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SPRING BIASED DISPENSING CLOSURE

Filed April 18, 1967

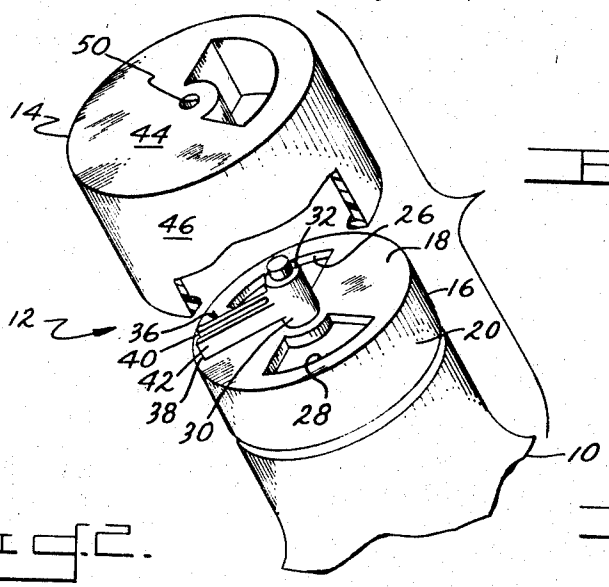


Fig. 1.

Fig. 2.

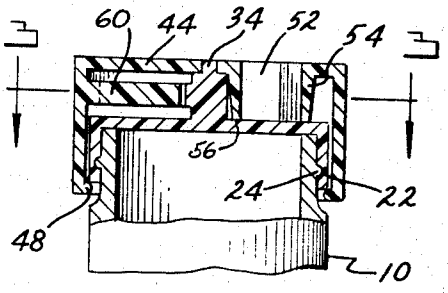


Fig. 3.

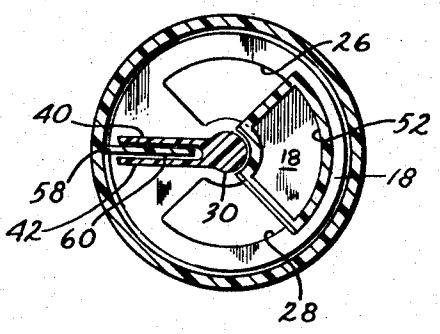


Fig. 4.

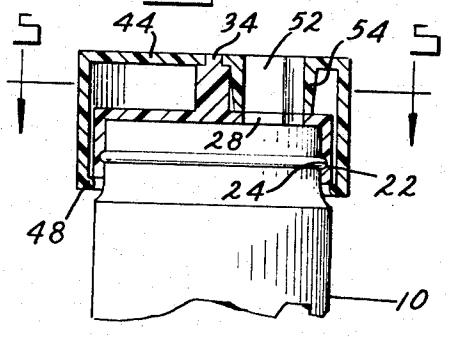
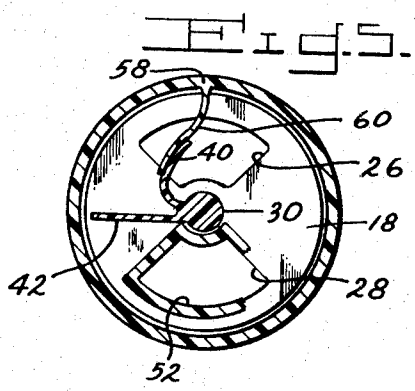


Fig. 5.



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SPRING BIASED DISPENSING CLOSURE

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ABSTRACT OF THE DISCLOSURE

This invention relates to a dispensing closure and particularly to a dispensing closure of two-piece construction wherein an inner cap portion is engaged so as to close the open end of a container and an outer cap portion is adapted to be in movable overlying relation therewith and wherein spring means are provided which normally bias an opening within the outer cap in staggered position in regard to an opening formed within the inner cap so as to present the closure in a normal, non-dispensing closed position.

Background of the invention

This invention relates to a container closure and particularly a closure which is normally biased to a closed non-dispensing position in regard to its container whereby relative rotational movement of an outer cap portion of the closure in regard to an inner cap portion temporarily places the closure in an open dispensing position.

Containers having closures which are normally biased in a closed non-dispensing position are known. It is, however, desirable with such type of closure to facilitate the opening thereof and ease of manipulative movement needed by the user of the container whereby he or she may dispense the contents of the container using either one hand or both hands. In many instances, prior art devices further fail to utilize construction presenting components which were easily inter-connected with each other and capable of being manufactured through the use of high speed forming techniques so as to reduce the cost of each closure to a minimum. It should be further recognized that prior art devices of this general type have commonly utilized separate spring members which have been separately formed from materials such as coil or strip steel or similar materials and which involve an additional assembly operation to operationally engage such with the component members of the closure.

Summary of the invention

It is thus an object of the present invention to overcome the above elicited shortcomings of prior art constructions and to provide a novel closure of two-piece construction, the components of which may be readily assembled by high speed assembly techniques.

It is a further object of the present invention to provide a container closure of novel construction wherein the individual component parts thereof are adapted for molding production by high speed, low-cost techniques such as injection molding from thermoplastic compositions.

Another object of the present invention is to present a container closure construction which is readily adapted for either double or single hand usage and wherein relative rotation of the manipulative portion thereof in regard to the container in either rotational direction momentarily (so long as the opening force remains) places such closure in an open dispensing position relative to the container.

Still another object of the invention is the provision of the closure construction wherein relative rotational movement of the manipulative portion thereof in either direction temporarily places the closure in open dispensing position and wherein the force necessary for the placement of the closure in such open dispensing position may be of a differing intensity in each of the opposed opening positions.

These and other advantages of the present invention are accomplished by the provision of a two-piece container closure construction wherein an outer cap member is adapted for overlying position with regard to an inner cap member and wherein dispensing openings provided through the top walls of such caps are held in normal entirely offset relationship to each other by cooperatively associated spring means provided externally and internally of the respective inner and outer cap members. Such springs means are in the form of leaf-like extensions integral with the separate cap members and exhibiting inherent flexible properties by means of the materials from which they are formed and/or the general configuration thereof. Such leaf spring members resiliently engage each other upon a limited rotation of the outer cap member relative to the inner cap member and accordingly continuously serve to bias said outer cap member to a normally closed position so as to prevent accidental discharge of the contents contained within the container. One specific embodiment of the invention utilizes a leaf-form spring member having a bifurcated terminal portion adapted for the receipt of a single leaf-form spring member which extends from one of the cap members so as to bias the outer cap member to a normally closed, nondispensing position regardless of the direction of the relative rotational movement by which the outer cap is placed in open dispensing position.

Various other objects and features or advantages of the present invention over those of the prior art will appear from a consideration of the following drawings and written description.

Description of the drawings

FIGURE 1 is a partial perspective view of the closure and container of the present invention with parts broken away for clarity wherein the outer cap portion of the closure has been shown in exploded relationship to the inner cap portion mounted upon the neck finish of the container.

FIGURE 2 is a cross-sectional view of the container and closure shown in FIGURE 1 in assembled closed position,

FIGURE 3 is a sectional view taken along the line 3—3 of FIGURE 2 and shows in particular the relationship of the dispensing openings of the outer and inner cap members,

FIGURE 4 is a cross-sectional view of the container and closure shown in FIGURE 1 of the drawings and is similar to FIGURE 2 thereof except that the closure is shown in an open dispensing position relative to the container, and

FIGURE 5 is a sectional view taken along the line 5—5 of FIGURE 4 and showing in particular the spring-like biasing of the leaf-form members extending respectively from the inner and outer cap members.

Description of the preferred embodiments

Referring to the drawings and more particular FIGURE 1 thereof, there is therein shown a container **10** having an open end upon which a closure **12** is mounted. The particular construction of the open end of the container **10** has been shown as that of a reduced neck configuration of a bottle type but it should be brought out that any open end container configuration is anticipated. Closure **12** is in turn comprised of an outer cap member

14 and an inner cap member 16. The inner cap member 16 is adapted for fixation to the open end of the container so as to form a major portion of a barrier which in combination with the outer cap member 14 normally forms a closure seal or barrier past which the contents of the container 10 may not normally move.

The inner cap member 16 comprises a top wall portion 18 having a downwardly dependent peripheral skirt 20 having in turn an internal annular groove 22 with which a cooperating annular bead 24 of the outer wall portion of container open end is adapted for snap engagement. It should be brought out that other means by which the inner cap member may be attached to the open end of the container 10 are contemplated and that the particular embodiment herein indicated should not be considered as limting except as defined in the appended claims. The top wall portion 18 is further provided with a pair of spaced openings 26 and 28 which communicate directly to the interior of the container and accordingly form part of the means by which the contents of the container may be dispensed through the closure 12.

Preferably centrally of the top wall portion 18, a generally cylindrical outwardly extending boss 30 is formed, which boss includes a top bearing surface 32, and a trunnion member 34 upwardly extending therefrom. The inner cap member 16 further includes spring means 36 which comprises a leaf-form member 38 which laterally outwardly extends from the boss 30 as best shown in FIGURE 1 and which includes a bifurcated terminal configuration defining a pair of individual leaf-form members 40 and 42.

Turning now to the outer cap member 14, such comprises a top closure wall 44 having a peripheral skirt 46 downwardly dependent therefrom. The skirt 46 is in turn of a vertical extent so as to provide means such as the inwardly extending annular bead 48 by which an outer cap member 14 may be placed in engagement and in overlying position with the inner cap member 16. The top wall 44 is further provided with a bearing opening 50 preferably centrally located thereof and adapated for receipt of the trunnion 34 of the inner cap member. An opening 52, of a peripheral extent less than that of the space defined by the top wall portion of the inner cap member between the radially spaced openings 26 and 28 thereof, is adapated to overlay such space and further defines the configuration of the outer cap member 14. The periphery of the opening 52 includes a downwardly dependent side wall 54 of such a vertical extent and exhibiting a peripheral terminal surface 56 whereby sealing engagement is made with the top wall portion 18 of the inner cap member, such as shown best by FIGURE 2 of the drawings. Accordingly, it may be seen that outer cap member 14 is free to, at least partially as will hereinafter be evident, rotate relative to the inner cap 16 in overlying relationship therewith and wherein an alignment of the opening 52 through the outer cap member with either of the openings 26 or 28 of the inner cap member will produce a composite opening through the entire closure 12, so that the contents within the container may be dispensed therethrough either by a squeeze action upon the container or inversion thereof depending upon the nature of the contents contained therein.

A further feature of the invention is that the closure 12 is normally biased to a closed nondispensing position wherein the sidewalls 54 of the outer cap openings are in overlying sealing relationship within the peripheral portions of the space defined between the spaced openings 26, 28 of the inner cap member, such as shown in FIGURES 2 and 3 of the drawings. Such action is accomplished through the interaction of the spring means 36 of the inner cap member 16 and spring means 58 provided internally of the outer cap member 14. Spring means 58 preferably as shown in the drawings comprises a single leaf-form member 60. Such leaf-form member 60 is adapated to inwardly extend from the inner periphery of the downwardly extending skirt 46 of the outer cap member 14 and is of an extent so as to be receivingly engaged by the bifurcate portion of the spring means 36 as shown in FIGURE 3.

Thus clockwise movement of the outer cap member as shown in the transition between FIGURES 3 and 5 urgingly places the leaf-form member 60 into resilient engagement with leaf-form member 40 whereupon the removal of the twisting force from the outer cap member 14 permits cooperative spring means 36 and 58 to return the outer cap member 14 to its normally closed initial FIGURE 3 starting position.

The resiliency of the individual leaf-form members may be varied in accordance with particular desirable end purposes such as by increasing the thickness thereof or by the formation thereof with inherently more or less flexible materials. Thus, in those cases wherein a compartmentalized container is utilized to store different materials such as tablets of aspirin and artificial sweetener respectively in several compartments thereof, individual leaf-form members 40 and 42 of the spring means 36 may be accordingly varied so as to e.g. necessitate a higher twisting force to be applied so as to place closure 12 in an aspirin tablet dispensing position. Furthermore, the leaf-form member 60 should be modified to exhibit differing directional resiliency as by the placement of stiffening members on one side thereof and accordingly is equally adapatable for dispensing of materials through the application of an unequal twisting force. Such a container will be recognized as of enhanced utility in regard to the dispensing of products which in excess could be considered dangerous e.g. for the dispensing of children's products.

It is accordingly believed that preferred constructional means have been set forth for accomplishing the desired objects of the present invention and that the embodiments of such specific constructions should not be taken as solely limiting the invention as herein presented and as defined by the appended claims. Accordingly, an embodiment encompassed by the claims is anticipated where one dispensing opening area through the inner cap is provided rather than two. Wherein such single directional dispensing action is desired the bifurcate form of the spring means 36 may be modified so as to present but a single leaf-form engageable member. A further modification which is intended to be covered by the present invention is the alternative mounting of the bifurcated spring means, when utilized, upon either the outer or the inner cap member respectively.

What is claimed is:

1. A two-piece dispensing closure adapted for attachment to an open end of a container for controlled dispensing of the contents thereof, comprising a one-piece inner cap member in direct communication with the interior of said container and a one-piece outer cap member adapted to overlie said inner cap member, said inner member fixedly attached to said container and having a top wall portion covering said open end of the container, said top wall having a pair of radially spaced openings therethrough, separate leaf spring means formed as an integral part of each of said inner and said outer cap members, said outer cap further provided with an opening therethrough, said separate spring means being operatively associated so as to position peripheral portions of said outer cap member opening above the space defined between said inner cap member openings and in sealing engagement therewith whereby rotational movement of said outer cap member relative to said inner cap member aligns the openings of said cap members to a dispensing position against the action of said spring means which continually resilently urges said outer cap member into said normally closed position.

2. The structure of claim 1 wherein said spring means comprises a first leaf-form member integral with and extending radially outwardly from said inner cap and a second leaf-form member integral with and extending radially inwardly from said outer cap.

3. The structure as defined in claim 2 wherein one of said leaf-form members is of bifurcate terminal configuration distal from the cap member from which it extends and wherein the other of said leaf-form members is positioned between said bifurcate.

4. The structure of claim 2 wherein said leaf-form extensions are of dissimilar flexibility.

5. The structure as defined by claim 3 wherein the opposed sides of said bifurcate portion are of dissimilar flexibility.

6. A dispensing closure adapated for attachment to an open end of a container for controlled dispensing of the contents thereof, comprising an inner cap member adapted for attachment to the open end of a container and an outer cap member having a downwardly extending peripheral skirt adapated for overlying attachment to said inner cap member, said outer cap member partially rotatable relative to said inner cap member from an initial closed nondispensing position to an open dispensing position, said inner cap member having a top wall portion covering said container open end, said top wall portion having a generally centrally orientated upwardly extending boss member thereon serving to axially space said inner and outer cap members from each other, said top wall portion further being provided with a pair of radially spaced openings therethrough, said outer cap member provided with an opening therethrough, said outer cap opening normally orientated in a closed nondispensing position above a top wall space defined between said inner cap openings, a first resilient spring means of a leaf-form

configuration outwardly extending from the side of said boss distal from said space and terminating short of said outer cap downwardly extending skirt and a second resilient spring means of leaf-form configuration inwardly extending from the skirt of said outer cap member into operative association with said first spring means whereby partial rotational movement of said outer cap member relative to said inner cap member aligns the openings of said cap members to an open dispensing position and whereby said spring means continually urges said outer cap member to a normally closed nondispensing position relative said inner cap member wherein peripheral portions of said outer cap opening are orientated entirely above said space and in sealing contact therewith.

7. The structure as defined by claim 6 wherein one of said leaf-form extensions is of bifurcate terminal configuration distal from the cap member from which it extends and the other leaf-form extension is positioned between said bifurcate.

8. The structure as defined by claim 7 wherein said bifurcate leaf-form extension is of a lesser flexibility than the other spring means.

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