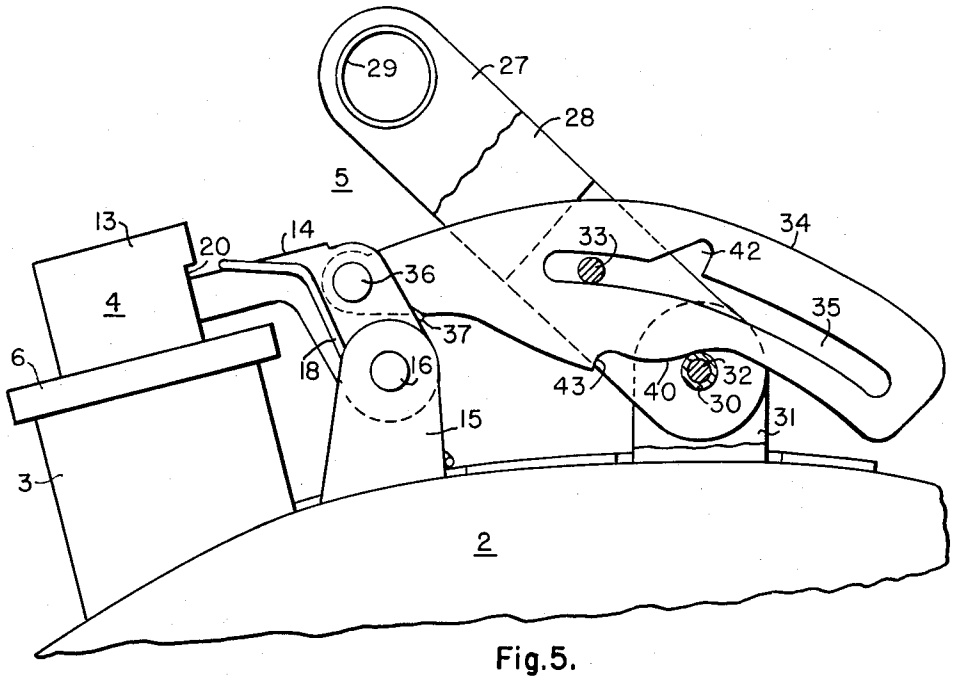


Fig.5.

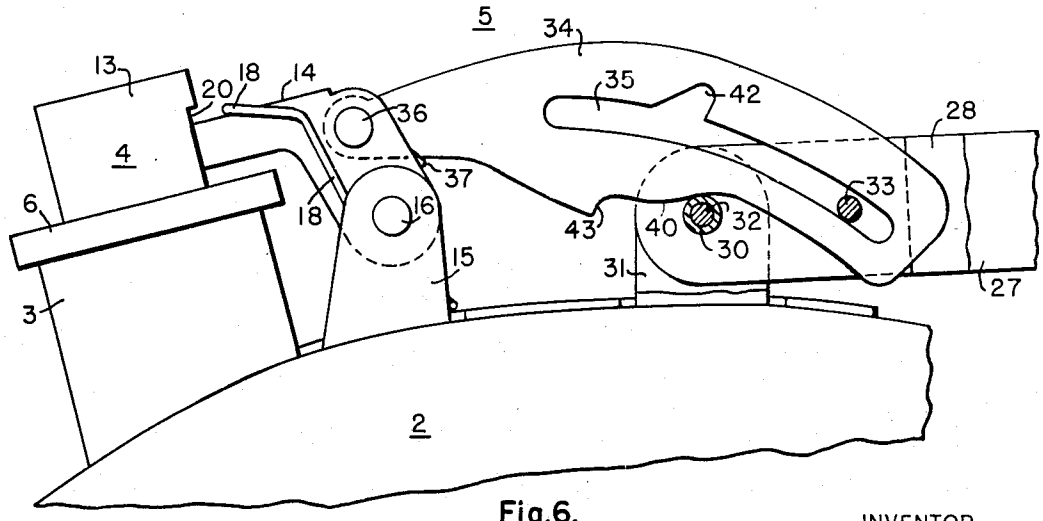


Fig.6.

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SPOUT CLOSURE CAP AND OPERATING MECHANISM FOR SAFETY GASOLINE CANS

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Original application June 23, 1951, Serial No. 233,185, now Patent No. 2,678,758, dated May 18, 1954. Divided and this application December 24, 1953, Serial No. 400,215

9 Claims. (Cl. 222—469)

This application is a divisional application directed to subject matter divided out of my copending application Serial No. 233,185, filed June 23, 1951, for Improvements in Bail Operated Closures for Gasoline Cans and the Like, now Patent No. 2,678,758, dated May 18, 1954. More specifically, the invention to which this application is directed relates to an improved form of closure cap for the can pour spout and to a combination of such closure cap with an operating mechanism which is effective to resist accidental movement of the closure cap to an open position.

My above-mentioned copending application is directed to an improved form of bail operated mechanism for actuating a gasoline can spout closure to open position while held by the bail, the operating mechanism being effective to maintain the spout closure in closed position at all times even though the container be upset and be rolling about on the ground or other floor surface. In one and its main aspect, the invention of this application is directed to the structure of the closure cap per se which has improvements effective to minimie its being canted to open position by striking objects when the container may be upset and rolling about, and, in a second and more limited aspect, is directed to the combination of such cap with the operating mechanism which is effective to apply a resisting force to opening movement of the cap in response to an accidental jar tending to open the cap.

The closure cap comprising the invention of this application is applied to a cylindrical pour spout and has a circlar sealing member which has seating and sealing engagement with the outer end of the pour spout. The sealing member has a diameter larger than the spout and thus has a lip which overhangs the spout. To prevent canting of the cap to open position by reason of blows applied to the overhanging lip, a tubular extension is mounted concentrically of the sealing member to accept blows which would otherwise be applied to the lip. In a manner to be described, the force of blows applied to the extension are distributed around the sealing member and are thus effective to increase the sealing engagement of the sealing member with the spout instead of canting it to open position as would otherwise be the case.

In its more limited aspect, the invention comprises the closure cap in combination with the closing mechanism which is effective to apply an increased resisting movement to opening movement of the cap in response to forces which may be effective to unseal the cap.

Other objects and advantages of the invention will be apparent from the following description.

In the drawings, there is shown a preferred embodiment of the invention. In this showing:

Fig. 1 is an elevational view of a fluid container having a closure member operating mechanism embodying the principles of this invention;

Fig. 2 is a fragmentary enlarged plan view of the container of Fig. 1;

Fig. 3 is a fragmentary enlarged elevational view, partly in section, showing the closure operating mechanism of Fig. 1 with the cap in closed position;

Fig. 4 is a fragmentary enlarged elevational view showing the closure operating mechanism of Fig. 1 with the cap in open position; and

Figs. 5 and 6 respectively show the relative positions which the operating mechanism may assume with the closure cap in its closed position.

The container illustrated in Fig. 1 is one of conventional cylindrical shape having a top cover portion 2. The cover portion 2 is sheet metal stamping having a pour and fill spout 3 adjacent an edge thereof. The spout is sealed by a cap generally designated 4 which is operated by a mechanism generally designated 5.

As best shown in Fig. 3, the cap 4 comprises an inverted cup-shaped cap member 6 having a centrally positioned short tubular section 7 projecting upwardly from the top surface thereof. A sealing washer 8 which may be rubber or other suitable gasket material is fitted into the cup-shaped cap member 6 and is secured therein by means of a screw 9 which has a threaded engagement in the lower end of tubular section 7, the head of the screw having holding engagement with the washer 8. The gasket or washer 8 seats on the end of spout 3 to seal the spout.

The washer and cap, being of larger diameter than the spout, have a radially overhanging portion 10 thereabout. By reason of this overhang, a blow on the edge of the cap, for example at point 11, may cant it to a position in which the spout is partially open thereby enabling leakage through the spout. To eliminate partial opening in this manner, the cap is provided with a tubular extension 13 which has a diameter only slightly less than the cap. The extension 13 projects upwardly from the cap and has its lower end secured as by welding or other suitable means to the cap 6, in a position forming a housing for the tubular section 7. In a manner to be described, the extension 13 is effective to prevent canting of the cap to open position.

The cap is mounted on the outer end of one arm of a bell-crank lever 14 which has the outer end of its other arm pivotally connected to a bracket 15 by a pin 16. The bracket 15 may be a U-shaped stamping of sheet metal having the bight thereof secured by spot welding to the top 4 of the container. A torsion spring 18 which is coiled about pin 16 is anchored at one end to the bracket 15 and at the other end to the lever 14 and applies a counterclockwise bias to the lever, as viewed in Fig. 3, forcing the free end of the lever 14 down upon cap 4 to assure positive seating of the cap on the spout. The mounting of the cap on the free end of the bell-crank lever 14 is deliberately made loose to provide relative movement between the cap and lever to assure seating of the cap on the spout. This mounting of the cap is effected by part 7a which extends loosely through an opening 19 in the end of lever 14, and has its lower end secured to the upper end of the tubular section 7. Part 7a may be press-fitted or threaded in the upper end of tubular section 7. The material of the lever about its opening 19 abuts against the upper end of the tube 7 and is effective to apply the bias of the spring 18 to seat the cap on the spout 4. The lost motion of the part 7a provides a sup-

port for the cap about which it may wobble and automatically seat on the spout.

Thereafter the tubular extension 13, which has a slot 20 in the side through which the lever 14 extends, is secured to the cap portion 6. The lateral and vertical dimensions of the tubular extension 13 are proportioned essentially as shown to afford impact of the surface over which the container may be tumbling, in most instances, with the upper edges of the tubular extension 13, for example at points such as 22, thereby preventing impact of such surface with the cap portion 6 along edge 11, when the relative movement between the container 6 and the surface over which tumbling occurs is in a direction generally represented by arrow 24 and other corresponding directions. Blows against the cap closure such as are encountered when the container is upset and strikes objects in rolling about are applied to the extension 13 and are distributed thereby around the periphery of the spout 3. Canting of the cap on the spout 3 is thereby minimized if not entirely eliminated.

The operating mechanism for the closure member or cap 4 includes the carrying bail 26 which is formed of a pair of trap metal side portions 27 and 28 connected at their upper ends by a tube 29 forming a hand grip. The strap side portions are connected at their lower ends by a tubular member 30 extending between the side portions and parallel to the hand grip 29. A U-shaped bracket 31 has the bight thereof secured to the top 2 of the container substantially centrally thereof and mounts a pivot pin 32 which extends through the tubular member 30 to provide a pivotal connection of the carrying bail to the container. An operating pin 33 is secured across the spaced side portions 27 and 28 of the carrying bail at a point radially displaced from the pivot pin 32.

A link 34 stamped from sheet metal, or otherwise suitably formed, is provided with an arcuate slot 35 disposed longitudinally of the link and terminating adjacent one end thereof. The other end of link 34 is pivotally connected to the bell-crank lever 14 at the junction of its arms by a pin 36. The slotted end of link 34 passes between the side portions 27 and 28 of the carrying bail and operating pin 33 extends through the slot 35 therein.

A counterclockwise bias is applied to link 34, as viewed in the drawings, by a torsion spring 37 which is coiled about connecting pin 36, one end being connected to lever 14 and the other end being connected to link 34. This counterclockwise bias forces the lower uniform edge of slot 35 upwardly against operating pin 33. Hence, upon pivotal movement of the carrying bail between its extreme left and right-hand positions, as viewed in Figs. 5 and 6, respectively, the operating pin 33 rides over the uniform lower edge of slot 35 without interference therefrom. Throughout this movement the link 34 moves between its uppermost position when the carrying bail is vertical, as seen in Fig. 3, to its lowermost position (indicated by the broken lines in Fig. 3), and in so moving pivots about connecting pin 36. Figs. 5 and 6 illustrate the relative positions of the parts with the bail in a collapsed position and the pin 33 adjacent the ends of the slot 35.

Movement of the slotted end of link 34 downwardly, as viewed in the drawings, against the bias of torsion spring 37 is limited by engagement of the lower edge of the link 34 with tubular bridging member 30 of the carrying bail. This lower edge 40 is cam shaped, the surface thereof being inclined downwardly from right to left toward lever 14, so that upon application of downward pressure on the link 34 the cam surface 40 bearing on tubular member 30 thrusts the link 34 toward lever 14 applying a counterclockwise torque thereto and more securely seating the cap 4 on spout 3. With this arrangement, the application of any force to the link 34, whether through the carrying bail or to the link directly, which forces the link against the tubular bridging member 30 results in an increase in the seating force of the cap 4 on spout 3 due to the camming action of the lower link edge 40. This action prevents the cap from opening when the can may have upset and be rolling about the floor.

An operating pin receiving notch 42 is provided in the upper edge of slot 35 at a point substantially corresponding to a position directly above operating pin 33 when the carrying bail is vertical or just slightly to the left of vertical, as best seen in Fig. 3. This notch opens into the slot 35 and slopes towards the spout or lever 14 to a slight extent. By depressing link 34 when the notch is aligned with the operating pin 33, the pin engages the notch and due to the inclination of the notch the arrangement becomes self-locking when the hand grip is pulled from left to right, tensioning the link 34. The application of sufficient force, from left to right, to the hand grip of the carrying bail, tensions link 34 against the bias of both torsion springs 18 and 37 and rotates the bell-crank lever 14 clock-wise lifting cap 4 from its position sealing spout 3.

Clockwise movement of the carrying bail in moving the cap 4 to open position is limited by providing a depending projection 43 on the lower edge of link 34 which after predetermining movement of link 34 from left to right, corresponding to the full open position of cap 4, engages tubular bridging member 30, and arrests movement of the link, as shown in Fig. 4.

In a pouring operation the container may be carried between the hand grip of the carrying bail and the lower right-hand edge of the container in which position, if the container is full, the contents are usually sufficiently heavy to cause movement of the mechanism to the full open position shown in Fig. 4 when the container is tilted. If the weight is insufficient, the application of a small compressive force between the mentioned supporting points is sufficient to move the cap to open position.

It will be appreciated that inadvertent movement of the cap to open position is substantially obviated by the construction shown. The carrying bail is ineffective at all times to actuate the cap to open position until such time as the notch 42 and the operating pin 33 are deliberately engaged by a manual operation and clockwise torque applied to the carrying bail at the same time, to maintain such engagement. Thus the carrying bail may be employed to transport the container and though free to move, in the event the container is dropped or upset and caused to roll or tumble, is ineffective to unseat cap 4.

Attention is directed particularly to the fact that the provision of the arcuate slot 35 together with the bias of the spring 37 enables free movement of the carrying bail 26 at all times when the actuating pin 33 is out of the notch 42, the bias of the spring 37 being effective to maintain the link 34 in a position with the actuating pin out of engagement with the notch 42. Due to the fact that the radius of curvature of the slot 35 is greater than the distance between the pins 32 and 33, the pin 33 in sliding over the lower surface of the slot 35 is effective to cam the link 34 downwardly against the bias of the spring 37 when the bail 26 is moved in either direction from a vertical position. The camming action of the pin 33 on the lower surface of the slot 35 causes the link 34 to pivot about its pivot pin 36 without imparting movement to the bell-crank lever 14. At the extreme limits of movement of the bail 26 as shown in Figs. 5 and 6, the cam movement imparted to the link 34 by the pin 33 is effective to engage the camming surface 40 with the surface of the tube 30. Further, downward movement of the link 34, as explained above, is effective to apply force to the pin 36 in a direction adding to the closing force of the biasing spring 18, thereby increasing the force tending to hold the closure cap in its closed position.

Referring to Fig. 3, it will be noted that the tubular extension has a diameter less than the diameter of the pour spout 3. By reason of this difference in diameters,

forces applied to its outer periphery **22**, as pointed out above, are distributed equally around the periphery of the cap **6** and thus cause the cap to seat against the spout **3** with even greater sealing effect than is normally applied by the spring **18** through mounting lever **14**. It will also be noted, referring to Fig. 3, that the extension has an axial length of significant proportion such that objects in the path of rolling movement of the can in tumbling about on the floor will normally strike the extension **13** about the peripheral edge **22** which will prevent such objects from striking the overhanging lip **11**.

It will be recalled that the biasing spring **18** applies a closing force to the cap. Should the cap encounter a force effective to overcome the action of the biasing spring **18**, the action of the biasing spring **37** on the lever **34** becames effective to resist opening movement of the cap and to return it to closed position. The spring **37** normally maintains the lower surface of slot **35** in sliding engageement with the pin **33** carried by the bail. Any movement of the cap toward open position results in pivoting the lever **14** which causes relative endwise movement of the link **34** with respect to the pin **33** and sliding movement of the lower surface of the slot **35** over the pin **33**. Since the slot **35** has a radius of curvature greater than the radius of pivotal movement of the pin **33**, such sliding movement will cam the link **34** in much the same manner as pivotal movement of the bail as demonstrated by the showings of Figs. 5 and 6. The camming movement of link **34** in this manner can be effected only against the action of spring **37** which reacts against lever **14** and applies an additional closing force to the cap for resisting its opening movement.

While I have illustrated and described a preferred embodiment of my invention, it will be understood that this is merely by way of illustration, and that various changes and modifications may be made therein within the contemplation of my invention and under the scope of the following claims.

I claim:

1. Mechanism for seating and unseating a cap over the spout of a container comprising a cap, a sealing washer on the bottom face of said cap adapted to seat on the end of the spout, said cap being of larger diameter than the spout and having a radial overhang thereabout, a lever pivotally mounted on said container adjacent said spout, a pin secured to said cap and loosely secured to the free end of said lever to afford limited movement of said cap for proper seating over said spout, a carrying bail, link means for connecting said carrying bail to said lever to actuate said lever to and from positions seating and unseating said cap on the spout, and a substantially cylindrical section secured to said cap and projecting upwardly therefrom about the free end of said lever, said section being of a diameter and of a height to engage a surface on which said container may be upset and over which the container may be tumbling or rolling and prevent contact of the radially overhanging portion of said cap with said surface.

2. A closure for a container for gasoline and the like having a cylindrical pour spout comprising a cap mounted for movement to and from a position in which one side thereof has seating engagement with said spout to provide a closure therefor and having resilient means biasing its movement to seated position, said cap having a larger diameter than the spout and having a radial overhang thereabout, and a substantially cylindrical extension secured to the other side of said cap and projecting axially outwardly therefrom, said extension having a diameter and height effective to prevent canting of the cap to an unseated position upon contacting objects when the container may be upset and tumbling and rolling about on a floor surface.

3. A closure as defined in claim 2 characterized by said extension having a diameter less than the diameter of said spout.

4. A closure for a cylindrical pour spout comprising a cap having a surface on one side thereof for seating engagement on the end of the pour spout to provide a closure therefor, said cap having a diameter larger than the diameter of said spout and having a radial overhang thereabout, and a cylindrical extension secured to and mounted concentrically on the other side of said cap for distributing the striking force of objects moving relatively toward the cap and distributing such forces within the periphery of the cap to maintain the cap in seating engagement with the spout.

5. The combination with a closure as claimed in claim 4 of means mounting the cap for movement to and from a position seated on the spout and resiliently biasing its movement to seated position, and linkage means including cooperating camming parts responsive to an external force applied to said cap for developing a biasing force resisting movement of the cap away from its seated position.

6. In a closure for a cylindrical pour spot, a cap having a surface on one side thereof for seating engagement on the end of the pour spout to provide a closure therefor, said cap having a diameter larger than the diameter of said spout and having a radial overhang thereabout, a cylindrical extension secured to and mounted concentrically of the other side of said cap, said extension being hollow and having an opening in its side, a pivoted lever extending through said opening and having an operating connection with said cap centrally thereof, and a spring biasing the pivotal movement of said lever in a direction effective through said connection to maintain said cap in seating engagement with said spout.

7. In a closure for a cylindrical pour spout, a cap having a surface on one side thereof for seating engagement on the end of the pour spout to provide a closure therefor, said cap having a diameter larger than the diameter of said spout and having a radial overhang thereabout, a cylindrical extension secured to and mounted concentrically of the other side of said cap, said extension being hollow and having an opening in its side, a pivoted lever extending through said opening and having an operating connection with said cap centrally thereof, a spring biasing the pivotal movement of said lever in a direction effective through said connection to maintain said cap in seating engagement with said spout, and linkage means connected with said lever including cooperating camming parts responsive to an external force applied to said cap for developing a biasing force additional to the biasing force of said spring for resisting movement of the cap away from its seated position.

8. In a closure for a cylindrical pour spout, a cap having a surface on one side thereof for seating engagement on the end of the pour spout to provide a closure therefor, said cap having a diameter larger than the diameter of said spout and having a radial overhang thereabout, a cylindrical extension of less diameter than the cap secured to and mounted concentrically of the other side of said cap, said extension being hollow and having an opening in its side, a pin secured to said cap and extending axially and concentrically of said extension, a pivoted lever extending through said opening and having a loose connection with said pin affording limited movement of said cap relative to said lever for proper seating engagement of the cap on said pour spout, and a spring biasing the pivotal movement of said lever in a direction effective through said connection to maintain said cap in seating engagement with said spout.

9. A closure for the pour spout of a container for inflammable liquids, comprising a cap having a diameter greater than that of the spout providing a radial extension about the spout, a resilient member secured to the inner face of the cap providing a sealing engagement between the cap and the upper surface of the spout, an upwardly extending hollow housing portion on the outer face of the cap and connecting therewith inwardly of the peripheral

bearing engagement between the cap and spout, an opening in one side of the housing, a cap mounting lever pivotally mounted on the container adjacent said cap and having a portion extending within the housing opening in vertically spaced relation to the cap, a connection between said lever portion and the cap providing limited movement between the cap and lever portion, a spring biasing said lever and cap in sealing position on the spout.

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