Feb. 11, 1936. S. A. LOVE 2,030,380

CLOSURE CAP

Filed Oct. 19, 1933 4 Sheets-Sheet 1

Fig. 1.

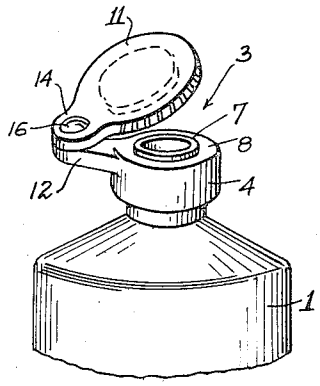


Fig. 2.

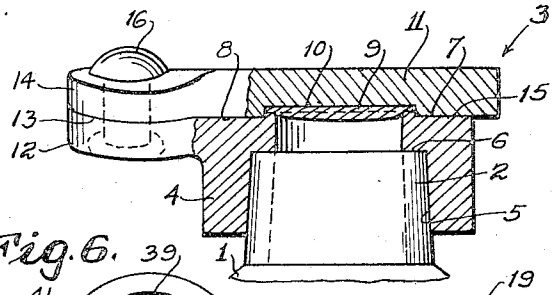
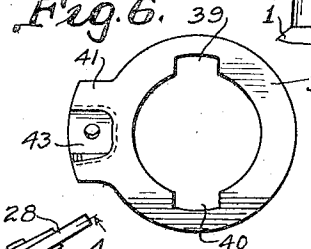


Fig. 6.



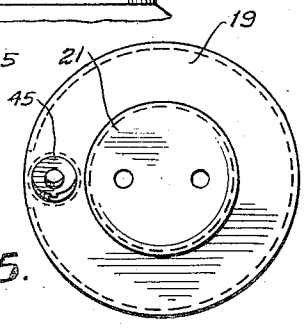


Fig. 5.

Fig. 3.

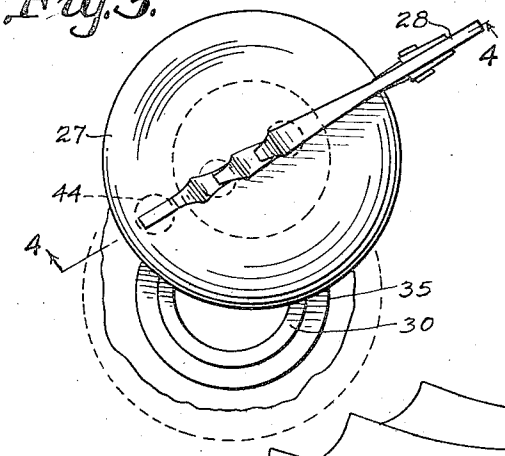


Fig. 4.

Fig. 7.

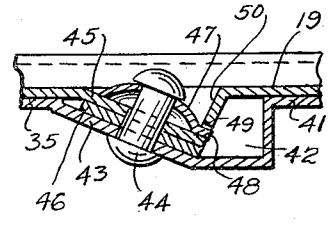
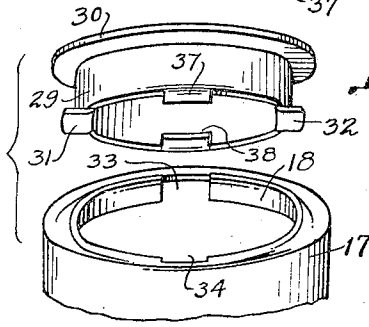


Fig. 8.



Inventor

S. A. Love

By Mason Fenwick & Lawrence

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Feb. 11, 1936. S. A. LOVE 2,030,380

CLOSURE CAP

Filed Oct. 19, 1933 4 Sheets-Sheet 2

Fig. 9.

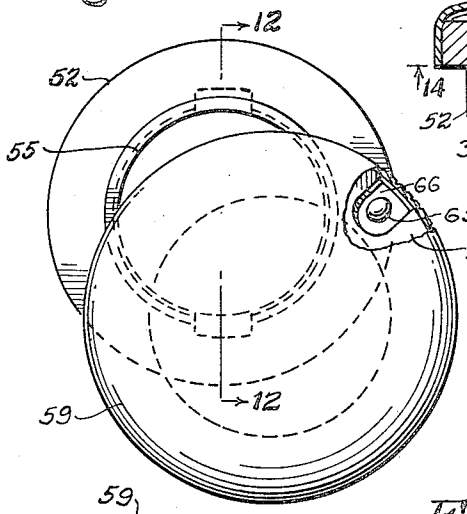


Fig. 12.

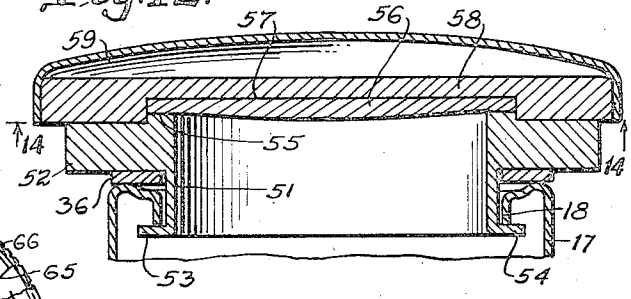


Fig. 13.

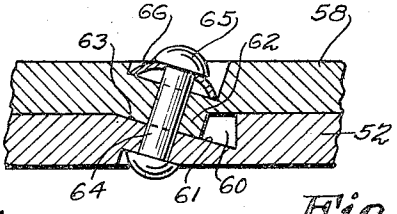


Fig. 10.

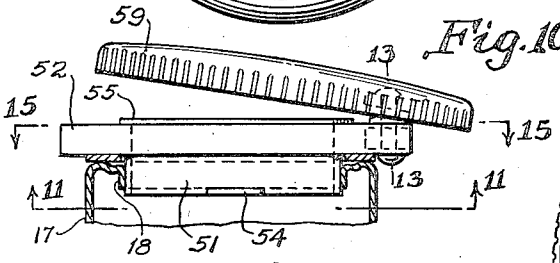


Fig. 14.

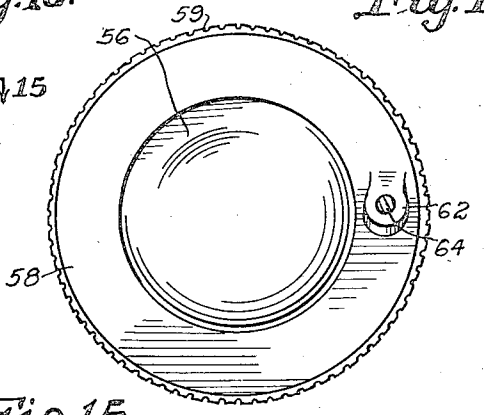


Fig. 11.

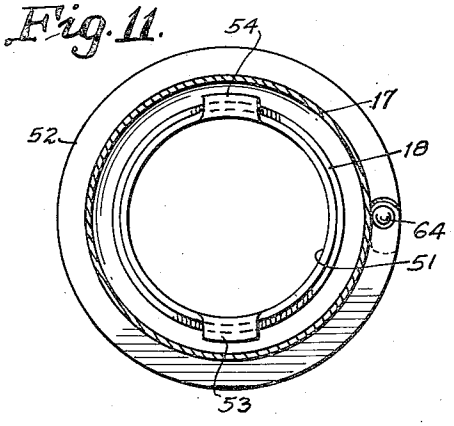
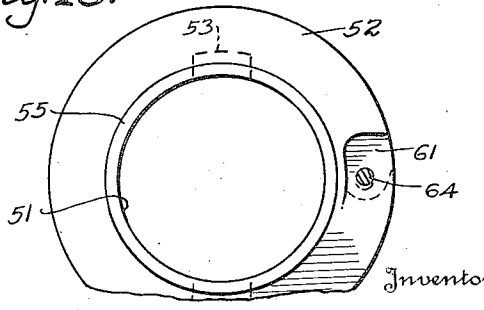


Fig. 15.



Inventor

S. A. LOVE

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Feb. 11, 1936. S. A. LOVE 2,030,380

CLOSURE CAP

Filed Oct. 19, 1933 4 Sheets-Sheet 3

Fig. 17.

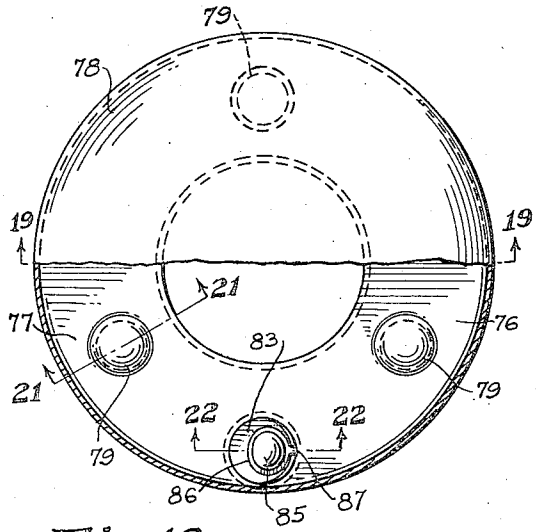


Fig. 16.

Fig. 18.

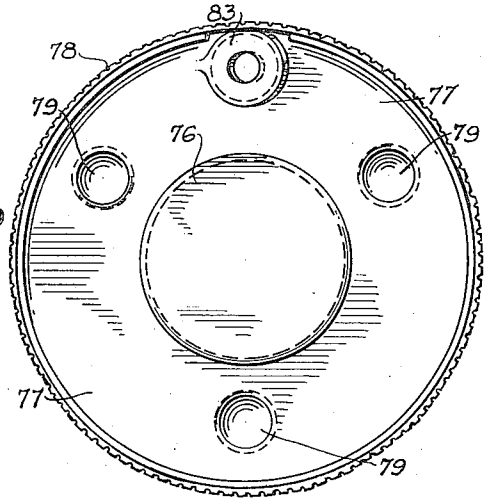


Fig. 19.

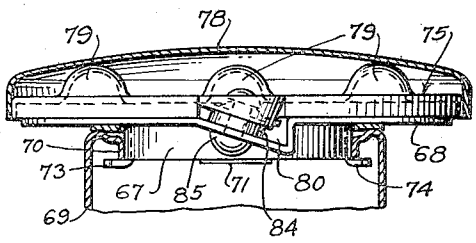


Fig. 21.

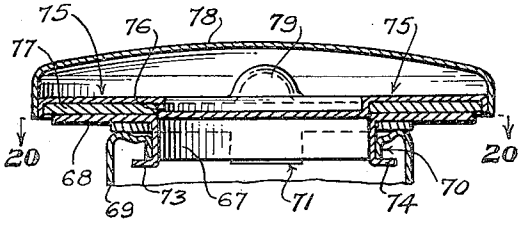


Fig. 20.

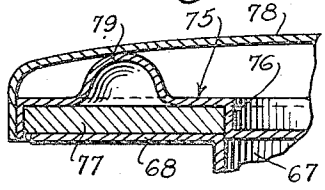
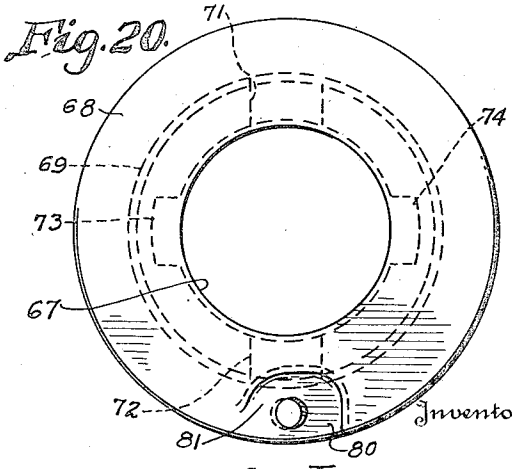
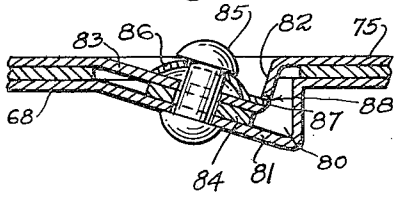


Fig. 22.





Inventor

S. A. LOVE

By Mason Fenwick & Lawrence

Attorneys

Feb. 11, 1936. S. A. LOVE 2,030,380

CLOSURE CAP

Filed Oct. 19, 1933 4 Sheets-Sheet 4

Fig. 24.

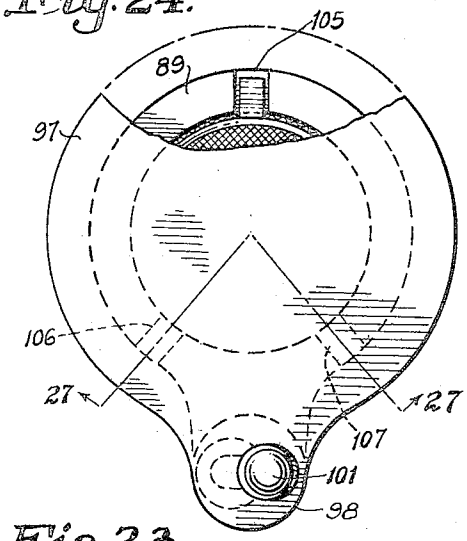


Fig. 28.

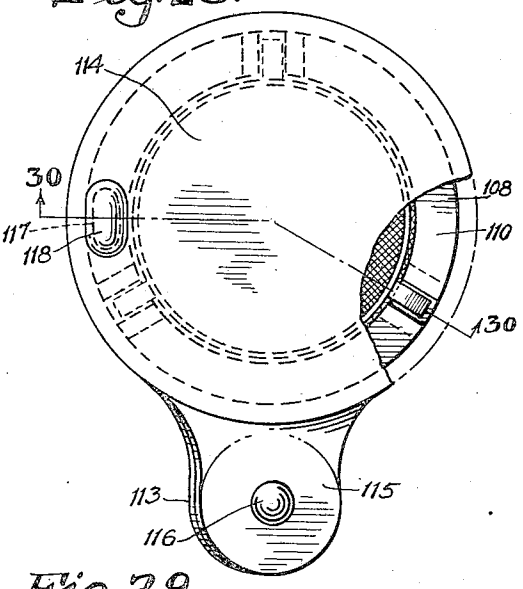


Fig. 23.

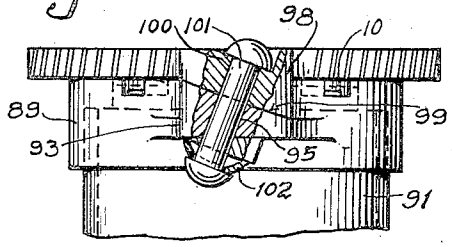


Fig. 29.

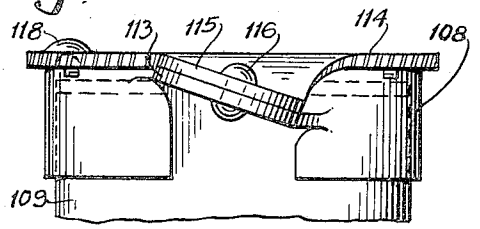


Fig. 25.

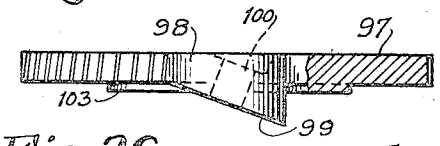


Fig. 30.

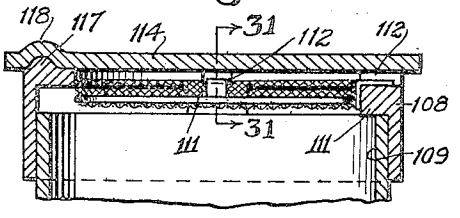
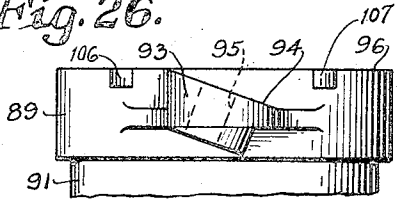


Fig. 26.



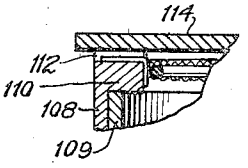
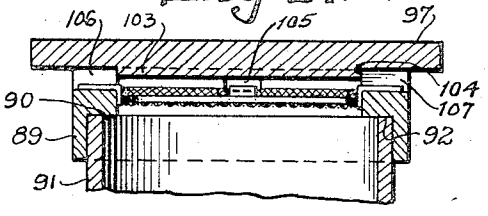


Fig. 31.

Fig. 27.



Inventor

S. A. LOVE

By Mason Fenwick & Lawrence

Attorneys

Patented Feb. 11, 1936 2,030,380

UNITED STATES PATENT OFFICE

2,030,380

CLOSURE CAP

Solomon A. Love, Decatur, Ga.

Application October 19, 1933, Serial No. 694,312

6 Claims. (Cl. 220—33)

This application is a continuation in part of my pending application for Closure cap, Serial No. 652,224, filed January 17, 1933.

As in my prior application, this invention relates to closures of a small type generally adapted for use on the dispensing apertures of collapsible tubes, such as are now commonly used to contain tooth paste, shaving cream, paints, etc. A larger type of the invention relates to closures adapted for use on the radiator, gas tank and crank case filler pipes of automobiles, trucks, busses, etc; and for any other kind of filling or dispensing apertures of containers regardless of their size or particular uses.

The main object of the invention is to provide closure caps of the type referred to which can be readily and cheaply die cast or stamped out of sheet metal; and which, when applied can be very readily moved into and out of closing position on any dispensing or filling neck to which it may be applied.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawings:

Figure 1 is a fragmentary perspective of a closure cap such as is disclosed in my aforesaid pending application, and illustrating generally the principle involved in the construction and use of the various forms of the invention disclosed herein;

Figure 2 is a fragmentary central sectional elevation, to an enlarged scale, of the closure illustrated in Figure 1;

Figure 3 is a top plan view of one of the preferred forms of the larger type closures, particularly adapted for use on the filling necks of automobile radiators, gasoline tanks or crank case filling pipes;

Figure 4 is a vertical transverse section, to an enlarged scale, taken on the line 4—4 of Figure 3;

Figure 5 is a top plan view of part of the cap illustrated in Figure 4;

Figure 6 is a top plan view of a securing collar positioned immediately under and cooperating with the cap shown in Figures 4 and 5;

Figure 7 is a section taken on the line 7—7 of Figure 4;

Figure 8 is a fragmentary exploded perspective of the upper end of a filling neck and a securing member designed to secure the filling closure firmly in position on the filling neck.

Figure 9 is a top plan view of a modified form of the invention shown as applied to a filling or dispensing neck of a container;

Figure 10 is a side elevation of the device shown in Figure 9, with parts broken away and shown in section to illustrate details of construction;

Figure 11 is a horizontal section taken on the line 11—11 of Figure 10;

Figure 12 is a vertical central section, to an enlarged scale, through the form of the invention shown in Figure 9;

Figure 13 is a section, to an enlarged scale, taken on the line 13—13 of Figure 10;

Figure 14 is a bottom plan of the cap of the member shown in Figures 9 to 12;

Figure 15 is a top plan of a securing collar arranged directly under the cap shown in Figure 14 and provided with a pivot recess cooperating with a corresponding pivot lug formed on the cap shown in Figures 9 to 14;

Figure 16 is a central vertical section through another modification of the invention;

Figure 17 is a top plan view of the device shown in Figure 16;

Figure 18 is a bottom plan view of the cap shown in Figure 17;

Figure 19 is a vertical transverse section taken on the line 19—19 of Figure 17;

Figure 20 is a horizontal section taken on the line 20—20 of Figure 19;

Figure 21 is a fragmentary sectional detail, to an enlarged scale, of part of the cap shown in Figures 17 to 19;

Figure 22 is a fragmentary vertical section taken through the hinged connection between the cap and the securing member of the device shown in Figures 17 to 19;

Figure 23 is a side elevation, partly in section, of still another modification of the invention;

Figure 24 is a top plan view of the closure illustrated in Figure 23;

Figure 25 is a side elevation of a closure cap illustrated in Figure 23;

Figure 26 is a side elevation of a securing member cooperating with the cap shown in Figure 25 and hinged thereto;

Figure 27 is a transverse section taken on the line 27—27 of Figure 24;

Figure 28 is a top plan view of a stamped metal form of closure adapted to be applied particularly to crank case filler pipes, part of the closure being broken away to show details of construction;

Figure 29 is a side elevation of the closure shown in Figure 28;

Figure 30 is a fragmentary vertical transverse section taken on the line 30—30 of Figure 28; and

Figure 31 is a fragmentary vertical section taken on the line 31—31 of Figure 30.

The form of the invention shown in Figures 1 and 2 of the drawings differs from that illustrated in my aforesaid pending application in that the collar used to secure the closure cap to a filling or dispensing neck is designed to be held by friction to the aforesaid neck. In the prior application, the securing collar is screw-threaded. In Figures 1 and 2, the reference character 1 designates a collapsible tube or similar container having a filling and dispensing neck 2 extending from the upper end thereof with its outer periphery shaped substantially as a frustrum of a cone. The closure member designated generally by the reference character 3 comprises an attaching collar 4 having a shouldered inner recess 5 shaped to fit snugly on the neck 2 of the container 1 and to be secured thereto by tight friction fit.

The recess 5 has, at its upper end, a shoulder 6 adapted to limit the movement of the cap on the neck 5. Ordinarily the recess 5 will be formed so that when it is securely applied to the neck 2 the shoulder 6 will be slightly spaced apart from the top of the neck 2. The collar 4 is centrally apertured to provide an outlet for the contents of the container 1, and the central aperture has a ring 7 secured therein by tight friction fit. This ring 7 extends above the upper plane end 8 of the collar 4 to form a seat for a gasket 9 suitably secured in a recess 10 formed in a closure cap 11 hinged to the collar 4.

The hinge connection between the cap 11 and the collar 4 is of a peculiar construction which permits the cap to be rotated from closing position on the collar 4 to an open inclined position in which the cap clears the dispensing aperture of the container both laterally and vertically. As shown in the drawings, the hinge connection comprises a pivot lug 12 extending laterally from the upper end of the securing collar 4. The plane of the upper face 13 of the pivot lug 12 is inclined with respect to the plane of the upper end 8 of the collar 4. This inclined plane face 13 forms a seat for a cooperating pivot lug 14 projecting laterally from the cap 11. The face of the lug 14 contacting with the face 13 of the lug 12 is inclined at the same angle to the closing face 15 of the cap 3.

The pivot lugs 12 and 14 are centrally apertured to receive a pivot 16 which is preferably in the form of a rivet for securing the collar and cap permanently but rotatably connected to each other. The cap 11 insofar as its closing portion is concerned is of larger diameter than the outer diameter of the collar 4, thereby providing a flange around the outer periphery of the collar 4 so that the user may by mere pressure on the edge of the cap 11 move the cap from its closing position shown in Figure 2 to the open position shown in Figure 1.

It will be obvious from inspection of Figures 1 and 2 that the further the cap 11 is rotated anti-clockwise around its pivot 16, the greater will be its elevation above the plane face 8 of the collar 4. The angle of the pivot lugs 12 and 14 is such that when the cap is rotated until its axis coincides with the axis of the securing collar 4, the gasket 9 will be pressed tightly down against the upper edge of the ring 7, thereby insuring a close fitting airtight joint between the cap and the said ring.

The modification shown in Figures 3 to 8 is particularly adapted for permanent attachment to the filling neck of the radiators of automobiles and is designed so that the greater number of its parts can be stamped out of thin sheet metal. In Figures 3 to 8 the filling neck is designated by the reference character 17; and, as usual in devices of this character, is provided at its upper end with an inwardly and downwardly turned annular flange 18. The closure proper, designed to be applied to the filling neck 17, comprises a circular cap 19 having its outer circular edge shaped to form a depending flange 20. The central part of the cap 19 is dished to form a cylindrical recess 21 in which is seated a gasket 22.

The recessed portion of the cap 19 is suitably apertured to receive the shanks of machine screws 23 and 24 which are threaded into bosses 25 and 26, respectively, projecting from the inner face of an ornamental cover 27 which is shaped to project over and around the cap 19. The cover 27 forms a suitable base for the ornament 28 such as is in common use on radiator caps. This ornament and base may, as is common in this art, be cast of any suitable material and in any desired ornamental form. Properly speaking, this ornamental cover and ornament form no part of the closure disclosed herein. However, because of the fact that the closure is constructed of very cheap stamped out material, it is highly desirable that provision be made for covering these cheap parts with some ornamental and protective cover.

The cap 19 is secured to the radiator neck 17 by means of a thimble 29 having an annular flange 30 extending outwardly from its upper end. The thimble 29 fits snugly within the flange 18 of the radiator neck 17, and at its lower end is provided with outwardly turned locking lugs 31 and 32 adapted to slide through slots 33 and 34, respectively, formed in the flange 18 of the neck 17. These lugs and slots constitute a sort of bayonet joint between the thimble 29 and radiator neck 17.

When the thimble 29 is properly secured to the radiator neck, the flange 30 serves to clamp a pivot collar 35 securely to the radiator neck 17, an annular gasket 36 being interposed between said collar and the top of the radiator neck to ensure an airtight joint. To facilitate separation or assembly of the thimble 29 and the radiator neck 17, the lower end of the thimble is provided with inwardly directed lugs 37 and 38 adapted to receive a special tool for the purpose of effecting rotation of the thimble to move its locking lugs 31 and 32 into or out of registration with the slots 33 and 34.

The pivot collar 35 is provided with diametrically opposite recesses 39 and 40 to permit the lugs 31 and 32 to pass therethrough when the collar 35 is being assembled on the thimble 29. The collar 35 has formed integral therewith a radially projecting extension 41 stamped to form a recess or casing 42 having a wall 43 inclined with respect to the plane upper face of the aforesaid collar. The center of the inclined wall 43 is suitably apertured to receive a shank 44 of a headed pivot connecting the cap 19 pivotally to the collar 35. The cap 19 is stamped to form a wall 45 inclined at the same angle to the plane face of the cap 19 as the wall 43 is inclined to the plane face of the collar 35.

A gasket 46 is interposed between the walls 43 and 45 to permit the yielding movement necessary to insure an airtight fit between the gasket 22 in said cap and the flange 30 of the thimble 29. While Figure 7 of the drawings shows a rivet

as the pivot connection between the cap 19 and the collar 35, the invention must not be considered as limited in any way to any particular form of pivot connection. To insure a proper yielding fit between the walls 43 and 45 and the gasket 46, a cup-shaped spring washer 47 is interposed between one head of the pivot 44 and the upper face of the inclined wall 45. To prevent rotation of the cup-shaped spring washer 47, the said washer is provided with a small lug 48 projecting radially into an aperture 49 formed in a wall 50 connecting the inclined wall 45 to the plane face of the cap 19.

The operation of this form of the invention is quite similar to that illustrated in Figures 1 and 2 of the drawings. The structural differences, however, are such as are inherent in a device of this character which is stamped from thin sheet metal so that it can be manufactured in great quantities very cheaply to adapt it for use generally on filling or dispensing necks such as the necks of automobile radiators.

The form of the invention shown in Figures 9 to 15 differs mainly from that shown in the preceding figures in that the thimble and cap connected thereto are die-cast instead of being stamped out of thin sheet metal. In this form, the thimble 51 is cast to provide a pivot collar 52 projecting laterally from the upper end thereof; and is also constructed to form the radial locking lugs 53 and 54 adapted to slide in the slots 33 and 34 formed in the flange 18 of the filler neck 17. A gasket 36 is interposed between the lower face of the flange 52 and the upper end of the filler neck 17. The thimble 51 is provided at its upper end with an annular projection 55 forming a seat for the gasket 56 which is suitably secured in a recess 57 formed in the die-cast cap 58. Any suitable ornamental cover 59 may be secured to the cap 58.

The flange 52 corresponds to the pivot collar 35 of the form of the invention illustrated in Figure 4 of the drawings. This flange 52 is provided with a recess 60, one wall 61 of which is inclined to the upper plane face of the flange 52. The cap 58 is provided with a projection 62 having a plane face 63 inclined at the same angle to the lower plane face of the cap 58 as the wall 61 is inclined in the flange or collar 52. The inclined portions of the flange 52 and the cap 58 are provided with registering apertures to receive the shank 64 of a headed pivot 65, a cup-shaped spring washer 66 being interposed between one head of the pivot and the upper inclined face of the projection 62 to permit vertical separation of the cap 58 from the collar 52 whenever the cap is rotated from closed to open position. The operation of this form of the invention is quite similar to that of the form shown in Figures 3 to 7 and will be evident to persons skilled in the art without further description.

The form of the invention illustrated in Figures 16 to 22 of the drawings is particularly adapted for production cheaply and in large quantities. This form of the invention is a stamped sheet metal product primarily intended as a closure for the gasoline tanks of automobiles.

In this form of the invention, a thimble 67, having a flange 68 formed at its upper end, is seated on a filler neck 69 which may be that of a gasoline tank or automobile radiator. The neck 69 is inwardly and downwardly turned at its upper end to provide a flange 70 which forms a collar for the thimble 67 when the latter is positioned therein. The flange 70 is provided at diametrically opposite ends with slots 71 and 72 designed to permit the sliding movement therethrough of the lugs 73 and 74 which are outwardly turned at diametrically opposite points of the thimble 67 to form with said slots a locking bayonet joint connection for the thimble and filler neck 69.

The cap 75 is depressed at its center to form an annular recess 76 in which is seated an annular gasket 77 adapted to form an airtight joint with the pivot collar or flange 68 of the thimble 67. An ornamental shell 78 may be secured frictionally or otherwise to the cap 75 which is provided with a series of protuberances 79 spaced around the cap 75 to form a rest or support for the shell 78.

The flange or collar 68 is stamped to form a recess 80 having a wall 81 inclined to the plane face of the flange 68. The cap 75 is stamped to form a recess 82 corresponding in the inclination of its wall 83 relative to its plane face with the inclination of the wall 81 of the flange 68 to the plane face thereof.

A metal washer 84 is interposed between the inclined walls 81 and 83 to eliminate wear and to secure perfect performance, and surrounds a pivot 85 passing through registering apertures in the walls 81 and 83. A spring cup washer 86 of the same type as that disclosed in Figure 7 of the drawings is interposed between the head of the pivot 85 and the upper face of the inclined wall 83; and a radial extension 87 projects from the lower edge of the washer 86 into an aperture 88 formed in the wall connecting the inclined wall 83 to the plane face of the cap 75. The operation of this form of the invention is quite similar to that of the forms previously described. The main difference between this form and others residing in the structure and arrangement of parts to adapt it for manufacture in great quantities at very low cost.

The form of the invention illustrated in Figures 23 to 27, inclusive, is particularly adapted for die-cast production. This form comprises a collar 89 having an annular recess 90 adapted to fit frictionally over the upper end of a standard filler pipe 91. A shoulder 92 of the said recess forms a stop to contact with the top of the filler pipe 91. The collar 89 is provided with the laterally extending lug 93, which in the casting of the collar, is constructed to form a wall 94 having a pivot aperture 95 formed therein. The wall 94 is inclined so that the axis of the aperture 95 is also inclined to the upper plane face 96 of the said collar.

The cap 97, in this form of the invention, is of greater diameter than the collar 89 and is provided with a radially projecting lug 98 having a wall 99 inclined to the plane of the lower face of the cap at the same angle as the plane of the lug 94 is inclined to the upper plane face of the collar 96. The lug 98 has an aperture 100 extending therethrough and adapted to register with the aperture 95 in the projecting lug 94 of the collar 89. A headed pivot 101 extends through these registering apertures and the lower end thereof projects sufficiently below the lower face of the lug 93 to permit the use of a spring cup washer 102. The cap 97 is provided at its center with a circular nub 103 adapted to fit snugly into the central aperture 104 of the collar 89. In this form of the invention the nub 103 gives the proper clicking effect when it is moved into or out of closing position. Air vents 105, 106 and 107 are

formed by providing recesses extending radially across the upper edge of the collar 89.

In the form of the invention illustrated in Figures 28 to 31, the cap is adapted to be formed as a stamped sheet metal product. This form includes a collar 108 adapted to be secured on a cylindrical filler neck 109 by friction fit. The upper end of the collar 108 is extended inwardly to form an annular flange 110 which is provided at various parts with downwardly projecting lugs 111 adapted to seat on the upper end of the filling neck 109. Directly above the projections 111 the flange 110 is provided with radially extending ventilating notches or grooves 112.

The collar 108 is stamped out to form the pivot receiving lug 113 arranged at an angle to the upper plane face of the flange 110. The cap 114 is somewhat larger in diameter than the collar 108 and is stamped to provide a pivot lug 115 arranged at the same angle to the plane face of the cap as the pivot lug 113 is arranged with respect to the upper plane face of the flange 110. A headed pivot 116 extends through registering apertures in the lugs 113 and 115 to connect the cap pivotally to the collar 108. The locking effect between the cap and collar is secured by providing the upper face of the collar 108 with a nub 117 adapted to seat in a corresponding recess 118 formed in the cap 114. In this form of the invention, the natural resilience of the several parts being depended upon to make the necessary closure contact between the collar and its cap. The operation of this modification is substantially the same as that of the other forms of the invention.

It will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of my invention, or sacrificing any of the material advantages thereof; and I reserve the right to make all such changes as fairly fall within the scope of the annexed claims.

What I claim is:

1. The combination with the neck of a container, of a closure therefor comprising: a collar detachably connected to said neck, a lug extending radially from said collar, a closure cap having a lug extending radially therefrom, said lugs being inclined at the same angle relative to said collar, and a pivot extending through said lugs at an angle to the common axis of said collar and neck.

2. The combination with the neck of a container, of a closure therefor comprising: a collar, means for detachably connecting said collar to said filling neck, a lug extending radially from said collar, and a closure cap pivoted to said lug, the pivot axis between said cap and lug being inclined to the axis of said neck.

3. The combination with the neck of a container, of a closure therefor comprising: a collar having a shouldered recess fitting snugly over said neck, said cap having its upper end lying in a plane, a disk having a plane face adapted to contact said upper end, said collar and disk having lugs projecting radially therefrom and inclined to said plane, a pivot extending through said lugs and having heads at opposite ends thereof, and yielding means interposed between one of said heads and one of said lugs.

4. The structure set forth in claim 3 in which the upper end of said collar is provided with radial ventilating grooves.

5. The structure set forth in claim 3 in which the cap is provided with a central disk-like projection adapted to snap into the upper end of said collar when the cap is in closed position.

6. The structure set forth in claim 3 in which the collar and cap are provided with cooperating interlocking means for frictionally locking the cap in closing position.

SOLOMON A. LOVE.