

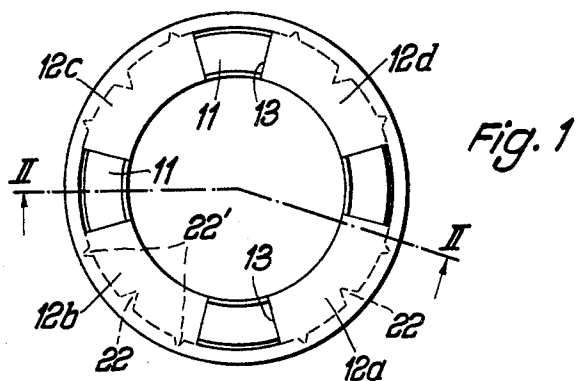
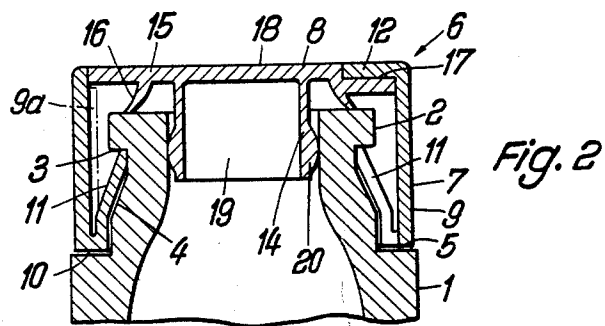
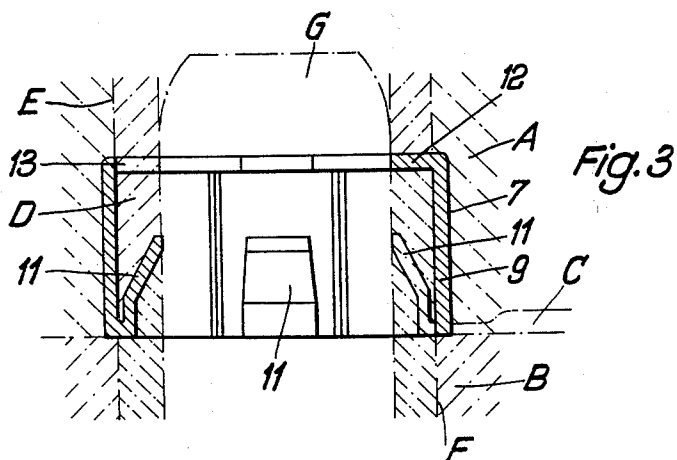
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F. HOFFMANN
BOTTLE STOPPERS

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2 Sheets-Sheet 1



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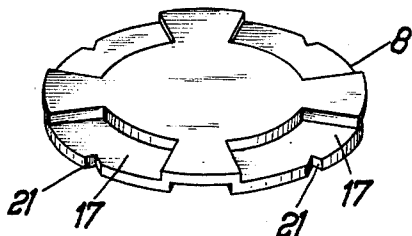
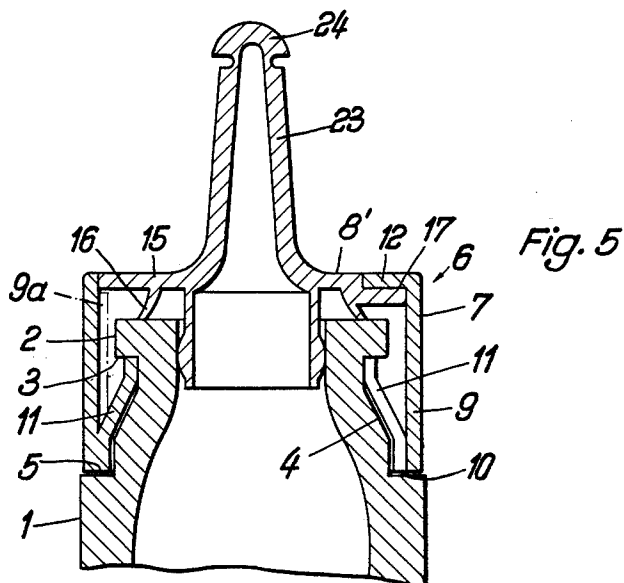
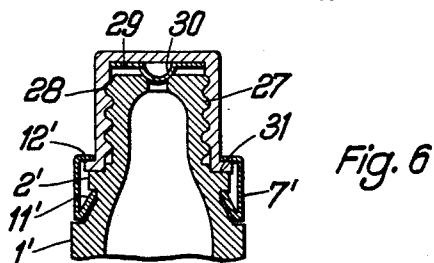
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Fig. 4



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BOTTLE STOPPERS

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4 Claims. (Cl. 215—41)

The invention is in respect of a bottle with a stopper which is locked against becoming loose and is in the form of a stopper cap which holds an elastically compressible sealing washer firmly on the bottle top, which, on the inner facing of its cap casing is provided with several inwardly projecting locking tags which, when the stopper is pressed on the bottle top—which has collar projecting radially outwards—first of all give, resiliently, and then, by snapping into place behind the collar, hold the stopper cap complete with sealing washer secure in its position of closure on the bottle top.

Stoppers with resilient lock-tags such as have become known up to the present time have lock-caps pressed out of springy sheet metal, the lock-tags being inwardly cut out of the stopper cap's superficies, whilst the sealing insert is an elastically compressible washer which lies flush against the base of the stopper cap. Such stoppers have two drawbacks, viz:

(1) The lock-tags, which are able to be reached from the outside through the cut-out sections, can easily be pulled out of their snap-in position and so the stopper can be released and, if need be, pressed back on again, without damaging the cap.

(2) The seal insert which, when the stopper is pressed home, has first of all to be compressed very powerfully so as to enable the lock-tags to snap-to into their locked position and which then expands again somewhat and holds the ends of the lock-tags securely in their snap-to position, does not, as a general rule, afford sufficient guarantee that there will be an absolutely faultless sealing of the mouth of the bottle.

The purpose of the invention is to avoid the drawbacks as stated above in respect of the known-type stoppers which have resilient lock-tags; it consists essentially in the fact that the stopper cap—made of hard-resilient plastic—has lock-tags in the vicinity of the bottom edge of its non-interrupted cap casing and, along its top edge, a radial flange projecting inwards in each case, which has, vertically above those points at which the lock-tags are located, gaps which correspond to the width of the tags and whose ring-sector shaped flange sections, located between the gaps, serve as a holder for the sealing inserts which are made of relatively soft-elastic material.

The employment of a relatively hard-resilient plastic for the manufacture of the stopper cap with "closed" cap casing brings with it the advantage that the stopper itself is proof against corrosion and that, because of the sprung lock tags' being arranged along the inner facing of a closed cap casing there is no possibility of the tags' being forced back and hence, there is no possibility of any unauthorised opening of the stopper without breaking the brittle casing of the stopper cap.

This execution does however, out of reasons to do with the actual manufacture, necessitate the stopper cap's being constructed with an open base and it requires its being provided with gaps above the particularly spring tags in the radial flange which serves as a holder for the sealing insert in order that the proud dies in the press or injection mould—serving to form these tags—are able to get right through to the spring tags in an axial direction along the inner facing of the superficies.

In a further development of the subject of the invention it is recommended that the sealing insert, which has to be introduced into the stopper cap by temporarily

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forcing the lock-tags apart, shall be designed not as a washer or disc-shaped seal but as a stopper with an axially compressible flange. With such a sealing insert the stopper-like part of the seal performs the task of sealing off the mouth of the bottle whilst the axially compressible flange supplies the axial pressure necessary for pressing in, and locating, the sprung lock-tags in their catches.

The flange on the sealing insert can either be a powerful radial flange which is capable of being compressed elastically by a fair amount; it can also however be executed as a ring of cylindrical or conical superficies lying coaxially with the stopper's axis as from a radial flange which is held less powerfully, the said ring being formed along the underside of the radial flange and lying with its edge resiliently touching the end facing of the mouth of the bottle.

In order that the stopper cap, complete with sealing insert, shall have a smooth finish, the sealing insert should, at those points at which it bears against the stopper cap's ring-sector shaped flange section, be provided with ring-sector shaped recesses adapted to the dimensions and the strength of these flange sections and in which the stopper cap's flange sections are so countersunk that their free surface is flush with the free surface of the sealing insert.

The press-on stopper complete with lock-tags in accordance with the invention is particularly suitable for injection stoppers in which the sealing insert has a hollow stopper and, on this, a hollow teat projecting outwards which can be opened in a manner quite well known of itself, by cutting off the end of the teat—usually at a place previously marked.

In order to enable a stopper in accordance with the invention to be used as a guaranteed stopper which, at every attempt to remove the cap from the bottle mouth, is damaged in every event, it is sufficient, as a material from which it shall be made, to select a hard plastic and to make the cap casing in a thick-walled execution, a further useful measure—to prevent the introduction under the bottom edge of the stopper cap of any implement capable of being used to force the spring tags back—being for the bottle neck to be given, at the point at which, in the stopper's closed position, the bottom cap walling is located, an outwards projecting circular lug or collar of about the same diameter as the stopper cap's casing.

When the stopper cap of the stopper in accordance with the invention is used as an easily destructible mark of guarantee it is not absolutely necessary for the sealing insert to constitute, directly, the base of the stopper cap complete with sprung lock-tags. It is also possible for a special stopper cap to be used which, for its part, contains the sealing insert, and for this special stopper cap to be equipped with an external collar which is fixed by the ring-sector shaped flange section of the stopper cap. In such an event the stopper cap can also be a screw cap which is capable of being screwed on to a thread on the bottle neck provided above the bottle's outwards projecting collar. The stopper cap—complete with the spring lock-tag—then constitutes nothing more than a "guarantee ring" which has to be destroyed when loosening the stopper cap.

The invention will now be further described with reference to the accompanying drawings which illustrate two examples of execution of press-on stopper together with bottle mouths adapted to these stoppers. In these drawings:

FIGURE 1 shows a plan view of a cap stopper in accordance with the invention;

FIGURE 2 shows an angled axial section through the cap stopper in accordance with FIGURE 1, taken along the section line II—II;

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FIGURE 3 shows an individual representation of the stopper cap of the cap stopper in accordance with FIGURES 1 and 2, with reference to which there is, at the same time, an explanation of the method of manufacture;

FIGURE 4 shows the diagrammatic representation of the sealing insert such as is used in the cap stopper in accordance with FIGURES 1 and 2;

FIGURE 5 shows an injection stopper in vertical angled axial section similar to FIGURE 2,

FIGURE 6 shows an application of the stopper cap in accordance with the invention as a "safety-first guarantee" for a normal screw cap.

The cap stopper as represented in FIGURES 1 to 4 is intended for use with bottles which have a specially designed neck. The bottle neck 1 (FIGURE 2) has, on its orifice, a collar 2 projecting radially outwards, the underside 3 of which is sharply recessed. Underneath the collar 2 the diameter of the bottle neck widens out again in a partially conical section 4, this being followed by an outwards projecting circular lug 5.

The cap stopper 6 represented in FIGURE 2 in its working position consists of the stopper cap proper 7 and the sealing insert 8. The stopper cap 7 has a cylindrical casing 9 formed on to which, in the vicinity of its bottom edge 10, are spring tags 11 which project obliquely inwards, whilst on the top edge of the stopper cap's casing 9 only one inwardly projecting radial flange 12 is provided which, at any particular time (cf. FIGURE 1 and FIGURE 3), vertically above those points at which the spring tags 11 are located, has gaps 13 corresponding to the width of these tags and, with its ring-sector shaped flange sections 12a, 12b, 12c and 12d located between the gaps 13, forms a stop or holder respectively for the elastically compressible sealing insert 8 made of relatively soft-elastic material.

The stopper cap 7 represented on its own in FIGURE 3 is made of hard-elastic plastic, e.g. polystyrol or hard PVC by press or injection casting. Its casing 9 is completely closed; the formation of the lock-tags 11 in a relatively simple press or injection mould, is easily possible because of the gaps 13 in the inwardly projecting flange 12 of the stopper cap 7.

In FIGURE 3 the mould sections of an injection mould for the manufacture of the stopper cap 7 are indicated in faint broken lines.

The mould's two outer sections A and B in whose line of separation the injection channel lies, contain axial mould inserts which interlock with each other by a greater or lesser amount. Fitted in section A is a hollow cylindrical insert E constructed so as to have, on its underside, dies D arranged in a crenelated manner, whilst a hollow cylinder F with corresponding notches is located in the mould's bottom section B. The middle, cylindrical shaped, main die G passes through both hollow cylinders.

With their inclined front facings the crenelated dies D of the hollow cylinder E shape the top facing of the spring tags 11 whilst the recesses in the hollow cylinder F—whose solid sections of walling "cut their way" past the hollow cylinder's dies D—limit the underside of the spring tags 11.

The resilience and durability of the particular plastic used in the manufacture of the stopper cap must obviously be so adapted to the strength of the spring tags 11 that, when the stopper cap is being pressed home, the spring tags are in fact able to be pushed easily over the outer bead 2 of the mouth of the bottle without losing their springiness in the process. As a general rule, plastics such as polystyrol, hard PVC and, if necessary, modified cellulose derivatives are so elastic as to enable this stipulation easily to be complied with.

The sealing insert 8 is made, preferably, of poly-ethylene and constructed as a stopper seal; at the top end of the stopper 14 which passes inside the neck of the bottle, there is an outwards projecting flange 15, formed on to the un-

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derside of which there is a slightly conical designed annular rib 16 which—as can be seen in FIGURE 1—when the stopper cap is pressed on to the mouth of the bottle 1, is compressed resiliently, its bottom edge being pressed outwards slightly in a radial direction. The rib 16, which runs all the way round, forms not only a resilient member which, when the lock tags 11 have snapped to behind the collar 2 on the bottle's mouth, all the way round, pulls the end of the lock tags firmly against the collar's sharply recessed underside 3, and thus holds the cap stopper firm, elastically, on the mouth of the bottle; moreover, the rib provides an additional seal all round.

The flange 15 of the sealing insert 8 is provided, on its top side, with ring-sector shaped recesses 17 which are so laid out and, in their dimensions so matched to the ring-sector shaped flange sections 12a to 12c of the stopper cap 7, that the top 18 of the middle portion of the sealing insert 8, and the top of the sectors of the stopper cap 7's flange 12 lie flush in one plane.

The stopper 14 is executed as a hollow stopper; the cavity 19 makes for a saving in material and increases the stopper's elasticity. On the superficies of the stopper 14 there is at least one sealing bead 20 running the whole way round, the function of which is to improve the stopper's seal in the mouth of the bottle and at the same time—as a result of the reduction in the diameter of the bottom end of the stopper—facilitate the introduction of the sealing stopper into the neck of the bottle.

In order to ensure that the sealing insert 8 is properly aligned in the stopper cap 7 while actually introducing the stopper into the bottle neck—and so ensure that the recesses 17 each coincide with the respective ring-sector shaped flange sections 12a to 12d, as shown in FIGURE 4—it is equipped along its circumference with four notches 21 which engage on axial guide strips 22, FIGURE 1, of the stopper cap 7's casing 9.

It is also possible for sunken notches 22' to be provided parallel to the axial guide strips 22; then, for locating the seal insert in the stopper cap, the insert is given projections on its circumference which are located in the axial notches 22' arranged along the stopper cap's inner superficies and corresponding to the projections.

Finally it is possible, without further ado, for the outside of the cap casing, in a manner quite well known of itself, to be serrated or otherwise profiled, in order, in this way, apart from having the entire material finished in some distinctive colour, to obtain special marks of identity proving the "genuineness" of the stopper.

The cap stopper is assembled quite simply in that the seal insert 8 is pressed into the stopper cap 7 from underneath, the great elasticity, or soft pliability respectively, of the seal insert together with the springiness of the lock tags 11 making it an easy matter for the seal insert to be pressed in. When the sealing insert's flange 15 has been pressed inwards over the ends of the lock tags 11 the sealing insert 8, by virtue of the lock tags' springing back into their rest position as represented in FIGURE 2, is perfectly secured against falling out of the stopper cap.

If the sealing insert 8 is intended to be secured not only against falling out but also to be fixed in its ultimate position on the ring-sector shaped flange sections 12a to 12d of the stopper cap 7, then, at those points along the inner facing of the cap casing 9, at which the sprung lock tags are located, axial lengthwise ribs 9a are formed (cf. FIGURE 2 left hand side) which extend approximately to the bottom edge of the sealing insert's flange 15.

When the seal insert is being fitted it is pressed into the stopper cap as far as the stop on the flange sections 12a to 12d, its edge snapping into place behind the top projection of the axial lengthwise ribs 9a.

The fixing of the sealing insert by the axial lengthwise ribs 9a is especially recommended when the sealing insert is equipped with a hollow teat in accordance with FIGURE 5, which, for a machine fitting of the cap stopper, should be aligned axially as accurately as possible.

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The cap stoppers assembled in this way can therefore be shaken up as much as possible during transport without there being any cause for concern; the sealing inserts will stay located exactly concentrically in the stopper caps 7.

It is a very easy matter to seal a bottle using the cap stopper in accordance with the invention; the stopper, with its seal insert, is placed on the mouth of the bottle and, upon axial pressure being exerted, it is brought into the locked position as represented in FIGURE 2.

In order to enable the lock tags to snap-to behind the bead 2 there has to be a slight amount of play between the circular lug 5 on the bottle neck and the bottom edge of the stopper cap 7's casing 9, since the spring tags are not able to snap into place until the stopper cap is in a position slightly lower than that depicted in FIGURE 1 in which the spring tags have already snapped into position. This slight difference in height is easily compensated for by the elasticity of the circular ring rib 16.

The injection bottle stopper as represented in FIGURE 5 is constructed, basically, in the same manner as the cap stopper in accordance with FIGURES 1 to 3. However, the sealing insert 8' has been provided with a projecting hollow teat 23 which, near its tip 24, is executed with at least partially reduced wall thickness. At this point the hollow teat can be cut open so as to enable access to be gained to the contents of the bottle.

FIGURES 1 to 4 show clearly that, because of the fragility of the spring-hard material used for the manufacture of the stopper cap 7, the stopper cap can only be released by destroying this cap. In order for it to be released, the sprung lock tags 11 would in fact all have to be forced apart simultaneously; the closed casing 9 of the stopper cap 7 makes it impossible however for the tags to be pulled back from the outside. Nor does the slight amount of free clearance between the lower edge 10 of the stopper cap's casing and the lug 5 on the bottle neck permit of the introduction of any special implement from underneath. Since the wall of the casing 9 is, furthermore, substantially weakened at a few points on account of the axial notches 22' or other inner or outer grooves or flutes, the cap will break open at these "points of intended rupture" at every attempt at an unauthorized opening of the stopper.

The forms of execution of the subject of the invention as represented in the drawings are simple press-on caps which are pressed on to the bottle neck in an axial direction from above.

It is however—as should be readily obvious—possible, without undue difficulty, for the stopper cap to be designed as a screw cap too, by shaping on to the bottom edge 10 of the cap casing 9 an extra cylindrical extension casing complete with internal thread and for that portion of the bottle neck 1 which is located below the widened conical section 4, to be given an external thread.

Such an extension 25 of the cap is represented on the right hand side of FIGURE 5 in broken lines, as is too the thread 26 on the bottle neck.

A screw stopper such as this can, it is true, be screwed on to the bottle's mouth 1 until such time as the sprung lock tags 11 snap into place behind the circumferential bead 2 on the mouth of the bottle; however it can only be screwed off again by destroying the cap, since the tags, because they are latched against the sharply recessed underside 3 of the bead 2, are unable to be compressed again but, instead, they burst open the stopper cap 7's superficialities 9 at the points of intended rupture.

Finally, FIGURE 6 shows how a lock tag cap—designed similarly to the stopper cap as already described—can be used as a "guarantee ring" for a washing bottle which, for its part, can be stoppered by a screw cap with

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an elastic sealing insert. On the bottle neck 1, above the collar 2' constituting the catch for the sprung lock tags 11' there is formed a screw thread 27 on to which a screw cap 28—of familiar type of execution—can be screwed which holds a sealing insert 29, suitable for washing bottles, with a hemispherically protruding hollow nipple 30.

The screw cap bears with its outer bead 31 on the parts of the flange 12' of the stopper cap 7', or else it is held firm by these parts of the flange 12' after the sprung lock tags 11' have snapped into place.

If the outer diameter of the screw cap's outer collar 31 is not made substantially larger than the outer diameter of the collar 2' on the bottle neck, then it will be possible, first of all, to screw on the screw cap 28 and then push the stopper cap 7', with its sprung lock tags, over the screw cap until its lock tags snap into place behind the collar 2'. It is however also possible for the screw cap to be pressed, first of all, into the stopper cap 7' from the inside, and then for the whole to be screwed on to the bottle neck, the stopper cap 7 constituting the "guarantee ring" being pressed into its locked position in the process.

The screw cap 28 can only be released by destroying the "guarantee ring" which will burst open, from the inside, at its points of intended rupture.

I claim:

1. A closure for a bottle having a collar projecting radially outwards from the bottle neck, comprising a sealing member adapted to seal the bottle having an elastic tubular portion adapted to fit into the mouth of the bottle neck, and having a radial flange portion formed integrally with the tubular portion overlying the top of the mouth of the neck, with said radial flange having an elastic annular rib adapted to engage the top of the bottle neck, a cap integrally formed of hard resilient plastic and comprising a flat annular top portion adapted to overlie the flange of the flange of the sealing member, an uninterrupted skirt portion having an inner diameter greater than the outer diameter of the collar on the bottle neck and depending from the outer margin of the annular top portion, a plurality of locking tags projecting inwardly and upwardly from the inner surface of the lower part of said skirt portion in spaced relation from the annular top portion so as to be able to snap below said collar when the cap is pressed down over the bottle mouth to secure the sealing member thereon, said annular top portion of the closure cap having gaps formed therein always vertically above each of the locking tags and having a width corresponding to the width of the tags.

2. A closure for a bottle according to claim 1, wherein said sealing member projects upward centrally of the elastic tubular portion to form a tapered hollow stopper, said tapered hollow stopper forming a top portion at its upper end with said top having an annular ridge.

3. A closure for a bottle according to claim 1, wherein said sealing member along said radial flange portion is provided with notches along the outer circumferential edge thereof, and said skirt portion of said cap along its upper inner surface is provided with strips projecting radially inward and in corresponding alignment with said notches.

4. A closure for a bottle according to claim 1, wherein said plurality of locking tags are elongated and flat and project upward and inwardly in length.

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