

[54] CAN CLOSURE DEVICE

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[22] Filed: **Apr. 2, 1973**

[21] Appl. No.: **346,989**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 142,972, May 13, 1971, abandoned.

[52] U.S. Cl. **220/243**; 215/280; 215/287; 220/314; 220/323

[51] Int. Cl. **B65d 45/18**

[58] Field of Search 220/57, 25; 215/90, 280, 215/287

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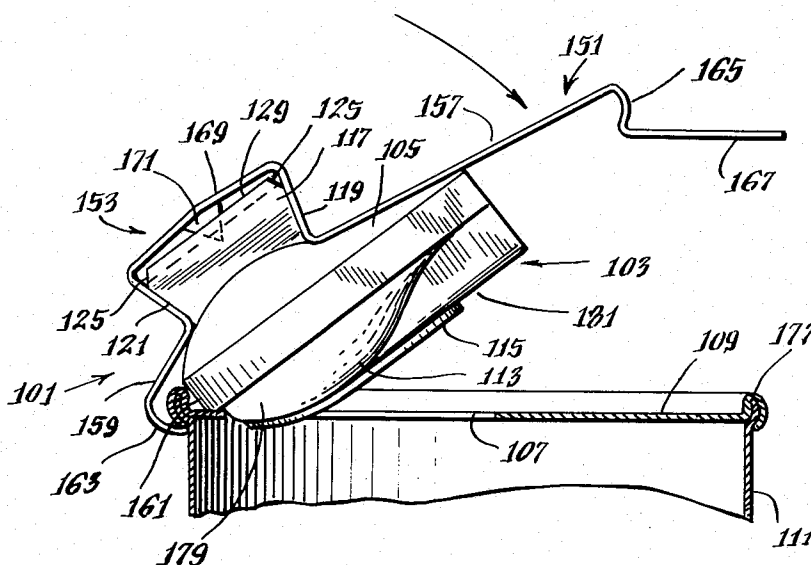
Attorney, Agent, or Firm—Irving M. Kriegsman; Mark C. Jacobs

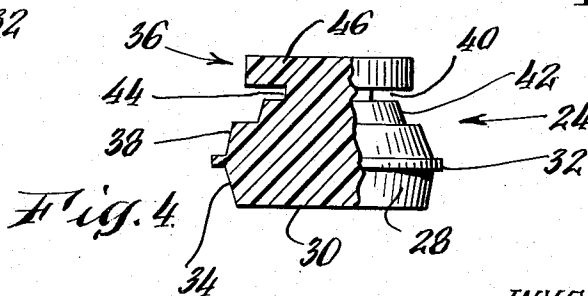
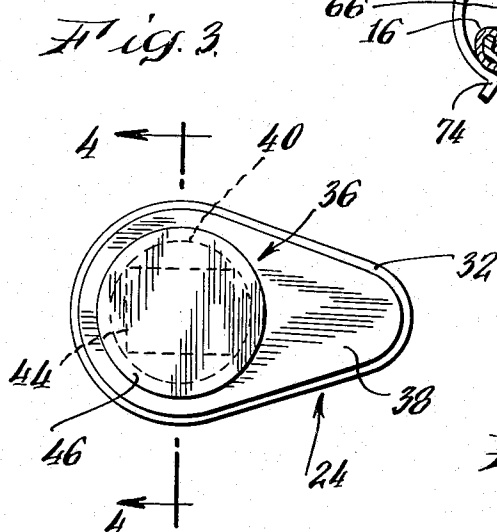
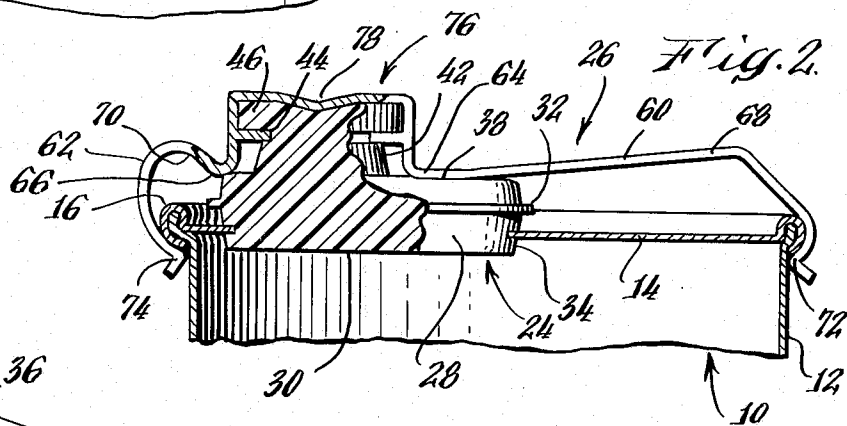
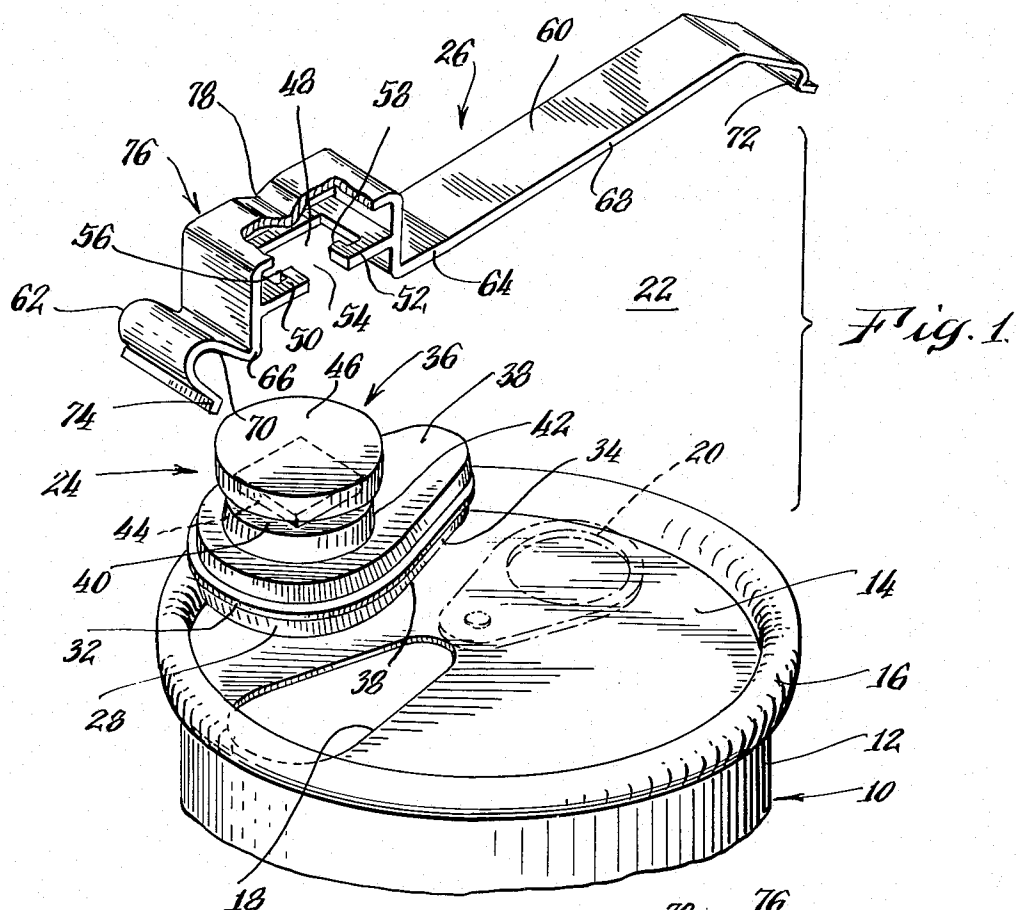
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ABSTRACT

A reusable can closure device particularly adapted for use in sealing a radially directed teardrop shaped opening formed in the top of a cylindrical can by a built-in pull-tab. The device is made up of two pieces, a plug of deformable resilient material and an elongated spring clip. One end of the spring clip is shaped in the form of a hook and the other end is shaped in the form of a clamp. The plug is attached to the clip in a force-fit manner near one end. When the clip is secured to the rim at the top of the can with the plug positioned over the opening, the plug extends over and partially into the opening so as to provide an airtight seal.

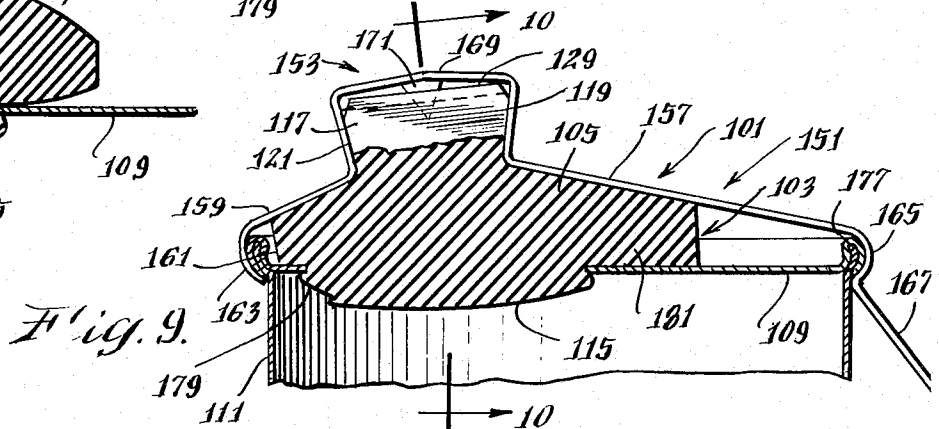
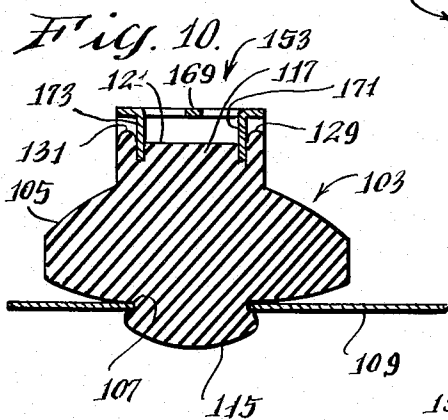
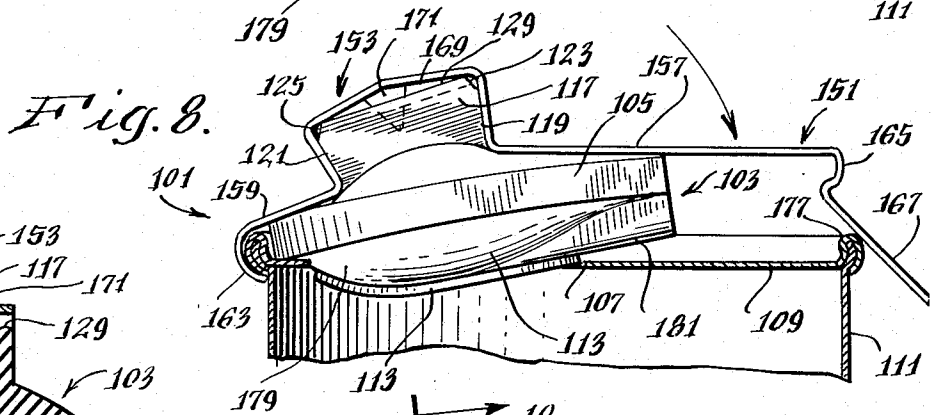
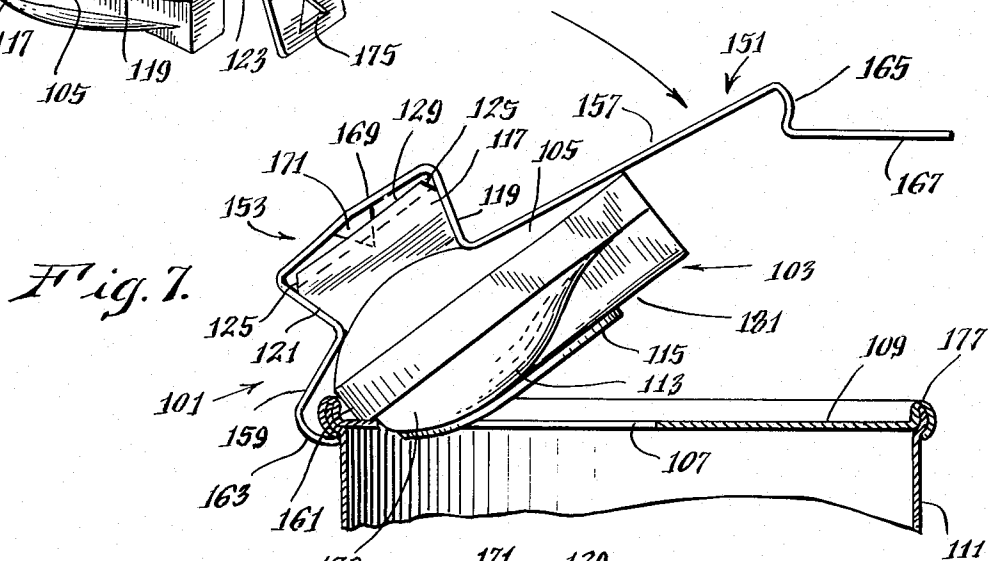
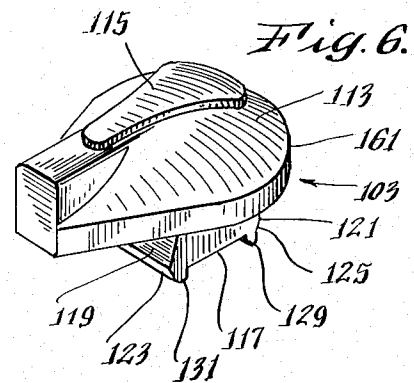
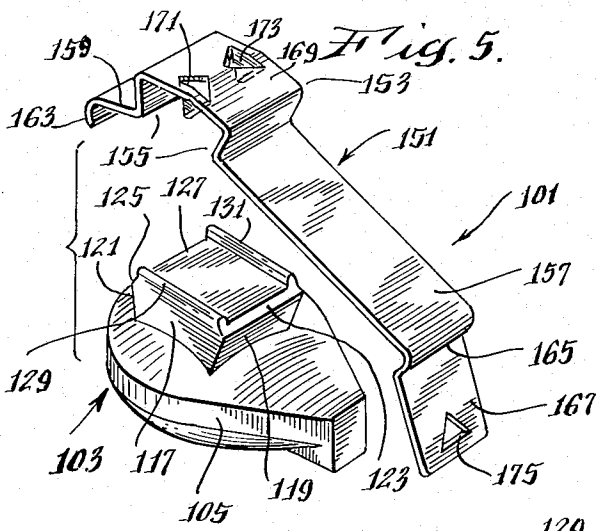
7 Claims, 10 Drawing Figures





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CAN CLOSURE DEVICE

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of our co-pending application Ser. No. 142,972 filed May 13, 1971, now abandoned.

This invention relates to can closure devices. More particularly, this invention relates to a reusable can closure device particularly adapted for use in sealing a radially directed teardrop shaped opening formed in the top of a cylindrical can by a built-in pull-tab, but which may also be used to seal a radially directed opening formed in the top of a can by means other than a built-in pull-tab.

There has been on the market for several years now cylindrical cans for dispensing beverages and the like in which a built-in pull-tab is provided at the top of the can for quick opening. These cans have become very popular because of the ease of opening; however, once they have been opened, they cannot be resealed. Some of the known devices especially adapted for sealing such an opening can be found in U.S. Pat. No. 3,326,403, U.S. Pat. No. 3,622,034 and U.S. Pat. No. 3,650,432.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a reusable can closure device particularly adapted for use with pull-tab cans.

It is another object of this invention to provide a reusable can closure device adapted for use with pull-tab cans, that contains relatively few pieces, that is long lasting and easy to manufacture, assemble and disassemble.

It is still another object of this invention to provide a can closure device adapted for use with pull-tab cans, that is easy to put on and take off the can, that will provide an airtight seal and that will stay secured once it is attached to the can.

It is still another object of this invention to provide a can closure device particularly suited for use with cans having a built-in pull-tab that is attached to the rim at the top of the can.

According to this invention the above and other objects are achieved by providing a reusable can closure device made up essentially of a resilient deformable generally teardrop shaped plug and an elongated spring clip having one end shaped to form a hook and the other end shaped to form a clamp. The plug, which is attached to the clip nearer one end than the other end, is sized and shaped larger than the opening formed when the pull-tab is removed. When the can closure device is secured to the rim at the top of the can, the plug covers the opening and extends partially down into the opening to form an airtight seal. The can closure device is easily attached to and detached from the can.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a disassembled perspective view of one embodiment of a can closure device constructed according to the invention shown positioned above a perspective view of a portion of a pull-tab can already opened.

FIG. 2 is a section view of the closure device of FIG. 1 secured to the can shown in FIG. 1.

FIG. 3 is a top view of the plug portion of the closure device shown in FIG. 1.

FIG. 4 is a vertical sectional view taken along lines 4—4 of FIG. 3.

FIG. 5 is a dissembled perspective view of a preferred embodiment of a can closure device constructed according to this invention.

FIG. 6 is a perspective view of the plug portion of the device shown in FIG. 5 oriented so as to show the details of the bottom side.

FIGS. 7, 8 and 9 are views partly in section and partly in elevation showing in numerical sequence how the new can closure device in the FIG. 5 embodiment is secured to a can.

FIG. 10 is a section view taken in the direction of arrows 10—10 in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1 there is shown a can 10 having a side wall 12, a top 14 and a rim 16 for securing the top 14 to side wall 12. An opening 18 generally in shape of a teardrop with rounded corners, extending radially outward from about the center of the top 14 to just before the rim 16, increasing in width in an outward direction, is formed by the removal of a tab 20 which is shown in dotted lines as being in the turned over position but not yet detached from the can 10. Also shown is a can closure device 22 constructed according to the invention.

The can closure device 22 comprises a plug 24 and a spring clip 26. Plug 24 is a one-piece member made of an elastomeric material such as rubber. Alternatively, plug 24 may comprise a porous material covered with a layer of elastomeric material. Although plug 24 is preferably solid, it may alternatively be hollow. Plug 24 has a lower teardrop shaped main body portion 28 extending downward to a bottom surface 30 from a flange 32. As shown in FIGS. 1 and 3, the shape of the bottom surface 30 and flange 32 conform generally to the shape of opening 18; however, the size of bottom surface 30 is smaller than opening 18 whereas the size of flange 32 is larger than opening 18. For use with a conventional sized pull-tab beverage can, the axial length of bottom wall 30 is 1 inch and the width of the widest point is five-eighths inch, while the axial length of flange 32 is 1½ inches and the width of the widest point is 1 inch. As shown in FIGS. 1, 3 and 4, side wall 34 of main body portion 28 is tapered upwardly and outwardly from bottom surface 30 to the flange 32. Thus, when the plug 24 is placed in opening 18, the main body portion 28 will extend partially into can 10 with side wall 34 in contact with the sides of the opening 18.

Extending upward from the flange 32 is a securing portion 36. Securing portion 36 has shoulder 38 formed on the upper surface of the main body portion 28 and a neck 40 comprising a lower annular section 42 formed on shoulder 38, a collar 44 formed on section 42 and an upper annular section 46 formed on collar 44. Collar 44 is in the form of a prism, however, it may have any desired shape provided that the dimensions of collar 44 are smaller than the dimensions of upper and lower sections 42 and 46. In the embodiment shown the cross-section of collar 44 is square. Alternatively, the lower annular section 42 can be eliminated and the collar 44 formed directly on shoulder 38.

The closure device 22 further includes an elongated resilient spring clip 26 which is connected to the plug

24 for holding plug 24 in airtight sealing engagement with the opening 18 of the can 10. Clip 26 has sleeve portion 48 adapted to engage collar 44 on plug 24 and thereby secure the clip 26 to the plug 24. Sleeve portion 48 has arms 50 and 52 with a gap 54 therebetween and is generally shaped to conform to the shape of collar 44. Preferably, sleeve portion 48 is smaller than collar 44 so as to insure that the clip 26 will be held tightly on the plug 24. Sleeve portion 48 also has protrusions 56 and 58 extending inwardly from the ends of arms 50 and 52 respectively for tightly engaging the plug 24.

Spring clip 26 includes a front section 60 and a back section 62 extending in opposite directions from sleeve portion 48. Sections 60 and 62 have beginning portions 64 and 66, respectively, and intermediate portions 68 and 70 respectively which are resiliently biased upward from the plane of end wall 14 of can 10. Portion 68 typically forms an angle of 30° with the plane of the end wall and portion 70 typically forms an angle of 60° with the plane of the end wall. A clamp 72 and a hook 74 for gripping the edges of can 10 are formed at the outer end of sections 60 and 62 respectively. Spring clip 26 also contains a central portion 76 extending above sleeve portion 48 between sections 60 and 62. Central section 76 has at least one downwardly extending portion 78.

Clip 26 is assembled to plug 24 as follows. Arms 50 and 52 of sleeve 48 are pulled outward from the plane of the drawing thereby increasing the size of gap 54, while simultaneously an axially outward force is applied to sections 60 and 62 thereby increasing the size of sleeve portion 48. Collar 44 is then forced into sleeve portion 48 until the sleeve 48 surrounds the collar 44. The clip 26 is then released and because of its resiliency it returns to its unstressed dimensions, with protrusions 56 and 58 gripping collar 44. When the dimensions of sleeve 48 are smaller than those of collar 44, the resilient material of the collar is compressed by the forces acting on it through the sleeve thereby aiding in securing spring clip 26 to the plug 24. The spring clip 26 is also held on to plug 24 by a downward compressive force exerted by downwardly extending portion 78 of central portion 76 on the top of section 46. With spring clip 26 in place, downwardly extending portions 64 and 66 of sections 60 and 62 respectively are in contact with shoulder 38 of the plug 24.

In use the closure device 22 is adapted to seal the opening 18 resulting from removing the pull-tab 20 on can 10. Referring to FIGS. 1 and 2, the assembled can closure device 22 is brought into alignment with opening 18. Main body section 28 is inserted into opening 18 with side walls 34 in contact with the edges of the opening and hook 74 is attached to the rim 16 at the edge of can 10. A downward force is applied at section 60 pushing main body 28 into opening 18. Simultaneously, clamp 72 is forced outward and over rim 16 at the opposite edge of the top of the can from hook 74. Clamp 72 grips the underside of the rim 16 adjacent to side wall 12 locking plug 24 in place as shown in FIG. 2. The main body section 28 is inherently sufficiently resilient so that a portion of the main body portion 28 above end wall 14 is compressed into engagement with the exterior surface of the end wall. Since the main body portion 28 undergoes resilient expansion after passing through opening 18, a portion of the main body portion 28 engages the interior face of the end wall. In this manner an airtight seal is provided for the opening

18. With spring clip 26 in place, a downward force is exerted on plug 24 at points 64, 66 and 78 thereby tending to maintain the airtight seal. The plug is readily removed from the opening by grasping clamp 72 and pulling section 60 upward until the plug 24 is pulled from the opening 18.

The spring clip 26 can be made by stamping or casting or any of the other well known metal forming manufacturing processes. In the embodiment shown in FIG. 1, the spring clip can be made by casting. In an alternative embodiment, by suitable modification of sleeve portion 48, the spring clip can be made by stamping. This is accomplished by providing arms on the back side of the clip 26, corresponding to arms 50 and 52 instead of a continuous flange as shown in the detail.

A preferred embodiment of a can closure device 101 constructed according to this invention is shown in FIGS. 5 - 10. The can closure device 101 includes a solid one-piece plug 103 of elastomeric material such as rubber. Plug 103 has a main body 105 of considerable thickness. The back portion 104 of the main body 105 is generally circular in horizontal cross-section and generally oval shaped in vertical cross-section. The front portion 106 of the main body 105 is somewhat elongated. The overall shape of the plug 103 is similar to a teardrop but sized larger than the teardrop shaped pull-tab opening 107 of the can 111. Extending down from the central portion of the bottom side 113 of the main body 105 is a platform 115 having a teardrop shape conforming to the shape of the opening 107 but being very slightly smaller in size. Thus, when the can closure device 101 is fastened to the top 109 of the can 111, the bottom 113 of the plug 103 rests on the top 109 and completely covers the opening 107, whereas the platform 115 extends down into the opening 107. The plug 103 has a neck 117 extending upward from the main body 105. The neck 117 has outwardly tapered flat front and back walls 119 and 121 respectively, rounded top corners 123 and 125 and a generally flat top surface 127. Formed on the top surface 127 are a pair of spaced apart parallel ribs 129 and 131 which extend from the front to the back. The plug 103 may be made by molding or any other well known process for making a shaped body of elastomeric material.

The closure device 101 further includes an elongated resilient one-piece stainless steel clip 151 having an intermediate section 153 shaped in the form of a dovetailed slot 155. Disposed in the slot 155 in tight fitting relationship is the neck 117 of the plug 103. Clip 151 also includes a front end 157 and a rear end 159. The rear end 159 slopes down and back from the slot 155 at an angle of about 45° with the horizontal to a distance just beyond the back edge 161 of plug 103 where it curves down and back to form a hook 163. The front end 157, which is substantially longer than the rear end 159, slopes forward and down at an angle of about 30° with the horizontal to a level lower than the level of hook 163, curves back to form a clamp 165 and then extends downward and outward at an angle of about 60° with the horizontal and forms a finger grasping tip 167. As can be seen in FIGS. 7, 8 and 9, the front end 157 of the clip 151 is in contact with the top surface 162 of the main body 115 of the plug 103. Extending down from the top side 169 of the slot 155 are a pair of pointed tabs 171 and 173 which are adapted to penetrate the top surface 127 of the neck 117 of the plug 103 between ribs 129 and 131 to prevent sidewise

movement of the plug 103 relative to the clip 151. The clip 151 is further provided with a hole 175 so that the closure device 101 may be hung on a nail or other means when it is not being used. The clip 151 may be made by casting or any other well known metal forming process. In use, the can closure device 101 is attached to the can 111 as follows. First, the hook 163 is attached to the rim 177 of the can 111 close to the opening 107 so that the plug 103 is positioned generally above the opening 107 with the platform 115 aligned so as to extend down into the opening 107 when the clamp 165 is attached. Next, downward pressure is applied to the front end 157 pushing the plug 103 over and into the opening 107 until the tip 167 comes into contact with the rim 177. Then additional pressure is applied to the front end 157 causing the tip 167 to effectively "slide down" on the rim 177 until the clamp 165 becomes engaged with and locks on to the rim 177 at the opposite side of the can 111. At the same time, the platform 115 is pushed down further into the opening 107 and becomes slightly deformed due to the increased pressure. Thus, the clip 151 not only positions the plug 103 over the opening 107 but applies pressure to force a portion of the bottom of the plug 103 down on the top 109 of the can 111 so as to provide an extremely tight seal. Since the clamp 165 is at a lower level than the hook 163, when both the clamp 165 and hook 163 are attached to the top 109 of the can 111, the plug 103 is tilted upward and forward with the back end 179 of the plug 103 being lower than the front end 181 of the plug. The closure device 101 is removed by raising the tip 167 until the clamp 165 is detached from the rim 177 and then lifting the hook 163 off the rim 177.

It is to be noted that although the invention is particularly suited for use in connection with pull-tab cans, it is obvious that the invention may also be used for sealing the openings in the ends of cans of the same general configuration as the pull-tab openings, created by other means. Also it is to be noted that the invention is applicable to cans of any size and is not intended to be limited to cans of one particular size or to cans containing any particular substance.

What is claimed is:

1. A can closure device for sealing a teardrop shaped opening in the top of a cylindrical can extending radially outward from the center of the top to the rim comprising:

- a. a one piece resilient plug comprising a main body portion and an integral securing portion extending upward from said main body portion, said main body portion having a teardrop shaped bottom wall sized smaller than the size of the teardrop shaped opening in the can, an upper surface and side walls tapering upwardly and outwardly from the bottom wall to the upper surface, and a flange sized larger than the teardrop shaped opening in the can, said securing portion comprising a shoulder section formed on the upper surface of the main body portion, a collar section formed on the shoulder section and an annular shaped section formed over the collar section, said annular shaped section having a top; and

- b. a one piece elongated resilient spring clip having a sleeve portion engaging the collar section of said plug, an intermediate section coupled to said sleeve portion and extending over and having a downwardly extending portion in contact with at least one point of the top of the annular section of said plug and outwardly extending and upwardly sloping front and rear sections of unequal length coupled to said sleeve, each section being in contact with at least one point on the shoulder section of the plug on opposite sides of the collar section, one section having a hook at one end and the other section having a clamp and finger grasping tip at the end for engaging opposite points of the edges of said can, the length of each section being such that the sealing portion of the plug is forced into airtight sealing engagement with the opening in the end wall of said can when the clamp and the hook at the respective ends are in engagement with opposite edges of the can.

2. A reusable can closure device particularly adapted for use in sealing openings found in the top of a cylindrical can, which can has a cylindrical side wall and a circular rim, said closure comprising:

- a. a resilient deformable plug having a generally teardrop shape and including a main body portion sized larger than the opening area of the can top, and a neck portion extending upward from the main body portion, the neck portion having a top surface and upwardly tapered back and front walls, the main body portion having a bottom side, and a generally teardrop shaped platform;
- b. an elongated resilient spring clip adapted to be removably hooked onto the can rim at one end and clamped onto the rim at the other end, said clip being a one piece metallic member, the intermediate section thereof being shaped to form a dovetail slot for receiving and holding in tight fitting relationship the neck of the plug, the dovetail slot including upwardly tapered front and back walls co-reacting with said neck portion of the plug, and a top wall cooperating with the top surface of the neck portion of the plug to prevent sidewise movement of the plug relative to the clip, and having a front section sloping downwardly with the horizontal, and a reverse curved portion forming a clamp and then terminating in downward and outward extending finger grasping tip, and the rear section terminating in a downward and outward curve portion forming a hook, the clamp being lower than the hook.

3. The can closure as in claim 2 wherein the top surface of the plug neck has a pair of ribs thereon to cooperate with the clip top wall.

4. The can closure of claim 2 further including tab means extending out from the top wall of the clip.

5. The closure of claim 2 wherein the plug is a one piece body of elastomeric material.

6. The closure of claim 2 wherein the plug is a porous material covered with a layer of elastomer.

7. The can closure of claim 3 wherein the plug is a one piece body of elastomeric material.

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