

Dec. 17, 1957

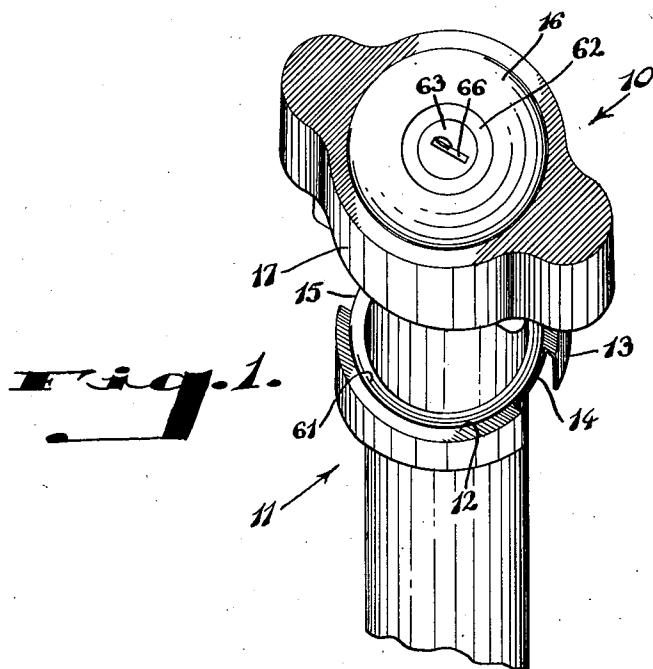
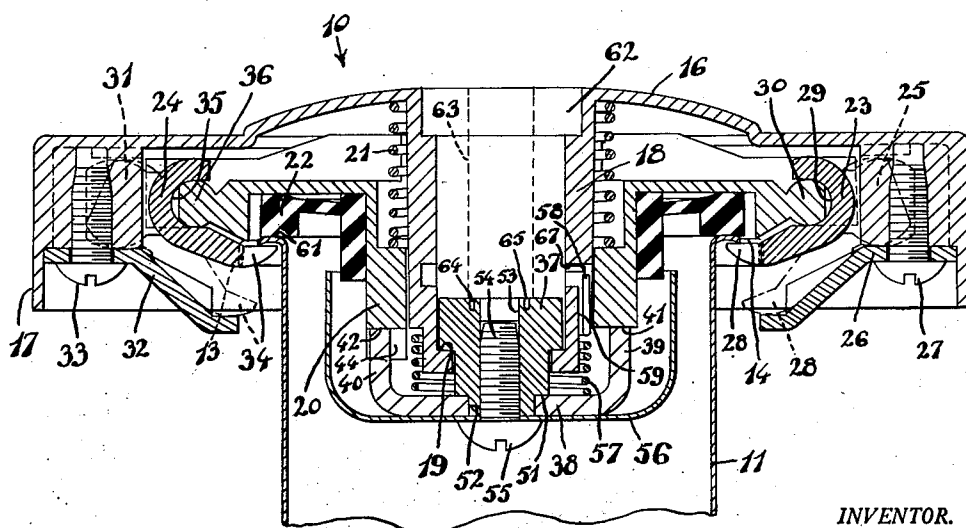
D. FRIEND

2,816,433

PUSH-ON TYPE, LOCKING GAS TANK CAP

Filed May 28, 1956

2 Sheets-Sheet 1



INVENTOR.
DAWSON FRIEND
BY: *Harold B. Hood*
ATTORNEY

Dec. 17, 1957

D. FRIEND

2,816,433

PUSH-ON TYPE, LOCKING GAS TANK CAP

Filed May 28, 1956

2 Sheets-Sheet 2

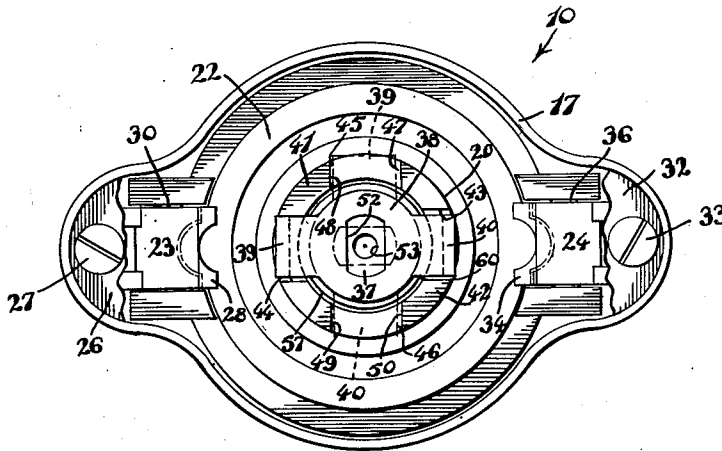


Fig. 3.

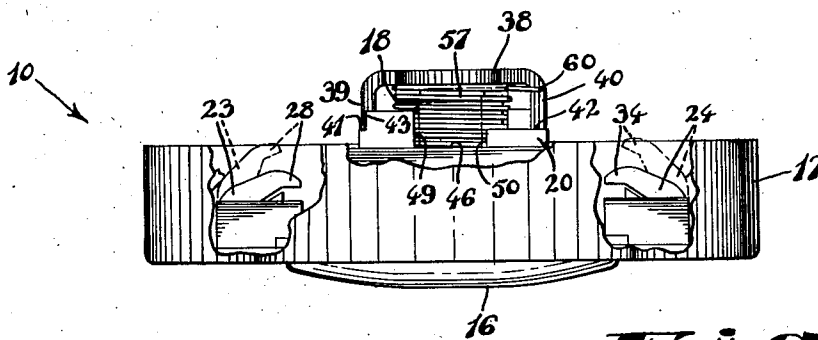
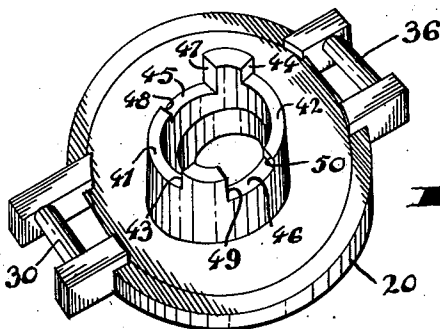


Fig. 4.



INVENTOR.
DAWSON FRIEND
BY: Harold B. Hood,
ATTORNEY

1

2,816,433

PUSH-ON TYPE, LOCKING GAS TANK CAP

Dawson Friend, Connersville, Ind., assignor to Stant Manufacturing Company, Inc., Connersville, Ind., a corporation of Indiana

Application May 28, 1956, Serial No. 587,636

8 Claims. (Cl. 70-169)

The present invention relates to a locking closure cap for filler necks such as, for instance, are used in connection with vehicle fuel tanks, though it will be apparent, as the description proceeds, that the cap of the present invention might find advantageous use in many other specific environments. The invention has been illustrated, however, and will be described as a closure cap for a vehicle fuel tank.

The primary object of the invention is to provide a cap which, when it is pressed home upon the mouth of the neck which it is intended to close, will automatically establish a positive engagement with the neck, without requiring relative rotary movement between the cap and the neck, and in which that positive engagement can be released only through manipulation of a key-controlled lock member.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a somewhat idealized perspective view of a cap constructed in accordance with the present invention, separated from a filler neck with which it is associated;

Fig. 2 is a somewhat enlarged, transverse sectional view through the cap of the present invention, showing the cap in locked and closing relation to a portion of a filler neck;

Fig. 3 is a bottom plan view of the cap of Fig. 2, drawn to a somewhat smaller scale and with certain parts removed or broken away for clarity of illustration;

Fig. 4 is a side elevation of the cap, with parts broken away; and

Fig. 5 is an inverted perspective view of the plunger which is an element of the operating mechanism of my invention.

Referring more particularly to the drawings, it will be seen that the reference numeral 10 indicates generally a closure cap for a conventional filler neck, indicated generally by the reference numeral 11. Conventionally, such a filler neck is formed with a radial flange 12 which, in the cap selected for illustration of the invention, extends radially outwardly and includes a depending skirt 13 which is interrupted at diametrically opposite points as indicated at 14 and 15.

The cap 10 comprises a roof 16 and a depending, peripheral flange 17 as well as a central, depending barrel or guideway 18 which projects in the direction of projection of the skirt 17. In the illustrated embodiment of the invention the guideway 18 is cylindrical, but its cross-sectional shape is not important, except that it must preferably be hollow. Near its distal end, the guideway is formed to provide an inwardly projecting shoulder 19 for a purpose which will later become apparent.

Reciprocably mounted and guided upon the barrel 18 is a plunger 20 which is most clearly illustrated in Fig. 5; and a spring 21 is sleeved upon the guide 18 and is confined between the roof 16 and the plunger 20 to urge

2

the plunger resiliently away from the roof 16. Preferably, the plunger 20 carries a gasket 22 which is preferably formed of rubberoid material and whose peripheral region is preferably resiliently flexible.

Locking dogs are suitably supported from the cap body 10. In the illustrated embodiment of the invention, I provide two such dogs 23 and 24 at diametrically opposite points on the body. The dog 23 includes a base 25 having a radiused external surface confined between the internal surface of the roof 16 and a plate or bracket 26 secured to the cap body by means of one or more screws 27, the arrangement being such that the dog 23 may rock about an axis which is disposed in a plane substantially perpendicular to the axis of the guide 18. The dog 23 is formed with a toe 28 which is movable, as the dog rocks about said axis, between the solid line position and the broken line position of Figs. 2 and 4. In the broken line position of the dog, the toe is radially spaced from the axis of the guide 18 sufficiently to permit the dog to pass the portion of the flange 12 within the interruption 14; while in the solid line position of the dog, the toe 28 has been moved into such proximity to the axis of the guide as to prevent such passage. The dog 23 is formed with a socket 29 in which is rockably received a bar 30 integral with, or fixedly attached to, the plunger 20, whereby movement of the plunger 20 axially of the guide 18 will shift the dog 23 between its solid line and its broken line positions.

Similarly, the dog 24 is formed with a base 31 which is rockably confined between the cap roof and a plate or bracket 32 secured by means of one or more screws 33, and the toe 34 of the dog 24 is similarly movable between solid line and broken line positions similar to the corresponding positions of the toe 28 of dog 23. The dog 24 similarly is formed with a socket 35 rockably receiving a bar 36 corresponding to the bar 30.

A block 37 is disposed within the barrel 18 for oscillation about the axis of said barrel and is retained against movement away from the cap roof 16, beyond its illustrated position, by the shoulder 19. At a point beyond the distal end of the guide 18, the block 37 is formed with an outwardly facing shoulder 51 upon which is seated a key 38 which is formed with a central perforation 52 receiving a polygonal projection at the distal end of the block 37, whereby the key 38 is constrained to oscillate about the axis of the guide 18 only with the block 37.

As is most clearly seen in Figs. 2 and 4, the key 38 spans the end of the guide 18 and is formed, at its opposite ends, with fingers 39 and 40 extending toward the cap roof 16 in substantial parallelism with the axis of the guide 18.

As is most clearly shown in Fig. 5, the distal end of the plunger 20 is formed with a pair of diametrically opposite abutment surfaces 41 and 42 which register, respectively, with the ends of the fingers 39 and 40. One end of the surface 41 is bounded by a shoulder 43 and the corresponding end of the surface 42 is bounded by a shoulder 44. Beyond the opposite end of the surface 41 the plunger is formed with a further abutment surface 45 disposed at a level closer to the cap roof 16 than is the plane common to the surfaces 41 and 42; and beyond the corresponding end of the surface 44 there is formed a further abutment surface 46 in the plane of, and diametrically opposite, the surface 45. The surface 45 is guarded at its opposite ends by shoulders 47 and 48, and the surface 46 is guarded, at its opposite ends, by shoulders 49 and 50.

The block 37 is centrally provided with a threaded bore 53 in which is received a screw 54 whose head 55 retains the key 38 against movement away from the cap roof 16. Preferably, but not necessarily, I provide a bell or hous-

3

ing 56 to enshroud the key 38, the abutment surfaces at the distal end of the plunger 20, and the associated parts; and, as shown, it is convenient to use the head of the screw 55 to retain the bell 56 in its illustrated position.

A torsion spring 57 is sleeved on the distal end of the guide 18 and has one end 58 anchored in an axially extending slot 59 in the outer end of the guide 18, while the opposite end 60 of the spring 57 engages the finger 40 of the key 38 (Figs. 3 and 4) to urge said key in a counter-clockwise direction as viewed in Fig. 3.

The parts will normally occupy positions in which the fingers 39 and 40 of the key 38 are received, respectively, between the shoulders 47 and 48 and the shoulders 49 and 50, to bear against the abutment surfaces 45 and 46 of the plunger 20, as indicated in broken lines in Figs. 3 and 4, the plunger being in its lower position, as viewed in Fig. 2, and the dogs 23 and 24 being in their broken line positions. If, now, the cap 10 is brought into association with the filler neck 11, substantially in the attitude of orientation suggested in Fig. 1, and is pressed home upon the filler neck, the perimeter of the gasket 22 will first come into contact with the seat 61 of the filler neck flange 12 as the distal ends of the brackets 26 and 32 pass through the flange interruptions 14 and 15, and as the toes 28 and 34 of the dogs 23 and 24 pass the flange 12. As downward pressure is exerted upon the cap 10, the perimetral region of the gasket 22 will flex into engagement with the body of the plunger 20, and thereafter the cap body will move downwardly relative to the plunger 20 which is held against corresponding movement by the filler neck seat 61. As a result of such relative movement, the spring 21 will be compressed and the dogs 23 and 24 will be oscillated toward their solid line positions. At the same time, the fingers 39 and 40 of the key 38 will move along the shoulders 48 and 50; and when the body 10 has moved far enough relative to the plunger 20 for the distal ends of the fingers 39 and 40 to clear the shoulders 48 and 50, the spring 57 will act to shift the key 38 in a counter-clockwise direction as viewed in Fig. 3 to its broken line position, in which the fingers 39 and 40 bear against the abutment surfaces 41 and 42 and engage the shoulders 43 and 44. Now, the toes 28 and 34 of the dogs 23 and 24 will be positively engaged beneath the flange 12 to prevent upward movement of the cap body as viewed in Fig. 2; and the dogs will be held positively in such engagement with the flange by the plunger 20 which is retained against movement away from the cap roof 16 by the engagement of the key fingers 39 and 40 with the abutment surfaces 41 and 42. The cap is held against substantial oscillation relative to the filler neck by the engagement of the plates 26 and 32 and the dogs 23 and 24 between the ends of the interruptions 14 and 15 in the filler neck flange skirt 13. It will be clear that, while this retention of the cap against oscillation is desirable, it is not at all essential to the present invention.

Any desired means may be provided for turning the key 38, against the tendency of the spring 57, to bring its fingers 39 and 40 again into registry with the abutment surfaces 45 and 46; but I prefer to provide key-actuated, locking means for that purpose. Thus, I have indicated a conventional lock barrel 62 suitably fixed in the hollow interior of the guide 18 as, for instance, by means of a retainer key 67. A cylinder 63 is retained, as, for instance, by a suitable tumbler arrangement (not shown) in place in the barrel 62, and said cylinder is suitably connected to actuate the block 37 as, for instance, by pins 64 and 65 carried by the cylinder and engaging in suitable sockets in the block 37. The barrel affords a conventional keyhole 66 so that, when a proper key is inserted therein, the barrel may be oscillated through manipulation of the key to turn the block 37 and thus the key 38, against the tendency of the spring 57. Obviously, when the fingers 39 and 40 are moved into registry with the abutment surfaces 45 and 46, the spring 21 will act to shift the plunger 20 away from the cap roof 16, thus rocking the dogs 23 and 24 into their broken line positions as

4

illustrated in Figs. 2 and 4, whereby the cap 10 may be removed from the filler neck 11 in a straight line and without any relative rotation.

This straight-line removal and application is important in some environments, and particularly in connection with some current makes of automobiles in which the mouth of the filler neck is disposed inside a trapdoor and in a compartment of such dimensions as to make rotational manipulation of a closure cap difficult, if not impossible.

I claim as my invention:

1. A snap-on, locking cap for association with a filler neck having a flange adjacent its mouth, comprising a cap body having a roof and a perimetral skirt, a plurality of locking dogs peripherally spaced and supported from said body for oscillation about substantially coplanar, separate axes, each dog having a toe which, in one position of said dog, will engage such a filler neck flange and, in another position of said dog, will clear such a filler neck flange when said cap is in registering association with such a filler neck, plunger means supported from said cap body for axial reciprocation relative to said cap body, said plunger means operatively engaging said dogs and acting, upon movement toward said cap body roof, to swing said dogs toward said one position, and upon movement away from said cap body roof, to swing said dogs toward said other position, spring means resiliently urging said plunger means away from said cap body roof, sealing means movable with said plunger means and engageable with such a filler neck, stop means axially fixed with respect to said cap body but oscillable relative thereto about an axis substantially perpendicular to said body roof, said stop means acting, in one position of oscillatory adjustment, to stop said plunger means in one position, and, in another position of oscillatory adjustment, to stop said plunger means in another position more remote from said body roof, and lock-controlled means for shifting said stop means to release said plunger means for such movement.

2. A snap-type locking cap comprising a cap body having a roof, a perimetral skirt, and guide means axially depending from said roof, a plurality of dogs peripherally spaced and supported from said body between said skirt and said guide means for rocking movement relative to said body about axes disposed in planes substantially perpendicular to the axis of said guide means, plunger means mounted for guided movement axially of said guide means, said plunger means being operatively connected with said dogs to move the same about their respective axes as said plunger means moves toward or away from said body roof, means resiliently urging said plunger means away from said body roof, means axially fixed relative to said guide means but oscillable about the axis thereof and disposed in the path of said plunger means to limit movement of said plunger means away from said body roof, said last-named means acting, in one position of adjustment about said guide means axis, to stop said plunger means in one position, and, in another position of adjustment about said guide means axis, to stop said plunger means in another position more remote from said body roof, each of said dogs having a toe portion movable toward and away from the axis of said guide means as a result of rocking movement of said dogs, and means for shifting said oscillable means from said one position of adjustment to said other position of adjustment.

3. A snap-type locking cap comprising a cap body having a roof, a perimetral skirt, and guide means axially depending from said roof, a plurality of dogs peripherally spaced and supported from said body between said skirt and said guide means for rocking movement relative to said body about axes disposed in planes substantially perpendicular to the axis of said guide means, plunger means mounted for guided movement axially of said guide means, said plunger means being operatively connected with said dogs to move the same about their respective axes as said plunger means moves toward or away from said body roof, means resiliently urging said plunger means away

5

from said body roof, means axially fixed relative to said guide means but oscillable about the axis thereof and disposed in the path of said plunger means to limit movement of said plunger means away from said body roof, said last-named means acting, in one position of adjustment about said guide means axis, to stop said plunger means in one position, and, in another position of adjustment about said guide means axis, to stop said plunger means in another position more remote from said body roof, each of said dogs having a toe portion movable toward and away from the axis of said guide means as a result of rocking movement of said dogs, a lock barrel disposed within said guide means, an element oscillably mounted in said lock barrel and providing a keyhole accessible from the outer side of said cap body roof, said element being oscillable by a key entered in said keyhole, and means connecting said element to shift said oscillable means from said one position of adjustment to said other position of adjustment.

4. The cap of claim 2 including means resiliently urging said oscillable element toward said one position of adjustment.

5. A snap-type locking cap comprising a cap body having a roof, a perimetral skirt, and guide means axially depending from said roof, a plurality of dogs peripherally spaced and supported from said body between said skirt and said guide means for rocking movement relative to said body about axes disposed in planes substantially perpendicular to the axis of said guide means, plunger means axially-slidably sleeved on said guide means for movement therealong toward and away from said cap roof, said plunger means providing a first abutment surface facing away from said roof and a second abutment surface, angularly spaced from said first-named surface, facing away from said roof and more remote from said roof, said plunger means being operatively connected with said dogs to move the same about their respective axes as said plunger means moves toward or away from said body roof, means resiliently urging said plunger means away from said body roof, means axially fixed relative to said guide means but oscillable about the axis thereof and having a portion which, in one position of adjustment of said last-named means, is disposed in the path of said first abutment surface and, in another position of adjustment of said last-named means, is disposed in the path of said second abutment surface, to limit movement of said plunger means away from said roof, each of said dogs having a toe portion movable toward and away from the axis of said guide means as a result of rocking movement of said dogs, and means for shifting said oscillable means from said one position of adjustment to said other position of adjustment.

6. A snap-type locking cap comprising a cap body having a roof, a perimetral skirt, and guide means axially depending from said roof, a plurality of dogs peripherally spaced and supported from said body between said skirt and said guide means for rocking movement relative to said body about axes disposed in planes substantially perpendicular to the axis of said guide means, plunger means axially-slidably sleeved on said guide means for movement therealong toward and away from said cap roof, said plunger means providing a first abutment surface facing away from said roof and a second abutment surface, angularly spaced from said first-named surface, facing away from said roof and more remote from said roof, said plunger means being operatively connected with said dogs to move the same about their respective axes as said plunger means moves toward or away from said body roof, means resiliently urging said plunger means away from said body roof, means axially fixed relative to said guide means but oscillable about the axis thereof and having a portion which, in one position of adjustment of said last-named means, is disposed in the path of said first abutment surface and, in another position of ad-

6

justment of said last-named means, is disposed in the path of said second abutment surface, to limit movement of said plunger means away from said roof, each of said dogs having a toe portion movable toward and away from the axis of said guide means as a result of rocking movement of said dogs, spring means cooperating with said oscillable means to shift the same into said other position of adjustment whenever said plunger means is moved into maximum proximity to said body roof, and key-actuated locking means for moving said oscillable means to said one position of adjustment against the tendency of said spring means.

7. A snap-type locking cap comprising a cap body having a roof, a perimetral skirt, and guide means axially depending from said roof, a plurality of dogs peripherally spaced and supported from said body between said skirt and said guide means for rocking movement relative to said body about axes disposed in planes substantially perpendicular to the axis of said guide means, plunger means axially-slidably sleeved on said guide means for movement therealong toward and away from said cap roof, said plunger means providing a first abutment surface facing away from said roof and a second abutment surface, angularly spaced from said first-named surface, facing away from said roof and more remote from said roof, said plunger means being operatively connected with said dogs to move the same about their respective axes as said plunger means moves toward or away from said body roof, means resiliently urging said plunger means away from said body roof, means axially fixed relative to said guide means but oscillable about the axis thereof and having a portion which, in one position of adjustment of said last-named means, is disposed in the path of said first abutment surface and, in another position of adjustment of said last-named means, is disposed in the path of said second abutment surface, to limit movement of said plunger means away from said roof, each of said dogs having a toe portion movable toward and away from the axis of said guide means as a result of rocking movement of said dogs, spring means cooperating with said oscillable means to shift the same into said other position of adjustment whenever said plunger means is moved into maximum proximity to said body roof, lock means housed within said guide means and including a normally-locked oscillable member presenting a keyhole accessible from the outer surface of said cap body roof, and an operative connection between said normally-locked member and said oscillable means whereby, upon unlocking said normally-locked member by insertion of a proper key into said keyhole, said oscillable means may be turned by said key into said one position of adjustment.

8. A snap-type locking closure cap comprising a body having a roof, a plurality of dogs mounted from said body for oscillation about angularly-separated axes substantially in a common plane, each dog having a toe movable, upon such oscillation, toward and away from the axis of said body, means supported from said body and movable toward and away from said body roof and having an abutment surface facing away from said roof to be engaged by a filler neck when said cap is forced home on such a filler neck, said means being shifted toward said body roof by such cap movement, said means being operatively connected to said dogs to shift the same upon such movement of said means toward said body roof, means coacting with said movable means to retain the same in proximity with said body roof, and lock-controlled means for shifting said last-named means out of such retaining relation to said movable means.

References Cited in the file of this patent

UNITED STATES PATENTS

965,590	Lokody	July 26, 1910
1,847,117	Lantero	Mar. 1, 1932