Jan. 3, 1956 A. MOELLER 2,729,353

STOPPER FOR VACUUM BOTTLES

Filed Sept. 19, 1952

Fig. 1.

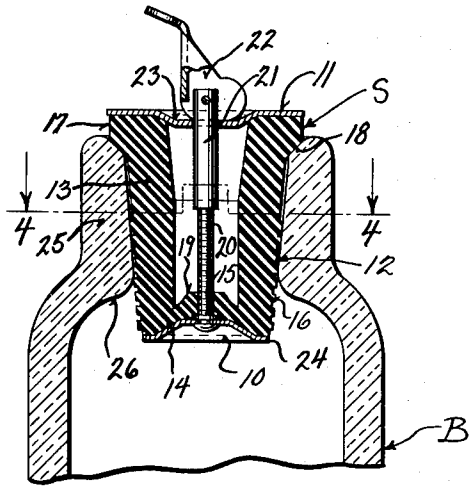


Fig. 2.

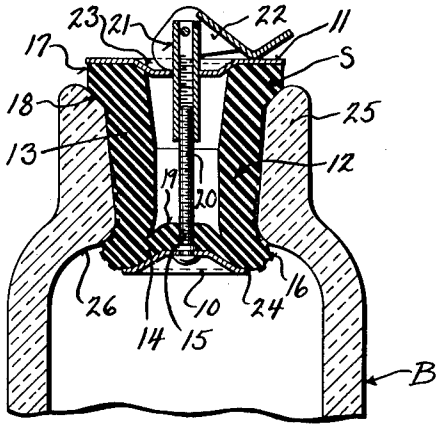


Fig. 3.

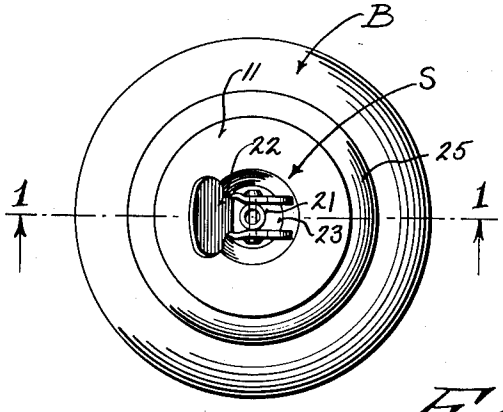


Fig. 4.

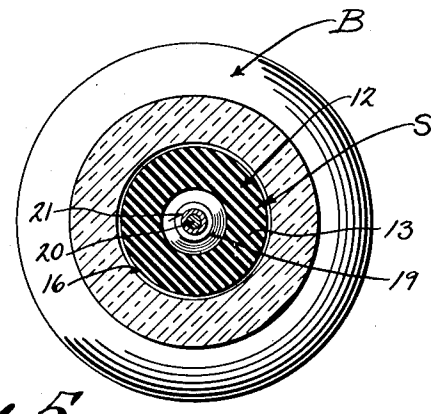
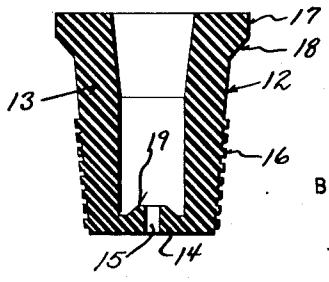


Fig. 5.



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STOPPER FOR VACUUM BOTTLES

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Application September 19, 1952, Serial No. 310,496

1 Claim. (Cl. 215—53)

This invention appertains to bottle stoppers of the general type shown in my prior Patents No. 2,292,149; No. 2,315,538 and No. 2,347,835 issued respectively on August 4, 1942; April 6, 1943, and May 2, 1944, and more particularly to an improved stopper for vacuum bottles having mouth or neck openings of relatively large diameter.

In vacuum bottles of the type having large neck openings, difficulty has been encountered in obtaining a perfect seal upon radial expansion of the stopper body.

It is therefore one of the primary objects of my invention to provide a stopper which can be easily placed in and removed from the neck of a bottle in its contracted form and which will effectively seal the neck in its expanded form.

Another salient object of my present invention is to provide a stopper having an elongated compressible resilient stopper body of a greater length than the bottle neck, so that the compressible body will extend into the bottle below the neck, with novel means for forming the interior of the body in such a manner that the body will be insured of uniform bulging radially outward to grip and seal the interior of the bottle directly below the neck opening upon compression of the body longitudinally.

Another important object of my invention is the provision of novel means for forming the bottom wall of a hollow compressible resilient stopper body, so that upon compression of the body longitudinally, the bottom wall will be forced into the hollow body and against the inner face of the body at its lower end thereof for forcing out the lower end of the body radially into sealing engagement with the bottle shoulder below the bottle neck.

A further important object of my invention is the provision of a novel stopper body constructed of compressible material and so-formed that upon longitudinal compression of the body, portions of the body will be forced into intimate sealing contact with the lip of the neck and the shoulder of the body below the neck.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts as will be hereinafter more specifically described and claimed, and illustrated in the accompanying drawing, in which drawing,

Figure 1 is a central longitudinal sectional view showing my improved stopper inserted in the neck of a vacuum bottle and prior to the final compression of the stopper body longitudinally, the section being taken on the line 1—1 of Figure 3 looking in the direction of the arrows.

Figure 2 is a view similar to Figure 1, but showing the cam lever swung down to its operative position and the final compression of the stopper body longitudinally, the view illustrating the shoulder and lip seal.

Figure 3 is a top plan view showing my stopper inserted in a vacuum bottle and prior to the swinging down of the cam lever to its operative position.

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 1 looking in the direction of the arrows.

Figure 5 is a detail longitudinal sectional view through the resilient compressible body.

Referring to the drawing in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter S generally designates my improved stopper and the same includes a bottom cone plate **10** and a top compression plate **11**. Confined between the cone plate **10** and the top compression plate **11**, is the compressible body member **12**, which can be formed from rubber or similar resilient compressible material.

The body member **12** is of a hollow form and embodies a tapered cylindrical side wall **13** and a bottom wall **14**. The bottom wall **14** is provided with an axial opening **15** for a purpose which will later appear. The outer surface of the side wall **13**, at least for a portion of its length, is provided with equidistantly spaced annular compressible ribs **16**. The upper edge of the side wall **13** is provided with an outstanding annular flange **17**, the lower face of which is tapered inwardly, as at **18**. Particular attention is directed to the construction of the bottom wall **14**, which forms an important feature of the present invention. The inner face of the bottom wall **14** is provided with an axially disposed cone shaped enlargement or boss **19** and the tapered face of the boss extends downwardly and inwardly toward the lower inner end of the side wall **13**.

The bottom plate **10** has riveted to its axial center an upstanding threaded stem **20**, which extends through the opening **15** formed in the bottom wall **14** and slidably mounted through the axial center of the top compression plate **11** is a sleeve nut **21** which receives the threaded stem **20**. Pivoted to the upper end of the sleeve nut **21** is the operating cam lever **22**. As is best shown in Figures 1 and 2, the top compression plate **11** is formed with a central depressed portion **23** against which the throw of the cam lever presses, and this depressed portion **23** is received within the upper portion of the hollow body member **12**. This depressed portion also forms a seat for the upper surface of the body member **12**, and it is to be noted that the plate **11** has a diameter substantially equal to the diameter of the upper end of the stopper.

The cone plate **10** abuts against the lower surface of the wall **14** of the stopper member **12**, and this cone plate has formed on its peripheral edge an outwardly extending flange **24** on which is seated the edge of the lower end of the stopper member **12**.

In use of the stopper, the parts are assembled as shown in Figures 1 and 2, and by turning the sleeve nut **21**, a slight initial longitudinal compression of the stopper member **12** can be had, as shown in Figure 1 of the drawing. In this position, the stopper can be readily moved into or out of the neck of a bottle; but this initial adjustment carries the cone portion of the cone plate **10** against the bottom wall **14** moving the cone shaped boss **19** into the hollow body and the tapered surface of the cone shaped boss **19** will then extend directly to the inner surface of the side wall **13**.

As set forth in the objects of this specification, the stopper has been particularly designed for use with vacuum bottles having a mouth of a relatively large size, and this type of vacuum bottle is indicated generally by the reference character B. As shown, the bottle B below the neck **25** is provided with an interior shoulder **26** and the stopper is formed of a sufficient length so that said stopper will extend into the neck **25** below the shoulder **26**.

After the insertion of the stopper within the neck **25** as shown in Figure 1, the sleeve **21** can be slightly turned so as to compress the body member **12** longitudinally, after which the cam lever **22** is swung down to a position shown in Figure 2, at which time the bottle and

upper plates **11** and **12** will be brought forcibly toward one another to bring about desired longitudinal compression of the body member **12**. At this time, the cone shaped boss **19** will be further moved into the body member **12** functioning to insure the radial outward bulging of the stopper body member **12** into sealing engagement with the shoulder **26** of the bottle. With this outward bulging of the lower end of the stopper member **12**, the annular flange **17** will be brought into intimate sealing contact with the lip of the neck **25** of the bottle. Thus, not only will the wall of the body member **12** intimately engage the inner surface of the neck **25**, but the body member and its flange **17** will effectively seal against the lip of the neck and the shoulder **26** of the body.

Changes in details may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

In a stopper for bottles, an elongated hollow compressible body member of a longer longitudinal length than the neck of the bottle including a cylindrical side wall and a bottom wall, said bottom wall having an interior cone shaped boss extending toward the side wall, an annular flange formed on the upper end of the stopper member adapted to intimately engage the lip of a bottle, a bottom cone plate engaging the lower wall with the cone portion of the plate movable toward the axial center of the body, said bottom cone plate having an annular seat extending beyond the conical portion of said plate and the inner periphery of the side wall of the body member, an axially disposed threaded stem on the center of the cone plate extending into the hollow body, a top compression plate engaging the upper surface of the body member, a sleeve nut threaded on the stem and movable through the upper plate, and a cam lever pivoted to the upper end of the sleeve nut for engaging the upper plate, the conical boss being movable bodily into the body member upon longitudinal compression thereof for bulging out the lower end of the body member.

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