The present invention relates to a system for stoppering the mouths of containers, as bottles and the like, the tightness organ or gasket of which has at least one annular protrusion intended to be inserted into a corresponding notch provided in the forcing organ or cap (or vice-versa) so as to obtain a removable coupling of the two organs aforesaid, and to the component parts of said system. It is known that, in general, the gaskets for bottles, and particularly the ones for the small bottles containing nail-lacquers and lacquer removers, show several disadvantages, among which the most often noted are the defective tightness, the difficulty met in correctly matching the gaskets to the forcing cap and the danger of frequent breakages; these disadvantages are further magnified when gaskets of synthetic substances, e.g., polyethylene, are adopted.

While the defective tightness is due, in general, to the contact area of the gasket being limited only to the upper edge of the mouth of the container, the risk of breakages is due to the fact that the gasket is inserted into the cap and thrust thereinto until it cooperates with the inner top surface of said cap; by so doing the outer edge of the gasket is forced against the inner cylindrical surface of the cap in order to obtain the tightness.

The gasket tends to expand radially when the cap is screwed onto the mouth of a bottle, this expansion being hindered by the surface of the cap and this may induce cracks in the gasket or in the cap or even in both. If the gasket is introduced into the cap with a certain clearance, in order to overcome possible breakages, it is necessary to adhesively tack said gasket to the inner top surface of the cap; consequently a separation of the two members is extremely likely to occur for several reasons, mainly because of the radial stresses the gasket is to undergo during its being forcibly adapted to the mouth of the container.

It is a purpose of the present invention to overcome the disadvantages above described, by employing a tight stoppering system for the mouths of containers, bottles and the like.

The distinctive feature of the system embodying the invention is that the removable coupling of the tightness organ (gasket) with the forcing organ (cap) is made by inserting an annular protrusion, preferably uninterrupted, formed on one of the two organs of the system, into a corresponding notch made in the other organ. The protrusion is formed preferably on the gasket, while the notch is provided in the forcing organ. In a preferred embodiment of the invention the annular protrusion is formed by a ring-shaped ridge on the upper face of the tightness organ or gasket, while the corresponding notch is in the form of a ring-shaped groove in the inner top surface of the forcing member (cap).

To secure perfect tightness by providing a dual sealing action, extending from the bottom face of the tightness organ or gasket another annular protrusion is provided, having a conical shape: the average outer diameter of the last mentioned protrusion substantially equaling the average inner diameter of the mouth of the container to be sealed, so that tightness is obtained not only along the upper edge of the mouth, but also along a certain part of the upper portion of the inner surface of the mouth.

Should the aforementioned stoppering system be applied to bottles containing nail-lacquers or the like which usually have brush applicators associated therewith, the gasket is of annular shape so as to allow a passage way for the handle of the brush: said handle is held within a suitable seat, longitudinally arranged in the top of the cap, said cap being of such a shape as to be easily held by fingers.

All the features of the present invention will be described hereinafter reference being made to the accompanying drawings, wherein:

Fig. 1 is a longitudinal section of an assembled stoppering system embodying this invention, in which the gasket has an upper annular contact area and a lower conical projection.

Fig. 2 shows, partly in diametral section and partly in elevation, the gasket shown in Fig. 1, but in an enlarged scale.

Fig. 3 is a perspective view of the gasket of Fig. 2.

Fig. 4 is a longitudinal section of an assembled stoppering system constructed in accordance with another embodiment of the invention and in which the gasket, for instance of polyethylene, has the lower surface flat and an upper annular protrusion.

Fig. 5 shows, partly in diametral section and partly in elevation, another type of cap having an annular notch.

Referring to the drawings in detail, it will be seen that, the stoppering system of the invention comprises a forcing member A, in the present instance a rigid Bakelite cap, and a tightness organ B, in the present instance a sufficiently yielding polyethylene gasket.

According to the embodiment shown in Figs. 1 to 3 inclusive, the stoppering system is of the type applicable to the mouth of small bottles for nail-lacquers, lacquer-removers and the like; and cap A includes, consequently, an upper dome-shaped part 10 to be held by the operator's fingers, and a lower hollow part 12 which has a cylindrical internally threaded outer wall 14 for being screwed onto the corresponding thread formed on the outside of the wall 16 of the mouth C of the container to be stoppered or sealed. The hollow part 12 has an upper inner face 18 and, in this upper face 18, an annular notch 20 is provided, the average diameter of which is of suitable size with respect to the purposes which will be specified hereinafter, while along the central axis of the cap a seating 21 is provided capable of holding the upper end of a small brush (not shown in the drawing).

Polyethylene gasket B includes a radial wall portion 22 to ensure tightness, with a hole 24 being provided therein. Extending from the upper surface 25 of rear portion 22 in the direction normal to the plane thereof, is a peripheral protrusion 26, which preferably is continuous and which, in the present example, has a ring shape.

The average diameter of the protrusion 26 equals the average diameter of notch 20 while the thickness of said protrusion exceeds by a suitable amount the thickness of the notch.

From the lower surface 27 of wall portion 22 another ring 28 protrudes, the active surface whereof is conically shaped with a suitable tapering, while the inner face 32 is cylindrical and is the boundary of hole 24.

The stoppering system consists of the removable coupling of the two organs A and B; and in order to effect this coupling, the organ B is introduced into the hollow chamber 12 until the ring shaped protrusion 26 enters the notch 20; to hold together the gasket and the cap.
It is apparent from Fig. 1 that, once cap A has been tightly screwed on mouth C, a two-way tightness is obtained with gasket B providing sealing contact not only along the upper annular portion of mouth C, on which the relevant annular portion of the lower surface 27 of wall 22 is pressed, but also on the upper inner part of said mouth against which the active part of the conical surface 30 have a differently shaped surface, for instance of angular shape. Practically the constructional details may be varied in any way without, however, departing from the scope or spirit of the invention, except as defined in the appended claims.

What we claim is:

1. A closure assembly for tightly sealing the mouth of a container comprising a cap having a downwardly opening hollow portion adapted to extend over and be secured to a container mouth, said hollow portion having a flat interior top wall surface and a cylindrical side wall surface extending from the periphery of said top wall surface, and a compressible polyethylene sealing gasket including a radial wall portion adapted to seat between said flat top wall surface and the rim of a container mouth and having a normally smaller peripheral diameter than the internal diameter of said side wall surface so that a radial clearance is provided between the latter and the periphery of said radial wall portion into which the latter can radially expand as it is axially compressed by tightening of the cap on a container mouth, and an annular protrusion extending axially from the top surface of said radial wall portion and having an external diameter substantially smaller than the diameter of said radial wall portion, said interior top wall surface of the cap having an annular, downwardly opening groove therein receiving said protrusion to hold said sealing gasket within said hollow portion of the cap.

2. A closure assembly for tightly sealing the mouth of a container comprising a cap having a downwardly opening hollow portion adapted to a container mouth, said hollow portion having a flat interior top wall surface and a cylindrical side wall surface extending from the periphery of said top wall surface, and a compressible polyethylene sealing gasket including a radial wall portion adapted to seat between said flat top wall surface and the rim of a container mouth and having a normally smaller peripheral diameter than the internal diameter of said side wall surface so that a radial clearance is provided between the latter and the periphery of said radial wall portion into which the latter can radially expand as it is axially compressed by tightening of the cap on a container mouth, and an annular protrusion extending axially from the top surface of said radial wall portion and spaced radially inward from the periphery of the latter, said interior top wall surface of the cap having an annular, downwardly opening groove therein receiving said annular protrusion to hold said sealing gasket within said hollow portion of the cap.

3. A closure assembly as in claim 2; wherein said sealing gasket further includes a second protrusion projecting axially from the bottom surface of said radial wall portion and spaced radially inward from the periphery of the latter, said second protrusion having a frustoconical downwardly tapering outer surface to enter the mouth of a container to be sealed and effect sealing engagement with the inner surface of the mouth adjacent the rim of the latter.

4. A closure assembly as in claim 2; wherein the bottom surface of said radial wall portion is flat over the entire area of the latter.

5. A closure assembly as in claim 3; wherein said second protrusion is annular, and said cap has an axial socket therein opening at said interior top wall surface and said radial wall portion of the gasket has an aperture aligned with said socket so that a brush applicator can extend through said second protrusion and radial wall portion of the gasket into said socket for attachment to said cap.

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