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BOTTLE CLOSURE

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FIG. 1

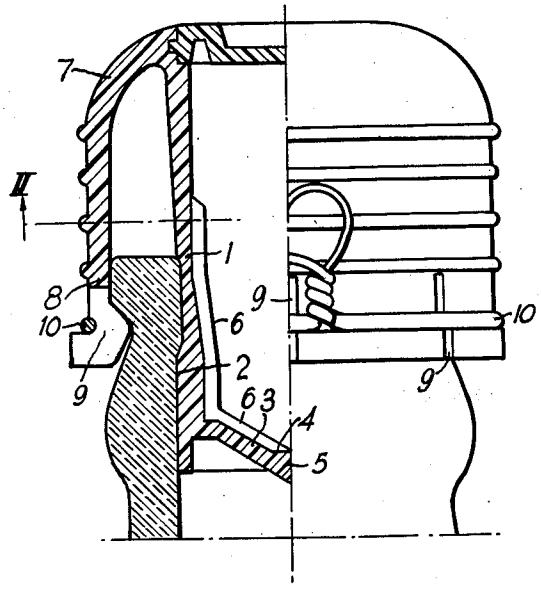
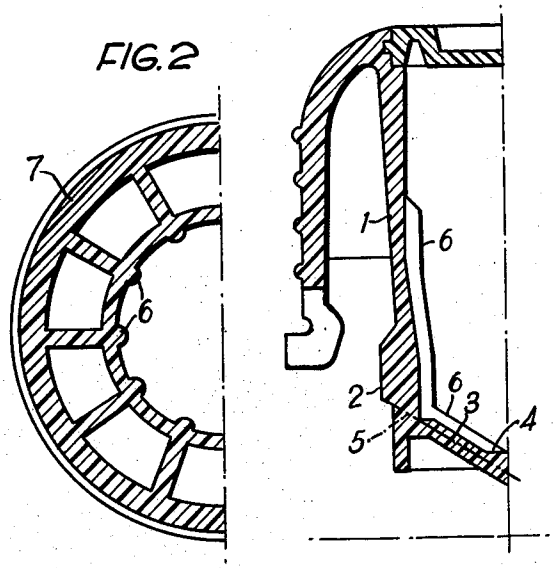


FIG. 3

FIG. 2



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BOTTLE CLOSURE

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4 Claims. (Cl. 215—52)

This invention relates to a bottle closure of elastically resilient synthetic material having a tubular sealing member adapted to be pressed into the inner surface of a bottle neck for sealing engagement with the same, and connected at its upper end with a covering cap portion extending down over the outside of the upper bottle neck portion in gripping engagement therewith, said tubular closure member at its lower end having a central bottom piece or closure wall to close the tubular sealing member.

In known bottle closures of this type the bottle closure is generally formed of an upper cap-shaped portion. Bottle closures of this type are not capable of a reliable, tight closing of the bottle if its content is under high pressure, as for instance in champagne bottles.

A bottle closure according to the invention is specially intended for use in bottles under pressure where the closure has to resist high pressure, though the closure according to the invention can also be used advantageously in other bottles.

It is an object of the present invention to provide a bottle closure capable of ensuring a better closure of the bottle even if it has to withstand high pressures. It is an essential feature of the invention that the said closure wall, which is provided at the inside of the tubular sealing member and closes its central opening, is formed of a wall portion extending from near the lowermost end of the closure member obliquely downwards to the longitudinal axis of the bottle, thus forming a depressed end portion of the closure member. The outer diameter of the annular portion of the closure member adjacent said depressed end wall in the untensioned condition of the closure is larger than the inner diameter of the corresponding part of the inner surface of the bottle neck and forms a sealing list which is compressed when the closure is inserted into the bottle neck. Preferably, the depressed end wall of the closure member has the shape of a cone tapering downwards. It is further advantageous to provide longitudinal reinforcing ribs on the inside of the closure member and possibly also along said closure wall.

Other features and advantages of the invention will be apparent from the following description of an embodiment illustrated in the accompanying drawing.

FIG. 1 is a side view with its left half in section of a bottle closure according to the invention mounted on the mouth of a bottle. FIG. 2 is a section along line II—II in FIG. 1. FIG. 3 is a section similar to that of the left half of FIG. 1 showing sealing means in their untensioned shape before inserting the closure into the bottle mouth.

The bottle closure illustrated, which is preferably of synthetic, thermoplastic material, comprises an inner sealing member 1 of tubular shape provided on the outside with an annular projection 2 forming a sealing ring which in the untensioned state illustrated in FIG. 3 has an outer diameter larger than the inner diameter of the portion of the bottle neck engaged by said sealing ring when the closure is inserted into the bottle mouth. The sealing member 1 is near its lower end closed by a closure wall 3 extending from the member 1 obliquely downwards and inwards to form a downwards tapering cone. On the inside of said cone there is a small plane central surface 4. The sealing ring 2 and the closure wall 3 are placed in such relationship to each other that the center line 5 of

the closure wall 3 section meets the outer periphery of the sealing member 1 where the lower end of the sealing ring 2 is situated. The sealing member 1 is on its inside provided with regularly shaped, longitudinal reinforcing ribs 6 of which there are twelve in the embodiment illustrated in the drawing. These reinforcing ribs 6 extend from a level above the upper end of the bottle neck to the border portion of the closure wall 3 and preferably also further along the inside of said closure wall, as shown in FIGS. 1 and 3. The sealing member 1 is at its upper end connected to a covering cap portion 8 enclosing the outside of the bottle mouth by a connection 7 in the form of an upturned U. The cap portion has a thickened lower border portion adapted for engaging the underside of a widened head of the bottle neck and has longitudinal slots 9 to divide said border into a number of flaps resiliently engaging said bottle neck head and maintained in this engagement by appropriate tie means, such as a wire 10.

As stated above, the outer diameter of the sealing ring 2 in the untensioned state is larger than the inner diameter of the corresponding inner surface of the bottle mouth. When the sealing member 1 is pressed into the bottle mouth, said sealing ring will be compressed inwards, which results in a constriction of the periphery of the conical closure wall 3. Since the sealing ring and the closure wall 3 strive to restore themselves to their original shape, the sealing ring will be pressed onto the bottle mouth surface with a force which depends on the thickness of the sealing ring and the closure wall 3 and on the angle between said closure wall and the axial direction of the bottle neck. It will thus be possible to determine in advance the magnitude of the pressure exerted by the sealing ring on the bottle mouth surface. When the bottle closure is pressed into its place in the bottle mouth and if thereafter the pressure rises within the bottle, this increasing pressure will exert an increasing force from below on the conical closure wall 3, which tends to flattening and thereby to exert an increased radial force outwards on the sealing ring 2. The sealing ring will thus be pressed onto the bottle mouth surface with a pressure which is directly dependent on the pressure within the bottle. For this reason, the bottle closure according to the invention is specially well adapted for bottles containing fluids under pressure, such as champagne. The reinforcing ribs 6 give the closure member 1 sufficient stiffness for its pressing into the bottle mouth without prejudice to the necessary elastic deformability of the walls which can be made with little thickness and thereby need lesser quantities of material for their manufacture.

The invention is not limited to the embodiment above described and illustrated in the drawing. Within the scope of the invention the form of the conical closure wall can be modified, for instance by giving it different conicity on its outside and on its inside or otherwise varying thickness, by giving the inner cavity of the wall a frustrated cone shape and by making the closure wall 3 and the walls of the sealing member 1 of different thickness.

What I claim is:

1. A bottle closure of elastically resilient synthetic material comprising a tubular sealing member for sealing engagement with the inner surface of the bottle neck, a covering cap portion extending from the upper end of said sealing member downwards over the outside of the bottle neck top and having inner projections engaging the underside of a widened head portion of the bottle neck, a closure wall closing the tubular sealing member near its lower end extending from near the lower end of said sealing member inwards and downwards obliquely relative to the axis of the bottle to form a cup-shaped closed end portion of said sealing member, longitudinal reinforcing ribs on the inside of said sealing member in regular peripheral spaces extending at least along the length of the seal-

ing member to be inserted into the bottle neck and down to said closure wall, an annular projection forming a sealing ring on the outside of the sealing member near its lower end, said sealing ring having in the untensioned state of the bottle closure a diameter larger than the inner diameter of the part of the bottle neck engaged thereby.

2. A bottle closure of elastically resilient synthetic material comprising a tubular sealing member for sealing engagement with the inner surface of the bottle neck, a covering cap portion extending from the upper end of said sealing member downwards over the outside of the bottle neck and having inner projections engaging the underside of a widened head portion of the bottle neck, a closure wall closing said tubular sealing member near its lower end extending from near the lower end of said sealing member inwards and downwards obliquely relative to the axis of the bottle to form a cup-shaped closed end portion of said sealing member, longitudinal reinforcing ribs on the inside of said sealing member in regular peripheral spaces extending at least along the length of the sealing member to be inserted into the bottle neck, down to said closure wall and inwardly along the upper surface thereof, an annular projection forming a sealing ring on the outside of the sealing member extending axially from the junction of the closure wall and the tubular sealing member upwards and having in the untensioned state of the bottle closure a diameter larger than the inner diameter of the part of the bottle neck engaged thereby.

3. In combination, a bottle for containing fluid under pressure, said bottle having a neck with an interior annular recess; a closure of resilient synthetic material comprising a tubular sealing member having a lower end portion inserted in and sealingly engaging said neck, a convex closure wall extending from said lower end portion inwards and downwards substantially to a center point thereof in a direction oblique to the longitudinal axis of said tubular member and of said neck so as to close said tubular member near the lower end portion thereof said wall being so shaped that any internal pressure within the bottle acting substantially in an axial direction against the outside of said convex wall is transmitted thereby to said lower end portion as a force directed toward the circumference of said tubular member, and a sealing sleeve in

the shape of an annular projection surrounding said lower end portion and sealingly received in said recess so that in response to pressure internal to said bottle the sealing sleeve will, by the force transmitted to said lower end portion be pressed against the inner surface of said recess into even firmer sealing engagement therewith.

4. A bottle closure of resilient synthetic plastic material for sealing a bottle against leakage in response to internal pressure, comprising a tubular sealing member having a lower end portion adapted to be inserted in and to sealingly engage the inner surface of the neck of a bottle; a convex closure wall extending from said lower end portion inwards and downwards in a direction oblique to the longitudinal axis of said tubular member and to a point located on said axis to close said tubular member near said tubular end portion; said closure wall being so shaped that any internal pressure in the bottle acting substantially in an axial direction against the outside of said convex wall is transmitted thereby to said lower end portion as a force directed toward the circumference of said tubular member; and a sealing sleeve comprising an annular projection surrounding said lower end portion and arranged to be sealingly received in the neck of a bottle when said lower end portion is inserted into such neck so that, in response to internal pressure in the bottle, the force transmitted to said lower end portion presses said sealing sleeve against and into firm sealing engagement with the inner surface of the neck of the bottle.

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