



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.08.2024 Bulletin 2024/32

(51) International Patent Classification (IPC):
B65D 39/00 (2006.01)

(21) Application number: **23155139.1**

(52) Cooperative Patent Classification (CPC):
B65D 39/0064

(22) Date of filing: **06.02.2023**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

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(54) **BOTTLE STOPPER**

(57) The invention relates to means of closing bottles, namely to bottle stoppers capable of retaining the high pressure of carbon dioxide in the beverage contained in the bottle. The bottle stopper comprises a sealing sleeve (1) installed in the neck of the bottle, and an

outer shell (5) installed on the sealing sleeve (1), fixed to each other in axial and radial direction, wherein the outer surface (7) of the outer shell (5) comprises a hole (6) made with the possibility of accommodating the upper end wall (3) of the sealing sleeve (1).

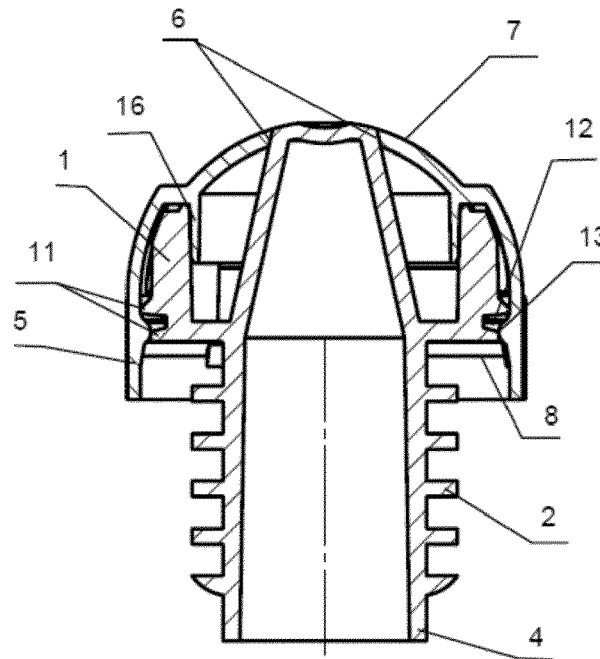


Fig. 1

Description

[0001] The invention relates to bottle closures, or bottle stoppers, capable of withstanding the high pressure of carbon dioxide in the beverage contained in the bottle, in particular a highly carbonated beverage such as champagne or sparkling wine.

[0002] World market for sparkling and carbonated wines is fully developed and already exceeds 2 billion bottles per year, produced in more than 50 countries. One of the main aspects of particular importance is the correct and safe sealing of this type of bottle.

[0003] At the moment, two main types of closures are used for closing sparkling wines - cork stopper and plastic stopper of the "mushroom" type. Both of these options are designed to withstand the high pressure of carbon dioxide in the beverage. But the reliable fixation of such stoppers requires additional reinforcement with the help of a muzzle.

[0004] Thanks to the latest technological innovations, modern polymer stoppers for champagne are not inferior, and even surpass cork stoppers in many physical and mechanical characteristics.

[0005] Requirements for sparkling wine market are many and specific, the most important of which are uniformity of performance (sealing, aging, behaviour after opening and retention of organoleptic features), market acceptance (standard appearance of mushroom-shaped type stopper), as well as high quality, corresponding to the price.

[0006] Also, not all known stoppers, especially two-component ones, for closing containers with carbonated liquids, are able to pass carbon dioxide saturation tests using aphrometer, where the upper end wall of the cover is pierced using a needle with sealant to obtain accurate indicators of carbon dioxide saturation while maintaining the necessary tightness of the closed container.

[0007] A reusable screw cap for champagne bottles is known from the prior art (EP0079552, IPC B65D41/04, publ. 25.05.83). The design of said cap comprises a threaded cap housing in the form of a hemisphere and a sealing plug made in the form of a stopper installed in the neck of the bottle. The disadvantage of this design is that when testing for saturation, the presence of the stopper does not allow obtaining the necessary parameters for the concentration of carbon dioxide in the final product, for example, if the aphrometer's needle is not long enough.

[0008] Also known from the prior art is a stopper for bottles with sparkling wines (DE3236156, IPC B65D39/00, publ. 12.11.1987), comprising an outer cap, a sleeve part and a seal in the form of a separate element. The disadvantage of this closure is the impossibility to obtain the necessary parameters of saturation of the product with carbon dioxide due to the presence of a seal that covers the internal cavity of the container, for example, with aphrometers having insufficient needle length.

[0009] The closest in technical essence to the claimed

stopper is a stopper for bottles with champagne and other carbonated liquids, made in the form of a hollow cylinder with sealing rings (sealing part) and a head (outer shell) having a groove along the profile of the bottle finish and a cover, and the entering end of the cylinder has the shape of a hemisphere (A.S. 189699, IPC B67B, 30.11.1966). The disadvantage of this stopper is that the lower end of the sealing part is blind, which does not allow to obtain accurate saturation parameters when using types of aphrometers with a needle of insufficient length, and there is also a risk of carbon dioxide leakage at the place where the stopper is fixed to the cover.

[0010] The object of the claimed invention is to eliminate the disadvantages of known stoppers for closing bottles with highly carbonated beverages such as champagne or sparkling wine, as well as soft beverages.

[0011] The technical result provided by the present invention is achieved by creation of a two-component stopper for closing bottles with carbonated liquids, which makes it possible to test the saturation of the final product with carbon dioxide while maintaining the necessary tightness of the closure and without losing the concentration of carbon dioxide in the container when using any types of aphrometers.

[0012] Said technical result is achieved by the fact that the bottle stopper comprises a sealing sleeve installed in the neck of the bottle, and an outer shell installed on the sealing sleeve, fixed to each other in axial and radial direction, wherein the outer surface of the outer shell comprises a hole made with the possibility of accommodating the upper end wall of the sealing sleeve.

[0013] Implementing the upper end wall of the sealing sleeve as part of the outer surface of the outer shell allows to carry out the saturation test with any type of aphrometer while maintaining tightness and carbon dioxide concentration.

[0014] The object and claimed technical result are also achieved in the following particular embodiments of the invention.

[0015] Preferably, the sealing sleeve and outer shell are made of polymeric materials having different values of elasticity and rigidity.

[0016] Preferably, on the outer surface of the sealing sleeve, there are fixing means in the form of axial protrusions and annular groove on the side surface. At the same time, it is preferable if, on the inner surface of the outer shell, there are reciprocal fixing means in the form of vertical locking ribs interacting with the axial protrusions of the sealing sleeve, and an annular collar interacting with the annular groove of the sealing sleeve.

[0017] Preferably, the sealing sleeve is provided with annular projections to seal the bottle neck.

[0018] Further, with reference to the figures, embodiments of the claimed stopper are disclosed in more detail, which, however, do not limit the invention.

Fig. 1 shows a general sectional view of an embodiment of the stopper according to the invention.

Fig. 2 shows a general view of the sealing sleeve.

Fig. 3 shows a general sectional view of the outer shell.

[0019] The stopper for closing bottles comprises a sealing sleeve 1, which is made with annular sealing protrusions 2, upper end wall 3 (see Fig. 2) and lower end 4, and outer shell 5, which has a hole 6 on the outer surface 7 and a groove 8 along the profile of the bottle finish. Said hole 6 has a diameter sufficient to accommodate a part of the upper end wall 3 of the sealing sleeve 1, which makes it possible to achieve optimal characteristics of the tightness of the stopper as a whole and the saturation of the carbonated product contained in the bottle with carbon dioxide during the corresponding tests.

[0020] The outer surface of the upper part of the sealing sleeve 1 comprises axial ribs 9 interacting with the respective vertical locking ribs 10 of the outer shell 5 to fix the stopper's parts in radial direction. Fixing means in the form of upper and lower axial protrusions 11 with an annular groove 12 between them are made on the outer side surface of the sealing sleeve 1. The inner surface of the shell 5 comprises an annular collar 13 located opposite to the groove 12, which, when force is applied, abuts against the upper axial protrusion 11, thus preventing the parts from disengaging when the bottle is opened.

[0021] Additionally, the sealing sleeve 1 comprises an annular wall 14 and stiffeners 15, and the outer shell 5 is made with an inner annular protrusion 16, which fits tight against the inner surface of the wall 14 and abuts against the stiffeners 15, thus preventing the annular wall 14 from being compressed under the force of the annular collar 13 when removing the stopper from the neck of the bottle.

[0022] Said fixing means between the sealing sleeve 1 and the outer shell 5 provide reliable fastening between said parts in axial and radial direction when the stopper is being removed by preventing the outer shell 5 from turning when the stopper is being removed from the neck of the bottle. In this case, it will be clear to a specialist that the fixation of the sealing sleeve relative to the outer shell in axial and radial directions is possible using other means.

[0023] The sealing sleeve 1 and outer shell 5 are made of polymeric materials, and the selected materials may differ in terms of rigidity and elasticity. For example, the sealing sleeve 1 can be made of a softer polymeric material such as low-density polyethylene, etc., because the sealing part must fit the neck of the bottle to ensure a perfect seal, and the outer shell 4 can be made of a harder polymeric material, such as polyethylene or polycarbonate, because it must firmly fix the stopper on the bottle opening and, therefore, must not give in.

[0024] The stopper is made of high-quality food-grade polymeric materials resistant to alcohol environments. The described stopper is applicable for closing both alcoholic and non-alcoholic carbonated beverages.

[0025] The outer shell 5 and sealing sleeve 1 can be

made in different colours at the request of the ordering customer. The outer shell 5 may also be made of transparent polymeric material.

[0026] The parts of the claimed stopper are manufactured by various known methods, in particular, by injection moulding.

[0027] Assembly of the outer shell 5 and sealing sleeve 1 is carried out by snapping, providing a secure fastening due to the implementation of fixing means in axial and radial directions between the parts.

[0028] When closing the bottle, the sealing sleeve 1 is inserted into the neck of the bottle by axial pressing until its collar abuts against the groove 8 of the outer shell 5. In this case, the annular protrusions 2 on the outer surface of the sealing sleeve 1 fit tight against the inner surface of the bottle neck due to gas pressure on the lower end 4, which allows to keep high pressure of carbon dioxide in the beverage and increases the reliability of the sealing of the interior of the bottle.

[0029] The proposed technical solution allows testing with any type of aphrometers while maintaining the necessary parameters for the tightness of the closure and concentration of carbon dioxide in the final product.

Claims

1. Bottle stopper comprising a sealing sleeve (1) installed in the neck of the bottle, and an outer shell (5) installed on the sealing sleeve (1), fixed to each other in axial and radial direction, **characterized in that** the outer surface (7) of the outer shell (5) comprises a hole (6) made with the possibility of accommodating the upper end wall (3) of the sealing sleeve (1).
2. The stopper according to claim 1, **characterized in that** the sealing sleeve (1) and outer shell (5) are made of polymeric materials having different values of elasticity and rigidity.
3. The stopper according to claim 1, **characterized in that** on the outer surface of the sealing sleeve (1) there are fixing means in the form of axial ribs (9) and annular groove (12) on the side surface.
4. The stopper according to claim 3, **characterized in that** on the inner surface of the outer shell (5) there are reciprocal fixing means in the form of vertical locking ribs (10) interacting with the axial ribs (9) of the sealing sleeve (1), and annular collar (13) interacting with the annular groove (12) of the sealing sleeve (1).
5. The stopper according to claim 1, **characterized in that** the sealing sleeve (1) is made with annular protrusions (2) to seal the neck of the bottle.

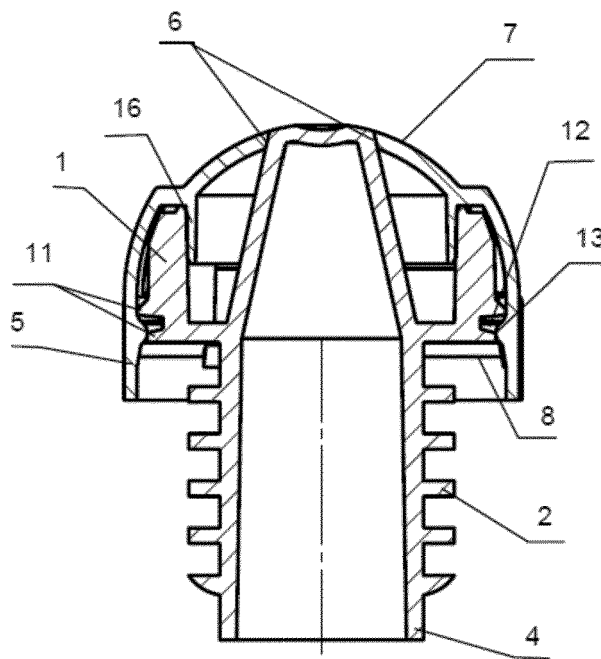


Fig. 1

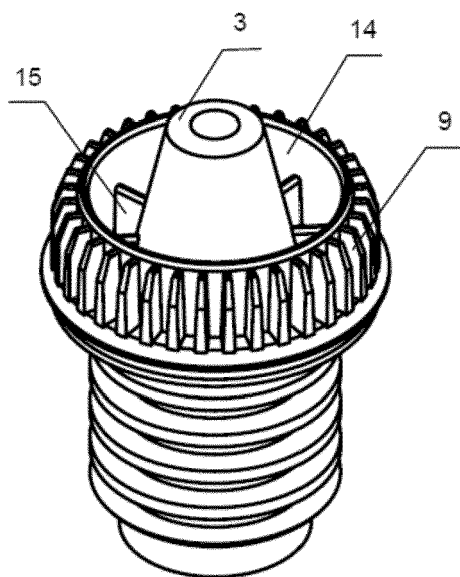


Fig. 2

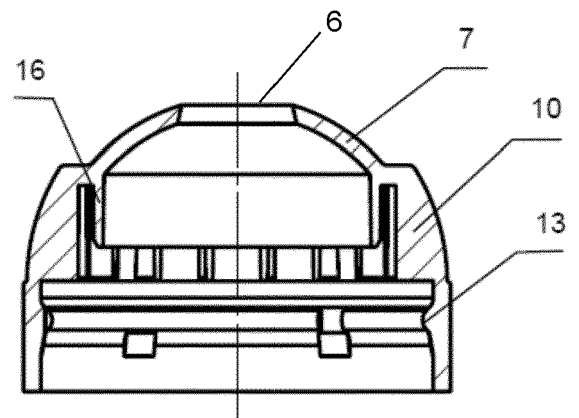


Fig. 3



EUROPEAN SEARCH REPORT

Application Number

EP 23 15 5139

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 27 21 387 A1 (ESSICH HELMUT) 23 November 1978 (1978-11-23)	1, 2, 5	INV. B65D39/00
A	* figures 1, 2 *	3, 4	
X	WO 2022/180337 A1 (APTAR FRANCE SAS [FR]) 1 September 2022 (2022-09-01)	1, 2, 5	
A	* page 6, line 26 - line 28 * * figures 11, 12 *	3, 4	
X	WO 2006/021640 A1 (RODIUS ERIC [FR]) 2 March 2006 (2006-03-02)	1, 2, 5	TECHNICAL FIELDS SEARCHED (IPC) B65D
A	* figures 1-3 *	3, 4	
X	WO 2018/130906 A1 (DIAM BOUCHAGE [FR]) 19 July 2018 (2018-07-19)	1	
A	* figures 1-6 *	2-5	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 July 2023	Examiner Sacepe, Nicolas
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 15 5139

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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31-07-2023

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