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DROP CLOSURE FOR BOTTLES, RECEPTACLES, AND THE LIKE

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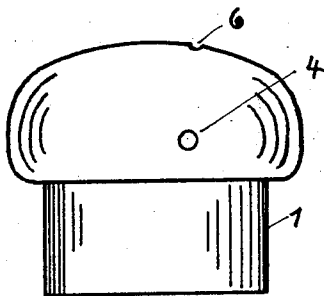


Fig. 1

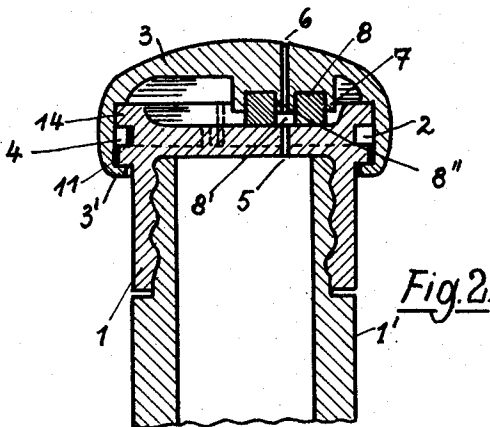


Fig. 2

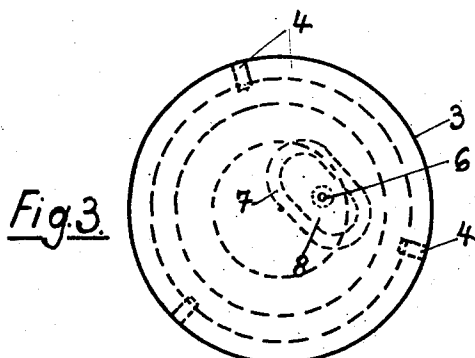


Fig. 3

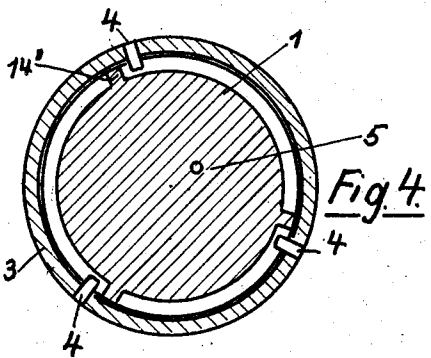


Fig. 4

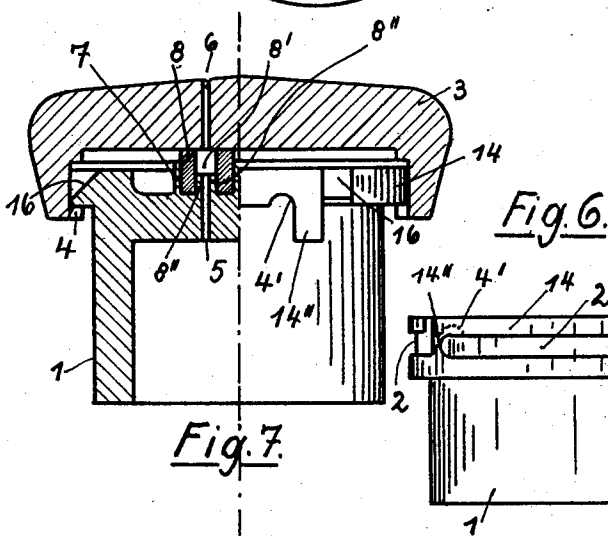


Fig. 6

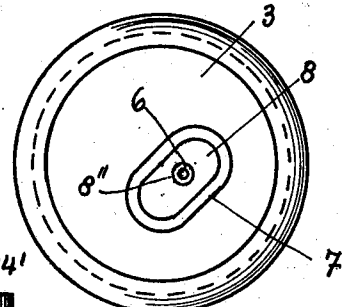
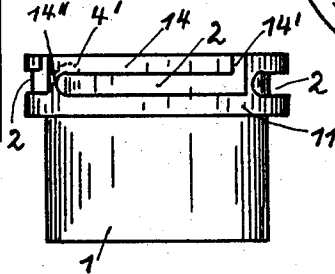


Fig. 5

Fig. 7



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## UNITED STATES PATENT OFFICE

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DROP CLOSURE FOR BOTTLES, RECEPTACLES AND THE LIKE

Application filed March 25, 1930, Serial No. 438,833, and in Germany March 28, 1929.

The invention relates to a drop closure for bottles, receptacles and the like in which a cover is rotatably mounted on a closure cap placed upon the neck of the bottle or directly on an upper closing wall of the bottle neck, this cover and this closure cap or this closing wall being provided with concurring outlet openings adapted to be brought into and out of juxtaposition with one another by the turning movement of the cover.

It has already been proposed to guide the cover in its turning movement by means of two diametrically arranged pins projecting in one or two grooves on the cap and to insert between the cover and the closure cap an elastic intermediate pad the elasticity of which is utilized for securing the cover in its two end positions for opening and closing the outlet openings. In this construction guiding the cover only in two diametrically situated points of the cap and, therefore, permitting the cover to balance, there is the necessity that the elastic intermediate pad is applied with a relatively large surface to the whole inner surface of the cover or of the cap respectively in order to obtain an uniform distribution of the elastic action with regard to the securing and the tightening of the cover and, in this way, to prevent the cover from balancing even in the case of an unilateral pressure exerted upon the cover.

But when using an intermediate elastic pad having a large area equal or approximately equal to the inner surface of the cover and at the same time the necessary high required for realizing an efficacious tightening and securing action on the cover, the adherence between the cover or the cap and the elastic pad is augmented to such an extent that the turning by hand of the cover becomes difficult owing to the high opposing adherence force. From this point of view, it is, therefore, desirable to reduce the area of the elastic pad so far as possible.

The invention has for its object to overcome the difficulties arising from these contradictory requirements. To this end according to the invention, the guiding of the rotatable cover on the closure cap or on the bottle neck is effected by means of at least three grooves

and pins provided in uniform distribution on the periphery of the cover and the closure cap or bottle neck respectively so that the plurality of these advantageously arranged guiding means secures in an efficacious manner the end positions of the cover and the tightening action of the drop closure and, at the same time, permits to employ an elastic intermediate pad of a highly reduced area without injuriously influencing this securing and tightening action. Furthermore the cover is prevented in a simple manner from balancing even in the case of an unilateral pressure exerted thereon. Owing to the possibility of reducing to a minimum the area of the elastic intermediate pad applied to the surface of the cover or the closure cap, also the adherence between these elements is correspondingly decreased and, consequently, the turning of the cover by hand is facilitated. This considerable reduction of the pad surface possible according to the invention includes also the possibility to render the elastic pad relatively high and thereby to increase its tightening and securing action.

In the drawing in which a form of construction of the improved drop closure is illustrated by way of example

Fig. 1 shows a side view of a drop closure according to the invention.

Fig. 2 is a vertical section through the drop closure of Fig. 1.

Fig. 3 is a plan view of this drop closure.

Fig. 4 is a horizontal section through the drop closure of Fig. 1.

Fig. 5 shows the inside of the cover of this drop closure.

Fig. 6 is a side view of the closure cap of the drop closure of Fig. 1.

Fig. 7 shows a modified form of the closure cap.

The drop closure shown in Figs. 1 and 2 consists of a closure cap 1 which is screwed on the open bottle neck 1' and possesses an eccentric outlet opening 5 in its upper wall, and of a cover 3 which is rotatably mounted on the cap 1 and engages by means of a turned over border 3' with a ring-shaped set off edge 11 of the cap 1 so as to be inseparably connected with the cap 1. The cover 3 shows an

eccentric outlet opening 6 which is adapted to be brought in and out of juxtaposition with the outlet opening 5 of the cap 1 by the turning movement of the cover 3.

Between the cap 1 and the cover 3 there is inserted at the place of opening 6—see Figs. 2, 3 and 5—an elastic intermediate pad 8 for instance of rubber which lies in a little receptacle 7 situated on the inside of the cover 3 and connected therewith. The pad 8 possesses an opening 8' forming the prolongation of the outlet opening 6 of the cover 3. A short little tube 8'' forming the prolongation of the opening 6 of the cover 3 projects from the bottom of the receptacle 7 into the opening 8' of the pad 8 so as to maintain open in a sure manner the outlet opening 8' of the elastic pad 8. At the same time the little tube 8'' and the receptacle 7 prevent the pad 8 from turning relatively to the cover. The receptacle 7 can be fixed also on the cap 1, in which case the opening 8' of the pad 8 lies in the direction of the opening 5 of the cap 1. The elastic intermediate pad 8 has a surface highly reduced with respect to the inner surface of the cover 3 and the adjacent surface of the cap 1 and which may have for instance an ovaliform or circular circumference.

The cover 3 is provided—see Figs. 4 and 5—at several, for instance three points uniformly distributed on its periphery with inwardly directed projections, for instance pins 4 each engaging with a horizontal or inclined rib 14 projecting on the outside of the cap 1 as shown in Fig. 6, whereby the cover 3 is applied to the elastic intermediate pad 8 so as to realize together with this pad a sure tightening action. At the one end of each rib 14 a notch 14' is provided in the cap and at the other end an abutment 14'' limiting the turning movement of the cover 3 is foreseen. At this latter end of each rib 14 also a notch 4' may be formed as indicated in dotted lines in Fig. 6, these notches arresting the cover in the closing position which can be secured also by giving the necessary high to the elastic pad 8. The ribs 14, the notches 14' and 4' and the abutments 14'' are uniformly distributed around the circumference of the cap 1 in the same manner as the pins 4 of the cover 3.

By means of this plurality of pins 4 and ribs 14 the cover 3 is guided in a sure and uniform manner during its turning movement and, at the same time, it is prevented from balancing when an unilateral pressure is exerted thereupon. Furthermore an efficacious securing of the cover 3 in the opening as well as in the closing position is realized and a sure tightening action in the closing position is guaranteed. The reduction of the surface of the pad 8 to the possible minimum permits an easy turning of the cover 3 by hand and offers the further advantage that

only a little pressure is to be exerted upon the cover 3 in order to move the same from the one to the other of its end positions. The pad 8 considerably reduced in surface and consequently in adherence action can be easily dimensioned with a favourable high required for producing a perfect tightening action.

The guiding pins 4 may be provided instead on the cover 3 also on the cap 1 and in this case the ribs 14 are to be arranged on the cover 3. Furthermore the ribs 14 and the ring-shaped set off edge 11 of the cap 1 may be situated, as shown in Fig. 6, on the cap 1 at such a relative distance that they form slits 2 guiding the pins 4 of the cover. The cap 1 can be omitted when the bottle neck itself is executed in the form of the cap of Fig. 6 with an upper closing wall carrying the eccentric outlet opening 5, and carries itself the ribs 11, 14 the notches 14' and the abutments 14''.

As regards the uniform distribution of the cover guiding means around the periphery of the cover and the closure cap or the closing wall of the bottle neck, it may be noted that the advantages of the invention are secured to an extent practically satisfying in many cases also when this regular distribution is not exactly but only approximately realized. Furthermore the ring-shaped set off edge 11 of the cap 1 or the bottle neck can be omitted in which case the notches 14' of Fig. 6 are replaced, as shown in Fig. 7, by inclined portions 16 along which the pins or projections 4 of the cover 3 can be brought by pressure into engagement with the underside of the ribs 14 whilst the inverse displacement of the engaged cover is impossible, the ribs 14 and the inclined portions 15 forming a coherent ring-shaped set off edge. This coherent ring-shaped edge conducting the cover 3 is subdivided in a manner analogous to Fig. 6, by means of the abutment 14'' in a plurality of guiding means each being in engagement with one of the pins or projections 4 of the cover.

What I claim is:

1. A dropper closure for bottles, receptacles or the like, comprising a wall closing off the opening of the bottle or the like, a rotatable cover on said wall, an intermediate elastic cushion the area of which is a small fraction of the area of the surfaces of the wall and cover, said cushion being interposed between said wall and cover, said wall, cover and cushion being provided with openings adapted to be brought into and out of register by rotary movement of the cover, and at least three guides for regulating and limiting the relative movement of said wall and cover.

2. A dropper closure for bottles, receptacles or the like, comprising a wall closing off the opening of the bottle or the like, a rotatable cover on said wall provided with a re-

cess, an intermediate elastic cushion the area of which is a small fraction of the area of the surfaces of the wall and cover, said cushion being disposed in said recess and interposed between said wall and cover, said wall, cover and cushion being provided with openings adapted to be brought into and out of register by rotary movement of the cover, and at least three guides for regulating and limiting the relative movement of said wall and cover.

3. A dropper closure for bottles, receptacles or the like, comprising a wall closing off the opening of the bottle or the like, a rotatable cover on said wall provided with a recess, an intermediate elastic cushion the area of which is a small fraction of the area of the surfaces of the wall and cover, said cushion being disposed in said recess, said cushion being provided with an opening therethrough, a projection on said cover extending into the opening of said cushion, said wall cover and projection being provided with openings, all of said openings being so disposed as to be brought into register by rotation of said cover, and at least three guides for regulating and limiting the relative movement of said wall and cover.

4. A dropper closure for bottles, receptacles or the like comprising a wall closing off the opening of the bottle, or the like, a rotatable cover on said wall, an intermediate elastic cushion in the form of an oval tube disposed on end and interposed between said wall and cover, said tube having end surfaces and an opening extending therethrough, the end surfaces having an area which is a small fraction of the area of the adjacent surfaces of the wall and cover, said wall and cover being provided with openings, said openings and the openings of the tube being adapted to be brought into and out of register by rotary movement of the cover, and at least three guides for regulating and limiting the relative movement of said wall and cover.

In testimony whereof I affix my signature.

WALTER VOSS.