# United States Patent

**Forman**

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## [54] MULTI-PURPOSE STOPPER


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[52] **U.S. Cl.** .....**215/48,** 215/56, 220/44 R, 220/44 A

[51] **Int. Cl.**.....**B65d 41/28**

[58] **Field of Search**.....215/48, 56, 74, 37; 220/44 R, 220/44 A; 222/554, 546



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[57] **ABSTRACT**

A stopper having a tubular adapter provided with flexible flanges which are deflected into sealing engagement with the side of an opening in a wine jug when the adapter is pressed therein. The tubular adapter will support a fermentation lock in operating position on the jug or, alternatively, a cap is fitted to the adapter in one position to act as a normal closure for the jug and in another inverted position to serve as a combined closure and safety valve.


**10 Claims, 6 Drawing Figures**

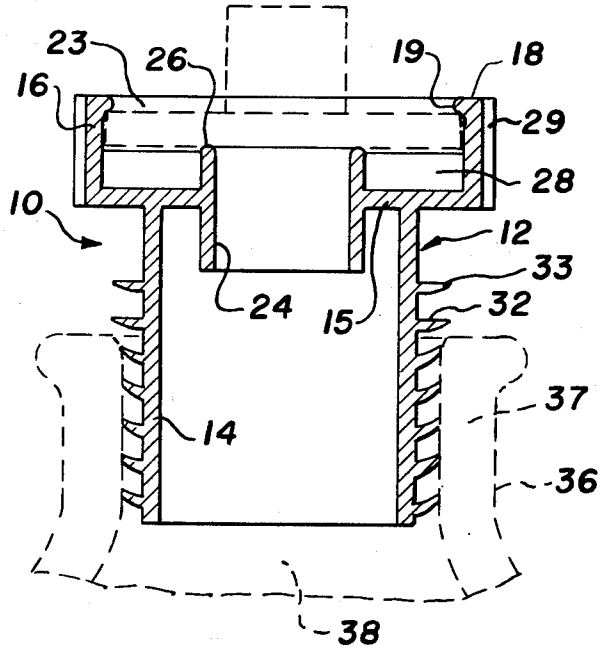


Fig. 1.

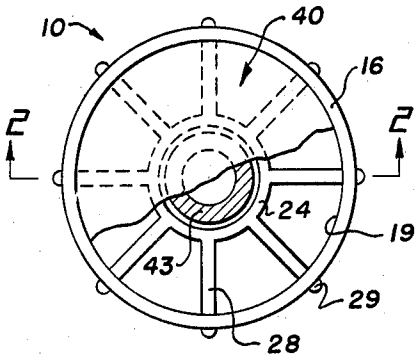



Fig. 2.

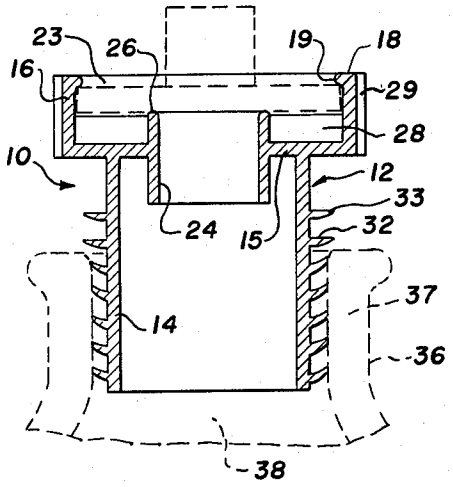



Fig. 3.

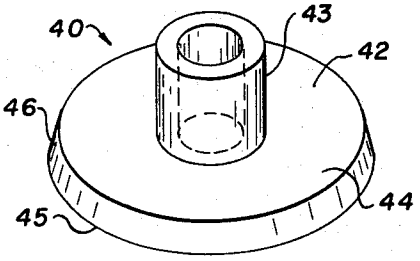



Fig. 4.

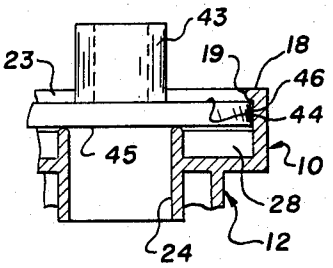



Fig. 5.

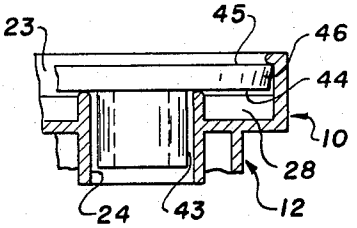
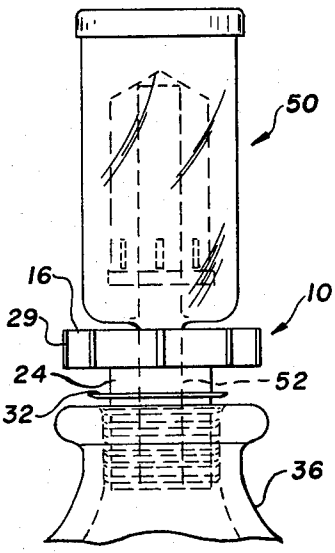



Fig. 6.

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# MULTI-PURPOSE STOPPER

My invention relates generally to stoppers for various types of containers and more particularly to a stopper for a wine jug.

An amateur wine maker usually finds himself in possession of a collection of containers such as 1-gallon jugs and 5-gallon carboys and the like. These glass jugs are of standard sizes as far as their capacity is concerned but different manufacturers will vary the inside diameter of the opening in the neck of the jug and, as a result, the wine maker is faced with the problem of finding a suitable cork for each container in his collection. As the wine ferments, some provision must be made for venting the jugs of excessive gas pressure and a commonly used device for this purpose is one called a fermentation lock which acts as a mechanical vent. The fermentation lock has a depending tube which must be inserted into the neck of the jug and, in order to support the lock in operating position, many wine makers use an ordinary cork which will fit the particular jug and drill a hole in the center of this cork to take the tube. This makes it necessary to have a supply of corks on hand and to adapt some of them as a support for a fermentation lock all of which adds to the cost of preparing homemade wine and is an inconvenience which is objected to by many amateur wine makers.

I have overcome the disadvantages of conventional household corks and rubber stoppers intended for use on wine jugs by providing a device which will fit a number of containers even when there is a considerable variation in the inside diameters of the neck openings. The present stopper can be assembled one way to act simply as a positive closure for a jug and in a second alternative way to act as a combined closure and safety valve should excessive pressure develop within the jug. Whenever it is necessary to use a fermentation lock, the stopper can readily be converted for use as an adapter which will fit the lock to the neck of the jug.

In drawings which illustrate a preferred embodiment of the invention,

FIG. 1 is a plan of the multi-purpose stopper showing part of the cap broken away,

FIG. 2 is a vertical section of the adapter taken on the line 2—2 of FIG. 1 with the cap being shown by dotted lines only,

FIG. 3 is a perspective view of the cap,

FIG. 4 is a detailed section showing the cap fitted to the adapter in a first position of use,

FIG. 5 is a similar view showing the cap in a second position of use, and

FIG. 6 is an elevation showing the stopper supporting a conventional fermentation lock.

Referring to the drawings, the present stopper which is indicated generally by the numeral **10** preferably is formed of a suitable plastic such as polyethylene. This particular plastic can readily be injection molded to provide a tough, non-corrosive and slightly resiliently stopper which is odourless and easily kept clean.

The stopper **10** comprises a tubular adapter **12** having a side wall **14** and a top wall **15**. The horizontal top wall **15** projects laterally beyond the cylindrical side wall **14** and terminates in an upper rim **16**. The vertical rim **16** has an upper edge **18** and projecting inwardly from the inner surface of said rim near this edge is a rounded bead **19**, see particularly FIGS. **2**, **4** and **5**. The circular rim **16** and top wall **15** provide the adapter **12** with a relatively shallow recess **23**. A centrally disposed sleeve **24** is integrally formed on the top wall **15**, the sleeve projecting above as well as below said top wall. Upper edge **26** of the sleeve **24** is disposed about midway between the top wall **15** and the upper edge **18** of the rim.

Within the recess **23**, there is a plurality of radial ribs **28** which are integrally formed with the top wall **15**, the rim **16**, and the upper end of the sleeve **24** so as to reinforce the aforesaid parts of the adapter. The reinforcing ribs **28** merge with the rim **16** adjacent other reinforcing ribs **29** which extend vertically of said rim on the outer surface thereof. The plastic material used to form the adapter **12** is fairly soft and quite pliable but has sufficient natural resiliency to return to its original shape if it is distorted. Reinforcing ribs **28** and **29** increase the strength and rigidity of adjoining parts of the adapter **12** while still allowing the rim **16** in particular to be flexed as required.



On the outer surface of the cylindrical side wall **14**, there are a suitable number of integrally formed flanges **32**, see FIG. **2**. These circular flanges **32** preferably are tapered from the wall **14** towards their outer edges **33**.

In FIG. **2**, the numeral **36** indicates a typical wine jug having a neck **37** which provides the jug with an inlet-outlet opening **38**. The inside diameter of the opening **38** will vary slightly from one jug to another but the adapter **12** can be inserted into the neck **37** to plug the opening **38** because of the flanges **32**. To insert the adapter **12**, the cylindrical side wall **14** is pushed into the neck **37** to cause the adapter **12** to jamb or to be frictionally held in substantially the same manner as a cork is held in a bottle. As this is done, some or all of the resilient flanges **32** are deflected upwardly as shown in FIG. **2**. The portions of the flanges **32** nearest the tips **33** grip the neck **37** so as to strongly resist upward movement of the adapter **12**. Since the plastic flanges **32** are firmly and resiliently pressed against the inner surface of the glass neck **37**, a fluid and gas tight seal is provided between side wall **14** of the adapter and the neck surface. If the inside diameter of the neck is slightly irregular as sometimes is the case, the side wall **14** will flex quite readily to compensate for such a flaw in the jug. The neck of the jug will sometimes be slightly undersize but this presents no real difficulty with the present stopper. The adapter **12** is simply heated in warm water whereupon the plastic material becomes softer and more pliable. In this condition, the adapter **12** can quite easily be forced into an undersize neck and, **37** when it later cools, the same tight seal is achieved.

The multi-purpose stopper **10** includes a cap which is generally indicated at **40**, the cap also preferably being formed of a suitable plastic material. Referring now to FIG. **3**, the cap **40** is shown to comprise a disc **42** and an integral stem **43**. The centrally disposed and hollow stem **43** stands above a surface **44** of the disc **42**, which surface will herein be referred to as the top of the cap. Circular disc **42** then has a plane bottom surface **45** and a beveled edge **46** which tapers inwardly from said bottom surface to the top surface **44**.

The diameter of the disc **42** is slightly greater than the inside diameter of the rim **16** of the adapter. Thus, the cap **40** is a press fit in the adapter **12** and the flexible rim **16** must be spread to a slight extent before the cap can be inserted therein as shown in FIGS. **2**, **4**, and **5**. When cap **40** is inserted as in FIGS. **2** and **4**, this is referred to as the safety position of the cap, since it then serves as a safety valve. At this time, surface **45** of the disc **42** is in contact with the upper edge **26** of the sleeve and this edge serves as a stop to limit further penetration of the cap into the recess **23**. The bead **19** overlaps the edge of the disc **42** and actually bears on the upper surface **44** with the beveled edge **46** sloping downwardly and inwardly away from said bead.

The above described overlapping and interlocking of the several parts of the cap **40** and rim **16** provides a relatively light seal at the bead **19**. If any appreciable amount of pressure should develop within the jug **36** due to fermentation of the wine, the seal at the bead **19** will break or yield sufficiently to allow excess pressure to escape so that the jug will not shatter. An amateur wine maker can easily misjudge the fermentation period of this homemade wine since, generally, he does not have the testing equipment necessary to run a proper check on this very important phase of the process. If the wine maker does error at this point, it is quite possible for fermentation to restart in the jug or bottle after he corks and stores his wine under the mistaken impression that fermentation is over. Use of the present stopper relieves the home wine maker of the need to conduct proper fermentation tests or concern himself about jar breakages due to excessive pressure build-ups.

Cap **40** is used in the safety position usually at the end of the period when the wine in the jug **36** is judged to have stopped

fermenting but when there is still some likelihood of a sudden build-up of gas pressure. Should this pressure develop and reach a predetermined level, the cap **40** will be forced upwardly so that the beveled edge **46** exerts an outwardly directed force on the overlapping bead **19** and the rim **16** is expanded sufficiently to release the resilient sealing pressure applied by the rim to the cap. The size and shape of the bead **19** and edge **46** are such that these interlocking members normally will retain the cap in the safety position and, at the same time, will ensure that the stopper **10** forms a proper but yieldable seal for the jug. The cap **40** is readily removed when necessary by grasping the stem **43** and exerting a laterally directed pull thereon so as to rock the beveled edge **46** of the disc past the bead **19** on the rim.

If after a period of from 10 days to 2 weeks, the cap **40** has not been forced from the safety position, the wine maker can safely assume that all fermentation has ceased. Once the fermentation period is over and the wine is merely being stored in the jug **36**, it may be considered desirable to assemble the stopper **10** to provide a positive seal which could not accidentally be broken and, to do this, the cap **40** is inserted as shown in FIG. **5** which is the locked position of said cap. To insert the cap **40** in the FIG. **5** position, the cap is turned so that the surface **45** is uppermost and the stem **43** is depending below the disc **42**. In this inverted position, the cap **40** is pushed into the recess **23** and it will be found that some effort is required to do so. The beveled edge **46** engages the bead **19** and wedges the rim **16** outwardly as the cap **40** is thrust into the recess **23** and, once the disc **42** is below the bead and in contact with the upper edge or stop **26** of the sleeve, then the resilient rim **16** will snap inwardly to hold the cap against withdrawal. The bead **19** now overlaps the beveled edge **46** and these two members are firmly interlocked. The stem **43** now projects into the sleeve **24** and since no part of the cap **40** projects above the rim **16**, there is no danger of said cap being accidentally knocked out of the adapter **12**. In other words the stopper **10** now provides a positive seal for the jug as opposed to the yieldable seal which is provided when the cap **40** is in the safety position.

It should be noted that the term "lock" is used in the sense that a reasonably strong force must be properly applied to the cap **40** in order to eject it from the adapter **12**. Normally, the interlocking members **19** and **46** will firmly secure the cap **40** to the adapter but if the stopper **10** is removed from the jug and a suitable tool is inserted through the sleeve **24**, then the cap can be forced out of the recess **23**.

Referring now to FIG. **6**, the numeral **50** indicates generally a conventional fermentation lock of the type commonly used by amateur wine makers. The glass or plastic lock **50** has a depending tube **52** which must be inserted into the neck of the jug and sealed therein in order for the lock to operate as required when the jug is filled with fermenting wine. The stopper **10** can readily be converted for this purpose and this is done by detaching the cap **40** from the adapter **12** and installing the adapter into the neck **36** as described above. The tube **52** of the fermentation lock is then pushed a suitable distance into the sleeve **24** and, since the tube is a press fit in the sleeve, a gas tight seal is provided therebetween. The lock **50** then is supported by the adapter **12** in an upright position and in communication with the interior of the jug **36** so that said lock is able to operate in the normal manner as fermentation takes place.

From the foregoing, it will be apparent I have provided an extremely simple, inexpensive, yet effective stopper for a wine jug. The stopper **10** serves a three-fold purpose and is suitable for use on jugs having necks which may be of irregular shape and of varying sizes. The plastic stopper is easy to wash and sterilize and the device can be used over and over again since the flanges **32** are not damaged when the adapter **12** is inserted into the neck of the jug nor are the interlocking members **19** and **46** worn to an appreciable extent by repeated removal and reattachment of the cap **40**. It is an extremely simple matter to change the cape **40** from the safety position (FIG. **4**) to the locked position (FIG. **5**) or vice versa, and also to remove the cap from the adapter **12** altogether so as to convert the latter member for use in supporting the fermentation lock.

I CLAIM:

**1.** A stopper for a wine jug or the like comprising a tubular adapter insertable into the neck of the jug and having an upper rim, a cap attachable to the upper rim to close the tubular adapter, interlocking members on the upper rim and the cap, said cap being attachable to the upper rim in a safety position or in a locked position inverted with respect to said safety position, said interlocking members yielding to release the cap from the safety position in response to a predetermined pressure developed within the jug.

**2.** A stopper as claimed in claim **1**, in which said tubular adapter has a side wall, a plurality of flexible flanges projecting laterally of the side wall, said flanges being deflected upwardly by insertion of the tubular adapter into the neck of the jug whereby to seal the opening therein.

**3.** A stopper as claimed in claim **1**, in which said adapter has a top wall below the upper rim, and a sleeve extending through the top wall adapted to receive and support a tube projecting therethrough.

**4.** A stopper for a wine jug or the like comprising a tubular adapter insertable into the neck of the jug and having a cylindrical side wall, a top wall, and an upper rim, said side wall having a plurality of flexible sealing flanges projecting laterally therefrom, a sleeve extending through the top wall, a cap insertable into the upper rim to close the tubular adapter and having a beveled edge, an inwardly projecting bead on the upper rim cooperating with the beveled edge to retain the cap within the upper rim, said cap having a safety position and locked position inverted with respect to said safety position, said beveled edge and inwardly projecting bead yielding to release the cap from the safety position in response to a predetermined pressure developed within the jug.

**5.** A stopper as claimed in claim **4**, in which said upper rim is formed of flexible material and is momentarily expanded by insertion of the cap.

**6.** A stopper as claimed in claim **4**, in which the entire adapter is formed of plastic.

**7.** A stopper as claimed in claim **4**, in which said sleeve projects above the top wall to provide a stop limiting movement of the cap into the upper rim.

**8.** A stopper as claimed in claim **4**, and including a plurality of ribs reinforcing the upper rim against distortion.

**9.** A stopper as claimed in claim **8**, in which some of said plurality of ribs extend radially of the recess to interconnect the top wall, the upper rim, and the upper end of the sleeve.

**10.** A stopper as claimed in claim **9**, in which other of the plurality of ribs are circumferentially spaced around the outer periphery of the upper rim.

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