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SELF CLOSING STOPPER FOR RECEPTACLES

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Fig. 1.



Fig. 2.

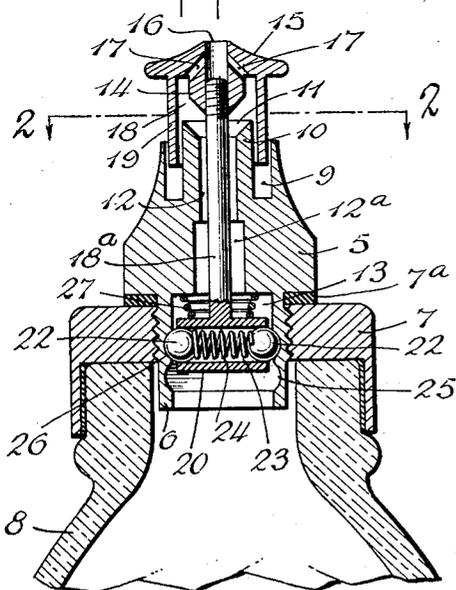


Fig. 3.

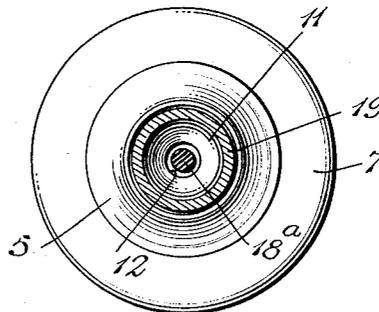
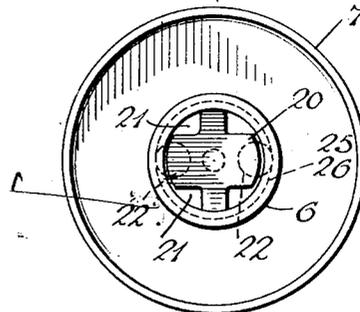


Fig. 4.



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SELF CLOSING STOPPER FOR RECEPTACLES

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The invention relates to receptacles designed to contain fluids and more particularly to bottles or vials adapted to contain perfume and equivalent liquids and has for its object to provide a stopper of simple and novel construction whereby the receptacles will be automatically sealed and which may be readily adjusted to fixed positions to respectively permit the contents to be expelled in drops or other relatively small quantities by a shaking movement of the receptacle, and to efficiently seal the receptacle against leakage.

Other objects will appear from the description hereinafter, and the features of novelty will be pointed out in the claims.

In the accompanying drawing, which illustrates an example of the invention without defining its limits, Fig. 1 is a side elevation of a perfume bottle equipped with the novel stopper; Fig. 2 is a fragmentary sectional view thereof; Fig. 3 is a horizontal section on the line 2-2 of Fig. 1, and Fig. 4 is an inverted plan view of Fig. 3.

In the illustrated example the stopper comprises a body or head 5, from one end of which a tubular neck 6 of relatively smaller diameter projects in an axial direction, said neck being provided with external screw threads adapting it for threaded connection with a collar 7 fixed in any conventional manner upon the exit end of a bottle or other receptacle 8; if desired, a suitable gasket 7^a may be located between the body 5 and collar 7, as shown in Fig. 2. At its outer end the body 5 is provided with an annular recess 9 which surrounds a cylindrical boss 10, which preferably projects outwardly beyond the body 5 and has its outer end internally shaped to constitute a valve seat 11, which forms the outer end of a bore or passage 12 extending axially through the body 5 and communicating with the interior chamber 13 of the neck 6, as shown in Fig. 2. The valve seat 11 co-operates with an external valve member 14 forming an inward axial extension of a cap 15 having an exit channel 16. The latter is connected by means of preferably inclined exit passages 17 with an interior chamber 18 formed by an annular

flange 19 extending in an axial direction from the cap 15 and projecting slidably into the annular recess 9 of the body 5 in enclosing relation to the cylindrical boss 10, as shown in Fig. 2. The inner end of the exit channel 16 is screwthreaded for the reception of the threaded outer end of a rod 18^a which extends axially through the bore or passage 12 and terminates at its inner end in a head 20 movably located within the chamber 13 of the neck 6; the rod 18 is of smaller diameter than the axial bore or passage 12, so that in the assembled condition of the parts an annular space surrounds said rod 18 to provide communication between the chamber 18 of the cap 17 and the interior of the bottle 8 when the valve 14 is in its open position, as will be more fully described hereinafter.

In the preferred arrangement, the inner end of the bore or passage 12 may be somewhat enlarged, as indicated at 12^a for the purpose to be more fully described hereinafter. The head 20 is of cruciform construction, as shown in Fig. 4, to provide exit passages 21 for the liquid from the bottle 8, it being understood that any equivalent form of head may be substituted for the one shown in the drawing. For the purpose of fixing the valve 14 in its open and closed positions respectively, the head 20 and sleeve 6 are provided with detent means cooperating to fix said valve 14 in either of its positions. In the illustrated example, the detent means comprises balls 22 contained in a recess 23, with which the head 20 is provided and controlled by a spring 24, also located in said recess 23, and cooperating annular grooves 25 and 26 formed on the interior surface of the sleeve 6, and so located as to properly position the valve 14 in its closed and open positions, respectively. To facilitate the operation of the stopper, a preferably conical coil spring 27 is located in the chamber 13 with its enlarged end in engagement with the body 5 and its reduced end in engagement with the head 20.

In the normal condition of the parts, in which the bottle 8 is sealed, the valve 14 is located in engagement with the seal 11, and the balls 22 are positioned in the groove 25

to yieldingly and firmly fix said valve 14 in such closed position. When it is desired to expel the contents of the bottle 8, a pressure is exerted on the head 15 to axially shift the parts outwardly to the position shown in Fig. 2 and to move the valve 14 in an axial direction to its open position away from the seat 11. In this condition the liquid is free to pass from the bottle 8 through the passages 21 into the enlarged portion 12^a of the bore 12 to constitute what may be termed a supply of such liquid. If the bottle 8 is now subjected to a shaking movement, the liquid will be expelled from the enlarged portion 12^a through the bore 12 and into the chamber 18 of the cap 15 and therefrom through the exit channels 17 and exit passage 16 in successive drops or other small quantities. As the aforesaid outward pressure is exerted upon the cap 15 to open the valve 14, the tension of the spring 24 will be overcome so that the balls 22 will yield inwardly and pass from the groove 25 to the groove 26, to thereby firmly and yieldingly hold the valve 14 in its open position. No effort on the part of the operator is thus necessary to maintain said valve in its open position, with the result that only one hand is required to manipulate the stopper and to shake the bottle 8 for the purpose of expelling some of its contents. When a sufficient supply of the latter has been forced from the bottle 8, the valve 14 may be returned to its closed position on the seat 11, by simply exerting an inward axial pressure on the head 15, which will cause the balls 22 to again yield inwardly and to pass from the groove 26 back to the groove 25 to thereby again yieldingly fix the valve 14 in its closed position, and to effectively seal the bottle against leakage or any further expulsion of its contents. This return movement of the valve to its closed position is assisted by the spring 27; it will be understood that the tension of the latter, even when fully compressed, is not sufficient to overcome the tension of the spring 24 whereby the balls 22 are maintained in the groove 26.

The stopper is extremely simple in construction and normally provides an efficient seal for the bottle, enabling the latter to be carried about in any position without danger of leakage or the spilling of its contents. At the same time the valve is capable of being adjusted to a fixed outer position, without material effort, so that the stopper provides a means whereby the contents of the bottle may be efficiently expelled in successive drops, or other limited quantities. While the stopper is adapted particularly for use in connection with receptacles for perfumes, it may obviously be used with equal efficiency as a closure for bottles or other receptacles designed to contain other liquids. The stopper may readily be disconnected from

the bottle 8 by simply unscrewing it from the collar 7 and may itself be disassembled by simply unscrewing the cap 15 from the rod 18. It is thus possible to easily and efficiently maintain the stopper in a sanitary condition and in a condition of maximum operativeness.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. A stopper of the kind described, comprising a body arranged to be attached to the exit end of a receptacle in communication with the interior thereof, a valve seat combined with said body, a valve movable toward and away from said seat to close and open said receptacle, and detent means located on said body, cooperating detent means carried by said valve and movable therewith, one of said detent means being yieldable for yieldingly fixing said valve in both its closed and open positions respectively.

2. A stopper of the kind described, comprising a body arranged to be externally attached to the exit end of a receptacle in communication with the interior thereof, a valve seat located at the outer end of said body, a valve exteriorly of said body and axially movable toward and away from said seat to close and open said receptacle, detent means interiorly located on said body, and cooperating yielding detent means carried by and movable with said valve for yieldingly fixing said valve in both its closed and open positions respectively.

3. A stopper of the kind described, comprising a body arranged to be externally attached to the exit end of a receptacle and provided with an axial bore and a continuing internal chamber communicating with the interior of said receptacle, a valve seat at the outer end of said bore located outwardly beyond said body, an externally located valve axially movable toward and away from said seat to close and open said receptacle, and yielding detent means within said interior chamber including yielding devices, carried by said valve and movable therewith for yieldingly fixing the latter in both its closed and open positions respectively.

4. A stopper of the kind described, comprising a body having an axial bore extending therethrough, a screwthreaded integral neck projecting from said body for connecting it with a receptacle, a cylindrical boss formed inwardly of said body as an integral part thereof, and projecting axially thereof, said boss with said body forming an annular recess, a valve seat at the outer end of said boss forming the outer terminus of said bore, an external valve cooperating with said seat to open and close said receptacle, an apertured cap carrying said valve, an annular

flange carried by said apertured cap and extending slidably into said annular recess in enclosing relation to said boss, detent means located within said neck and cooperating yielding detent means carried by said valve for yieldingly fixing it in its closed and open positions respectively.

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5. A stopper of the kind described, comprising a body having an axial bore extending therethrough, an integrally screwthreaded neck projecting from said body for connecting it with a receptacle, said neck being provided with internal annular grooves, a cylindrical boss formed inwardly of said body and projecting axially thereof, said boss with said body forming an annular recess, a valve seat at the outer end of said boss forming the outer terminus of said bore, an external valve cooperating with said seat to open and close said receptacle, an apertured cap carrying said valve, an annular flange carried by said cap and extending slidably into said annular recess in enclosing relation to said boss, a cruciform head movably located within said neck and connected with said valve, and spring pressed detent balls carried by said head and cooperating with said internal grooves to yieldingly fix said valve in its closed and open positions respectively.

In testimony whereof I have hereunto set my hand.

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