

July 27, 1926.

1,593,846

J. S. REID

CLOSURE

Filed Dec. 23, 1921

Fig. 1

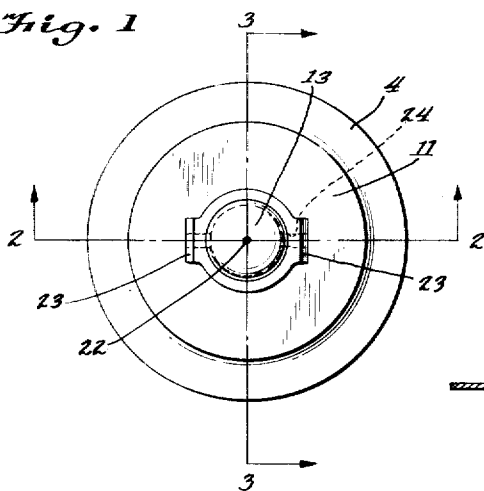


Fig. 2

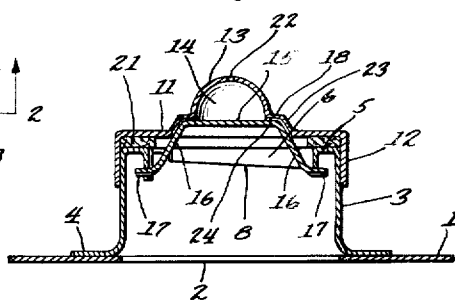


Fig. 3

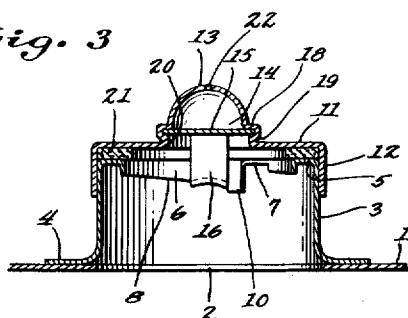


Fig. 4

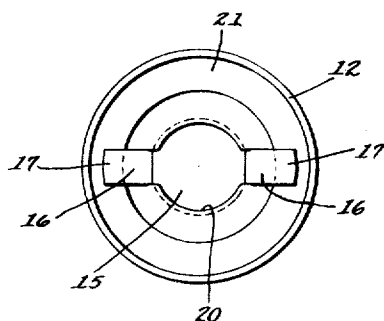
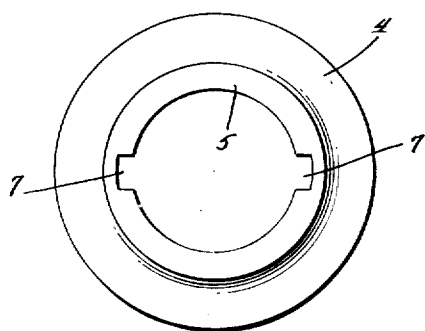
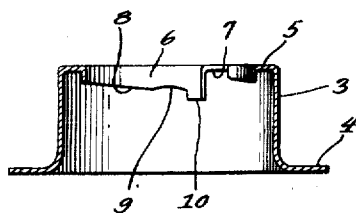


Fig. 5

Fig. 6



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UNITED STATES PATENT OFFICE.

JAMES S. REID, OF CLEVELAND, OHIO, ASSIGNOR TO THE EASY-ON CAP COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

CLOSURE.

Application filed December 23, 1921. Serial No. 524,396.

This invention relates to closures, and particularly to such devices for use in connection with the fuel tanks, radiators and wheel hubs, of motor vehicles.

More particularly, the invention relates to the locking spring of the cap member, and the novel manner of securing said spring thereto.

The object of the present invention is to provide a new and improved closure, which is easily operated to open and close an opening; in which the locking spring of the cap member is firmly secured to said member without the use of screws, rivets or other separate securing means; in which said locking spring possesses great yielding capacity, so that the cap gasket is relieved of undue compression, thereby materially prolonging the life of said gasket; in which the cap member is provided with an air passage for admitting air to the fuel tank, radiator or the like, thereby preventing the formation of a vacuum therein; in which the base portion of said locking spring constitutes the lower wall of the air chamber in said cap member and also serves as a baffle means for the outer end of said air passage; in which there are no threads to become worn or crossed; in which the cap member is securely locked when in fully closed position, so that there is no liability of it jarring off and being lost; and which is strong and durable, yet light and neat in appearance.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the drawings, Fig. 1 is a plan view of a closure embodying my invention; Fig. 2 is a vertical sectional view on the line 2—2, Fig. 1, the closure being shown applied to a fuel tank; Fig. 3 is a view similar to Fig. 2, taken on the line 3—3, Fig. 1; Fig. 4 is a bottom plan view of the cap member; and Figs. 5 and 6 are a plan view and a vertical sectional view, respectively, of the tubular member.

While the present closure is adapted for use with structures of various kinds, the drawings show the closure applied to a fuel tank 1, in which is an opening 2, such as a filling opening. 3 represents an upwardly extending filling tube, which may be an in-

tegral part of the fuel tank or, as shown in the drawings, a separate member, having a base flange 4 for securing said tube to that portion of the fuel tank surrounding the opening 2. At the upper end of said tube is an inwardly extending flange 5 and an inner, depending flange 6, said flanges 5, 6 being provided at diametrically opposite points with recesses or cut out portions 7, two being shown, forming two substantially semi-circular depending flanges. The lower or bottom edges of these depending flanges are inclined, so as to provide cam portions or faces 8, each of which is provided, at diametrically opposite points, with a dwell or seat portion 9 and a projection or stop portion 10.

The cap member, which is adapted for locking engagement with the filling tube 3, comprises a substantially circular top portion 11 and a depending flange or skirt portion 12 snugly surrounding said filling tube. Said cap member is provided in its top portion 11 with an upwardly extending dome or substantially semi-spherical projection 13, within the chamber 14 of which is seated the base or securing portion of a locking spring, as will later appear.

This locking spring comprises a substantially circular base or securing portion 15, and diametrically opposed integral resilient fingers 16, said fingers extending downwardly and outwardly and being provided at their outer ends with outwardly extending convex foot portions 17, which engage the cam faces 8, as will later appear. By having said foot portions curved or convex, a substantially point contact is secured between each of said foot portions and the cam faces, with a resultant increased binding engagement therebetween. The base or securing portion 15 of said spring is firmly and securely held within chamber 14 and against the annular shoulder 18 of dome 13, as above mentioned, by crimping the metal of two opposite walls 19 of the projection, said crimping operation forming two substantially semi-circular beads 20 extending inwardly against said spring base or securing portion from below. By having said bead interrupted at the points where the spring fingers 16 are provided, greater yielding capacity is possessed by said fingers. The spring is therefore firmly secured to the cap member, so that there is no liability of said

spring becoming loose or detached, as is the case when the spring securing means are rivets, screws and the like. Moreover, said spring is firmly secured to the cap member without the necessity of piercing or cutting the metal of said cap member.

21 represents an annular gasket, preferably made of cork, which is adapted to fit within the cap member against the top portion 11 and the depending flange 12, and is held therein by the resilient fingers 16 of the locking spring. When the cap member is in closing position, the gasket 21 lies between the inwardly extending flange 5 of the filling tube and the top portion 11 of the cap member, tightly sealing the opening 2, but due to the great yielding capacity of the resilient fingers 16 of the spring, obtained by having said fingers of relatively great length, the gasket 21 is not subjected to undue compression so that its life is materially lengthened.

In the preferred embodiment of my invention, the closure is provided with an air passage or passages for admitting air to the fuel tank, thereby preventing the formation of a vacuum therein. The drawings show the projection 13 provided with an air vent 22 for admitting air to the air chamber 14 thereof. Any suitable air passage leading from the air chamber 14 to the fuel tank may be provided. In the present embodiment, two diametrically opposed channels or ducts 24 are provided in the annular shoulder 18 and the inclined projection walls 23, so that the air in chamber 14 can flow around the periphery of the spring base portion 15 and along the outer surfaces of the spring fingers 16 into the fuel tank.

In applying the cap member, it is fitted over the filling tube 3, the resilient fingers 16 of the locking spring being passed through the recesses 7. The cap member is then turned, the curved foot portion 17 of the resilient fingers riding upon the cam faces 8, gradually causing said cap member to seat with increased pressure upon the filling tube 3. The cap member may be turned until the foot portions 17 of the spring fingers strike the projections or stop portion 10, at which point said foot portions will rest upon the dwell portions 9 of the cam faces 8, so that there is no liability of said foot portions accidentally sliding down the cam faces and the cap member jarring off. To remove said cap member, it is only necessary to turn said member in the reverse direction, whereupon the foot portions 17 of the spring fingers will ride down the cam faces, gradually relieving the pressure until said foot portions reach the recesses 7, whereupon the cap member may be lifted bodily from the filling tube.

Having described my invention, I claim:—

1. A closure, comprising a body member provided with a locking member, said lock-

ing member being secured to said body member by a crimping operation and without the necessity of piercing the metal of said body member.

2. A closure, comprising a body member provided with a recess, and a locking member having a portion secured in said recess by forming a portion of said body member over a portion of said locking member.

3. A closure, comprising a body member provided with a locking member, a portion of said locking member being spaced from a portion of the top of said body member so as to provide an air chamber therebetween, said body member being provided with a circuitous air passage leading from the inside thereof to said air chamber, and said air chamber being provided with a vent opening to the outside atmosphere.

4. A closure, comprising a body member provided with a locking member, a portion of said locking member being spaced from a portion of the top of said body member so as to provide an air chamber therebetween, said body member being provided with an air passage leading from the inside thereof to said air chamber, and said air chamber being provided with a vent opening to the outside atmosphere, said locking member being so arranged as to serve as a baffle means for said air passage.

5. A closure, comprising a body structure provided with an air chamber, a locking member carried by said body structure, said body structure being provided with passages providing communication between said air chamber and the outside atmosphere and between said air chamber and the inside of the body structure, and said locking member being so arranged as to serve as a baffle for the air passage providing communication between the air chamber and the inside of the body structure.

6. A closure, comprising a body member provided with a locking member, said locking member having a base portion secured to said body member and a locking portion connected to said base portion, said base portion being spaced from a portion of said body member so as to provide an air chamber therebetween, an air passage in the region of connection of the base and locking portions of the locking member for providing communication between the inside of said body member and the air chamber thereof, and said air chamber being provided with a vent opening to the outside atmosphere.

7. A closure, comprising a body member provided with a locking member, said locking member having a base portion secured to said body member and resilient locking finger portions connected to said base portion and extending outwardly therefrom, said base portion being spaced from a por-

tion of said body member so as to provide an air chamber therebetween, an air passage in the region of connection of the base and resilient finger portions of said locking member for providing communication between the inside of said body member and the air chamber thereof, said air chamber being provided with a vent opening to the outside atmosphere, and said resilient finger portions being so arranged as to serve as a baffle means for said air passage.

8. As a new article of manufacture, a closure having a central dome, a plate covering the bottom of said dome and secured thereto by pressing the material of said cap or closure about the edge of said plate, the plate being provided with yieldable extensions projecting outwardly and downwardly therefrom.

9. A closure comprising a body having

a peripheral guide flange, and a plate having opposed edge portions secured within said body by crimping the material of the latter about such edge portions, said plate having yieldable projections each extending outwardly therefrom between said opposed edge portions.

10. As a new article of manufacture, a cap having a dome provided with a breather opening, a plate secured within the dome and substantially covering the bottom thereof and provided with a pair of legs or extensions projecting from opposite sides thereof, and means providing a tortuous passageway for air about said legs to said dome and opening.

In testimony whereof I hereby affix my signature.

JAMES S. REID.

tion of said body member so as to provide an air chamber therebetween, an air passage in the region of connection of the base and resilient finger portions of said locking member for providing communication between the inside of said body member and the air chamber thereof, said air chamber being provided with a vent opening to the outside atmosphere, and said resilient finger portions being so arranged as to serve as a baffle means for said air passage.

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JAMES S. REID.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,593,846, granted July 27, 1926, upon the application of James S. Reid, of Cleveland, Ohio, for an improvement in "Closures," errors appear in the printed specification requiring correction as follows:

Page 2, line 32, after the word "opposed" insert the words *circuitous or tortuous*, and line 81, claim 3, for the word "circuitous" read *tortuous*; same page, lines 120 and 121, claim 6, and page 3, line 7, claim 7, strike out the word "thereof;" page 2, line 127, claim 7, before the word "resilient" insert the article *a*, and line 128 for the word "portions" read *portion*; page 3, lines 4 and 10, claim 7, for the word "portions" read *portion*; same page, line 20, claim 9, after the word "closure" insert a comma; pages 2 and 3, strike out present claims 1, 8, and 10, and for the ordinals of claims "2," "3," "4," "5," "6," "7," and "9" read 1, 2, 3, 4, 5, 6, and 8; page 3, after line 11 insert the following as claim 7:

7. A closure, comprising a body having a central dome, a plate covering the bottom of said dome and secured to said body by pressing the material of said body about the edge of said plate, said plate being provided with yieldable locking extensions projecting outwardly therefrom.

Same page, after line 27, insert the following as claims 9 and 10:

9. A closure, comprising a body having a dome provided with a vent opening, a plate secured to said body and substantially covering the bottom of said dome and provided with a pair of extensions projecting from opposite sides thereof, and means providing a tortuous passage way for air about said extensions to said dome and its vent opening.

10. A closure, comprising a body provided with a central dome forming an air chamber, a plate secured to said body and substantially covering the bottom of said dome, said chamber being vented to the outside atmosphere and to the inside of the closure body, and said plate being provided with an inherently resilient locking extension projecting outwardly therefrom.

; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of September, A. D. 1926.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.

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Same page, after line 27, insert the following as claims 9 and 10:

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