July 27, 1954 D. FRIEND 2,684,780

VALVING ASSEMBLY FOR CLOSURE CAPS

Filed Aug. 3, 1950

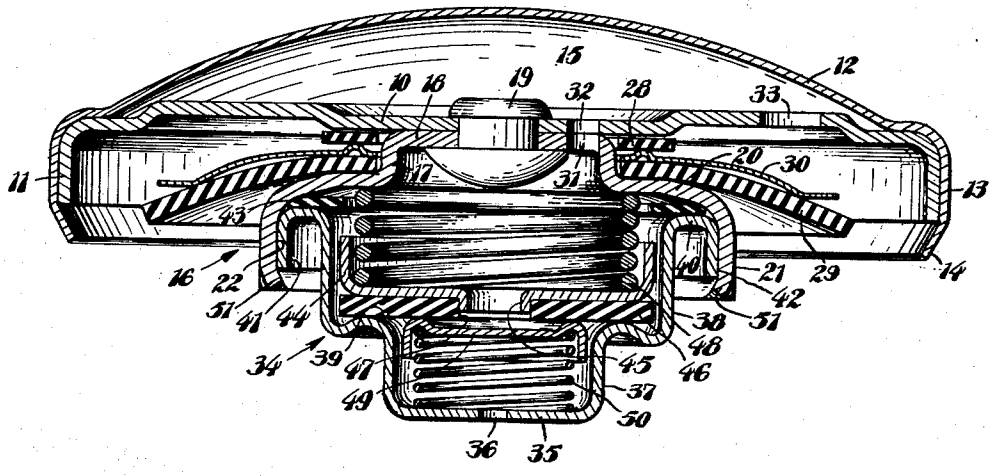


Fig. 1.

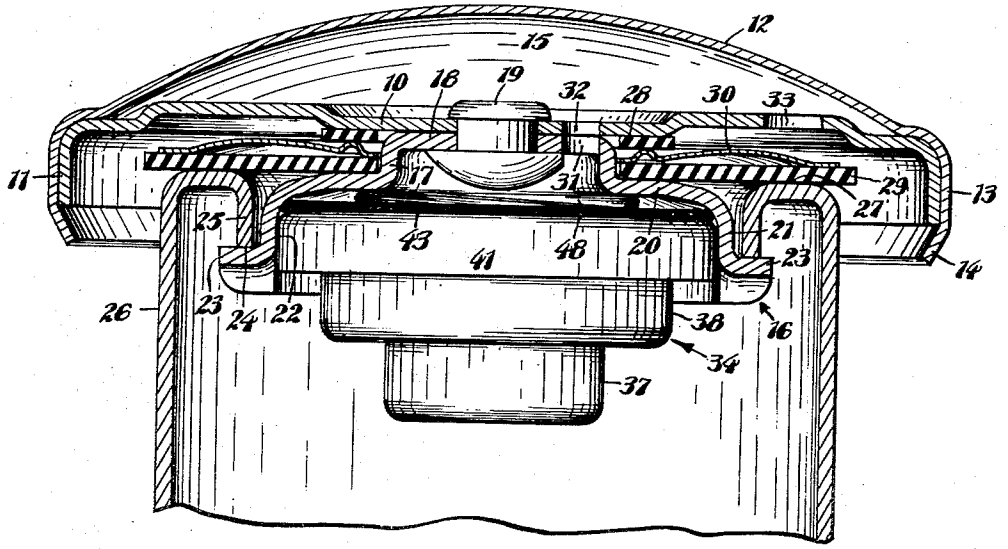


Fig. 2.

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

Patented July 27, 1954

2,684,780

UNITED STATES PATENT OFFICE

2,684,780

VALVING ASSEMBLY FOR CLOSURE CAPS

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

Application August 3, 1950, Serial No. 177,375

6 Claims. (Cl. 220—40)

1

The present invention relates to a valving assembly for closure caps, particularly vehicle fuel-tank caps; and the invention is primarily concerned with the provision of novel means for supplying such caps with valving means for controlling pressure conditions within the tank, while preventing escape of liquid therefrom as a result of surging within the tank.

It has long been recognized that such control is desirable, and various forms of valving means for exercising such control are known to the art. My invention resides in details of construction whereby manufacture of valved closure caps is facilitated and reduced in cost, primarily by the provision of a self-contained valving unit so designed and proportioned that it may be assembled with a conventional form of non-valved cap to convert the same into a valved cap having all the advantages of other known forms of valved caps. Since no modification in the structure of the conventional non-valved cap is required to permit assembly of my novel valving unit therewith, it will be seen that manufacturing is simplified and reduced in cost by rendering feasible standardization on a single form of basic cap construction for both valved and non-valved units.

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 transverse section through a cap constructed in accordance with my invention and including a preferred form of my novel valving unit; and

Fig. 2 is a similar section taken on a plane perpendicular to that of Fig. 1 and showing the valving unit in elevation.

Referring more particularly to the drawings, it will be seen that the illustrated cap comprises a discoid base element 10 having an axially-extending peripheral flange 11. A bonet 12, formed with a flange 13 which embraces the flange 11 and preferably has an inturned extension 14, cooperates with the outer surface of the base element to define a chamber 15.

A bell, indicated generally by the reference numeral 16, comprises a generally cylindrical neck 17 closed at its upper end by a transverse wall 18; and a rivet 19 penetrates the element 10

2

and the wall 18 to secure said bell and element together with the outer surface of the bell wall abutting the inner surface of the element 10.

A radially-extending wall portion 20 joins the neck 17 with a perimetrally-continuous, axially extending wall 21 which provides a preferably cylindrical inwardly facing surface 22 defining an open mouth for said bell. The edge of said wall 21 is mutilated at a plurality of points to define outwardly-extending fingers 23, 23 adapted to cooperate with the cammed edges 24 of the downturned lip 25 of the conventional filler neck 26 to hold the cap in closing relation with the end surface 27 of said neck.

A gasket 28 surrounds the bell neck 17 to bear against the inner surface of the element 10; a gasket 29 surrounds said bell neck to bear aginst the outer surface of the bell wall portion 20; and a spring washer 30 is interposed between said gaskets to exert a resilient separating force thereon and to urge the peripheral portion of the gasket 29 resiliently against the surface 27 when the cap is seated.

A port 31 in the wall 18 registers with a port 32 in the element 10 to establish open communication between the interior of the bell 16 and the chamber 15; and a port 33, radially outside the gasket 28, establishes open communication between the chamber 15 and the atmosphere.

The structure thus far described is usable as a non-valved closure cap.

The reference numeral 34 indicates generally the housing element of my novel valving unit. Said housing element has an end wall 35 provided with a port 36, a lower cylindrical wall 37, and an upper cylindrical wall 38, said walls 37 and 38 being joined by a seat portion 39 facing the upper open end of the housing. At its upper end, the wall 38 is outwardly turned as at 40 and downwardly turned as at 41 to provide a lip having an outwardly-facing, peripherally-continuous surface 42. The surface 42 conforms in contour and dimensions with the surface 22 of the bell wall 21, so that said lip 41 is snugly receivable telescopically in said bell wall where it will be effectively frictionally held, a gasket 43 being sealingly interposed between the lip portion 40 and the bell wall portion 20.

A valve element 44 is reciprocably mounted in the housing 34 for movement into and out of seating engagement with the seat 39. As shown, said valve element is formed with a port 45 therethrough, and carries a gasket 46 formed with a corresponding port 47 therethrough. A spring 48 bears against the upper surface of said valve ele-

ment, the relaxed length of said spring being greater than the depth of said housing above said seat 39. Thus, when the housing 34 is assembled with the bell 16, the spring 48 is confined between the valve 44 and the bell wall portion 20 and resiliently holds said valve 44 on its seat 39.

In the illustrated embodiment of my invention, the port through the valve 44 is controlled by a second valve 49 urged against valve gasket 46 in closing relation to the port 45, by a spring 50 confined between valve 49 and housing end wall 35.

If desired, the housing may be secured against removal from the bell by mutilation of the edges of wall 21, as at 51.

I claim as my invention:

1. A closure cap comprising, in combination, a base element, a bell fixed to said base element and having an open mouth facing away from said base element, said cap being provided with means cooperable with a filler neck for holding said cap in closing assembly with such neck, a valve unit including a housing formed to provide a passage therethrough and a seat intermediate the ends of said passage, a valve in said housing and movable into and out of engagement with said seat, and a spring in said housing and bearing on a surface of said valve remote from said seat, said housing being formed to provide, adjacent one end thereof, a terminal lip turned outwardly and back toward the other end of said housing, said lip presenting an outer perimetral surface conforming in dimensions and contour to the internal perimetral surface of the mouth of said bell and being telescopically received within the mouth of such bell, said spring being confined between said bell and said valve to press said valve yieldingly against said seat.

2. The invention of claim 1 including a sealing gasket interposed between the outwardly-extending portion of said lip and a substantially parallel wall of said bell.

3. A closure cap comprising, in combination, a base element, a bell fixed to said base element and formed to provide an open mouth facing away from said base element and defined by an inner cylindrical surface, a valve unit including a housing having a perforate bottom wall, a generally cylindrical body; and a terminal lip turned outwardly and back toward said bottom wall, said lip presenting an external cylindrical surface contoured and dimensioned for, and having, a snug, frictional fit within said internal cylindrical surface defining said bell mouth, said housing further being formed to provide a seat facing that end of said housing providing said lip, a valve reciprocably received in said housing for movement into and out of seating engagement with said seat, and a coiled spring bearing on a surface of said valve remote from said seat, said spring having a relaxed length greater than the distance from said seat to said last-named housing end reduced by the axial length of said valve and bearing against a wall of said bell.

4. The invention of claim 3 including a second valve in said housing located between said bottom wall and said seat, said first-named valve having a port therethrough, and a spring confined between said bottom wall and said second valve and yieldingly urging said second valve into seating engagement with said first valve in closing relation to said port.

5. A closure cap comprising a discoid base element having an axially-extending peripheral flange, a bonnet having a skirt embracing said flange, said bonnet and the outer face of said base element defining therebetween a chamber, a generally-cylindrical bell having a reduced, central neck terminating in a transverse end wall, means centrally securing said bell to said base element with said end wall abutting the inner surface of said base element, said bell providing, at its end opposite said end wall, an open mouth defined by an axially-extending perimetrally-continuous wall, said neck and said perimetrally-continuous wall being joined by a generally radially-extending wall section substantially parallel with said end wall, a gasket surrounding said neck and abutting the inner surface of said base element, a gasket surrounding said neck and abutting said radially-extending wall section, an annular spring surrounding said neck, positioned between said gaskets and exerting thereon a resilient separating force, said bell end wall and said base element being provided with registering ports establishing open communication between said chamber and the interior of said bell, said base element being provided with a further port radially outside said first-named gasket establishing open communication between said chamber and the atmosphere, a valve unit comprising a housing having a transverse perforate bottom wall and provided at its upper end with an outwardly and downwardly turned lip, said lip having a perimetrally-continuous external surface conforming in dimensions and contour to the internal surface of said perimetrally-continuous bell wall and being telescopically engaged therewith, a seat in said housing facing away from said bottom wall, a valve in said housing reciprocable axially into and out of sealing engagement with said seat, a gasket sealingly engaged between the outwardly-turned portion of said lip and said radially-extending bell wall portion, and a spring confined between said valve and said radially-extending bell wall portion and yieldingly urging said valve into closing engagement with said seat.

6. The closure cap of claim 5 in which said valve is formed with a port therethrough, a second valve disposed in said housing between said bottom wall and said first-named valve, and a spring confined between said housing bottom wall and said second valve and urging said second valve into seating engagement with said first-named valve in closing relation to said last-named port.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,060,504	Kjellstrom	Nov. 10, 1936
2,154,113	Smith	Apr. 11, 1939
2,191,614	Frantz	Feb. 27, 1940
2,350,950	Wiley	June 6, 1944
2,406,502	Lines	Aug. 27, 1946
2,504,072	Friend et al.	Apr. 11, 1950