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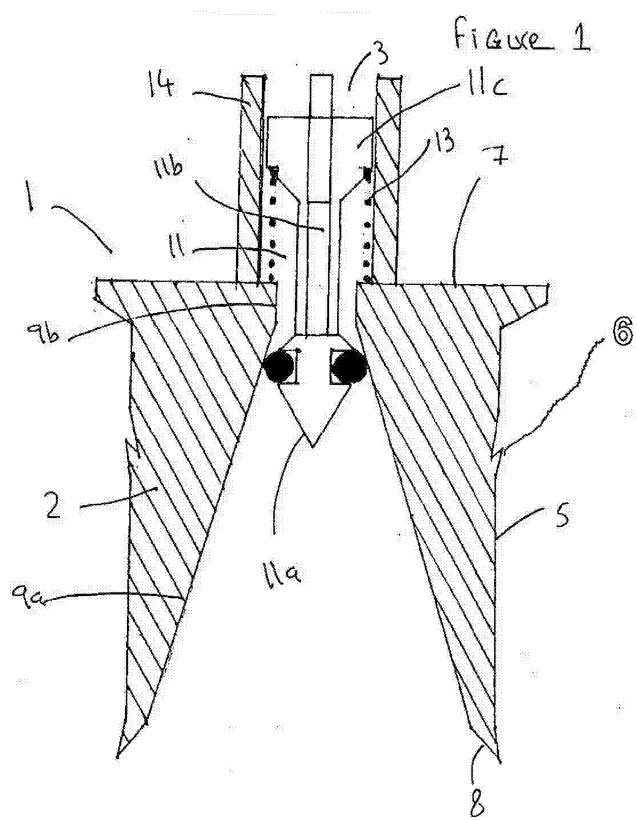
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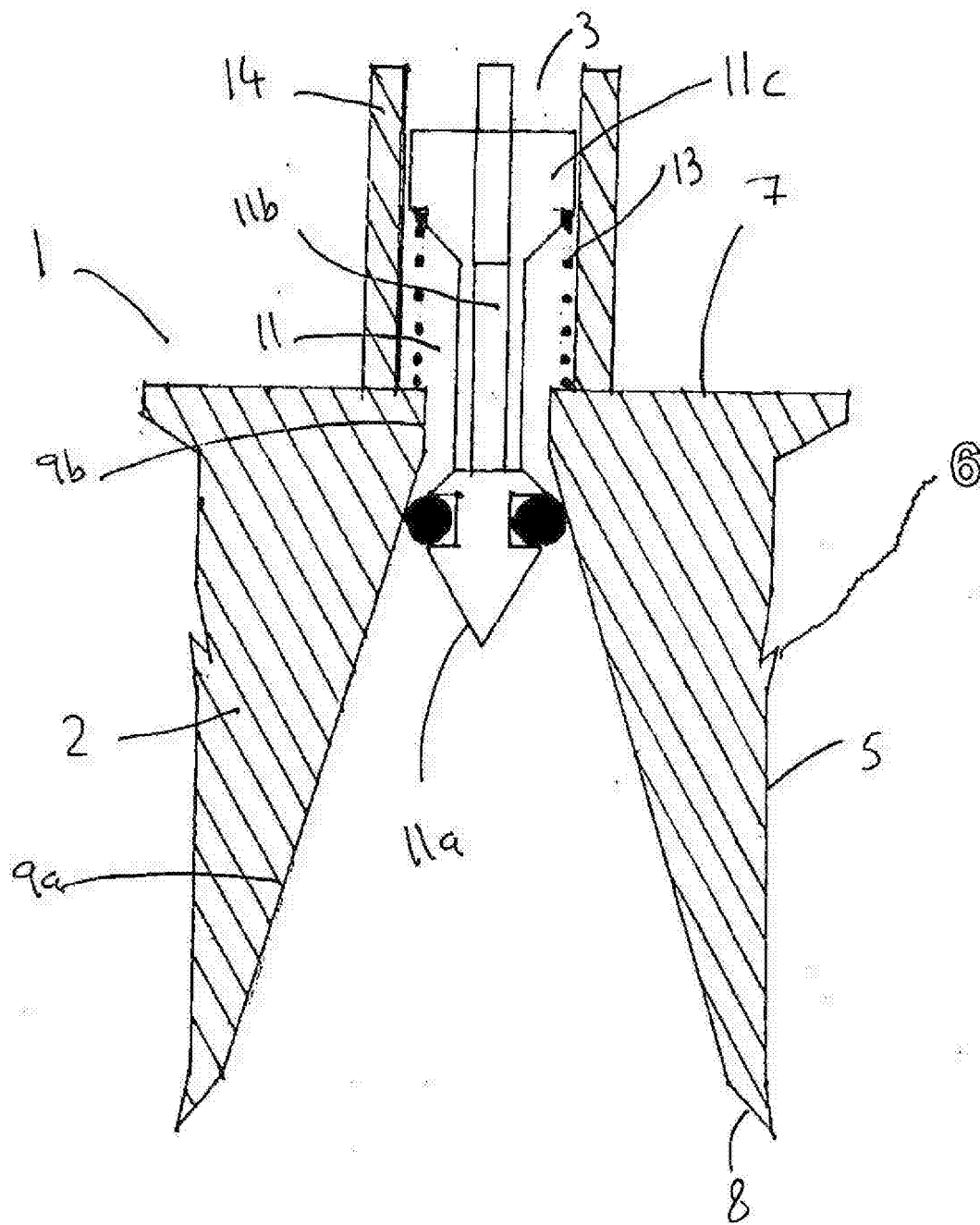
(54) Title of the Invention: **Cork with Valve**
 Abstract Title: **Cork with valve**

(57) A cork assembly suitable for disgorging champagne or sparkling wine bottles, comprising a plug 2 to insert into the neck of a bottle, a longitudinal hole 9 extending through the plug in which a movable valve 3 is mounted to engage to the sides of the plug in order to seal the hole. The valve is preferably biased into the closed position by a spring 13 and moves towards the bottom 8 of the plug when opening. Preferably the valve slides within the hole and has a pin 11 protruding from the top 7 of plug in the closed position. The seal 10 may contain an o-ring that is removably mounted, and is wider than the valve and the hole when mounted to groove 11d of the pin, to prevent removal. Preferably, the hole tapers inwards towards the top of the assembly.



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Figure 1



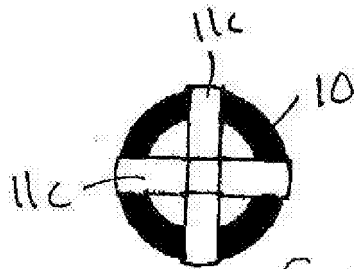


Figure 3.

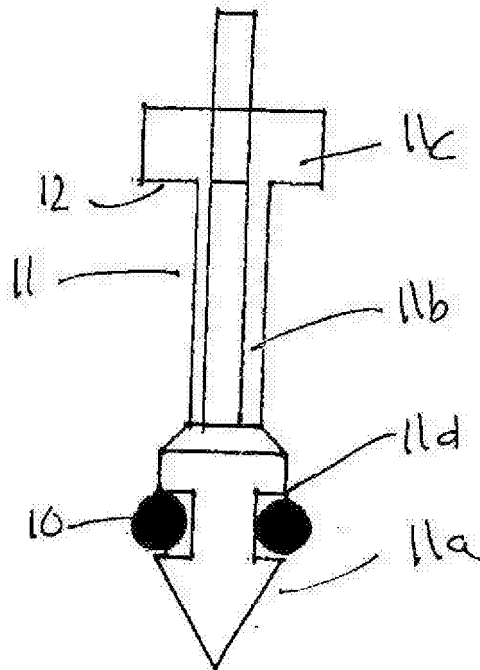


Figure 2

Cork with Valve

The present invention relates to corks for bottles and more particularly to corks for use during the bottle fermentation of sparkling wine

During traditional production of sparkling wine, it is necessary to access the contents of the bottle at numerous times during the fermentation process. For example, ingredients need to be added, samples taken for testing at various stages in the process and waste such as sediment removed. Each time this is required, the bottles have to be opened which inevitably results in some wastage. When disgorging a bottle of sparkling wine about 10% of the wine is wasted, and a skilled person is usually required to carry out the process. Furthermore, since the wine cannot be disturbed once it has cleared down, the wine has to be disgorged and then immediately recorked, meaning that expensive corking equipment is required.

The pressure within the bottle is also difficult to accurately monitor during bottle fermentation, and for safety reasons, the bottles are therefore typically over-engineered, leading to oversized, heavy bottles which give large safety margins. This significantly adds to the carbon footprint of the sparkling wine and also increases distribution costs.

There is accordingly a need for a system to allow access to the contents of a bottle during the fermentation process which avoids wastage and which also allows accurate monitoring of pressure within the bottle so as to enable bottle sizes to be reduced without giving rise to safety issues.

According to the present invention there is provided a bottle cork assembly comprising a plug member sized and shaped to be a close tolerance fit, in use, with the neck opening of a bottle, the plug member having an outer surface which, in use, frictionally engages the inner surface of the neck opening to retain the cork in the bottle, a longitudinal through opening extending through the plug member, a valve member moveably mounted in the through opening for movement between a closed position in which the valve member

engages the sides of the through opening so as to seal said opening and an open position in which the valve member is separated from the sides of the through opening to allow fluid passage through the opening, and biasing means biasing the valve member into the closed position, wherein the valve member is oriented such that closing movement thereof is in a direction away from a bottom end of the plug member, said bottom end being the end which, in use, is inserted into the bottle.

A cork assembly in accordance with the invention has the advantage that it allows easy access to a bottle, both for adding and well as removing / sampling operations without requiring expensive re-corking equipment and without the losses associated with conventional corks. For example, the valve allows yeast to be ejected by gentle opening of the valve by pressing on the valve member to push it downwards and away from the valve seat formed by the inner surface of the through opening. The pressure within the bottle will then cause the yeast plug which forms in the neck of the bottle to be expelled through the valve in a controlled manner, the valve automatically closing when the procedure is completed. This therefore enables the process to be completed by an unskilled person, and since the bottle has not actually been opened, expensive re-corking equipment is not necessary. Spillage is also reduced, giving a cost saving. Now that the wine within the bottle has been cleared the bottle can now be moved to a convenient place for corking and dressing of the bottles.

The orientation of the valve is important as it is not intended to act as a pressure relief valve – in the invention, the pressure in the bottle acts to increase the closing pressure on the valve member. However, the assembly of the invention does allow pressure within the bottle to be tested and excess pressure vented if necessary. This enables the wine maker to consider using a lighter, more engineered bottle, which has the effect of significantly reducing the carbon footprint both of the wine itself and the distribution process due to reduction in weight.

Preferably, the valve member is slidably moveably mounted in the through opening in the plug member, the member advantageously having a pin upstanding from its upper end

which, in the closed position, projects beyond a top surface of the plug member so as to enable easy engagement and depression by a user.

The valve member preferably has a seal member carried thereon which engages with the inner surface of the neck opening in the closed position of the valve in order to seal said opening. The seal member may be an O-ring, in particular a rubber O-ring but other seals are also possible. The seal member is advantageously removably mounted on the valve member so as to enable removal for cleaning / servicing.

In a particularly preferred embodiment, the outer dimension of the seal member is larger than the outer dimension of at least the lower end of the valve member. In this way, the valve member may be sized to allow it to pass through at least a top end of the through opening in the plug member, the seal member being sized such that, when it is engaged on the valve member, it is too big to pass through the through opening and hence prevents removal of the valve member from the plug member. This has the advantage that it enables the valve to be dis-assembled and removed from the plug for cleaning or replacement.

The valve seat in the plug member may be formed by a step change in the size of the through opening. However, in a preferred embodiment, the through opening tapers inwardly towards the top of the assembly, and in particular is conically shaped. This has the advantage that a wide range of flow speeds can be achieved by controlling the distance by which the valve member is depressed into the plug.

This conical shape in the main body allows an area where the sediment may collect prior to disgorgement through the opening.

In order that the invention may be well understood, there will now be described an embodiment thereof, given by way of example, reference being made to the accompanying drawings, in which:

Figure 1 is a sectional view of a cork assembly according to an embodiment of the invention;

Figure 2 is a side view of a valve pin which forms part of the cork assembly of Figure 1; and

Figure 3 is a bottom view of the valve pin of Figure 2.

Referring first to Figure 1, there is shown a cork assembly 1 which comprises a cork 2 with a valve assembly 3 mounted therein. The cork 2 is preferably formed of plastic material for reasons of cost, long life and ease of cleaning, but may be formed of any suitable material. The cork 2 has an outer surface 5 which includes a circumferential rib 6 which is inclined towards the top 7 of the cork 2. The outer surface 5 engages with the inner surface of the neck of a bottle when the cork is inserted into a bottle and the rib 6 allows easier insertion of the cork into the bottle whilst increasing the frictional resistance to withdrawing the cork 2 from the bottle. Although the cork is shown with a single rib, multiple ribs may also be present.

The cork 2 has a central passage 9 extending longitudinally therethrough from the top 7 to the bottom 8 so as to allow fluid communication from the inside of a bottle through the cork 2. As shown in Figure 1, the passage 9 has a generally conically shaped section 9a which tapers inwards from the bottom 8 towards the top 7 and finishing in a cylindrical section 9b which has a first inner diameter D1.

A valve pin 11, which forms part of the valve assembly 3, is slideably engageable in the passage 9 with its lower end 11a located in the conical section of the passage 9. The valve pin 11 is generally arrow shaped having a shaft 11b with a head 11a formed on one end and a stop 11c formed on the other. The head 11 is sized so that its outer diameter D2 is smaller than the diameter D1 of the cylindrical section 9b of the cork so as to allow the head 11a to pass through the cylindrical section 9b for assembling the valve assembly 3 in the cork 2. The head 11a furthermore has a circumferential groove 11d formed therein in which is engageable a seal member 10, such as an O'ring, effecting sealing engageable with the conical section 9a of the passage 9 into order to seal the passage 9 against the

fluid escape through the cork assembly. The seal member 10 is sized such that when it is engaged in the groove 11d, its outer diameter is greater than the inner diameter of the cylindrical section 9b and hence the valve head 11a is prevented from being withdrawn from the cork 2 when the seal member 10 is in place.

The stop 11c of the valve pin 11 similarly has an outer most dimension which is greater than the diameter D1 of the cylindrical section 9b such that the stop 11c is prevented from passing therethrough into the passage 9 and hence the valve pin 11 is prevented from dropping into a bottle in which the cork 2 is engaged. The stop 11c has a lip 12 at its lower end against which one end of a helical spring 13, acting as a biasing member, can engage as shown in figure 1. The spring 13 is again sized to be bigger than the cylindrical section 9b such that the other end of the spring 13 is engageable against the top 7 of the cork 2 around the cylindrical section 9d of the passage 9 as shown in Figure 1. In this way, the spring 13 is compressed between the upper surface 7 of the cork 2 and the stop 1c of the valve pin 11, and the valve pin thereby biased upwards so as to bring the seal 10 into sealing engagement with the cylindrical section 9a of the passage 9.

A valve guide 14 upstands from the top 7 of the cork 2 which is a close tolerance fit with the stop 11c of the valve pin 11 and which operates to restrict the valve pin 11 to longitudinal movement only by preventing tilting due to lateral movement. The stop 11c is preferably cross shaped in cross-section so as to minimise the surface area contact between the stop 11c and the guide 14 and hence minimise friction. Other shapes for the stop 11c are also possible.

The cork assembly is assembled as follows:

The valve head 11a is inserted through the spring 13 and the spring is seated against the lip 12. The valve head 11a is then passed through the guide 9b from the top of the cork 2, through the cylindrical section 9b and into the conical section 9a of the passage 9. With the valve pin 11 pressed as far into the cork as possible, the seal 10 is located in the groove 11d of the valve head 11a. The valve pin 11 is then released and the biasing

action of the spring 13 pushed the pin upwards and brings the seal 10 into sealing engagement with the sides of the conical section 9a of the passage, closing it against the passage of fluid through the cork 2 in either direction.

The valve may then be opened by simply pressing the stop end 11c of the valve pin towards the cork 2, which separates the seal 10 from the inner wall of the passage 9 and allowing material to pass through the passage 9.

In order to disassemble the valve, the cork is removed the bottle and the valve pin 11 pressed fully into the cork as to allow easy access to the seal 10. The seal 10 is then removed, allowing the head 11a to be withdrawn through the cylindrical section 9b and the valve pin to be fully removed from the cork.

Claims

1. A bottle cork assembly comprising a plug member sized and shaped to be a close tolerance fit, in use, with the neck opening of a bottle, the plug member having an outer surface which, in use, frictionally engages the inner surface of the neck opening to retain the plug member in the bottle, a longitudinal through opening extending through the plug member, a valve member moveably mounted in the through opening for movement between a closed position in which the valve member engages the sides of the through opening so as to seal said opening and an open position in which the valve member is separated from the sides of the through opening to allow fluid passage through the opening, and biasing means biasing the valve member into the closed position, wherein the valve member is oriented such that closing movement thereof is in a direction away from a bottom end of the plug member, said bottom end being the end which, in use, is inserted into the bottle.
2. A bottle cork assembly according to claim 1, wherein the valve member is slidably moveably mounted in the through opening in the plug member.
3. A bottle cork assembly according to claim 1 or claim 2, wherein the valve member includes a pin upstanding from its upper end which, in the closed position, projects beyond a top surface of the plug member.
4. A bottle cork assembly according to any of the preceding claims, therein the valve member includes a seal member carried thereon which engages with the inner surface of the neck opening in the closed position of the valve in order to seal said opening.
5. A bottle cork assembly according to claim 4, wherein the seal member is an O-ring.

6. A bottle cork assembly according to claim 4 or claim 5, wherein the seal member is removably mounted on the valve member so as to enable removal for cleaning / servicing.
7. A bottle cork assembly according to any of claims 4 to 6, wherein the outer dimension of the seal member is larger than the outer dimension of at least the lower end of the valve member and larger than the through opening such that the seal member is too big to pass through the through opening and hence prevents removal of the valve member from the plug member.
8. A bottle cork assembly according to any of the preceding claims, wherein the through opening in the plug member tapers inwardly towards the top of the assembly, and in particular is conically shaped.
9. A bottle cork assembly substantially as herein described with reference to the accompanying drawings.



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Examiner: Mr Peter Banks

Claims searched: 1-9

Date of search: 16 November 2015

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-5, 6, 8	US2003/091701 A1 (YAHAV). See fig. 4.
X	1-4, 7, 8	WO1998/51574 A1 (YAHAV). See fig. 9.
X	1, 2, 4, 7, 8	WO2009/015417 A1 (SHELLCOT). See fig. 7.
X	1-8	WO2009/012531 A1 (SHELLCOT). See fig. 11.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

Worldwide search of patent documents classified in the following areas of the IPC

B65D; C12G

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
B65D	0051/16	01/01/2006
B65D	0039/00	01/01/2006
B65D	0051/26	01/01/2006