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CUSHION FIT CAP

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Fig. 1.

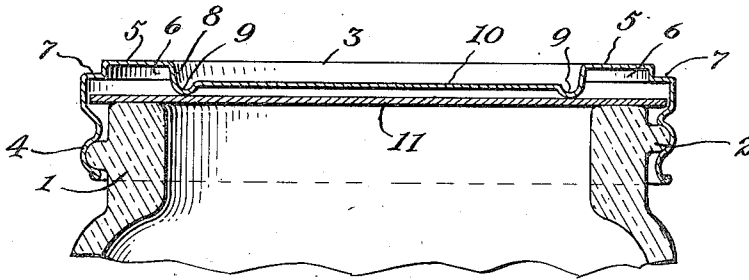
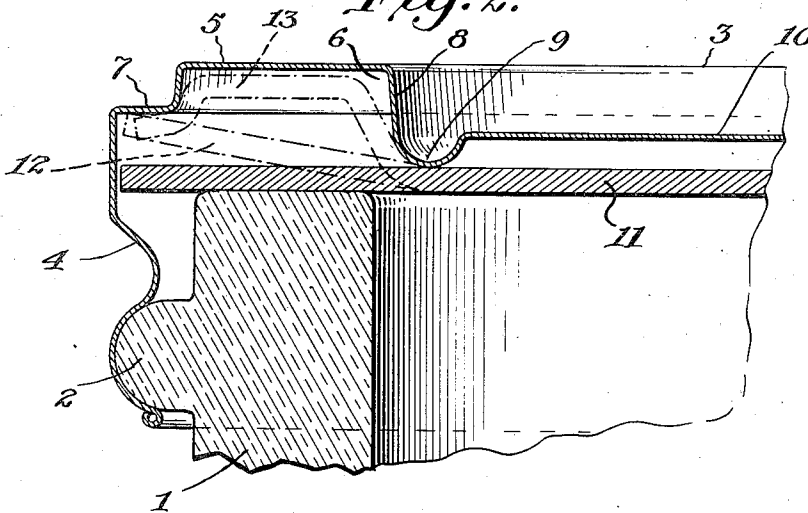


Fig. 2.



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CUSHION FIT CAP

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3 Claims. (Cl. 215—43)

It is well known that when ordinary screw caps are screwed into sealing position, the rotation is stopped abruptly. That is, there is not a gradual increase in the resistance offered to further rotation. Likewise, when the caps are unscrewed they are abruptly loosened, as distinguished from a gradual decrease in the resistance.

One of the objects of the present invention is to provide a cap by which there is a gradual increase in resistance to tightening over a very considerable number of degrees of rotation of the cap. In other words, the maximum amount of resistance is reached gradually as contrasted to the screw caps of the prior art in which the maximum point is reached in a very small number of degrees of rotation of the cap, after initial resistance is encountered. This is basically new, and constitutes an improvement of the greatest importance in caps which are secured in position by a rotary movement.

Another object of the present invention is to provide a cap which is more easily removed, due to the fact that the resistance to turning is gradually decreased, as distinguished from the abrupt loosening which occurs in the operation of previously known caps.

A further object of the invention is to provide, with this cushion effect, a better sealing than has been possible heretofore.

Various other objects and advantages of the invention will be apparent to those skilled in the art, from the following detailed description taken in connection with the accompanying drawing, in which,

Figure 1 is a vertical sectional view of the cap and liner mounted loosely on a receptacle, and ready to be turned to sealing position; and

Figure 2 is a similar but fragmentary view, on an enlarged scale, and showing in dotted outline positions assumed by the liner as the cap is turned to sealing position.

Referring to the drawing in more detail, numeral 1 indicates the neck of any desired receptacle, provided with the usual thread finish 2. The cap is referred to generally by the numeral 3, and has the usual depending threaded skirt 4.

Numerals 5 and 6 indicate a flat annular portion forming the top of the sealing groove 6, and this flat portion is, in the preferred construction, connected with the skirt by means of an annular inwardly projecting shoulder 7.

A wall 8, forming the inner boundary of the sealing groove, extends downwardly from the inner edge of the annular flat portion 5, and this

wall terminates in a downwardly projecting head 9, which connects with a central depressed portion 10. In the specific form of the invention illustrated the central depressed portion 10 is in a lower plane than the shoulder 7, and the bead 9 is in a lower plane than either the shoulder 7 or the central depressed portion 10.

The liner is referred to by numeral 11, and is arranged in the cap in the usual manner. This liner is preferably of a material which has more or less resilience and resistance to bending, so that there is retained a tendency to return to its original shape after being deformed; as distinguished from a more or less pliable or flexible material such as cork which largely retains a deformed shape. While a liner having more or less resilience and resistance to bending is preferably employed, yet the invention is in no manner limited to liners of any particular material, but contemplates the use of any desired liner.

The preferred construction of the cap will be understood from the foregoing detailed description, and a brief description will now be given of the manner in which the highly desirable cushion-fit effect is produced; reference being had particularly to Figure 2 which shows several stages of the operation.

When the cap is first loosely applied to the container the parts are in substantially the positions shown in full lines. The cap is now rotated, whereby the threads cause it to move downwardly. The first effect of this downward movement is that the liner offers some resistance to the downward movement of the bead 9, and a slight increase in pressure overcomes this resistance, and causes the annular peripheral portion of the liner to be sprung upwardly, to somewhat the position shown in the dotted lines referred to by numeral 12. It will be noted that the liner, after being forced to the position indicated, engages the shoulder 7. It is apparent that in this position further resistance is offered, as this peripheral portion of the liner must now be deformed. As the downward movement of the cap proceeds, due to the continued rotation thereof, the bead 9 tends to further force the peripheral portion of the liner upwardly, and the shoulder 7 is at the same time forcing this portion downwardly, so that a continuous, smooth, gradually increasing resistance is built up to the maximum point, where the cap and liner are in sealing position; the deformed shape of the liner being illustrated by the dotted lines referred to by numeral 13. There is thus produced an entirely new effect and re-

sult in this art, the desirability of which cannot be over-emphasized. Heretofore, the caps turned loosely until they approached the sealing position, and then within an extremely few degrees of rotation the maximum degree of resistance was reached and the cap was brought to a stop with a very distinct abruptness. There is thus produced neither the best seal nor the "feel" of the best seal. It is only when the resistance is gradually built up over a considerable number of degrees of rotation that the best seal and the best "feel" of a proper seal are produced.

While the most material feature of the present invention resides in the cushion-fit effect provided in the sealing operation, yet it is also of very considerable importance in the removal of the caps, for the action is to some extent the reverse. In the removal of screw caps it is well known that when sufficient force is applied the cap is released with great suddenness, and thereafter turns quite freely. The cap of the present invention is released gradually, as distinguished from the sudden release of the prior known caps, and as the release is gradual it follows that it does not require as much force to release the cap. Ease of removal is one of the features of this invention. It should also be mentioned that the cap may be removed and replaced many times, without the cushion-fit effect being lost, though it is obvious that there will be some lessening of the effect due to a slight permanent distortion of the liner.

While the cushion fit effect in applying the cap, the better seal effected thereby, and the ease with which the cap is removed, constitute the major features of the invention; yet the cap does possess other advantages. For instance, in the specific form illustrated, the strength and rigidity of the cap are considerably increased by means of the bead 9 and shoulder 7. Also, the seal is rendered more effective by the fact that the liner is turned down slightly at both the inner and outer edge of the neck of the container. This particularly takes care of any irregularities occurring in the glass finish and any warping of the cap. Numerous other advantages will be apparent to those skilled in the art.

It is to be understood that while a specific form of the invention is shown and described herein, yet obviously many changes and modifications may be made without departing from the spirit of the invention, and all such changes and

modifications are intended to be included within the scope of the appended claims.

What we claim is:

1. A closure for containers including a top and a threaded skirt, a liner within the closure, an annular downwardly projecting bead formed in the top of the closure and of a smaller diameter than the inner diameter of the mouth of the container, and an annular downwardly projecting shoulder in the top of the closure and of a diameter greater than the outer diameter of the mouth of the container, the bottom of the bead being in a lower plane than the shoulder, whereby the bead first engages the liner to force an outer annular portion of the liner upwardly against said shoulder.

2. A closure for containers including a top and a threaded skirt, a liner within the closure, a central depressed portion formed in the top of the closure, an annular bead projecting downwardly from the periphery of the depressed portion and of a diameter less than the inner diameter of the mouth of the container, and an annular downwardly projecting shoulder in the top of the closure and of a diameter greater than the outer diameter of the mouth of the container, the central depressed portion of the top being in a lower plane than said shoulder, and the bead being in a lower plane than either the shoulder or the depressed portion, whereby a cushion-fit effect is produced when the closure is turned to sealing position.

3. A closure for containers including a top and a depending skirt, means provided in the skirt for locking the closure to a container by rotation, a liner within the closure, said liner being materially resistant to bending, an annular downwardly projecting bead formed in the top of the closure and of a smaller diameter than the inner diameter of the mouth of the container, and an annular downwardly projecting shoulder in the top of the closure and of a diameter greater than the outer diameter of the mouth of the container, the annular bead forcing an outer annular portion of the liner upwardly against the shoulder and the shoulder forcing the outer annular portion of the liner downwardly as the cap is moved downwardly into sealing position.

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