

[54] AUTOMATIC ARRANGEMENTS FOR  
STOPPERING RECEPTACLES  
CONTAINING LIQUIDS AT ATMOSPHERIC  
PRESSURE

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[58] Field of Search 220/44 R, 24.5, 60 A, DIG. 19;  
137/525; 251/339, 353; 222/518; 401/205, 206

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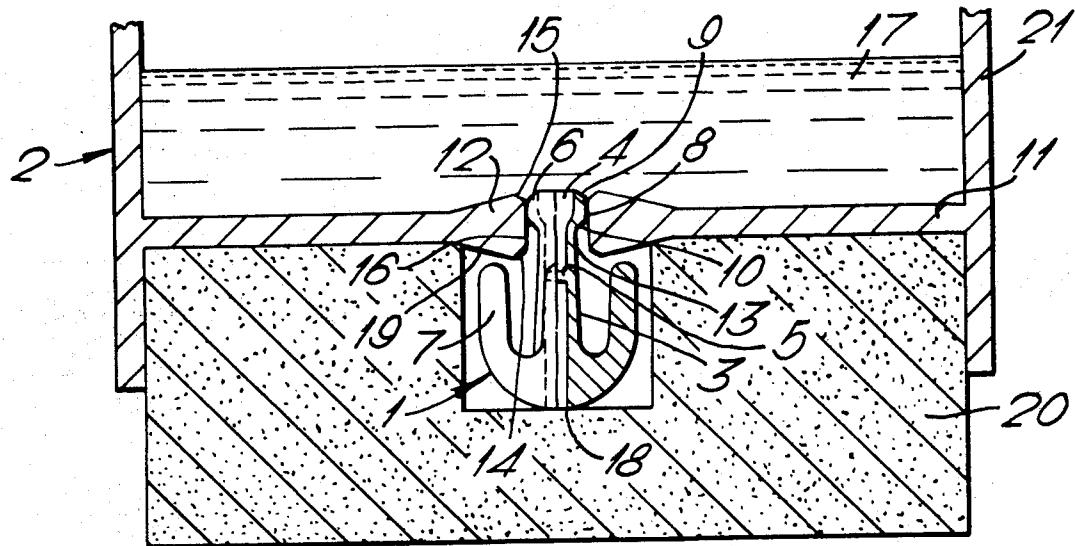
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ABSTRACT

In an arrangement for stoppering receptacle containing fluids, frustoconical seat portions are provided in a thickened zone around a cylindrical bore in a receptacle wall. A stopper has a stem thinner than said bore to allow passage between them; at one end of the boss there are resilient arms and, at the other end, a boss with a cylindrical portion to engage said bore in a permanently closed position and frustoconical portions to engage said frustoconical seat in a temporarily closed position.

1 Claim, 3 Drawing Figures



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Fig. 1.

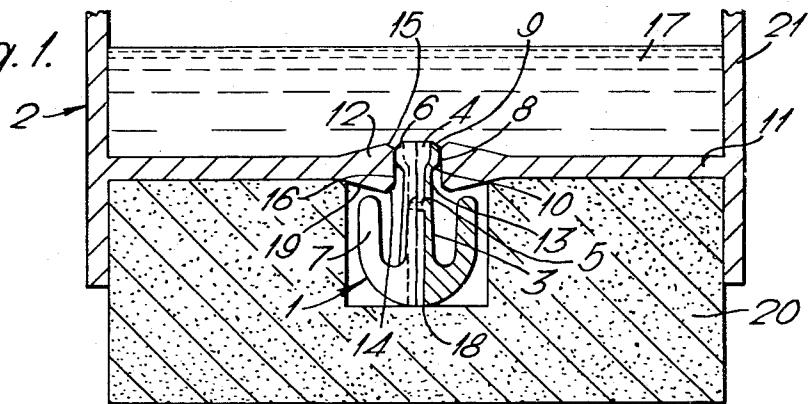


Fig. 2.

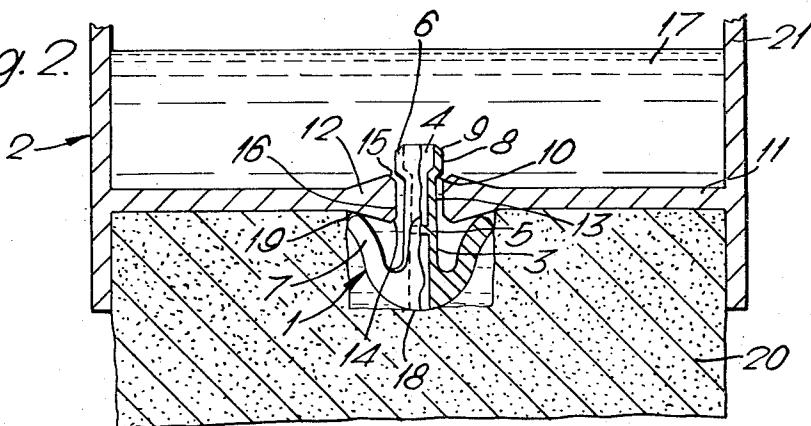
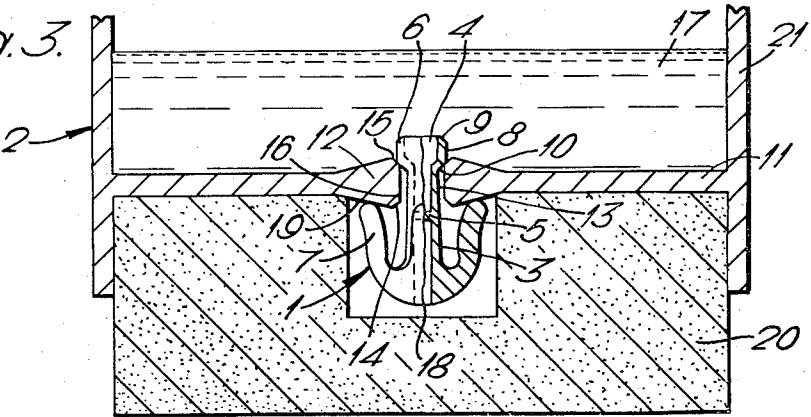


Fig. 3.



**AUTOMATIC ARRANGEMENTS FOR  
STOPPERING RECEPTACLES CONTAINING  
LIQUIDS AT ATMOSPHERIC PRESSURE**

**BACKGROUND OF THE INVENTION**

**Field of the Invention**

The present invention relates to improvements in automatic stoppering arrangements for receptacles containing liquids at atmospheric pressure, of the type comprising a body portion having a seat, a stopper member movable with respect to said body portion and a resilient biasing member which tends to hold the stopper member against the seat, wherein closure is achieved by stopper means in combination with resilient actuating means therefor and seat means for said stopper means, so that the stopper means forms an integral part with the resilient means, whilst the seat means is integral with the body portion of the receptacle to be closed.

The object of the present improvements is a simplification of the receptacle body portion seat means and a simplification of the stopper means, whilst at the same time the peculiar advantages of the above described arrangement are maintained.

**SUMMARY OF THE INVENTION**

The inventive improvements provides a stopper means which forms part of a member having a boss with a cylindrical central portion and frustoconical end portions. Extending axially from one of said ends there is a stem connected to the resilient means in such a way that, in the permanently closed position, the cylindrical portion of said boss engages the inner wall of said seat means, with mutual contact over the whole of said portion, whilst for the temporary closure position, said boss is moved out of engagement with said inner wall towards the interior of the receptacle. The boss is prevented falling into the receptacle by the resilient means and a new stoppering contact is obtained between the bevelled surface of the frustoconical end of the boss of the stoppering means and the corresponding frustoconical flank of the seat means, temporary opening of the receptacle being achieved by pressing externally on the stem to overcome the action of the resilient means. Once the pressure is released the resilient means reclose the stopper means against the seat.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Other objects and features of the invention will be disclosed in detail in the following description, with reference to the attached drawings in which:

FIG. 1 is a diametral sectional view of a device according to the invention in the permanently closed position of the receptacle.

FIG. 2 is a similar view to that of the previous Figure, showing the temporarily open position of the receptacle.

FIG. 3 is a similar view to those of the previous Figures, showing the temporarily closed position of the receptacle.

**DETAILED DESCRIPTION OF THE INVENTION**

The device according to the invention comprises an injected or blow moulded plastics body member 1, fitted to a plastic receptacle 2 to be stoppered.

The body member 1 comprises a stem 3 with an axial bore 4 intercepted by an intermediate wall 5. At one end of said stem there is a boss 6 constituting the stoppering means and the other end has radial arms 7, constituting said resilient means and extending towards said boss 6 parallelly of the stem 3 or flared outwardly therefrom.

The boss 6 has a central cylindrical portion 8 and frustoconical end portions 9 and 10.

10 In the centre of the end wall 11 of receptacle 2 there is an annular thickened portion 12, with a trough bore 13 having frustoconical flanks 14 and 15 at each end, which flanks engage with the flanks 9 and 10 respectively of the movable body member 1. The engagement 15 of the cylindrical portion 8 of the boss 6 with the wall 16 of the bore 13 ensures centering and axial slidability of the body member 1, resilient action being provided by the bore 4. When cylindrical portion 8 is engaged by the inner wall 16 of bore 13, the receptacle 2 containing 20 the liquid 17 is permanently closed.

The permanently closed position, that is, when storing or transporting of the receptacles 2, is as described above and shown in FIG. 1, in which said receptacles 2 are sealed tight. In this position the stopper is held 25 stationary and the resilient means 7 are inoperative, whilst the boss 6 is held by compression in the thickened portion 12.

The receptacle 2 is temporarily opened by pressing the stem 3 at its outer end 18, as shown in FIG. 2, urging the boss 6 out of the bore 13 and into the receptacle 2 thereby opening a free passage between said boss 6 and thickened portion 12, whereby the liquid 17 can flow out through bore 13. In this position the resilient means comes into play so that the legs 7 engage the outer portion 19 of the thickened portion 12, pressing with resilient pressure equivalent to a reaction which is balanced by the effort exerted on the end 18 of the stem 3.

When the pressure on stem 3 is released, the legs 7 recover and make the stem recede until the boss 6 is applied against the stoppering seat, so that the frustoconical flank 14 of the boss bears against the frustoconical flank 15 of the thickened portion 12, closing the bore 13 as shown in FIG. 3. This position is permanent 45 during the period of utility of the receptacle 2, nevertheless outflows of liquid may be obtained whenever desired by applying pressure to the boss 6 as shown for the temporarily open position.

There is shown in the Figures a spongy body 20 applied in the lower portion of the receptacle 2, that is, in an extension of its walls 21, which constitutes an example of application of the inventive device.

Having conveniently described the features of the invention, it is stated that as many variations of detail as recommended by experience may be incorporated therein, provided that thereby no modification is made to its essence as defined in the following claims.

What I claim is:

1. Improvements in automatic arrangements for stoppering receptacles containing liquids at atmospheric pressure, of the type comprising a receptacle body defining seat means; stoppering means constituted by a stopper movable relative to said body; resilient means integral with said stoppering means for actuating said stoppering means; said resilient means being constituted by a reactive resilient member tending to hold said stopper applied against said seat means, whilst said

seat means is integral with the body of the receptacle to be stoppered, characterised in that said movable stopper forms part of a portion having a boss with a cylindrical centre portion and frustoconical end portions; a stem extends from one of said frustoconical ends and connects said reactive resilient member thereto, said resilient member having a plurality of resilient arms extending therefrom towards said boss; said receptacle body seat means is constituted by a thickened portion in one end wall of said receptacle, said thickened portion having a cylindrical through bore with outwardly flared frustoconical seat portions adapted to engage with the end portion of said boss, whilst the cylindrical wall of said through bore is adapted to engage the cylindrical centre portion of said boss; the relative positions of said stopper and said seat means providing for three positions, a first or permanently closed position, a second or temporarily closed position and a third or temporarily open position, said permanently closed position being obtained when said cylindrical portion of 20

said boss is in engagement with the cylindrical wall of said through bore over the whole of their cylindrical surfaces; said temporarily closed position being obtained by urging said boss out of the bore and into the receptacle by pressing on the end of the stem opposite to said boss, said boss being prevented from falling into the receptacle by the effect of said reactive resilient member, the arms of which engage the outer surface of said one end wall and which tends to urge said boss back into said bore, a stoppering contact being established between the flank of said one frustoconical end and the interior one of said frustoconical seat portions; the temporarily open position of the receptacle being obtained by pressing the external end of the stem, when in the temporarily closed position, overcoming the action of the reactive resilient element, said resilient member returning to the temporarily closed position on relief of said external pressure.

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