Nov. 6, 1928. 1,690,781

D. GENESE

BOTTLE CAP

Original Filed Aug. 18, 1926

Fig. 1.

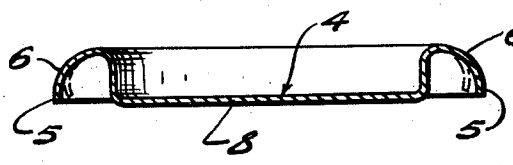


Fig. 2.

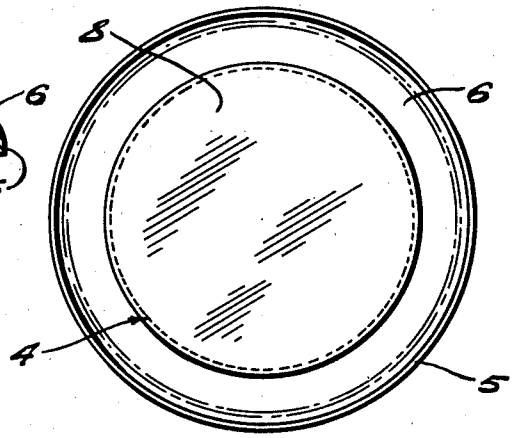


Fig. 3.

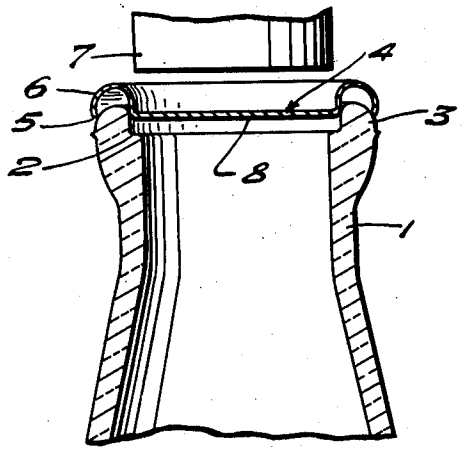
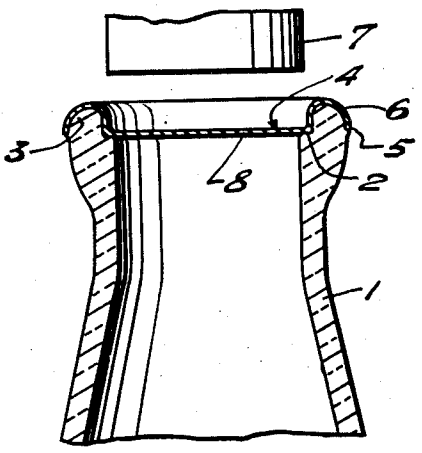


Fig. 4.



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UNITED STATES PATENT OFFICE.

DAVID GENESE, DECEASED, LATE OF BALTIMORE, MARYLAND, BY NORRIS GENESE, ADMINISTRATOR, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO WILLIAM H. OREM, OF BALTIMORE, MARYLAND.

BOTTLE CAP.

Application filed August 18, 1926, Serial No. 130,070. Renewed March 30, 1928.

This invention relates to bottle caps and particularly to closures for the standard type of milk bottle. The invention has for its object the construction of a one piece cap which not only frictionally retains itself within the internal rabbet at the mouth of the milk bottle but also extends over the pouring lip protecting the latter from lodgment of germs or foreign matter. The invention distinguishes from others having the same general object in that the flanged portion of the cap which covers the pouring lip grips the lip peripherally with an active pressure that persists indefinitely until the cap is removed, and is restored as often as the cap may be replaced upon the bottle by the consumer. In this manner germs are barred from entering beneath the edge of the lip-protecting portion of the cap, a prolific source of contamination in caps which have loose or fluted lip-covering edges or which merely fit the lip snugly without having the positive lip-gripping action which is a characteristic feature of the present invention.

This property is imparted to the milk bottle cap in the course of its manufacture and the present invention therefore not only covers the cap itself but also the method of making it.

Another object of the invention is to construct a bottle cap of inherently resilient material having the lip-covering flange normally contracted at its edge to a smaller diameter than that of the base of the pouring lip, so that when the cap is pushed upon the mouth of the bottle by the die which locks the center of the cap within the rabbet of the bottle, the contracted peripheral edge of the cap is expanded by and against the pouring lip, giving rise through the inherent resiliency of the cap, to the persistent active pressure between the cap and pouring lip above referred to.

Still another object of the invention is the construction of a one piece bottle cap of the type having a pouring lip protecting flange, in which the cap is functionally locked in place by the single action of a die in spreading the dished disk like center of the cap, the lip protecting flange automatically resiliently embracing the pouring lip under the sealing pressure of the die.

A still further object of the invention is the method by which the desirable qualities which make possible the bottle cap of the present invention, are imparted to the paper stock.

Other objects of the invention will appear as the following description of an illustrative embodiment thereof proceeds.

In the drawings:—

Figure 1 is a cross section through a bottle cap embodying the principles of the present invention.

Figure 2 is a plan view of the cap.

Figure 3 is a longitudinal section through the upper part of a standard type milk bottle with the cap in position to be pressed upon the mouth of the bottle by a suitable die.

Figure 4 is a similar view showing the cap after having been pressed upon the mouth of the bottle.

Referring now in detail to the several figures, the numeral 1 represents a milk bottle which is of the standard type having an internal rabbet 2 affording a shoulder against which the usual disk cap seats, by friction, in a fluid-tight manner. The bottle is formed with a convex pouring lip 3. The ordinary disk cap takes no account of possible contamination of the pouring lip but is concerned mostly with the retention of the contents within the bottle.

Caps have been devised, however, having for their object the protection of the pouring lip but these have failed of their purpose for one reason or another and principally from the fact that it has not heretofore been possible to construct a cap having a protecting portion for the pouring lip fitting so smooth and so tightly against the pouring lip as to prevent ingress of germs or other foreign substance within the joint between the cap and pouring lip.

The difficulty of constructing a cap which will effectively fulfil the office of a mechanical germ excluder for the pouring lip arises from the fact that the paper or other fibrous material from which the cap is constructed is

not by nature provided with those physical qualities which enable it to make the close and active joint which the present invention contemplates. Attempts have been made to mold the pouring-lip receiving channel of the cap by means of a die, but to permit the withdrawal of the die the edge of the flange surrounding the lip receiving channel cannot be of less diameter than the widest part of the cap. It has also been proposed to contract the peripheral edge of said flange by pressure of a die both before and after the cap is in position on the bottle. In the former case, the contracted edge is expanded when the cap is positioned upon the bottle and, through lack of inherent resiliency of the material from which the cap is made, it assumes a permanent set in its expanded state and therefore exerts no persistent active pressure against the pouring lip. In the latter instance, that is, when it is attempted to contract the flange by die-pressure against the pouring lip, the edge of the flange cannot be pressed inwardly any further than its position of contact with the pouring lip and therefore no active gripping pressure can exist.

In the present invention the paper stock or other fibrous substance from which the cap is made is treated so as to become inherently resilient to a high degree, and shrinkable upon drying. The inventor has found that by soaking the paper stock in a saturated solution of boracic acid, it acquires the desirable characteristics, aforementioned, and there are doubtless other substances yet to be tried out, by means of which the same result may be accomplished so that the invention contemplates the inclusion within its scope of the use of any and all substances which may be the equivalent of the boracic acid solution in their capacity to enhance the inherent resiliency of the paper and to cause it to shrink more or less upon drying.

In carrying out the method of the present invention the stock, after having been treated with the boracic acid solution, is molded to the desired shape while slightly moist. The cap thus formed is shown at 4 in Figure 1. It is then permitted to dry, and in drying undergoes a slight shrinkage which causes the edge 5 of the lip protecting flange 6 to contract inwardly from the full line position shown in Figure 1 to the dotted line position. The cap is then ready to be used, the boracic acid retained in the fiber of the stock incidentally rendering the cap antiseptic, but in order to comply with legal requirements in most jurisdictions the cap must then be paraffined. Coating with paraffine has little or no diminutive effect upon the resiliency of the cap. When the bottle is to be capped, the cap 4 is placed in the position shown in Figure 3 relative to the bottle by any suitable means, not shown, it being noted that the contracted edge of the flange 6 rests against the pouring lip above its base so that the cap cannot be forced home without expanding the flange 6. Suitable means such as the die 7 is then employed for seating the cap, said die being of such size as frictionally to lodge the disk-like center 8 of the cap within the rabbet 2 of the milk bottle, locking the cap in place.

Simultaneously with the descent of the central portion of the cap into the rabbet, the edge of the flange 6 is expanded permitting said flange to seat fairly upon the pouring lip, the edge 5, through the inherent resiliency of the cap being constantly tensioned against the pouring lip so as to create an active pressure between said edge and pouring lip which persists all the while the cap is mounted upon the milk bottle. In the manufacture of the cap the flange 6 is formed smoothly without any flutes or interstices, so that it makes intimate contact with the pouring lip all around. The active pressure maintained between the edge of the flange 6 and pouring lip constitutes a close impervious joint which is in contradistinction with the looser joints found in other devices designed to accomplish the protection of the pouring lip. It will be observed that while the bottle cap is positively locked with respect to the bottle at but one point, namely where the central portion of the cap fits the annular rabbet of the bottle, yet the contracted edge of the flange 6 assists materially in holding the cap in place. Furthermore, when the cap is once removed by the user of the bottled contents it may be again pressed into place by hand, the flange 6 again expanding so as to fit the pouring lip with active pressure, thereby again producing a sanitary seal for the pouring lip. This may be repeated any number of times, or until the bottle is empty. On account of the assistance rendered by the contracted edge of the lip protecting flange in holding the cap in place, a successful one piece cap of the lip protecting type is realized, other caps having a like purpose in view requiring an extra reinforcing disk in the center to insure a positive interlock with the bottle.

In the manufacture of the improved bottle cap it has been found advantageous to heat the molding die to such temperature as shall quickly evaporate moisture, for instance to a temperature at which the moisture in the cap stock will turn to steam. This appears to assist materially in obliterating any creases or flutes which may tend to form in the flange 6 while being pressed, and it is probable that it has an effect in producing some reaction between the boracic acid and the paper stock leading to the obtention of the desired qualities of resiliency and shrinkability, becoming thus an eligible step in the process of manufacturing the treated material from which various articles may be made. Of this, however, the inventor was not assured and

since it may be found practical to carry on the process of manufacture without the heating of the die, it is not desired to limit the invention by this step except in its more specific definition.

While in the above description there has been disclosed what is believed to be a preferred and practical embodiment of the invention, it is to be understood that the specific details described are not limitative in their effect upon the invention but merely illustrative except in so far as they are expressly prescribed by the terms of the appended claims.

Having described the invention what is claimed as new and desired to be secured by Letters Patent, is:—

1. A bottle cap of fibrous stock molded to have a disk-like portion adapted frictionally to lock within the rabbet at the mouth of the bottle, and a flange overlying and frictionally engaging the pouring lip of the bottle, said fibrous stock having been impregnated with a substance having the essential characteristics of boracic acid, enhancing the elasticity of the stock and causing it to shrink after removal from the mold.

2. A bottle cap of fibrous stock moulded to have a disk-like portion adapted frictionally to lock within the rabbet at the mouth of the bottle, and a flange overlying and frictionally engaging the pouring lip of the bottle, said fibrous stock having been impregnated with boracic acid solution, and heated at least to partial dryness while under restraint of the mold, thereby imparting to the cap the characteristics of improved elasticity, and shrinkage, after removal from the mold.

In testimony whereof I have hereunto set my hand.

NORRIS GENESE,
Administrator of the Estate of David Genese, Deceased.