Feb. 7, 1967 W. H. PLAMANN 3,302,664

SAFETY CAP ASSEMBLY FOR PRESSURIZED FOUNTS OF GASOLINE BURNING DEVICES

Filed April 7, 1964

Fig. 1.

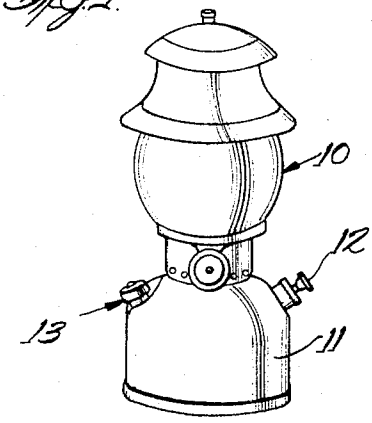


Fig. 2.

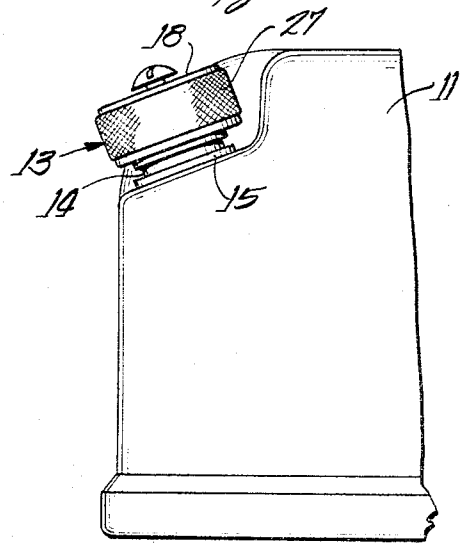


Fig. 3.

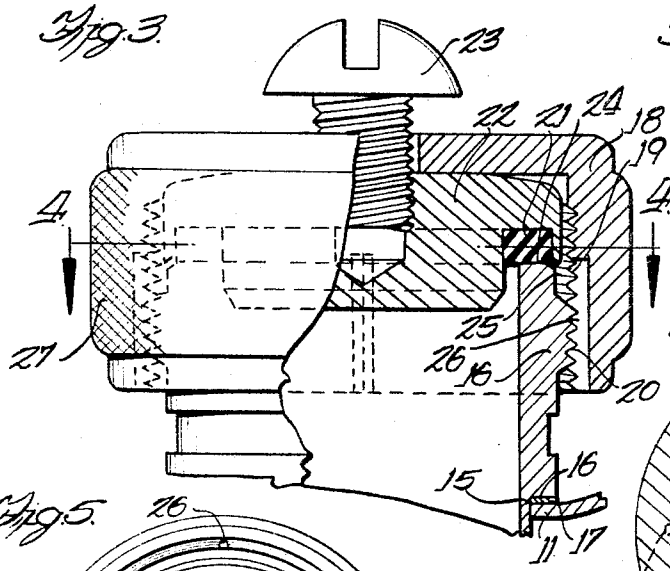


Fig. 6.

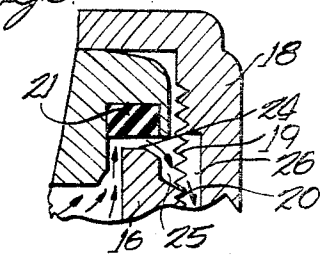


Fig. 5.

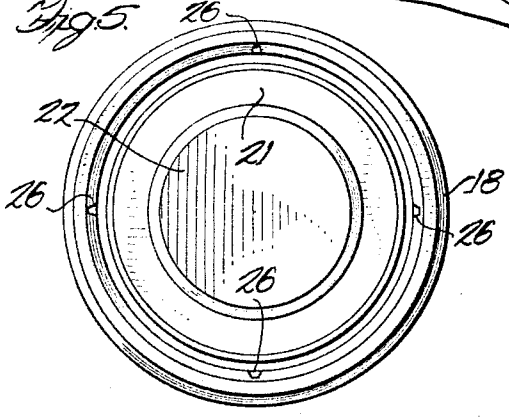
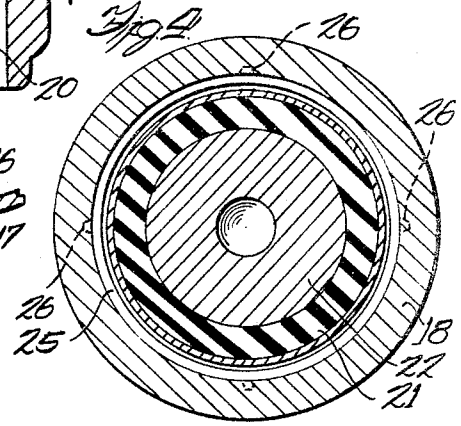


Fig. 4.



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3,302,664

Patented Feb. 7, 1967

3,302,664

SAFETY CAP ASSEMBLY FOR PRESSURIZED FOUNTS OF GASOLINE BURNING DEVICES

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Filed Apr. 7, 1964, Ser. No. 358,016
3 Claims. (Cl. 138—89)

This invention relates to a safety cap assembly for pressurized founts of gasoline burning devices. The safety cap assembly has particular utility for use with the founts or reservoir tanks of portable gasoline burning devices, such as gasoline lanterns, gasoline stoves, etc.

Such gasoline burning devices are provided with gasoline storage tanks or "founts," which are an integral part of the complete lantern or stove, and which therefore are located in close proximity to the gasoline burning element, such as the stove burner or the illumination burner. It is necessary, of course, to provide a filler inlet in the top of upper portions of the founts, which inlet is equipped with a removable cap to permit the founts to be refilled with gasoline as required. Since the operation of the devices requires that the founts be pressurized, a hand pump being provided for creating the required pressure within the founts, the removal of the closure caps may involve a sudden release of pressure as the cap is unscrewed. This pressure release may cause the gasoline in the fount to froth or foam, and either liquid gasoline or gasoline froth may blow out and be ejected with the outward movement of air in the release of the fount pressure.

It is, therefore, a general object of the present invention to provide a safety cap assembly for pressurized founts of gasoline burning devices which overcomes the problems described above, while at the same time being simple and economical to manufacture and which performs satisfactorily under repeated use. More specifically, it is an object to provide a safety cap assembly of a type described which positively directs the released air and gasoline away from the burner element of the stove or lantern, and which therefore provides for a safe opening of the filler inlet even if the burner element is at a relatively high temperature or is still ignited. Other objects and advantages will be indicated in the following detailed specification.

This invention is shown in an illustrative embodiment in the accompanying drawing, wherein—

FIGURE 1 is an elevational view of a gasoline lantern equipped with a pressurized fount and a filler inlet of a kind with which the present invention is particularly applicable;

FIG. 2 is an enlarged fragmentary side elevational view of the fount of the lantern in FIG. 1, showing the safety cap assembly as it would appear in place during the normal operation of the lantern;

FIG. 3 is an enlarged detail view, partly in section, of the safety cap assembly;

FIG. 4 is a transverse sectional view of the safety cap assembly taken on line 4—4 of FIG. 3;

FIG. 5 is a bottom view of the cap and gasket members of the assembly; and

FIG. 6 is an enlarged fragmentary sectional view illustrating the method of functioning of the pressure release means of this invention.

In FIG. 1 of the drawings, there is shown a gasoline lantern **10** having a gasoline tank or fount **11** which is equipped with the usual hand pump **12** for creating pressure within the fount. Fount **11** is provided with a safety cap assembly constructed in accordance with the present invention, the assembly being designated generally by the

number **13**. It will be understood, however, that the safety cap assembly of this invention is adapted for use in conjunction with other gasoline burning devices having pressurized founts, including particularly gasoline-burning camp stoves.

As shown more clearly in FIGS. 2 and 3, the safety cap assembly includes a filler bushing or sleeve **14** having a lower portion **15** adapted for attachment to the fount **11**, and an externally threaded upper portion **16**. In the illustration given, lower end **15** of the bushing is provided with an annular shoulder **16** which facilitates the uniting of the bushing to the fount through a ring of copper braze **17**. It will be understood that other methods of attachment can be employed, such as welding.

A closure cap **18** provided with internal threads **19** is received on the threaded upper end **16** of the bushing **14**. The bushing threads **20** are in threaded engagement with the cap threads **19**, as shown more clearly in FIGS. 3 and 6.

The cap assembly is provided with gasket means mounted within the cap **13** for establishing sealing engagement with the upper end of the bushing. In the illustration given, there is provided a gasket ring **21** which is held in a recess of a gasket carrier **22**. To permit cap **13** to be rotated independently of gasket **21** and carrier **22**, the carrier is supported by means of a retainer screw **23**. This arrangement tends to minimize frictional wear on the gasket during the final stages of tightening the cap or the initial stages of removing the cap. The bottom face of the gasket **21** can thereby be engaged and disengaged with the outer end **24** of the bushing without a relative scrubbing action between the parts. This construction in itself is not new, and in fact is well known in the art, and it is not believed it will be necessary to further describe it herein.

As already indicated, this invention is particularly concerned with a means of achieving a safe release of the fount pressure when the cap **13** is unscrewed. Consequently, in accordance with the present invention, one of the engaging threaded portions of the bushing **14** and the cap **18** is provided with a plurality of circumferentially spaced, axially-aligned channels extending across the zone of threaded engagement between these parts. For achieving the results of the present invention, these channels are designed to provide open paths of communication between the exterior atmosphere at the bottom of the cap and the interior of the cap adjacent the level of sealing engagement between the bushing end **24** and the gasket **21**. As shown in FIGS. 3 and 6, the bushing end **24** and the gasket **21** seal at a level outwardly of the zone of threaded engagement between the bushing threads **20** and the cap threads **19**.

Bushing threads **20** may advantageously be provided in a band area which is adjacent the outer end **24** of the bushing but spaced inwardly therefrom. As shown in FIGS. 3 and 6, this construction provides an annuular space **25** immediately adjoining the lower face of gasket **21** and the upper end **24** of the bushing. As indicated in FIG. 6, a separation of the gasket **21** from the bushing end **24** brings the annular space **25** into communication with the interior of the fount through the passage provided by the bushing **16**. Thus, the pressurized air together with liquid gasoline or gasoline froth will first enter the annular space **25** after it passes between gasket **21** and bushing end **24** as these parts are separated in the unscrewing of the cap. Since space **21** extends entirely around the inside of the cap, the fluid under pressure can distribute itself around the circumference of the cap within the passage **25**. The means for safely venting the pressurized fluid from the annular passage **25** will now be described.

In the illustration given, the inside of cap **18** is provided with a plurality of channels **26**. The channels are axially aligned and extend upwardly from the lower end of cap **18** to a level adjacent the level of sealing engagement between the gasket **21** and the bushing end **24**. As shown more clearly in FIGS. 3 and 6, the inner ends of the channels **26** communicate directly with the annular pressure relief space **25**. Preferably, more than one of the channels **26** are provided in communication with the annular space **25**, and the channels **26** may be circumferentially spaced around the inside of the cap. In the illustration given, four of the channels **26** are provided, and are equally spaced around the interior of the cap, as shown more clearly in FIGS. 4 and 5. In order that the pressure relief passages provided by the channels **26** are in open communication with the annular space **25** and the exterior atmosphere, the channels have a greater depth than the threads **19** across which the channels extend. More specifically, the bottoms of the channels **26** are outwardly of the root depth of the threads **19**, as shown particularly in FIGURES 3 and 6.

In the manufacture of the caps **18**, the channels **26** may be advantageously formed by a broaching operation prior to the cutting of the threads **19**. Formation of the channels after threading might damage the threads. If desired, the channels **26** may extend upwardly further than shown in the drawings, although this would usually be unnecessary where the annular passage **25** is employed adjacent the inner ends of the channels.

There is an advantage in forming the pressure relief channels in the cap, especially where the cap is formed of a softer metal, such as brass, while the bushing is formed on a harder metal, such as steel. Where the member providing the channels is formed of a softer metal than the other member, there is much less tendency for the channels to act as thread chasers with resulting damage to the threads of the other member. It will be understood that the cap **18** may be formed of other relatively soft metals, such as aluminum or copper, while providing the same advantages. Alternatively, the bushing **14** may be formed of a relatively soft metal, such as brass, aluminum, copper, etc., while the cap **18** is formed of a relatively harder metal, such as steel. Where the bushing is formed of a softer metal than the cap, the broached channels should be formed in the bushing while the threads in the cap will be uninterrupted.

To facilitate gripping of the cap **18** with the fingers, it can be provided around its outside with a knurled surface **27**.

Operation

The operation of the safety cap assembly of this invention is illustrated particularly in FIGS. 3 and 6. In FIGURE 3, the cap assembly is shown in closed position with the gasket **21** in sealing engagement with the upper end **24** of the bushing. In this condition, the gasoline in fount **11** will normally be under pressure as produced by the pump **12**. As cap **18** is unscrewed by manually gripping the knurled surface **27**, the gasket **21** will separate from the bushing end **24** with a breaking of the sealing engagement therebetween. The pressurized air from within the fount, together with any entrained liquid gasoline or gasoline froth, with then flow into the annular space **20**, as indicated in FIG. 6, and from there outwardly through the channels **26**. Since these channels are directed downwardly toward the upper surface of the fount **11**, the entrained gasoline or gasoline foam is safely discharged, and is kept away from and out of contact with the burner element of the heating device. As will be noted, the direction of discharge is not dependent on the position of the cap **18** as it is being unscrewed. After the pressure has thus been safely released, the cap **18** can then be unscrewed the rest of the way and removed from the bushing **14**.

While this invention has been described in the foregoing specification in relation to a specific embodiment thereof, it will be apparent to those skilled in the art that hte invention is susceptible to other embodiments without departing from the basic principles of the invention, and that many of the details described herein can be varied considerably while still achieving the objects of this invention.

I claim:

1. In a safety cap assembly, including a filler bushing having a lower portion for attachment to a pressurized fount of a gasoline burning device and an externally threaded upper portion, an internally threaded closure cap received on said bushing upper end portion in threaded engagement therewith, and gasket means mounted within said cap for establishing sealing engagement with the upper end of said bushing at a level outwardly of the zone of threaded engagement between said cap and bushing, the means for achieving a safe release of the fount pressure when said cap is unscrewed characterized by said cap being provided with a plurality of circumferentially spaced, axially aligned channels extending inwardly from the lower end thereof to the level of said sealing engagement, said cap being formed of a substantially softer metal than said bushing, said channels having a greater depth than the root depth of the threads in said cap, and providing open paths of communication for both liquid and vapor between the exterior atmosphere at the bottom of said cap and said level of sealing engagement adjacent said gasket.

2. The safety cap assembly of claim **1** wherein said cap is formed of brass and said bushing is formed of steel.

3. The safety cap assembly of claim **1** characterized further in that the threads on said bushing terminate at a spaced distance from the upper end thereof, and an annular space is provided around the outer end portion of said gasket, the upper portions of said channels communicating with said annular space.

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