April 4, 1933. L. K. SNELL 1,903,391

CLOSURE

Filed July 17, 1930

Fig. 3.

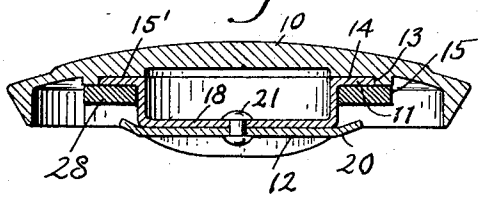


Fig. 1.

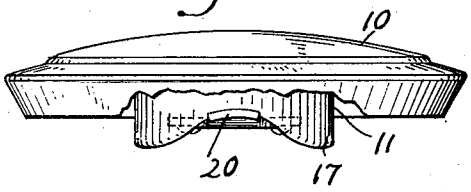


Fig. 5.

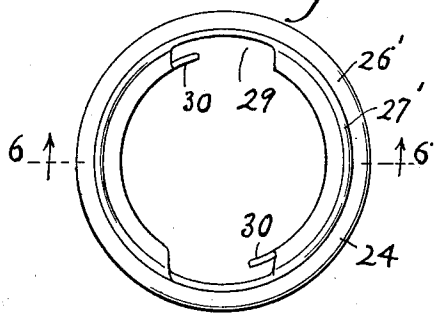
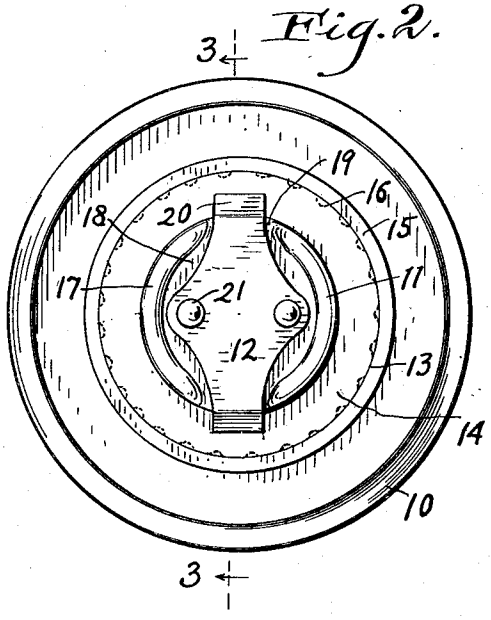


Fig. 2.



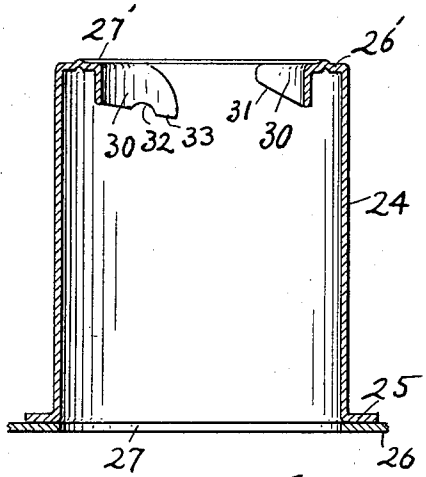


Fig. 6.

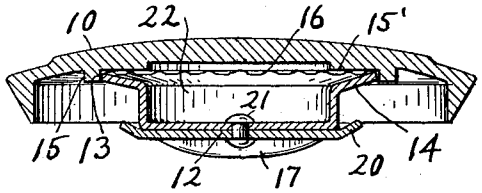


Fig. 4.

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UNITED STATES PATENT OFFICE

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CLOSURE

Application filed July 17, 1930. Serial No. 468,595.

This invention relates to closure devices, and more particularly to an improved form of closure of the bayonet type for use with the filling openings of fluid containers such as vehicle fuel tanks, radiators or the like.

The hollow arcuate extensions depending from the inner wall structure on opposite sides of the locking member, disclosed but not claimed herein, are claimed in copending application Serial No. 477,872, filed August 26, 1930.

In the construction of closures of the type mentioned the use of a cast-metal cap body is highly desirable because it can be made to conform in shape with various ornamental designs, and also because the cast-metal can be readily given a high polish or other bright finish. On the other hand, such portions of cast-metal cap bodies as are exposed to contact with the fluid of the containers to which the closures are applied, are subject to rapid corrosion, especially where the fluid involved is the hot water of a vehicle motor cooling system. I have discovered that the desirable features of a cast metal cap body can be attained without the objectionable corrosion mentioned, when those portions of the cast-metal cap body which have heretofore been exposed to the contact of the fluid, are either shielded from the corrosive fluid by sheet metal, or are themselves made from sheet metal. The construction of such portions of a closure in the form of sheet-metal stampings is desirable because with suitable dies those parts can be cheaply produced, however, the manufacture of a closure combining cast-metal parts with sheet-metal parts involves more than merely the substitution of one metal part for another, since the assembly of the cast-metal cap body with the parts stamped from sheet-metal, in such a manner as to permit the latter parts to efficiently perform their functions, presents a difficult problem.

It is, therefore, an object of this invention to provide a novel form of closure having cast-metal and stamped metal portions assembled so that the stamped metal protects the cast metal against contact with corrosive fluid.

Another object of this invention is to provide an improved construction for closures of the type having assembled inner and outer parts, in which the inner part is deformed at assembly and thereby expanded into assembled relation with the outer part.

Another object of this invention is to provide an improved bayonet type closure having a cast-metal outer wall structure, and a stamped metal inner wall structure expanded into assembled relation with the outer wall structure.

Still another object of this invention is to provide a bayonet type closure having a die-cast cap body, and supporting means for the locking member expanded into assembled relation with the cap body.

A further object of this invention is to provide a closure having a novel form of pilot cup construction.

Other objects and advantages of this invention will be apparent from the following description when taken in conjunction with the accompanying sheet of drawing in which:

Fig. 1 is a side elevational view of a closure embodying my invention.

Fig. 2 is a bottom plan view thereof.

Fig. 3 is a sectional elevation taken on line 3—3 of Fig. 2.

Fig. 4 is a sectional elevation showing the inner-wall structure in position ready to be expanded into assembly with the cap body.

Fig. 5 is a top plan view of a filler neck with which my closure may be used; and

Fig. 6 is a sectional elevation taken on line 6—6 of Fig. 5.

In the drawing to which detailed reference will now be made, I have shown a bayonet type closure which is adapted for quick detachable assembly with the tubular filler neck of a fluid container. Although the drawing which illustrates my invention shows but one form of closure, it should be understood however, that the principle of my invention may also be embodied in various other designs and types of closure construction.

My closure device, as herein illustrated, comprises a rigid cap body or outer-wall structure 10, and an inner wall structure 11

assembled therein so as to form a support for the resilient locking member 12. The cap body 10 is preferably constructed in the form of a casting, such as a die-casting, and may be of any desired shape or form. The essential feature of the cap body, so far as my invention is concerned, is that it is provided with suitable abutment means, such as that afforded by the annular shoulder 13, which cooperates with the flange 14 of the inner-wall structure for securing the latter in assembled relation with the cap body. In this instance the annular shoulder 13 is formed by providing the top wall of the cap body with the depending rib 15, but obviously such a rib is not necessary since suitable abutment means could be readily obtained by constructing the top wall of the cap body with a central recess of any desired shape or form, or by making the flange 14 of a suitable dimension to cooperate with a marginal flange or skirt portion, such as the depending flange 14′ shown in the drawing.

The inner-wall structure 11 is an essentially cup-shaped sheet metal stamping, and when ready for assembly with the cap body, the flange 14 thereof does not extend outwardly at right angles from the body portion of this structure, but is conical or inclined, as clearly shown in Fig. 4 of the drawing. During the assembly operation, the flange 14 of the inner wall structure is pressed to a flat or horizontally extending position and is thereby expanded laterally so that its outer edge is wedged into abutting relation with the shoulder 13. In the operation of expanding the flange 14 it may, if desired, be flattened against a face portion 15′ provided on the top wall. When the flange 14 has been deflected in this manner, from the angularly disposed position indicated in Fig. 4, to the position extending at substantially right angles to the body portion of the inner wall structure, indicated in Fig. 3, it will be found that the outer edge of this flange engages the shoulder 13 sufficiently tight to provide a connection which will permanently retain the inner wall structure in assembled relation with the cap body, and which will prevent relative turning between the cap body and the inner-wall structure. In addition to preventing relative turning between the inner and outer-wall structures this connection will also be sufficiently tight to prevent the passage of fluid therethrough.

If desired, additional means may be utilized for securing or anchoring the inner-wall structure against rotation relative to the cap body, in the form of spaced teeth or serrations 16 extending around the edge of the flange 14. These serrations can be readily formed during the blanking operation which shears the outer edge of the flange 14 from the sheet of stock. During this operation some of the metal of the flange 14 is swaged at spaced intervals to form the teeth 16. When the flange 14 is flattened down in assembling the inner-wall structure with the cap body, the outward expansion of this flange, causes these teeth to be pressed into the shoulder 13 of the cap body. When the parts are in assembled relation these teeth thus provide an interlocking connection between the inner and outer-wall structures tending to prevent relative rotation therebetween.

The inner-wall structure 11, as already stated, is essentially cup-shaped and is sometimes referred to as the pilot cup because it performs a guiding and centering function when the closure is applied to a filler neck. To provide this pilot cup with a shape which will enable it to more efficiently perform its guiding and centering functions, I have formed the same with the circumferentially arranged depending hollow lips 17 which extend below the plane of the bottom wall 18 of the pilot cup. These depending lips are continuous with, or in other words, substantially flush with the outer side wall of the pilot cup, and may be formed by suitable drawing operations during the construction of the inner-wall structure. The ends of these lips are spaced apart as indicated at 19 in Fig. 2 to accommodate the fingers 20 which extend laterally from the locking member 12. This locking member is arranged between the depending lips 17 and is secured to the exterior surface of the bottom wall 18 as by means of rivets 21. It should be noted that the locking member 12 is made of progressively varying width so that it will have the desired flexibility and will function efficiently as a spring. This member is preferably constructed from sheet metal, such as phosphor-bronze alloy, and as indicated clearly in Fig. 2, is formed relatively wide at its center and which narrows in width progressively outwardly toward the fingers 20. When constructed in this manner the resiliency of the locking member is such that, as nearly as is practical, uniform deflection and fiber stress is attained throughout the length of this member. This shape for the locking member allows the fingers maximum deflection before the elastic limit of the metal is exceeded.

By constructing the closure according to my invention the space between the assembled inner and outer-wall structures forms a fluid-tight chamber 22. During use of my closure fluid from the container, such as water from the radiator of a vehicle, cannot enter and accumulate in this chamber and cause corrosion therein as has been common in many forms of bayonet closures heretofore constructed. Furthermore, since during the use of the closure, corrosive fluids do not enter this chamber, it is not necessary to coat the inner surfaces thereof with the non-

corroding metal, such as cadmium, which is usually applied to the exterior surface of the pilot cup. The successful coating of the inner surfaces of the pilot cup with such material has heretofore been a difficult operation, and in my form of closure construction the need for such a coating is entirely eliminated because corrosive fluid does not enter the pilot cup.

As an illustration of a filler neck with which my closure may be used, I have shown, in Figs. 5 and 6 of the drawing, a tubular member 24 which is provided at the inner end thereof with an annular flange 25 adapted to be secured to the wall of the container 26 so as to surround the opening 27. At its outer end the metal of this tubular member is flanged radially inwardly to form the gasket seat 26′. If desired, this gasket seat may be provided with a raised annular bead 27′ for sealing engagement with one surface of the gasket 28 which surrounds the pilot cup. At diametrically opposed points openings 29 are provided through the flange 26′ to accommodate the locking fingers 20 when the closure is applied to the filler neck. Intermediate the openings 29 portions of the flange 26′ are turned to extend inwardly axially of the filler neck to form the depending lugs 30. The lower edges of these lugs are tapered in a well known manner to provide inclined cam surfaces 31 which are engaged by the locking fingers and serve to draw the closure toward the filler neck upon relative rotation therebetween. These inclined cam surfaces terminate at one end thereof in the openings 29 and at their opposite ends terminate in dwells 32 formed adjacent the depending stops 33 which limit the rotational movement of the fingers toward locking position.

The sheet metal inner wall structure 11 may also be referred to as a gasket carrier since, as illustrated in the drawing, one of its functions is to retain and position the gasket 28 for sealing cooperation with the bead 27′ of the filler neck.

It will now be readily seen that I have provided a form of closure construction in which the advantages incident to the use of a die-cast cap body, are obtained in combination with the advantages which result from the use of metal stampings for other parts of the closure. The construction which I have devised is very simple, but nevertheless is extremely rugged and very durable. My construction, furthermore, results in the production, at relatively low cost, of closures which may be very attractive and ornamental in appearance, and which are of great uniformity. Moreover, the sheet metal part, which in itself is not so readily attacked by corrosive fluids, is fluid tight and protects the cast-metal against the destructive action of such fluids.

While I have illustrated and described the device of my invention in a detailed manner, it should be understood however, that I do not intend to limit myself to the precise details shown and described, but regard my invention as including such changes and modifications as do not involve a departure from the spirit of the invention and the scope of the appended claims.

Having thus described my invention what I claim is:

1. A radiator cap comprising a cast metal top, a gasket, a carrier for the gasket, said carrier comprising a sheet metal body having an imperforate central portion and a circular flange-like portion rigidly connected to the lower portion of asid top, said top having a depending circular rib on the lower portion thereof against which the edge of said flange-like portion impinges, and mechanical holding means on said central portion.

2. A radiator cap comprising a cast metal top, a gasket, a carrier for the gasket, said carrier comprising a sheet metal body having an imperforate central portion and a flange-like portion extending laterally outwardly from said central portion, abutment means formed integral with the lower portion of said top and wedgingly engaged by said flange-like portion for rigidly connecting said sheet metal body with said top, and mechanical holding means carried by said central portion.

3. A radiator cap comprising a top formed of die-cast metal, a sheet metal member having rigid and fluid tight connection with said top for protecting the latter from corrosive fluid, said sheet metal member comprising an imperforate body having a circular flange extending outwardly therefrom, said top having a circular abutment on the lower portion thereof wedgingly engaged by said flange for connecting said sheet metal member to said top, and mechanical holding means carried by said body.

In testimony whereof, I hereunto affix my signature.

LYLE K. SNELL.