June 29, 1937. E. JACOB 2,085,366

NONREFILLABLE BOTTLE

Filed Nov. 28, 1934

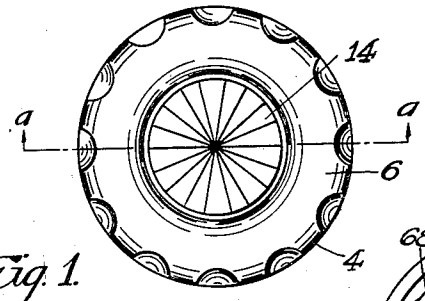

Fig. 1.

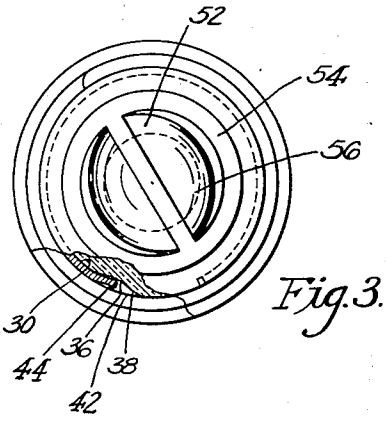

Fig. 3.

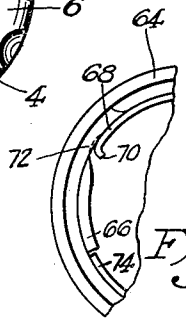

Fig. 7.

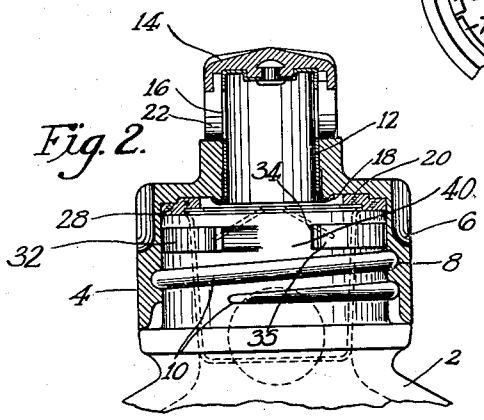

Fig. 2.

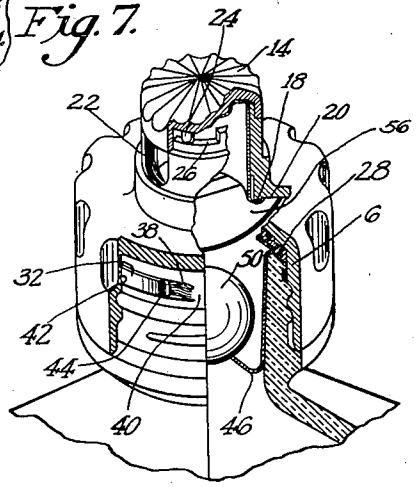

Fig. 4.

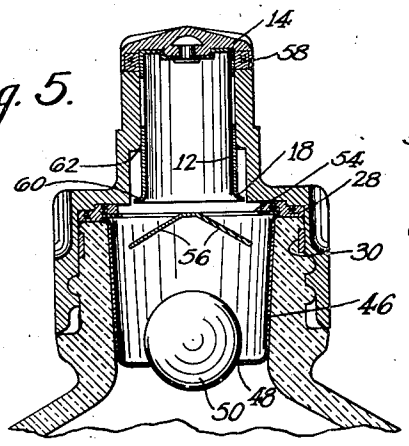

Fig. 5.

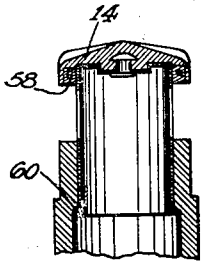

Fig. 6.

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NONREFILLABLE BOTTLE

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Application November 28, 1934, Serial No. 755,133

10 Claims. (Cl. 215—7)

My invention relates to non-reversible threaded connections and particularly to non-refillable bottles, containers or the like having closures which can be readily applied but which cannot be removed without destruction of the closure or the container or both.

Non-reversible threaded connections have been provided heretofore in which there are projecting tongues or ratchet members but these are not suitable for use in securing closures to bottles when the closure is formed of molded material, such as phenol or urea condensation products, casein or the like, because the ratchet teeth on the closure strip off readily without destroying the closure or the tongues provided bend when the closure is forcibly reversed permitting removal of the closure. Frictional locking means such as ball clutches are also known but these are too complicated and expensive for use on bottle closures. In accordance with my invention these objections are overcome by providing a closure preferably formed of molded material in combination with frictional locking means therefor which cause the closure to be broken when forcibly reversed to remove the same. My invention also embodies means serving to permit removal of the contents of a bottle while preventing refilling thereof to substitute or alter the contents.

One of the objects of my invention is to provide an irreversible threaded connection of universal application which is simple and inexpensive to produce and assemble.

Another object of my invention is to provide a closure for bottles or other containers formed of molded material with means serving to prevent removal thereof from the bottle without destruction of the closure.

A further object of my invention is to provide a non-refillable bottle having a closure formed of material capable of being easily broken and which permits discharge of the bottle contents while preventing refilling thereof.

These and other objects and features of my invention will appear from the following description thereof in which reference is made to the accompanying figures of the drawing illustrating typical embodiments thereof.

In the drawing:

Fig. 1 is a plan view of a typical closure embodying my invention;

Fig. 2 is a vertical sectional view of the form of closure illustrated in Fig. 1 as applied to a bottle, the section being taken on the line *a—a*;

Fig. 3 is a plan view of a bottle and float guard embodied in the construction of Fig. 2 with parts broken away;

Fig. 4 is a perspective of the construction shown in Fig. 2 with portions of the closure and bottle broken away;

Fig. 5 is a vertical sectional view of an alternative form of closure embodying my invention;

Fig. 6 is a fragmentary sectional view of the construction shown in Fig. 6 with the parts in open position for discharge of contents from the bottle, and

Fig. 7 is a fragmentary sectional view of a further alternative form of locking means.

While my invention is hereinafter described as applied to a closure for bottles or other containers it will be understood that the locking construction thereof also may be applied to other threaded connections if desired for preventing accidental or intentional separation of the parts.

In that form of my invention chosen for illustration in Figs. 1 to 4 of the drawing the device comprises a bottle **2** having a closure **4** embodying a member **6** provided with internal threads **8** cooperating with complementary threads **10** on the neck of the bottle. The member **6** preferably is formed of molded material such as a phenol condensation product and is open at the upper and lower ends thereof. The open upper end of the device is provided with a tubular closing element **12** having a head **14** provided with oppositely directed outlet openings **16** through which liquid may be discharged and air may enter the bottle. The tubular element frictionally engages the inner surface of the open upper end of said device providing a sealing engagement therewith to prevent passage of liquid between said member and said element to said outlet openings.

The lower end of the element **12** is provided with an outwardly extending flange **18** rolled over the edge of an inwardly extending shoulder **20** located above the top of the neck of the bottle on the member **6**. With this construction the tubular element may be rotated to bring the openings **16** into alignment with cut-away portions **22** formed in the upper edge of the member **6** to permit discharge of the contents of the bottle. A lug **24** carried by the head **14** and movable in a notch **26** in the upper edge of member **6** serves to restrict rotary movement of the closing element and insure proper registration of the openings with the cut-out portions when in open position and to prevent turning of said element beyond its closed position to bring the opposite outlet opening into registration with the cut-out portion **22**.

Packing 28 is located between the inturned shoulder 20 on member 6 and the top of the neck of the bottle to seal the bottle and prevent leakage thereof. The closure construction described may thus be applied to a bottle and left in place thereon continuously while the closing element is operated to its opened and closed positions for discharging or preserving the contents of the bottle.

In order to lock the closure to the bottle to prevent removal thereof I provide a recess 30 in the neck of the bottle extending about the same to receive a split resilient ring 32. The length of the recess may be varied but should extend more than half way around the neck to prevent the same from being lost or displaced prior to the application of the closure to the bottle. One end of the recess is formed with a substantially vertical end wall 34 against which the end 35 of split ring 32 may abut. The opposite end of the recess is formed with a depression 36 and an adjacent inclined surface 38 terminating in the portion 40 which is even with the surface of the neck of the bottle.

That portion of the closure 6 above the thread 8 presents an inner surface 42 which lies closely adjacent the recess 30 when the closure is screwed into place so as to engage the split ring 32. The end 44 of the ring 32 which is normally located adjacent the sloping end 38 of the recess is preferably bent outward as shown in Fig. 3 so as to engage the inner surface 42 of the closure. However, the end 44 is movable inwardly so that it will lie within depression 36 when the closure is in place and the ring 32 moved into position with the end 35 thereof in engagement with the vertical end wall 44 at the end of recess 30. While I have shown the end 44 of ring 33 as formed with an outwardly turned portion I have found in practice that this is not essential to the operation of the locking means provided the ring 32 engages the inner surface 42 of the member 6 with sufficient friction to insure movement of the ring 32 with the closure when the closure is rotated to remove the same. If desired the outer surface or end of the ring 32 and the inner surface of the closure may be roughened to insure the requisite friction between these parts to effect proper operation of the locking means.

In applying the closure described above to the bottle rotation thereof in a clock-wise direction as seen in Fig. 3 brings the surface 42 on the inner face of the closure into engagement with the end 44 of the ring. The end is thus moved inwardly so that it lies within depression 36 permitting the closure to be applied without material resistance to rotation thereof. Any tendency for the ring 32 to rotate with the closure in applying the same is overcome by engagement of the end 35 of the ring with the vertical end wall 34 of the recess 30. The closure may thus be applied easily to bring the shoulder 20 forcibly into engagement with the packing 28 to seal the bottle and prevent leakage of liquid therefrom. When the closure is seated in this manner the inner surface 42 of the member 6 is in engagement with the split ring 32 and the end 44 thereof bears against said surface. On rotation of the closure in the reverse direction to remove the same the ring 32 is carried with the closure due to the frictional engagement between the ring and inner surface 42 of member 6. The end 44 of the ring therefor rides up the inclined surface 38 at the end of the recess into frictional engagement with both the inner surface 42 and the neck of the bottle. The closure is therefore frictionally held against removal. Forcible rotation of the closure to remove the same will cause the ring 32 to be moved further until it lies in a position between the portion 40 on the neck of the bottle and the surface 42 on the side wall of the closure. The side wall is thus forced outwardly and when the closure is formed of relatively brittle material as in the preferred form of my invention the locking ring breaks the wall of the closure so that it cannot again be used without evidence that its use is improper. The construction thus provides effective protection against removal of the closure and unauthorized use thereof.

In order to render the bottle non-refillable I may employ any suitable device to allow removal of the contents from the bottle but prevent admission of liquid thereto such as the cup 46 located in the neck of the bottle and provided with an opening 48 closed by a float member 50. A guard 52 preferably in the form of a metal stamping having a marginal rim 54 and downwardly extending wings 56 is positioned over the float 50 and supported by the cup 46 or the top of the neck of the bottle. The guard 52 is held in spaced relation to the float so as to allow fluid to pass around the float when the bottle is tilted but prevents the insertion of a member through the laterally directed outlet opening to remove or destroy the guard and float.

In that form of my invention shown in Figs. 5 and 6 of the drawing the construction of the locking means is similar to that of the construction shown in Figs. 1 to 4. However, the open upper end of the member 6 is formed with a substantially flat continuous surface unbroken by cut-out portion and cooperates with a packing 58 carried by the head 14 to seal the bottle against leakage. As in the previous construction the tubular closing element 12 engages the inner surface throughout a substantial area and thus prevents the passage of liquid between the tubular element and the member 6. The lower portion of the tubular element as illustrated in Figs. 5 and 6 is extended to permit raising and lowering of the element to expose the laterally opening out-let openings and the lower edge of the tubular element is provided with a flange 60 movable into engagement with an inturned shoulder 62 to prevent longitudinal displacement or removal of the tubular element.

In Fig. 7 of the drawing I have illustrated an alternative construction of locking means in which the closure member 64 is formed with a recess terminating at the ends thereof in an inwardly extending portion 66, one side of which is substantially vertical forming an abutment to limit movement of split ring 68 and the other side sloping inward to force the internal end 70 of the ring against the outer surface of the bottle neck on relative rotation of the parts. A recess 72 adjacent the inturned end 70 permits said end to move outwardly so that the closure may be applied without material resistance to rotation thereof. When rotated in the opposite direction to remove the closure the enclosed surface of portion 66 rides up the ring away from the end 74 thereof so that the ring frictionally engages the inner surface of portion 66 and the outer surface of the bottle preventing removal of the closure. Forcible reverse movement of the closure will break the side wall thereof as in the forms of the device shown in Figs. 1 to 6.

That portion of the bottle engaged by the ring

may be roughened if desired to insure the necessary frictional engagement between the ring and bottle neck upon reverse rotation of the closure.

In each of the forms of my invention shown in the drawing, the ring and engaging surface are located above the thread. However, it will be evident that these elements may be located below the thread if desired. The latter construction will serve to cause the closure to break more readily but in some instances this construction may result in the formation of a marginal crack in the closure which will permit removal thereof without much damage to the closure as will be readily observed.

While the closures shown and described above may be formed of any suitable material I prefer to form the same of molded plastic composition in order that the closure will be destroyed when forcibly removed from the container. The constructions described are particularly adapted for molding operations in producing the member 6 and the head 14 of the tubular closing element to produce the same economically so as to render the cost of the article extremely low.

Although I have illustrated and described my invention above as applied to closures for bottles it should be understood that certain features of my invention are adapted for other uses particularly in connection with other non-reversible threaded connections such as lock nuts, anti-theft devices and the like. In view thereof, it is contemplated that numerous changes and modifications may be made in the form, construction and arrangement of the parts thereof without departing from the spirit and scope of my invention.

What I claim as my invention is:

1. A bottle or other container having a threaded neck formed with a recess extending more than half-way around the neck with a substantially straight abutment at one end of the recess and an inclined surface at the opposite end thereof, in combination with a spring member located in said recess and a closure for the neck of the bottle extending downwardly about said recess close to the neck of the bottle in position to engage said spring member and cause the same to move therewith up the inclined end of said recess into frictional locking position when said closure is rotated to remove the same and a cooperating thread formed on said closure for engaging that on the neck of said bottle.

2. A construction embodying a non-reversible connection for threaded elements comprising elements provided with interengaging threads, an engaging surface movable by one element, an inclined surface lying closely adjacent said engaging surface and movable by the other element, a split resilient ring lying between said elements and a stop limiting movement of said ring away from said inclined surface upon relative rotation of said elements in one direction, said ring having at least a portion thereof continuously in engagement with said engaging surface and movable into frictional engagement with both said surfaces upon relative rotation of said elements in the opposite direction.

3. A construction embodying a non-reversible connection for threaded elements comprising elements having interengaging threads, an engaging surface movable by one element, an inclined surface lying closely adjacent said engaging surface, a split resilient ring lying between said elements and a stop limiting movement of said ring away from said inclined surface upon relative rotation of said elements in one direction, said ring having at least a portion thereof continuously in engagement with said engaging surface and movable into frictional engagement with both said surfaces upon relative rotation of said elements in the opposite direction, one of said elements being formed of material more frangible than the other and adapted to be broken by said ring upon forcible rotation to separate said elements.

4. A bottle having a threaded neck a closure for said bottle formed of molded material which is substantially more frangible than the neck of the bottle and locking means for preventing removal of said closure from said bottle without destroying the closure comprising cooperating engaging and inclined surfaces one of which is formed on the closure and the other formed on the neck of said bottle adjacent said thread, a split resilient ring lying between said surfaces and a stop limiting movement of said ring away from said inclined surface upon relative rotation of said elements in one direction, said ring having at least a portion thereof continuously in engagement with said engaging surface and movable into frictional engagement with both said surfaces upon relative rotation of said elements in the opposite direction and of sufficient thickness to cause said molded material to be broken on forcible rotation of the closure to remove the same.

5. In combination with a container having a neck and a frangible closure for the neck rotatable to apply and remove the same, said neck having a groove formed therein and a member movably supported by the container and located in said groove and engaging the closure for moving said member therewith circumferentially of the container out of said groove to an expanded position in which it is wedged between the neck and closure to break the closure upon rotation thereof in removing the closure from the neck of the container.

6. In combination with a container having a neck and a frangible closure for the neck rotatable to apply and remove the same, said neck having a groove formed therein, one end of which is formed with a surface inclined to the circumference of the container and a split ring located in said groove and engaging said closure to be moved thereby up said inclined surface to a position in which the closure is broken upon rotation of the closure to remove the same.

7. A container having a recess on the outer surface thereof extending more than half way about said container and terminating at one end in a sloping surface of decreasing depth, a locking member located in said recess having a portion normally extending outwardly from said recess, and a closure surrounding said recess and locking member, said container and closure having cooperating means engageable by rotation to secure the closure to the container said closure engaging the projecting portion of said locking member and serving to move said locking member with the closure upon rotation thereof to remove the same whereby the end of the locking member is moved up said sloping surface into frictional engagement with the closure and container.

8. A container having an externally threaded neck having a recess located below the thread extending more than half way about the circumference of the neck and terminating at one end in a sloping surface of decreasing depth, a resilient locking member in said recess extending more than half way about said neck and retained in said recess by the resiliency

thereof, said member having a portion normally extending outwardly from said recess and a closure formed with a thread engaging that on said neck and with a skirt connected to the threaded portion of the closure by a weakened portion, said skirt extending downwardly about the recess and member to conceal the same and cooperating with the projecting portion of said member to move the same with the closure upon rotation thereof to remove the same whereby the end of said member is forced up said sloping surface to an expanded position in which the skirt is mutilated.

9. The combination comprising a container having a recess formed therein and extending more than half way about the circumference of the container, a locking member movable circumferentially of the container lying in said recess and retained therein by the resiliency thereof, said member cooperating with an end of said recess to expand the locking member on movement thereof and a closure for the container extending about said recess and member to conceal the same and closely adjacent the circumference of said container, said member and closure having cooperating elements serving to move the locking member with the closure to said expanded position in which the locking member is wedged between the closure and the container to break said skirt outwardly when the closure is moved to remove the same from the container.

10. In combination with a container having a neck, a frangible closure for the neck rotatable to apply and remove the same, said neck and closure having surfaces thereon defining a recess which is deeper in one part than in another and means located in said recess and movable into the deep part thereof on rotation of the closure in applying the same and movable into the shallower part of the recess and into wedging relation between the neck and closure on rotation of the closure to remove the same whereby said closure when forcibly rotated to remove the same will be broken outwardly by said means.

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