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2,157,601

MILK BOTTLE CAP

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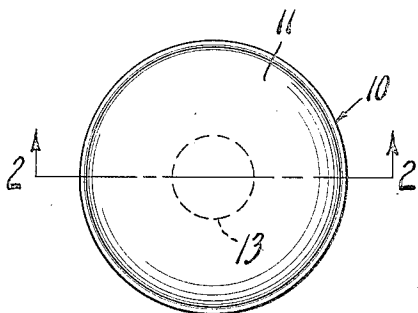


Fig. -1

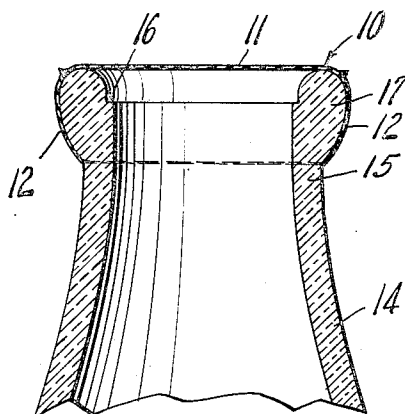


Fig. -3

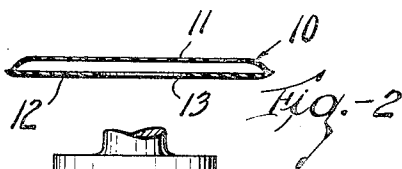


Fig. -2

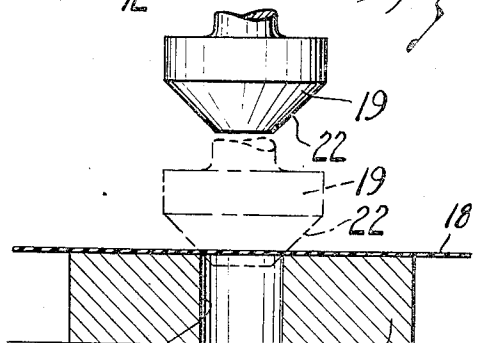


Fig. -4

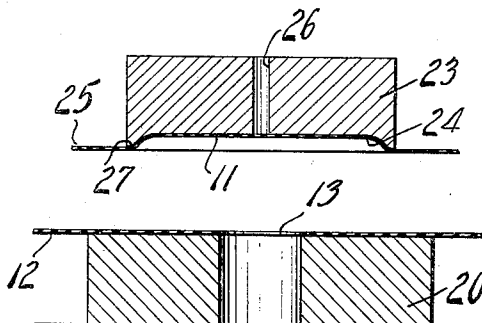


Fig. -5

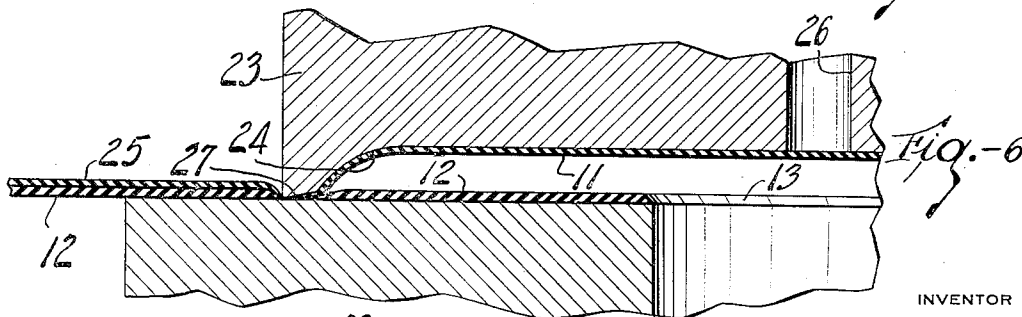


Fig. -6

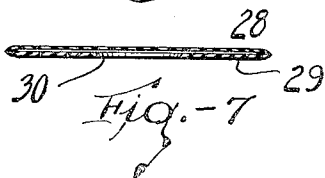


Fig. -7

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2,157,601

MILK BOTTLE CAP

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Application April 2, 1935, Serial No. 14,248

10 Claims. (Cl. 215—41)

This invention relates to improvements in milk bottle caps and the method by which the caps are produced and more particularly to caps made of rubber material which are inexpensive to manufacture and adapted to be applied to the bottles or other containers in a quick and simple manner.

A further object of the invention is to provide a cap having a substantially flat top portion adapted to extend across the opening in the bottle and a depending skirt portion engageable with the bead or outer portion of the bottle for retaining the cap in place, which cap before application on the bottle has its skirt portion extending substantially parallel with the top portion and in relatively close relation thereto thereby providing a normally flat cap capable of being stacked one upon the other in a minimum of space.

A still further object of the invention is to provide a cap of the type referred to in which the skirt portion is greatly tensioned in its application to the bottle but in which the top portion is appreciably free of tension to thereby permit expansion and contraction within the limits required without affecting the connection between the skirt portion and the bottle.

Another object of the invention is to provide a cap made from sheet rubber material and vulcanized and which may be made in any desired color.

Additionally the invention contemplates the provision of a top portion of the cap made of transparent material to enable unobstructed reading of the printing on the regular type of paper disc when used in conjunction with the present cap.

With the objects above indicated and other objects hereinafter explained in view, the invention consists in a cap construction and method by which the latter is produced.

Referring to the drawing:

Figure 1 is a top plan view of a cap embodying the present invention;

Figure 2 is a transverse sectional view taken on line 2—2 in Figure 1;

Figure 3 is a fragmentary sectional view of the neck portion of a bottle showing the manner in which the cap is reposed thereon;

Figures 4 to 6, inclusive, show steps in one method by which the cap may be produced;

Figure 7 is a transverse sectional view of a modified form of cap embodying the present invention.

In the drawing, referring particularly to Fig-

ures 1 to 3, inclusive, a milk bottle cap 10 is shown which may be made of rubber material or other similar yieldable material, and comprises a top portion 11 which is substantially flat and in this instance of circular shape approximately the size of the bottle to which it is to be attached. A skirt portion 12 of similar shape has its marginal edge secured to the adjacent marginal edge of the top portion 11 in any suitable manner but preferably by vulcanization.

The skirt portion 12 normally extends in substantial parallelism with the top portion 11 and is provided with an opening 13 preferably centrally arranged. The caps 10 are made relatively flat so that they may be stacked one upon the other with their skirt portions 12 positioned upon their under sides to afford ready application to the bottles. The cap 10, as made, is free of any inherent tension in the top portion 11 and skirt portion 12 for a purpose to be later described.

In Figure 3 a glass milk bottle 14 of the well-known type is shown and has a neck portion 15 providing an opening through which the milk may be introduced into the bottle. A peripheral shoulder 16 is provided upon the inner side of the neck portion adjacent the open end and is adapted to receive the usual paper cap or closure to prevent the milk from accidentally spilling from the bottle. A circumferential bead 17 is formed on the outside of the bottle adjacent the open end which is intended to function as a gripping portion to permit the bottle to be readily picked up so it can be moved from one place to another.

In applying the cap 10 to the bottle 14, the skirt portion 12 is stretched by gripping the latter around the opening 13 until it passes freely over the bead 17 on the end of the bottle. The lower edge of the skirt is then released and it grips the bead 17 assuming the shape shown in Figure 3, or any other shape the bead may have, because of its yieldability or being made of rubber. It is frictionally maintained in contact with the bead 17 and, being under tension, prevents accidental disengagement. Due to the fact that the skirt portion 12 is originally made flat and substantially parallel with the top portion 11, the greatest tension is exerted at the lower edge adjacent the opening 13 and decreases from this point toward the marginal connection with the top portion 11. This decrease in tension is desirable because it is practically non-stretched at the marginal edge with the result that no tension is present in the top portion 11. The top portion

11 is originally made to approximately the diameter of the top of the bottle and consequently, when in position thereon, assumes a normal, unstretched condition. This is desirable inasmuch as should a sharp object, such as ice, come in contact with the top portion it will not puncture the same. Even though it should be punctured the opening will not be enlarged as the top portion is not under tension and therefore the milk will probably not leak therethrough. The cap will also stand chafing and will not tear because the top is free of tension. The skirt portion which is under tension adheres to the bottle.

By providing a top portion 11 which is free from tension breathing is permitted, which consists of expansion and contraction of the contents within the bottle due to temperature changes resulting in a flexing of the top portion in opposite directions, without any possibility of disengaging the cap from the bottle.

The cap may be made in various colors or combinations of colors by adding pigments to the unvulcanized rubber in a manner well-known in the art and combinations of materials may be employed such as a rubber skirt portion connected to a top portion formed of a rubber hydrohalide film such as that disclosed in Calvert Patent No. 1,989,632, dated January 29, 1935, which is a product made by The Goodyear Tire & Rubber Company under the trade name "Pliofilm". Additionally the entire cap may be made of this rubber hydrohalide film material and, being transparent, has many advantages.

These caps 10 may be easily applied to bottles, preferably by machine operation, and for convenience the caps 10 may be placed in a tubular container with one cap upon the other. One end of the container may be open to permit withdrawal of the caps, one at a time, with the skirt portion down and positioned adjacent the top of the bottle for ready application.

The cap 10 may be made by various processes, but one which I have found very desirable is to use unvulcanized or uncured calendered sheet rubber material, the steps of this process being shown in Figures 4 to 6, inclusive. A sheet 18 of unvulcanized rubber of the desired thickness, preferably .015" to .02", is placed between co-operating dies 19 and 20, the latter having an opening 21 therein of the desired size. The upper die 19 is then moved toward the lower die 20 and has a tapered portion 22 which enters the opening 21 as shown in dotted lines in Figure 4. This punches the hole 13 in the skirt portion of the cap 10 and, while only one hole is here shown, it should be understood that the sheet 18 may be provided with many such holes.

After the punching operation a different upper die 23 is provided which has a recessed portion 24 formed upon its under side as shown in Figure 5. This recessed portion is circular in shape to correspond with the shape of the top of the bottle and of approximately the same diameter. A sheet 25 of unvulcanized or uncured rubber of the desired thickness, preferably .01", is placed upon the underside of the die 23, in superimposed relation with respect to the sheet 18, and a portion of the sheet is drawn up into the recessed portion 24 by means of vacuum effective through the provision of an opening 26 in the die 23. This opening may be connected to any suitable source for the purpose intended.

The dies 20 and 23 are then moved into engagement as shown in Figure 6 and the cap is cut out of the sheets leaving the top portion 11 and

the skirt portion 12 connected together at their marginal edges. To effect a proper seal or connection the underside of the die 23 is tapered upwardly and inwardly, as shown at 27, at the desired angle to cause the marginal edges to cohere. Here again only one die 23 is shown, but it should be understood that a plurality of dies may be used which should align with the openings provided in the sheet 18. For production purposes a plurality of such dies is preferable.

The caps are then removed from the dies on separation of the latter and vulcanized according to any well known method. Preferably the caps are first dusted with soapstone or similar material to prevent sticking together and are then placed in a tubular container one on top of the other with the skirt portions extending in the same direction. This may be the container in which the caps are shipped, or otherwise, and when the container has been filled it is slowly rotated about its axis in the presence of warm air to vulcanize or cure the rubber. Rotating the caps prevents them from adhering to one another and the formation of flat spots thereon.

The caps may also be cured in a temperature of approximately 150° F. for a period of eight hours. Suitable accelerators of course are incorporated in the unvulcanized sheets of rubber to speed up the vulcanization process according to what process is used.

In Figure 7 a cap made of "Pliofilm" is shown having a top portion 28 and skirt portion 29 having an opening 30 therein. These caps are blanked out according to the hereinbefore stated process, but to form the seal between the marginal edges local heat is applied sufficiently to cause the edges to slightly melt and become joined together.

When the cap is made from "Pliofilm" and uncured rubber, localized heat is likewise used to form the seal, but the rubber portion is afterwards cured at a low temperature of approximately 120° F. for a period of approximately 48 hours. This low temperature is used so that the "Pliofilm" will be unaffected by the vulcanizing of the rubber as it will stand a small amount of heat without injury.

With the "Pliofilm" caps it is sometimes necessary that they be heated to approximately 100° F. for efficient application to the bottles, but with the rubber caps this, of course, is not necessary as the rubber caps stretch sufficiently for application without permanent distortion.

While I have described the preferred embodiment of the invention it is to be understood that I am not to be limited thereto, inasmuch as changes and modifications may be resorted to without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A milk bottle cap comprising a pair of substantially flat discs connected at their marginal edges and extending in substantial parallelism, one of said discs having a transverse opening therethrough.

2. A milk bottle cap of rubber material comprising a pair of substantially flat discs connected at their marginal edges and extending in substantial parallelism, one of said discs having a transverse opening therethrough.

3. A milk bottle cap comprising a pair of substantially flat discs connected at their marginal edges and extending in substantial parallelism, one of said discs having a transverse opening

therethrough and one of said discs being transparent.

4. A milk bottle cap of transparent material comprising a pair of substantially flat discs connected at their marginal edges and extending in substantial parallelism, one of said discs having a transverse opening therethrough.

5. A milk bottle cap of vulcanized rubber material comprising a pair of relatively flat discs connected at their marginal edges, one of said discs having a transverse opening therethrough.

6. A milk bottle cap comprising a pair of relatively flat discs connected at their marginal edges, one of said discs having a transverse opening therethrough.

7. A milk bottle cap of non-porous material comprising a pair of relatively flat discs connected at their marginal edges, one of said discs having a transverse opening therethrough.

8. A milk bottle cap comprising a pair of relatively flat discs of different thicknesses connected

at their marginal edges, one of said discs having a transverse opening therethrough.

9. A milk bottle cap comprising a substantially flat top portion, and a flat open bottom portion having its marginal edge connected to said top portion, said top and bottom portions extending in substantial parallelism and being substantially in engagement with each other.

10. A milk bottle cap of flexible material comprising a substantially tensionless flat top portion adapted to extend across the opening in a bottle, and a normally tensionless flat bottom portion disposed in substantial parallelism with said top portion and having a transverse opening therethrough, said top and bottom portions being substantially in engagement with each other and said bottom portion being adapted to be stretched over the neck of the bottle into tensionless engagement therewith.

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