

[54] STOPPER OF PLASTICS HAVING AN EXPANSIBLE PORTION FOR BOTTLES FOR SPARKLING WINES AND THE LIKE

[75] Inventor: Piergiacomo Guala, Alessandria, Italy

[73] Assignee: Angelo Guala di Piergiacomo e Roberto Guala & C. S.A.S., Alessandria, Italy

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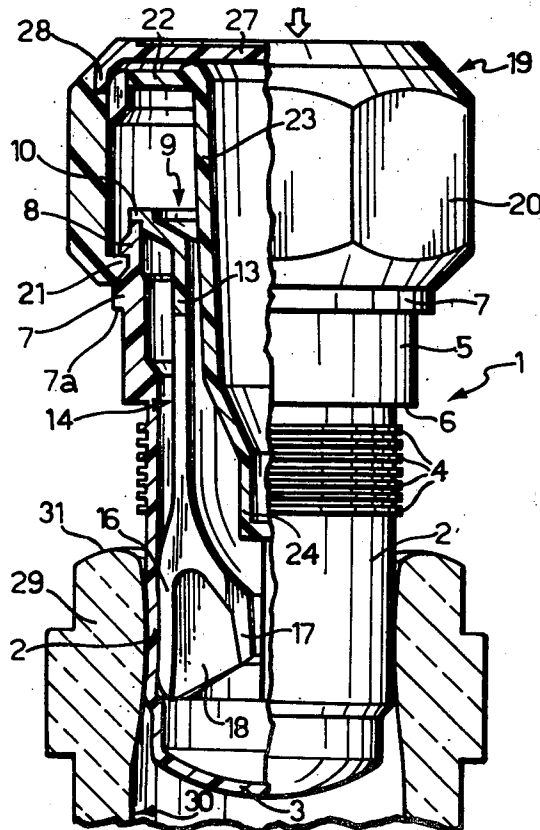
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Primary Examiner—William I. Price
Assistant Examiner—R. E. Hart
Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn & Macpeak

[57] ABSTRACT

A stopper for bottles of sparkling wine, which can be made of plastics material and which does not require a separate wire clamping cage to anchor it to the neck of a bottle. The stopper is formed in three parts, an outer tubular resilient sleeve, an intermediate substantially tubular element with a plurality of radially expandible wedge parts carried at the end of strips formed from a common part of the tubular intermediate element, and an inner axially movable actuating member having a projection which cooperates with the wedge parts to cause radial expansion thereof to jam the stopper in the neck of a bottle when the actuating member is moved in one direction and to permit radial inward movement of the wedge parts to release the stopper for withdrawal thereof upon movement of the actuating member in the opposite direction.

4 Claims, 5 Drawing Figures



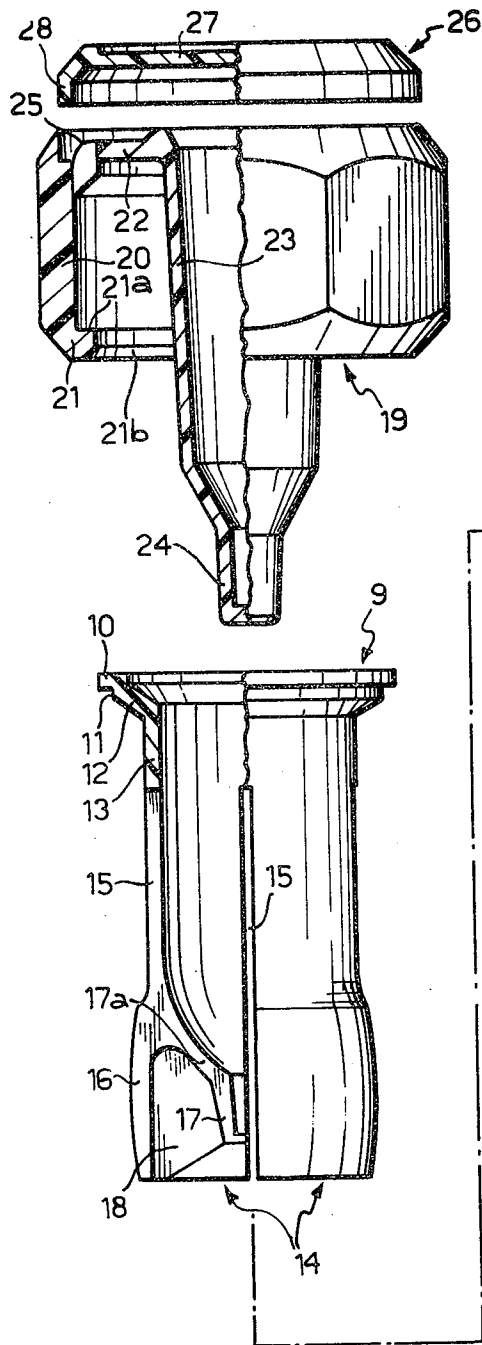
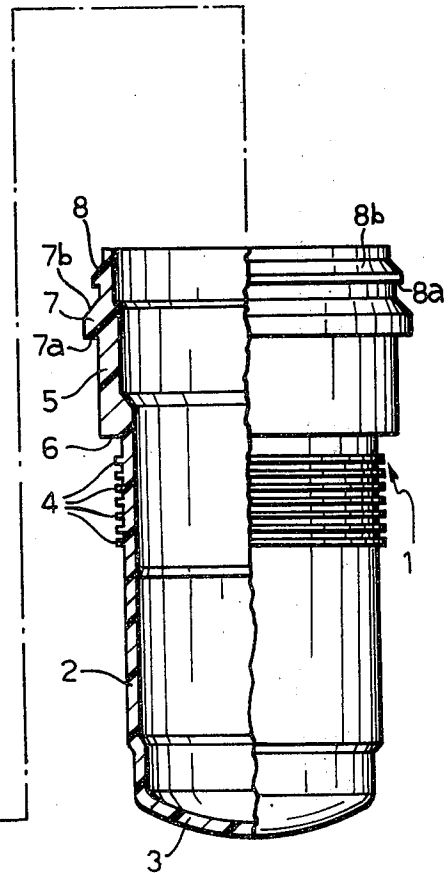
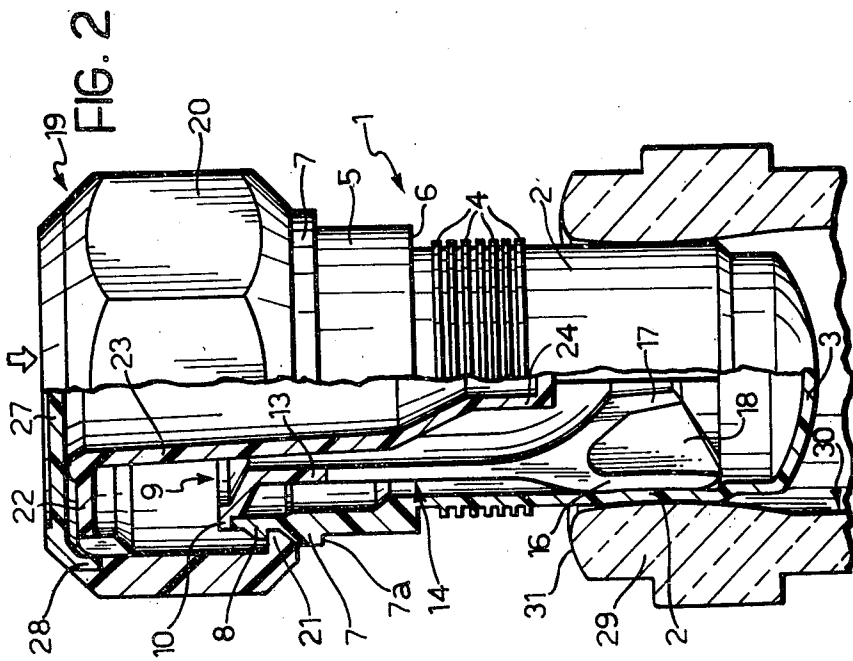
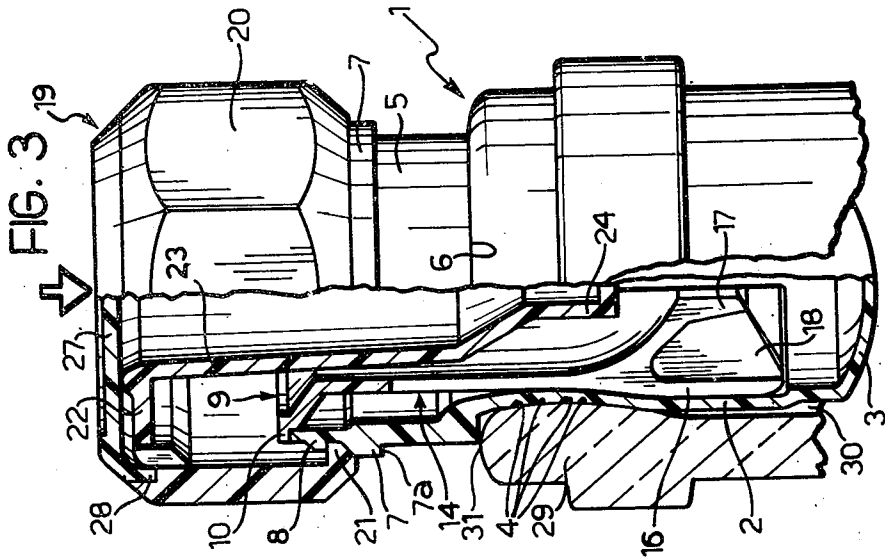
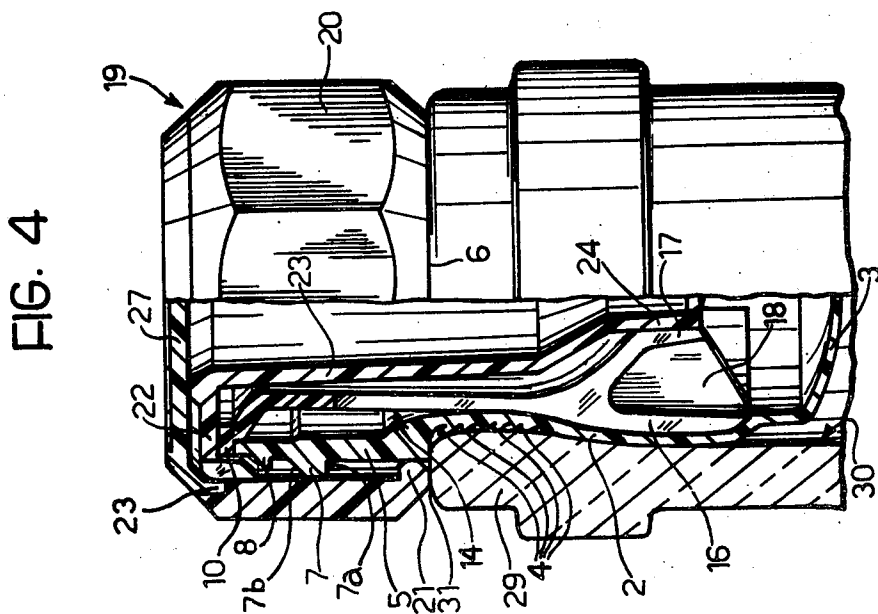
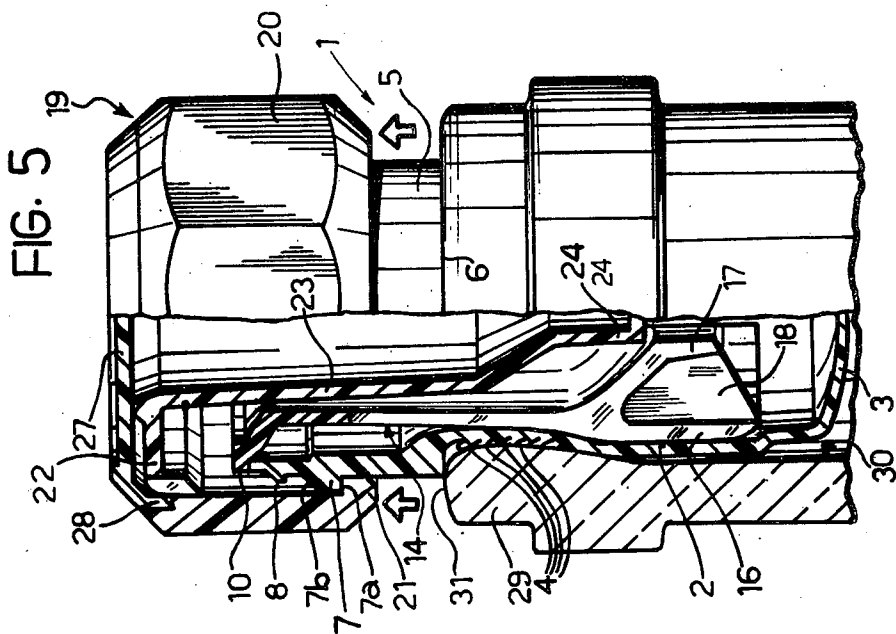


FIG. 1







STOPPER OF PLASTICS HAVING AN EXPANSIBLE PORTION FOR BOTTLES FOR SPARKLING WINES AND THE LIKE

BACKGROUND OF THE INVENTION

The present invention relates to stoppers for bottles of sparkling wines and like; in particular the present invention relates to such stoppers made from a plastics material.

The disadvantages of cork stoppers are well known, they often alter the taste of the liquid in the bottle and, in addition, difficulty is experienced in inserting corks, which require the use of special machines. Moreover, because of the limited resilience of cork stoppers it is necessary, when they are to be used on bottles containing sparkling wines, or the like, to hold them in position, such as by means of a wire clamping cage.

Plastics stoppers suffer from fewer disadvantages, but these are sometimes complicated and laborious to manufacture. In such stoppers, sealing against the high pressures inside the bottle is effected mainly by means of a number of outer annular fins on the stopper; these are forced in to a terminal section of the neck of the bottle. In order to ensure that the stopper may form an effective seal against the pressures within the bottle it is necessary for the inside of the neck of the bottle to have a perfectly cylindrical section at the end, this section being not less than 20 mm in length from the mouth; this increases the tolerance requirements of the construction of the bottle, with consequent increases in manufacturing expense. Moreover, even stoppers of plastics must be anchored to the neck of the bottle to prevent them being blown out by internal pressure; this is normally achieved either by the use of conventional wire cages, or by providing projections or lips, either internal or external, which make opening of the bottle difficult, and possible reclosure extremely difficult.

OBJECTS OF THE INVENTION

One object of the present invention is to eliminate, or at least substantially reduce, the disadvantages of previous plastics or cork stoppers.

Another object of the invention is to provide a plastics stopper suitable for bottles containing sparkling wines, which is simple and easy to use, both upon initial insertion and also upon extraction.

A further object of the invention is to provide a plastics stopper which can be used to reclose a bottle without the need for excessive muscular effort.

Yet another object of the invention is to provide a plastics stopper which can be anchored to the neck of the bottle rapidly, effectively and safely, without requiring the use of wire cages or hooks.

Still another object of the invention is to provide a plastics stopper which can be made capable of withstanding even very high inner pressures.

Yet a further object of the invention is to provide a plastics stopper which does not require accurate calibration of the neck of the bottle so that it can be used on currently available bottles of a low cost type.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a stopper for bottles for sparkling wines and the like, characterised in that it has at its lower end a part which is radially expansible, the expansion being effected by radially outward movement of a plurality of rigid inner

portions of the stopper, which are urged to move radially outwardly by axial movement of an actuating member of the stopper, which is relatively movable with respect to the remainder of the stopper, in order to clamp the stopper in position in the neck of a bottle subsequent to insertion thereof.

A preferred embodiment of the invention comprises a stopper as defined above characterised in that it comprises an outer tubular body closed at the bottom and provided with a plurality of circumferentially extending annular sealing fins, the tubular body having an upper part of larger diameter than a lower part and separated from the lower part by a shoulder which, when the stopper is inserted into the neck of a bottle, engages the mouth thereof, the upper part having two axially separated circumferentially extending annular ridges the lower of which has a diameter greater than that of the upper, an intermediate element housed coaxially within the inside of the tubular body and having a plurality of strips extending axially downwardly from the upper part of the intermediate element, and a movable member having an enlarged upper head including an annular skirt which surrounds the upper part of the said tubular body and has a radially inwardly directed annular ridge which cooperates with the said two annular ridges of the upper part of the tubular body to hold the movable member in position in the tubular body, the movable member also including an axially extending stem having an axial spigot at the lower end thereof which engages the lower ends of the strips of the intermediate element, which are so shaped that when the movable member is fully inserted into the tubular body the ends of the strips of the intermediate element are caused to move radially outwardly to clamp the stopper to the inside of the neck of a bottle when inserted therein and, when the movable member is partly withdrawn from the tubular body, to the limit imposed by engagement of the inwardly directed ridge at the bottom of the skirt of the movable member with the lower annular ridge of the tubular body, the strips are free to move radially inwardly to permit extraction of the stopper from the bottle.

Various other features and advantages of the invention will become apparent during the course of the following description, with reference to the accompanying drawings, which is provided purely by way of non-restrictive example:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded side view, shown partially in section, of a stopper of plastics formed as an embodiment of the invention suitable for bottles for sparkling wines and the like;

FIG. 2 is a partly sectioned side view of the embodiment of FIG. 1 placed into the neck of the bottle, at the beginning of a bottle closure operation;

FIG. 3, which is similar to FIG. 2, illustrates the stopper inserted fully into the neck of a bottle, but before completion of the anchoring operation;

FIG. 4 is a view similar to FIGS. 2 and 3, illustrating the stopper anchored in position in the neck of a bottle; and

FIG. 5 is view similar to FIGS. 2 to 4, illustrating the stopper in a position ready for extraction.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings, the stopper illustrated comprises a number of separate parts moulded in plas-

tics material and assembled together: the outer part of the stopper is an outer tubular body 1 moulded in flexible plastics material and comprising a tubular wall 2, closed at the bottom by a transverse web 3 and provided near its upper end with a number of flexible annular ridges 4 which act as sealing fins. The wall 2 is surmounted by a part 5 of larger diameter and of greater thickness than the wall 2, which forms, where it meets the lower part 2, an annular shoulder 6. The upper part 5 has two annular ridges, a lower ridge 7, and an upper ridge 8. Both ridges have flat lower faces 7a, 8a respectively, extending radially and substantially perpendicularly with respect to the axis of the tubular body 1, and each has a frusto-conical upper face 7b, 8b respectively. The diameter of the upper ridge 8 is less than that of the lower ridge 7.

Housed in the tubular body 1 there is an intermediate element 9, moulded from a stiff rigid plastics material, having an upper flange 10 with an annular shoulder 11 and a frusto-conical portion 12 linking it to a tubular wall portion 13 which is separated by a number of longitudinal slots 15 into a number of separate elongate segmental strips 14. Each strip 14 is bifurcated at the lower end to form an outer finger 16 which faces the lower, inner, part of the tubular wall 2 of the outer body 1, and an inner finger 17 which, with the corresponding inner fingers of adjacent elongate segmental strips 14 of the intermediate element 9, forms a central tubular passage of smaller diameter than that of the remainder of the intermediate element. Each inner finger 17 has a portion 17a which is inclined to the axis of the intermediate element 9 and between the two fingers of each strip there is a reinforcing web 18, which adds extra rigidity to the bifurcated lower part of each segmental strip.

Upon assembly the intermediate element 9 is inserted into the bore in the tubular body 1 and its upper flange 10 rests on, and is centrally located by, the upper end of the tubular body 1.

The stopper also includes a movable member, generally indicated 19, moulded in rigid plastics, which is formed with a central, hollow, substantially cylindrical stem 23 at the upper end of which there is an annular transverse web 22 from which projects a depending annular skirt 20 which, when the stopper is assembled, surrounds the upper part 5 of the tubular body 1. At the lower end of the tubular stem 23 there is an axial spigot 24 of smaller diameter. The outer face of the annular skirt 20 is provided with means for facilitating gripping; in the embodiment shown this consists of a polygonal shaping, although longitudinal grooves, scorings or projections or knurling may alternatively be provided.

The outer skirt 20 has, around its lower rim, an annular radially inwardly directed ridge 21 the upper face of which is substantially perpendicular to the axis of the central stem 23 and the lower face 21b of which is bevelled. Around the periphery of the web 22 there is an annular groove 25 into which there is engaged an annular peripheral axial lip 28 of a cover disc 26.

Upon assembly of the stopper, as shown in FIG. 2, first the intermediate element 9 is inserted into the outer body 1 and then the movable member 19 is inserted coaxially into the intermediate element 9 until the inner annular ridge 21 of the skirt 20 of the movable member 19 snaps over the upper ridge 8 of the tubular body 1. The elements forming the stopper are thus locked together and it is then ready for use. In this

condition it can be stored or transported without the elements becoming separated.

There are three stages to closing a bottle with the stopper described above. First, as shown in FIG. 2, the lower extremity of the stopper is fitted in to the neck 29 of a bottle which should be of the known type in which the inside wall 30 of the neck tapers toward the mouth. Secondly, by the exertion of an axial pressure on the upper surface of the stopper, the finned part of the tubular body 1 is forced into the neck of the bottle. At this stage the inner ridge 21 of the skirt 20 of the movable member 19 engages the upper face 7b of the lower outer ridge 7 of the tubular body 1. As shown in FIG. 3, the stopper is fully inserted when the shoulder 6 of the tubular body 1 comes into contact with the upper surface 31 of the mouth of the bottle. The finned part of the tubular body 1 is then engaged in the narrowest part of the neck of the bottle and the lower part 2 of the tubular body 1, below the fins 4, is at the level of a part of the inner wall 30 of the neck which is slightly wider than the upper narrow part in which the fins 4 are located. The ends of the fingers 15 are, however, slightly radially spaced from the wall of the neck of the bottle and, similarly, the end of the spigot 24 is slightly axially spaced from the inner fingers 17 of the bifurcated ends of the strips 15.

Upon exerting a further axial force upon the head of the movable member 19, the upper part 5 of the tubular body 1 deforms resiliently to allow the inner ridge 21 of the skirt 20 of the movable member 19 to snap engage over the lower ridge 7 of the tubular body 1; the movable member 9 thus moves axially downwards within the intermediate element and the tubular body. By varying the relative diameters of the ridges 21 and 7 the amount of force necessary to effect snap-engagement of the two can be varied. When this axial movement is completed, as shown in FIG. 4, the spigot 24 of the movable body 9 is located between the inner fingers 17 of the bifurcated ends of the strips 15 inducing radial separation of these thereby causing the corresponding portion of the outer wall 2 of the tubular body 1 to dilate resiliently and to press against the inner wall of the neck of the bottle at the part 30 which is wider than the mouth of the bottle. The stopper is thus firmly anchored to the neck of the bottle and able to resist any tendency to be forced out by pressure within the bottle due, for example, to the presence of gas; a secure seal is ensured by the annular fins 4 of the tubular body 1.

Security of sealing is maintained over a long period of time as the intermediate element 9 and the movable member 19 are both substantially rigid and thus are not liable to lose their resilience over a period of time, as could happen if the stopper was formed in such a manner as to be resiliently deformed in order to force it past the light constriction at the mouth of the bottle. In the stopper according to the invention the enlargement at the lower part of the stopper, which ensures retention, is formed after insertion of the stopper by means of the radial outward movement of substantially rigid parts which thus cause the lower part of the tubular body of the stopper to be pressed firmly against the inner widened wall of the neck.

In order to effect extraction of the stopper the movable body 19 is first moved axially with respect to the other two parts by gripping the annular skirt 20 and pulling it out until the annular ridge 21 of the skirt 20 comes into contact with the lower outer ridge 7 of the tubular body 1. The spigot 24 is thus withdrawn from

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engagement with the inner fingers 17 of the bifurcated ends of the strips 15 which are thus no longer held in their expanded positions thereby allowing manual withdrawal of the stopper from the bottle without requiring excessive effort.

After withdrawal of the stopper it can be replaced, if required, into the neck of the bottle, which can even be hermetically sealed thereby, simply by effecting, without difficulty, the same operations, as described above, for initial closure.

The stopper described can be used with bottles of simple and economical construction in which the inner surface of the neck has a substantially cylindrical portion of restricted length (5-6 mm), which is very much less than that (20 mm) required for conventional cork stoppers: It is thus possible to form bottles with a much shorter neck which can nevertheless be adequately sealed by the stopper of the present invention and the constructional complications needed to make an elongated cylindrical neck can be avoided; bottles can thus be made to a shape more nearly that which they naturally adopt from the blowing process.

I claim:

1. A stopper for bottles of sparkling wine and the like comprising:

a body member,

an actuating member housed within said body member and axially slidable with respect thereto,

a plurality of radially movable inner parts, and means interconnecting said radially movable inner parts to said actuating member such that relative axial movement of said actuating member with respect to said body member in a first direction causes radially outward movement of said movable inner parts thereby causing radial expansion of a part of said stopper whereby to clamp said stopper to the inside of the neck of a bottle when positioned therein, and axial movement of said actuating member with respect to said body member in a second direction permits radially inward movement of said movable inner parts whereby to release said stopper for withdrawal,

said body member is formed as an outer tubular body,

a transverse wall closing the bottom of said tubular body,

a plurality of annular sealing fins extending circumferentially around said body,

said body having an upper part of larger diameter and a lower part of smaller diameter, an annular shoulder separating said upper part from said lower part, said annular shoulder providing an abutment which, when said tubular body is inserted into the neck of a bottle, rests on the mouth of said bottle to define the maximum distance said tubular body can be inserted into said bottle,

upper and lower circumferentially extending, axially separated, annular ridges on said upper part of said

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tubular body, said lower annular ridge having a larger diameter than said upper annular ridge, said radially movable inner parts being carried by an intermediate element having an upper part and, a plurality of strips extending axially downwardly from said upper part, the lower ends of said strips constituting said radially movable inner parts, said actuating member being formed as a movable member having;

an enlarged head including an annular skirt, said annular skirt surrounding said upper part of said tubular body,

an annular ridge projecting radially inwardly from the lower edge of said skirt, said inwardly directed annular ridge cooperating with said two outwardly directed annular ridges of said tubular body to hold said movable member in position thereon,

an axially extending stem the lower end of which engages said lower ends of said strips of said intermediate element which are so shaped that when said movable member is fully inserted into said tubular body the ends of said strips of said intermediate element are caused to move radially outwardly to clamp said stopper to the inside of the neck of a bottle, when inserted therein, and when said movable member is partly withdrawn from said tubular body, to the limit imposed by engagement of said inwardly directed annular ridge at the bottom of said skirt of said movable member with said lower annular ridge of said tubular body, said strips are free to move radially inwardly to permit extraction of said stopper from the bottle.

2. A stopper as in claim 1, wherein said tubular body is moulded in flexible plastics and said intermediate element and said movable member are both moulded in a substantially rigid plastics material.

3. A stopper as in claim 1, wherein said movable member is provided with an additional cover over said upper part thereof.

4. A stopper as in claim 1, wherein the lower faces of said two outwardly directed annular ridges of said tubular body are substantially perpendicular to the axis of said tubular body and the upper faces thereof are inclined with respect to said lower faces to form frusto-conical surfaces,

the upper face of said inwardly directed annular ridge at the bottom of said skirt of said movable member being substantially perpendicular to the axis of said movable member and the lower face thereof being inclined with respect to said upper face thereof to form a frusto conical surface permitting snap engagement of said annular ridge of said skirt over said two annular ridges of said tubular body, said upper face of said annular ridge on said skirt and said lower face of said lower annular ridge of said tubular body abutting to define the upper limit of movement of said movable member with respect to said tubular body.

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