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J. RAVN

3,071,274

CAP STRUCTURE FOR BOTTLES

Filed April 4, 1961

FIG. 1.

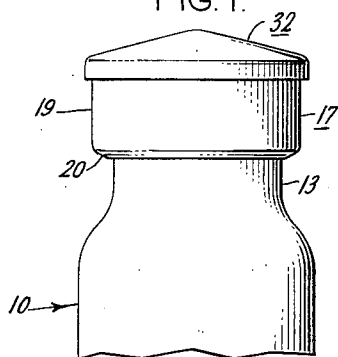


FIG. 3.

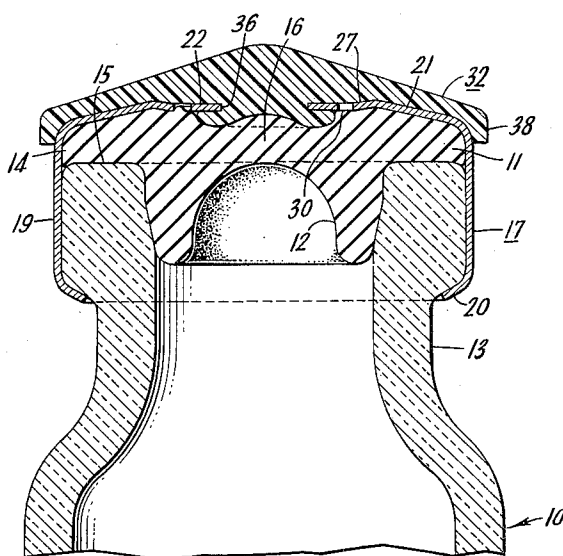


FIG. 2.

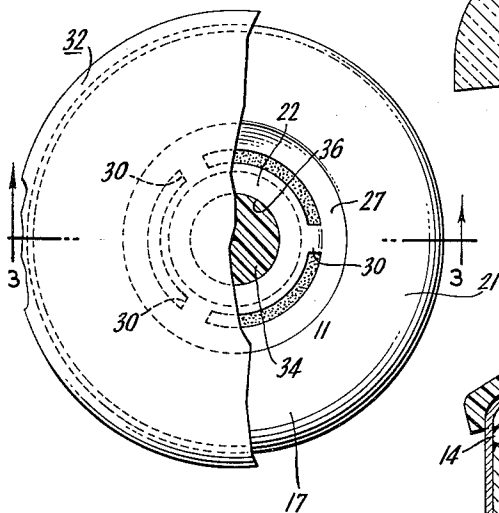


FIG. 4.

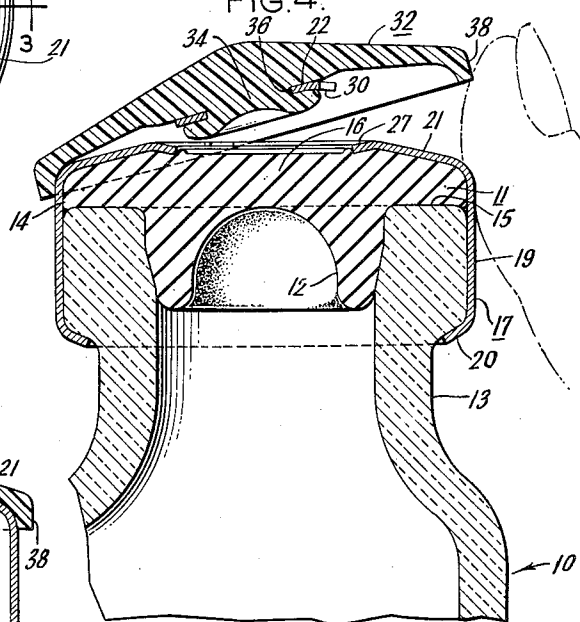
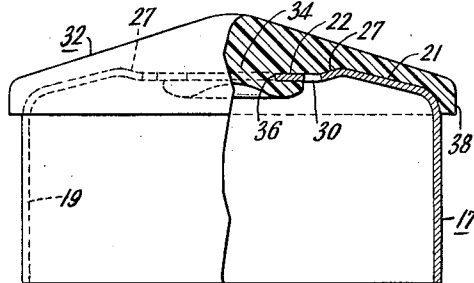


FIG. 5.



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CAP STRUCTURE FOR BOTTLES

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This invention relates to improvements in caps for pharmaceutical containers or bottles having a removable portion detachably secured to the cap and relates more particularly to new and improved means for detaching the removable portion of the cap.

Cap closures for certain types of pharmaceutical bottles have a pierceable closure member such as a disk or stopper formed of rubber or like material and a metallic cap to hold the stopper in place, in many instances by engaging a shoulder on the neck of the bottle. Such caps includes an inner central removable disk portion detachably secured to the outer annular top portion of the cap, for example, by fracturable connecting bridges. In the conventional closure, the user removes the central disk portion by inserting a fingernail beneath the disk to pry it upwardly thereby fracturing the bridge connections and affording access to the rubber stopper which then may be pierced by a hypodermic syringe.

Various problems have been encountered with the above-described construction. For example, removal of the disk in the normal use requires both hands of the user, one to support the bottle and the other to grip the disk adjacent the bridge connections to remove it from the cap. The proximity of the hand to the bridges presents the possibility of injury on the rough and sharp edges of the bridges created on removal of the disk. Further in some instances before assembly of the caps on bottles, the connecting bridges have been broken in tumbling about during production and transportation. I have found such breakage to be due to instability of the disk and its tendency to tilt or be tilted of the plane of the top. When this occurs an edge of another cap caught and twisted under an upturned edge is enough to break the disk away.

The cap of the present invention is an effective replacement for the type heretofore discussed since it overcomes the objectionable features enumerated and can be produced easily and economically. In accordance with the present invention, a cover member is connected to the inner portion of the cap which overlies the inner portion and is actuatable with respect to the outer portion to detach the inner portion therefrom. The cover member has at least a portion thereof projecting outwardly beyond the outer portion of the cap so that the user may support the bottle in one hand and engage the cover member with the thumb of the hand to remove the inner disk portion. This one-piece, temperproof construction permits removal of the central disk portion by a one-hand operation where the user's hand does not come in contact with the central disk or the fractured bridge connections, whereas, prior cap constructions of the type discussed above required both hands of the user to remove the disk portion and additionally exposed the hand of the user to the jagged edges of the fractured bridge connections. By the present invention, the fingers of the user are removed from the disk portion and accordingly the possibility of contaminating the sterile stopper of the bottle is precluded. In the illustrated form of the invention the cover embraces the top of the cap providing a seal to prevent dirt and other foreign matter from contaminating the contents of the bottle. Further, the cover member protects the cap and precludes premature breakage of the bridge connections which may otherwise result during production and transportation before assembly.

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The foregoing and other objects of the invention and the various details of the construction and arrangement thereof are hereinafter more fully described and set forth with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation of a cap made in accordance with the present invention secured in position on a bottle;

FIG. 2 is a plan view of the cap with a portion of the cover element broken away to more clearly illustrate the construction;

FIG. 3 is an enlarged sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is a sectional view similar to FIG. 3 showing the removal of the central disk portion; and

FIG. 5 is an enlarged side elevational view partly in section of the cap prior to its assembly to the bottle.

Referring more specifically to the drawings, reference numeral 10 designates generally a container or bottle of conventional form, a portion of which is shown in FIG. 1. As seen in FIG. 3, a stopper 11 which may be formed of rubber or like material has a hollow plug portion 12 adapted to fit within the neck 13 of the bottle, a peripheral flange 14 which seats against the lip 15 of the bottle and a central thin wall portion 16 which may be pierced, for example by the needle of a hypodermic syringe, to gain access to the bottle contents. The stopper 11 may be of any conventional form and the present invention is not concerned with the particular form employed.

A cap 17 of generally cup-like form, preferably of a sheet material such as aluminum, serves to hold the stopper in place and to seal the contents of the container. The cap 17 has a top portion and a peripheral flange 19 depending from its outer edge. This flange is adapted to be crimped or spun to provide an inwardly extending portion 20 below a shoulder provided by a lip 15 on the bottle thereby to secure the cap 17 permanently to the bottle. The top portion of the cap includes an outer annular portion 21 which terminates along its inner peripheral edge in a downwardly offset portion 27 which is adapted to displace a portion of the resilient stopper upon application over the stopper and an inner removable disk portion 22 disposed centrally of the annular portion and which is detachably connected to the edge 27 of the annular portion 21, in the present instance, by three circumferentially spaced fracturable bridge members 30.

In accordance with the present invention, a cover member 32 is connected to the inner removable disk portion 22 and is actuatable with respect to the outer annular portion 21 to remove the central disk portion from the cap. As best shown in FIGS. 2 and 3, the cover member 32 is generally disk-like and overlies the top portion of the cap, being secured at its center to the removable disk portion 22. The cover member 32 is preferably made of a plastic material and in the present instance has an extension 34 depending from the undersurface thereof to engage in an opening 36 in the disk portion 22 and having an out turned locking flange to thereby secure the cover to the cap. It is noted that the cover may be secured to the cap in this manner by fusing or welding of the plastic to the aluminum cap. The integral cap and cover construction provides a one-piece tamperproof cap which is economical to manufacture. The cover 32 has a peripheral flange 38 depending from its outer peripheral edge which embraces the cap in the manner shown in FIG. 5 so that the top portion of the cap is snugly nested in the undersurface of the cover. In this manner the cover serves as a seal to preclude infiltration of dirt and foreign matter in the area between the cap and stopper or the stopper and lip of the bottle. Additionally as noted above, the cover member protects the bridge connections thereby eliminating the tendency of the removable disk 22 to be

tilted or raised during production and transportation prior to assembly with the bottle.

With reference to FIG. 4, it can be seen that the user may detach the central disk portion 22 from the cap when it is desired to use the contents of the bottle by supporting the bottle in the palm of the hand with the tip of the thumb engaging the flange 38 of the cover. Upon exerting an upward force on the cover, it is pried upwardly, with the portion thereof diametrically opposed from the point engaged by the user serving as the fulcrum of a lever and supporting the cover as the bridges 30 are fractured. It is readily appreciated that it is not necessary for the hand of the user to contact the sharp edges of the disk portion or those on the top of the cap. Moreover since the fingers of the user are removed from the disk portion during removal thereof, there is no likelihood of contaminating the sterile stopper of the bottle.

From the foregoing, it will be apparent that the present invention provides an improvement in cap closures for pharmaceutical bottles or the like which is of one-piece tamperproof construction and wherein the removable disk portion may be readily and easily removed by a one-hand operation without exposing the hand of the user to any harmful edges at the tear points. Further the cap of the present invention provides an effective seal for the container to safeguard the contents of the container from contamination. Additionally the cap is relatively simple in construction and can be manufactured easily and economically.

While a particular embodiment of the present invention has been illustrated and described herein, it is to be understood that changes and modifications may be incorporated within the scope of the following claims.

I claim:

1. In a container cap of cup-like form adapted to hold in place a bottle stopper, a top construction comprising inner and outer portions, fractureable bridge means connecting said inner and outer portions, means on said outer portion for securing the cap to said bottle to hold the stopper in place, and a cover member overlying said inner portion and connected thereto being actuatable with respect to the outer portion to break said bridge means and separate said inner portion from said outer portion.

2. The container of claim 1 wherein said cover member is of generally disk-like form and extends radially outwardly beyond the outer peripheral edge of said annular portion, said cover member having a flange depending from the outer peripheral edge thereof surrounding said cap whereby said cap is nested in said cover member to provide a seal.

3. In a container cap of cup-like form adapted to hold in place a bottle stopper, a top construction comprising an annular portion and a removable disk portion disposed centrally of said annular portion, fractureable bridge

means connecting said disk and annular portions, a flange depending from the outer peripheral edge of said annular portion adapted to secure said cap to said bottle, the inner edge of said annular member being offset downwardly and adapted to displace part of the top of stopper to provide an effective seal, and a cover member overlying said disk portion and connected thereto being actuatable with respect to said annular portion to break said bridge means and separate said disk portion from said annular portion.

4. In a cap for pharmaceutical bottles or the like, a top construction consisting of inner and outer portions, means detachably connecting said inner and outer portions, means defining an opening in said inner portion, a cover member overlying said inner portion including an extension depending from the under surface thereof engaging through said opening and locking means at the outer end of said extension engaging under said inner portion to secure said cover member to said inner portion, said cover member being actuatable with respect to said outer portion to detach said inner portion from said outer portion.

5. A top construction as claimed in claim 4 wherein said locking means comprises an out turned flange.

6. In a cap for pharmaceutical bottles or the like, a top construction consisting of an annular portion and a removable disk portion disposed centrally of the annular portion, fractureable means detachably connecting said disk portion to said annular portion, means defining an opening in said disk portion, a cover member overlying said inner portion including an extension depending from the under surface thereof engaging through said opening and an out turned locking flange at the outer end of said extension adapted to engage under said disk portion to secure said cover member to said disk portion, said cover member being actuatable with respect to said annular portion to fracture said connecting means and thereby detach said disk portion from said annular portion.

7. A top construction as claimed in claim 6 wherein at least a portion of said cover member extends radially outwardly beyond the peripheral edge of said annular portion to provide means for actuating said cover member with respect to said annular portion.

8. A top construction as claimed in claim 7 wherein said cover member is of generally disk-like form and has a flange depending from the outer peripheral edge thereof whereby said cap is nested in said cover member to provide a seal.

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