May 30, 1933. E. S. CORNELL, JR 1,911,181

CLOSURE CAP FOR RECEPTACLES AND THE LIKE

Filed Oct. 9, 1931

Fig. 1.

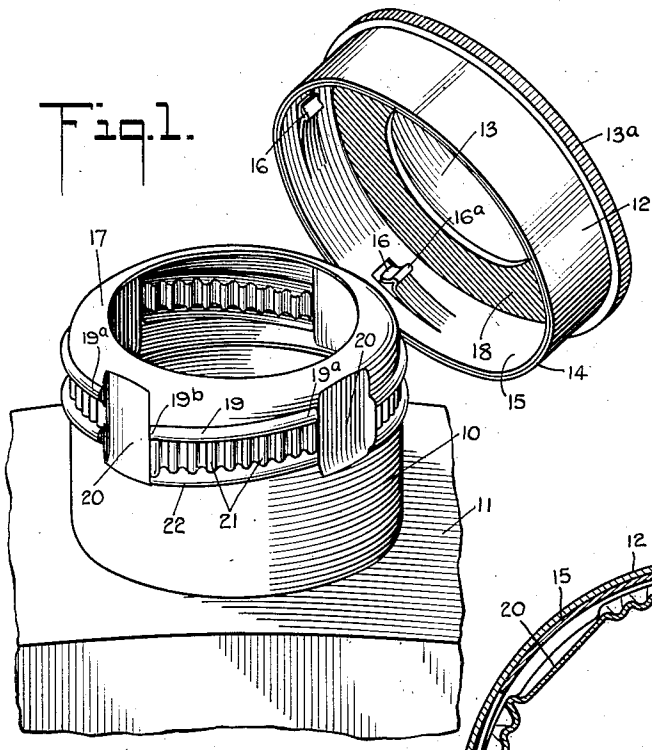


Fig. 3.

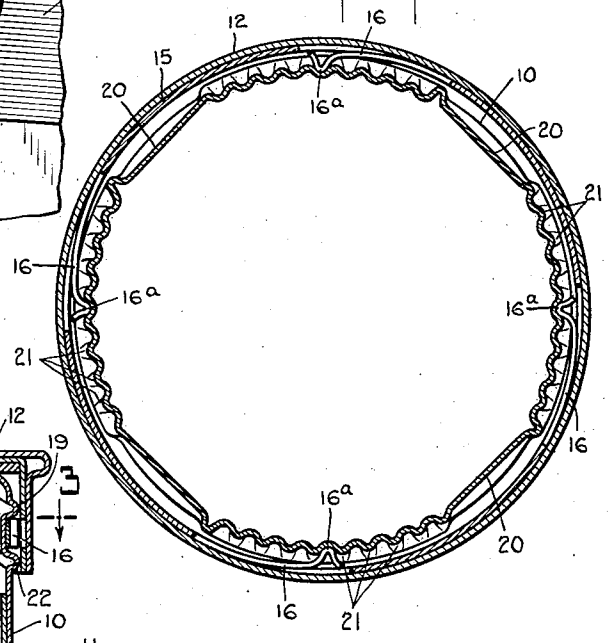
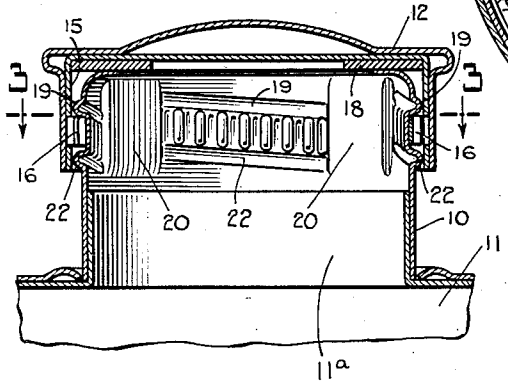


Fig. 2.



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CLOSURE CAP FOR RECEPTACLES AND THE LIKE

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This invention relates to improved self-sealing caps or like closures for filling pipes for radiators for motors of automobiles, aeroplanes, motor boats, gasoline tanks, oil caps, breather vents, and the like.

A distinctive feature of the invention is the provision of lug means carried by the cap and cooperating cam means provided for the filling opening of the radiator, whereby when it is desired to place the cap in its closing position, the cap may be located in general relation to the end of the filling pipe in any of a number of positions, and automatically locked in its self-sealed closing position by a turning movement of limited extent.

More particularly, the cap for a radiator filling opening is provided on its face with a set of, say, two or more uniformly spaced spring tongues, and the pipe of or surrounding the filling opening provided with a correspondingly numbered set of helically extending cam ridges, preferably associated with axially parallelly extending locking ribs, whereby upon application of turning movement or torque in a given direction, the lug-like tongues are progressively clamped jointly by the cam ridges and vertical ribs to attain final self-sealing closure between the terminal face of the pipe and the inner face of the cap.

By my invention, the retention of the closure in its sealing position is effected by positive means, thereby insuring against displacement or loss arising from vibrations, accidental shocks, etc., incidental to use. By disposing the spring tongues exteriorly of the filling pipe, the same are protected against corrosion. The coactive relation of the spring tongues and vertical ribs compensates for any wear to which the parts may be subjected.

Further features and objects of the invention will be more fully understood from the following detail description, in which

Fig. 1 is a perspective view, with the cover in a stage of removal of a self-sealing cap, embodying my invention; the illustration is applied to a radiator of an explosive motor, such as a motor for an automobile, aeroplane, motor boat, etc.;

Fig. 2 is a vertical central sectional elevation of Fig. 1; and

Fig. 3 is a horizontal sectional elevation on line 3—3 of Fig. 2, on an enlarged scale.

Referring to the drawing, the use of the invention is illustrated as applied to the neck of a filling opening 10, of a radiator for devices such as explosive motors, i.e., automotive, aeroplane, motor boat, and the like; the neck 10 usually extends through the top of the shell of a frame 11 of a honeycomb or other suitably reticulated air-cooled structure.

In such embodiment of my invention, a primary feature is the securement of the closure cap in liquid- and gas-sealed relation with the interior of the radiator.

Pursuant to the illustrated forms of my invention, the placement of the cap in its closing position, is attained by proper general locating of the cap relative to the pipe end and by a turn materially less than a full peripheral turn. As illustrated, the extent of the turn is less than ninety arcuate degrees.

A form of cap is shown at 12, which comprises in essence a top member 13 of any suitable contour and design, which may be ornamented as desired. The peripheral edge 13*a* of the top is usually serrated or otherwise roughened to facilitate manipulation. The top 13 is illustrated as domed in configuration.

Integral with or otherwise suitably secured to the top 13, I provide a downwardly dependent, circular flange or skirt 14.

The above named parts may be formed of brass, or other suitable metallic material, which is usually plated for ornamental and non-corrosive effects, as by nickel and/or chromium plating. These parts may be formed of inherently non-corrosive metal or other suitable material.

Within the circular flange or skirt 14, I provide suitable means for locating and sealingly retaining the cover 12 when in closed position; such means 15 is illustrated as a strip of steel or like tough resilient mate-

rial, of circular outline, and provided at desired arcuately spaced locations with individual tongues 16, or equivalent, which may be formed by blanking out the metal at each location along three sides of an elongated rectangle, and bending back the tongue, thus formed integrally at the fourth side of the rectangle with the body of the strip; the bending preferably provides a rectilinearly defined lug-like formation, see 16*a*, which rectilinear line extends substantially parallel to the axis of the cap 12 as a whole.

Usually, such locating and the retaining member 15 is in the form of a strip having a length slightly greater than the inner periphery of the circular flange or skirt 14, whereby upon placing the ends of the strip 15 in abutment with one another, the tongues 16*a* being disposed inwardly of the body portion of the resulting circular strip 15, the strip 15 is forced into frictionally locked relation within the circular flange or skirt 14. Cooperating with the tongues 16, I provide adjacent the terminus of the radiator neck 10, suitable means for receiving the respective tongues 16 and for retaining the same to effect liquid- and gas-proof sealing relation between the terminus of the neck 10 and the interior of the top 13 of the cap 12.

Desirably, for this purpose, the terminus of the neck 10 is provided with a smooth face 17, as by inwardly turning the upper edge of the pipe 10 to have a smooth uniplanar face, and a gasket 18, shown of annular contour, positioned on the inner face of the top 13 of the cap 12. Such gasket may be made of cork, cellulose material, etc., as preferred.

On the outer face of the pipe 10, adjacent its terminus 17, I provide sets of mutually spaced cam ridges 19, shown as interrupted, i.e., arcuately spaced, helically extending, outwardly projecting formations of the metal of the pipe 10, the initial ends 19*a* of the helical ridges 19 being uniformly spaced from the plane of the terminal edge 17, assuming the tongues 16*a* to be uniformly formed in the retention member 15; the final termini 19*b* may be similarly uniformly spaced from the plane of the end 17.

Such spacing of the cam ridges 19 provides for the clearances 20 for general location of the respective tongues 16*a* in the initial placement of the cap 12, to enable the tongues 16*a* to be located below the initial termini 19*a* of the cam ridges 19, whereby upon turning the cap 12, in this instance in clockwise direction, i.e., in right-handed screw direction, the tongues 16*a* are guided by and brought into engagement with the cam ridges 19, respectively; upon exerting sufficient final turning torque, the face 17 of the pipe 10 is brought in sealing relation with the gasket 18.

To insure stability of the final sealing position of the tongues 16*a*, I provide the axially parallelly extending ribs 21, which may similarly be formed in the metal of the pipe 10 by outwardly projecting bends, such ribs 21 serving to lock the tongues 16*a* respectively by stage-to-stage engagement therewith of the vertically extending edges of the tongues 16*a*, re-inforced by the locking engagement of the tongues 16*a* with the cam ridges 19.

The lowerly disposed ridges 22 may be utilized, if desired, and formed similarly to the cam effective ridges 19, each lower ridge 22 serving with its upper cam ridge 19 as a trackway for the movement of each tongue 16 therebetween in the closing and unclosing turning movements of each tongue. For ornamentive purposes, as well as for attaining rigidity of the individual ribs 21, the lower termini of the ribs 21 merge with the upper cam ridges 19.

Usually, in practice, the radiator is formed to have a nipple formation, see 11*a*, Fig. 2, the material of which is integral with the material of the radiator structure per se. Embodying my invention in such type of radiator frame construction, the neck 10 formed as hereinabove described, is secured in any suitable manner to the nipple 11*a*, as by brazing, pressure-fit, etc.

In Fig. 1, the cap 12 is shown in a stage of removal or placement relative to the pipe 10 of a radiator filling opening, whereas the cap is shown in its closing and self-sealing position in Figs. 2 and 3. It will be noted that in the event that insufficient torque is applied to the cap in the operation of placement, the lug-like tongues by engagement with the axially parallelly extending ribs 21, serve to preclude dislodgment of the cap owing to vibration or jarring of the radiator frame incidental to the use of the self-propelled vehicle.

From the above, it appears that the parts provided for by my invention may be of metallic and other suitable material, of low material cost, and formed to provide for the respective individual constructions at low fabricating and assembly costs. It further appears that the respective parts of my invention are rugged in arrangement and positive in action in attaining the desired results.

The present type of embodiment of the invention is adapted for closure caps for tanks for containing gasoline and the like, in which character of use a vent opening is provided, and a fluid-proof seal effected between the filling pipe and the body of the cap, as hereinabove set forth.

My invention is similarly adapted for oil caps, breather vents, and the like.

In the various types of embodiments of my invention, as hereinabove described, the sealing closure is effected by positive coaction of the complementary locking parts car-

ried respectively by the cap and the pipe or equivalent. In such function the vertical or axially parallelly extending ribs coact with the helical cam ridges to positively clamp the spring tongues.

In the event of wear of the spring tongues, compensation of the same is provided by these coacting locking means.

By locating the spring tongues exteriorily of the filling pipe or equivalent, the same are immune to any deleterious action of the contained liquid.

The generic arrangement herein described is applicable to other forms of closure caps and the like, specific instances of which are not recited in the present application.

Whereas I have herein described my invention by reference to various forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. Closure means for a hollow member, comprising a cap, a laterally extending spring tongue carried by said cap, laterally helically extending ridge carried by said hollow member, and locking ribs carried by said hollow member, said locking ribs extending angularly relative to said laterally helically extending ridge and arranged to be engaged by said laterally extending spring tongue jointly with said laterally helically extending ridge.

2. Closure means for a hollow member, comprising a cap, a sealing member carried inwardly by said cap, a laterally extending spring tongue carried by said cap below said sealing member, a laterally helically extending ridge carried by said hollow member, said hollow member having a sealing face disposed above said ridge, and locking ribs carried by said hollow member, said locking ribs extending angularly relative to said laterally helically extending ridge and arranged to be engaged by said laterally extending spring tongue jointly with said laterally helically extending ridge.

3. Closure means for a hollow member having a substantially cylindrical discharge opening, comprising a cap, oppositely disposed co-acting spring tongues carried by said cap, oppositely disposed sets of laterally helically extending ridges carried by said hollow member, oppositely disposed co-acting sets of locking ribs, the ribs of each set extending angularly relative to its associated laterally helically extending ridge and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

4. Closure means for a hollow member having a substantially cylindrical discharge opening, said discharge opening having a sealing face, comprising a cap, a sealing member carried inwardly by said cap to coact with said sealing face, oppositely disposed co-acting spring tongues carried by said cap below said sealing member, a set of oppositely disposed co-acting laterally helically extending ridges carried by said hollow member, a set of angularly extending locking ribs associated with each laterally helically extending ridge, and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

5. Closure means for a hollow member having a substantially cylindrical discharge opening, said discharge opening having a sealing face, comprising a cap, a sealing member carried inwardly by said cap to coact with said sealing face, oppositely disposed co-acting spring tongues carried by said cap below said sealing member, a set of oppositely disposed co-acting laterally helically extending ridges carried by said hollow member, the faces of said hollow member intermediate said set of laterally helically extending ridges being substantially smooth, a set of angularly extending locking ribs associated with each laterally helically extending ridge, and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

6. Closure means for a hollow member having a substantially cylindrical discharge opening, comprising a cap, oppositely disposed co-acting spring tongues carried by said cap, oppositely disposed sets of laterally helically extending ridges carried by said hollow member, the faces of said hollow member intermediate said sets of laterally helically extending ridges being substantially smooth, oppositely disposed co-acting sets of locking ribs, the ribs of each set extending angularly relative to its associated laterally helically extending ridge and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

7. Closure means for a hollow member, comprising a cap, a laterally extending spring tongue carried by said cap, a laterally helically extending ridge carried exteriorly by said hollow member, and locking ribs carried by said hollow member, said locking ribs extending angularly relative to said laterally helically extending ridge and arranged to be engaged by said laterally extending spring tongue jointly with said laterally helically extending ridge.

8. Closure means for a hollow member, comprising a cap, a sealing member carried inwardly by said cap, a laterally extending spring tongue carried by said cap below said sealing member, a laterally helically extending ridge carried exteriorly by said hollow member, said hollow member having a sealing face disposed above said ridge, and

locking ribs carried by said hollow member, said locking ribs extending augularly relative to said laterally helically extending ridge and arranged to be engaged by said laterally extending spring tongue jointly with said laterally helically extending ridge.

9. Closure means for a hollow member having a substantially cylindrical discharge opening, comprising a cap, oppositely disposed co-acting spring tongues carried by said cap, oppositely disposed sets of laterally helically extending ridges carried exteriorly by said hollow member, oppositely disposed co-acting sets of locking ribs, the ribs of each set extending angularly relative to its associated laterally helically extending ridge and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

10. Closure means for a hollow member having a substantially cylindrical discharge opening, said discharge opening having a sealing face, comprising a cap, a sealing member carried inwardly by said cap to coact with said sealing face, oppositely disposed co-acting spring tongues carried by said cap below said sealing member, a set of oppositely disposed co-acting laterally helically extending ridges carried exteriorly by said hollow member, a set of angularly extending locking ribs associated with each laterally helically extending ridge, and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

11. Closure means for a hollow member having a substantially cylindrical discharge opening, said discharge opening having a sealing face, comprising a cap, a sealing member carried inwardly by said cap to coact with said sealing face, oppositely disposed co-acting spring tongues carried by said cap below said sealing member, a set of oppositely disposed co-acting laterally helically extending ridges carried exteriorly by said hollow member, the faces of said hollow member intermediate said set of laterally helically extending ridges being substantially smooth, a set of angularly extending locking ribs associated with each laterally helically extending ridge, and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

12. Closure means for a hollow member having a substantially cylindrical discharge opening, comprising a cap, oppositely disposed co-acting spring tongues carried by said cap, oppositely disposed sets of laterally helically extending ridges carried exteriorly by said hollow member, the faces of said hollow member intermediate said sets of laterally helically extending ridges being substantially smooth, oppositely disposed co-acting sets of locking ribs, the ribs of each set extending angularly relative to its associated laterally helically extending ridge and arranged to be engaged by a laterally extending spring tongue jointly with its associated laterally helically extending ridge.

In testimony whereof I have signed this specification this 3rd day of October 1931.

EDWARD S. CORNELL, JR.