Aug. 6, 1940. A. B. McGINNIS ET AL 2,210,766

APPLICATOR CAP

Filed Dec. 24, 1936

Fig. 1.

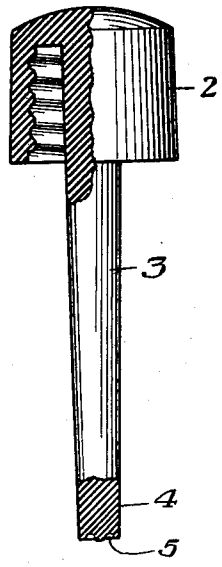


Fig. 5.

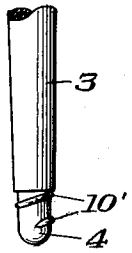


Fig. 2.

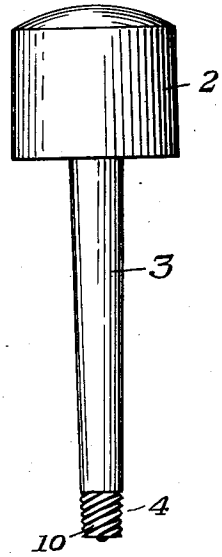


Fig. 3.

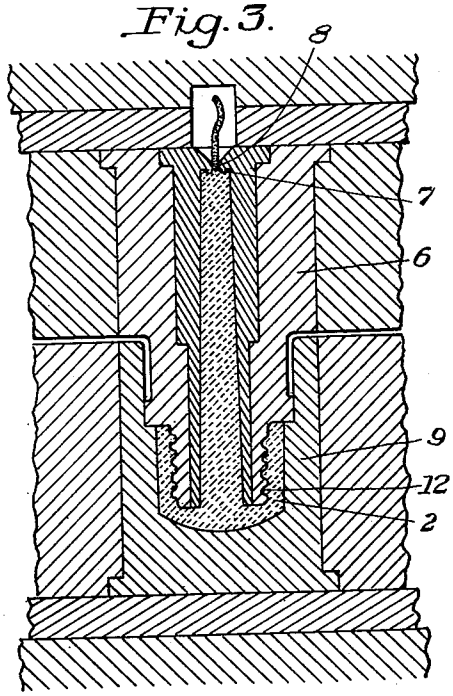
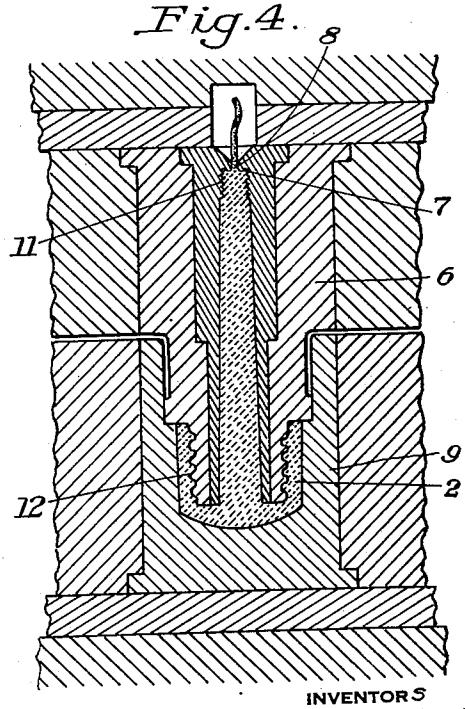


Fig. 4.



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APPLICATOR CAP

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Application December 24, 1936, Serial No. 117,502

5 Claims. (Cl. 91—67.4)

This invention relates to caps for bottles and like receptacles, and particularly to a cap having an applicator thereon by means of which fluid contents of a bottle may be applied to a surface to be covered with such contents.

One form of applicator cap commonly used heretofore has been a plastic cap having a central well therein into which a glass rod or applicator is fitted. In the copending application of Archibald B. McGinnis, Serial No. 93,013, filed July 28, 1936, there is disclosed a method and apparatus for the manufacture of an applicator cap wherein the cap and the applicator rod are molded integrally from a plastic material such as a synthetic resin. A cap produced in accordance with this method and by this apparatus does not require any glass rod and can be very cheaply produced. Since the applicator as disclosed in said copending application has to be made in a mold, it is more or less necessary that the applicator rod be formed with a taper, the rod tapering toward its free tip. Such a tapered applicator rod has a disadvantage by reason of the fact that when used with some liquids, the capillary attraction between the liquid and the rod is such that insufficient liquid is removed by the applicator. This difficulty is readily overcome in a glass rod applicator where it is practical to form a bulge or bead or other enlargement on the end of the glass rod. This is not practical, however, with an integrally molded applicator for the reason that the presence of such a bulge or bead would prevent the stripping of the finished product from the mold. Moreover, after the synthetic resin has once been molded, it cannot be re-shaped to form such a ball or bead by any further processing operation.

According to the present invention, the tip portion of the applicator is formed with a groove or grooves or threadlike formation by means of which the surface of the tip is increased so that more fluid will be retained on the applicator when it is withdrawn from the bottle.

The invention may be readily understood by reference to the accompanying drawing, in which—

Figure 1 shows an applicator cap partly in elevation and partly in section embodying one form of our invention;

Figure 2 is a side elevation of an applicator cap showing a modification of our invention;

Figure 3 illustrates the apparatus by means of which the applicator cap of Figure 1 is molded, the view being a transverse vertical section through a single mold unit;

Figure 4 is a view similar to Figure 3, showing the modified mold for making the construction shown in Figure 2; and

Figure 5 is a fragmentary view showing only the lower end of the applicator and showing another type of spiral groove or thread at the tip, the thread having a pitch the same as the threads of the cap.

The applicator shown in Figure 1 comprises a cap 2 having an integral applicator rod 3, this rod tapering from its base in the cap to the tip portion 4. In the end of the tip portion 4 is a recess, preferably in the form of an annular groove 5. The purpose of this recess is to enlarge the area of the end of the applicator over the area it would have if it were merely rounded off as has heretofore been the practice. It not only increases the area but is of such form that fluids tend to be retained therein when the applicator is drawn up through the liquid in the bottle.

The provision of an annular groove in the end face of the rod is a particular advantageous way of increasing the capacity of the applicator to remove liquid from the bottle because it lends itself to present molding equipment as illustrated in Figure 3. In Figure 3, the cap is formed in an inverted position, and the plunger member 6 of the mold is provided with an internal bore into which the plastic material is forced to mold the applicator. The groove 5 is formed by the provision of a small annular rib 7 at the end of the elongated chamber which forms the applicator and around the gas relief port 8. The construction and operation of the mold is fully explained in the above-mentioned copending McGinnis application. To remove the molded article from the mold, the lower mold member 9 drops away from the plunger mold member 6, leaving the molded article on the upper or plunger mold member. The molded article is stripped by rotating it, this being necessary by reason of the formation of the thread on the interior of the plastic cap. The provision of the bead 7 on the interior of the mold cavity forming the annular groove 5 does not restrain the rotation of the molded article in any way. Thus the groove 5 is of a shape which lends itself to the method and apparatus for molding the applicator cap. At the time when the cap is stripped from the mold the plastic material has not taken on its final rigidity and the groove-forming means should therefore, be one which does not impose any considerable torque on the applicator rod 3 as the cap is unscrewed from the mold.

In addition to the provision of the annular groove 5 in the end of the applicator, the applicator may also be formed with a spiral groove or grooves of thread-like form on the tip portion as illustrated in Figure 2, or, the spiral grooves or thread on the exterior of the tip may be used in lieu of the annular groove 5. In Figure 2 the cap is designated 2 and the applicator rod is designated 3. The tip portion is designated 4, and molded into the tip portion 4 are spiral grooves or threads, these being designated 10. These spiral grooves or threads may be formed as illustrated in Figure 4, by the provision of thread-like projections 11 in the interior of that portion of the mold cavity which forms the tip of the applicator. These threads or groove-forming projections have a pitch corresponding to the pitch of the threads 12 which shape the interior of the cap itself. The result of this is that when the cap is unscrewed from the forming mold, the threaded tip will withdraw from the portion of the mold in which it is formed at the same rate that the threaded cap is removed from the plunger on which it is formed, thus eliminating any undue twisting or straining of the applicator in removing it from the mold. In Figure 4, I have shown the mold as also being shaped to form a groove in the end of the applicator as illustrated in Figures 1 and 3, the groove-forming projection in the mold being designated 7 as in Figure 3. Instead of a plurality of threads being formed, as shown in Figure 2, a single thread as shown in Figure 5 may be employed, and this need be only a very fine hair-like thread, the thread in Figure 5 being designated 10'.

As above stated, the threads or grooves 10 may be formed in addition to the annular groove 5 or the threaded grooves may be used in lieu of the annular groove. With some liquids, the thread-like groove or the single fine thread is desirable because the surface tension of the liquid in the bottle often tends to draw the liquid off the applicator rod. The provision of the thread or threads on the exterior of the applicator serves to overcome this difficulty. The formation of a groove either in the end of the tip or in the side of the tip or both, serves to increase the effective area of the tip without enlarging the diameter of the tip and without interfering with the removal of the article from the mold in which it is formed. The formation of a groove or recess in the end of the tip or the side of the tip or both, as described, also serves to combat the effect of the surface tension of the fluid to pull the fluid away from the applicator as the applicator is lifted out of the fluid.

The general method and apparatus for forming the applicator cap are described and claimed in copending application Serial No. 93,013, and are merely illustrated in the present application for the purpose of showing how the groove may be formed in the end of the applicator or spirally in the side of the tip without interfering with the easy removal of the article from the mold.

While I have specifically shown and described certain embodiments of our invention, it will be understood that various changes and modifications may be made therein within the spirit of the invention and under the scope of the following claims.

We claim:

1. An applicator cap comprising a plastic cap member which is internally threaded and having an integral applicator with a tip portion, said tip portion having an external spiral thread forming a fluid retaining surface, the thread being of a pitch corresponding to the pitch of the thread in the cap to facilitate the molding of the cap and the applicator as a unit and the unscrewing of the molded cap and applicator from the mold.

2. An applicator cap comprising a plastic cap member which is internally threaded and which has an integral applicator with a tip portion, said tip portion being grooved to increase the surface area thereof, the character of the groove being such that when the cap is unscrewed from the mold in which it is formed the groove will permit the applicator to rotate with the cap and to travel longitudinally with the cap.

3. An applicator comprising a cap member serving also as a holder, and having an integral applicator rod with a thread at the tip portion thereof.

4. An applicator cap of the class described comprising an internally threaded cap portion having an integral slender rod-like projection extending perpendicularly from the interior thereof which is of a length sufficient to provide an applicator, the tip end of said rod-like projection having a fluid retaining recess formed therein of a character such as to permit it to be simultaneously rotated and moved in an axial direction in the mold in which it is integrally formed with the cap

5. An applicator cap of the class described comprising an internally threaded cap portion having an integral slender rod-like projection extending perpendicularly from the interior thereof which is of a length sufficient to provide an applicator, the tip end of said rod-like projection having a fluid retaining recess formed therein of a character such as to permit it to be simultaneously rotated and moved in an axial direction in the mold in which it is integrally formed with the cap, said recess being an annular indentation at the tip end of the projection.

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