Oct. 1, 1957 R. J. OLSON ET AL 2,808,183

COMBINATION DISPENSING AND CLOSURE DEVICE

Filed May 18, 1955

FIG. 1

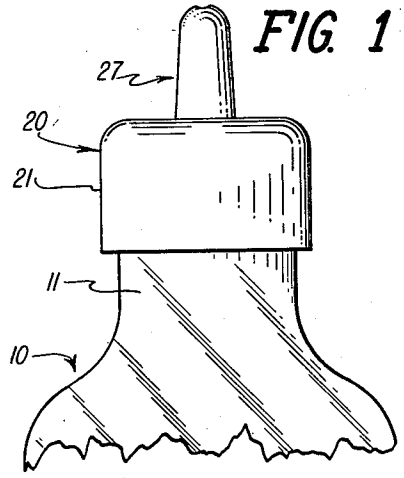


FIG. 2

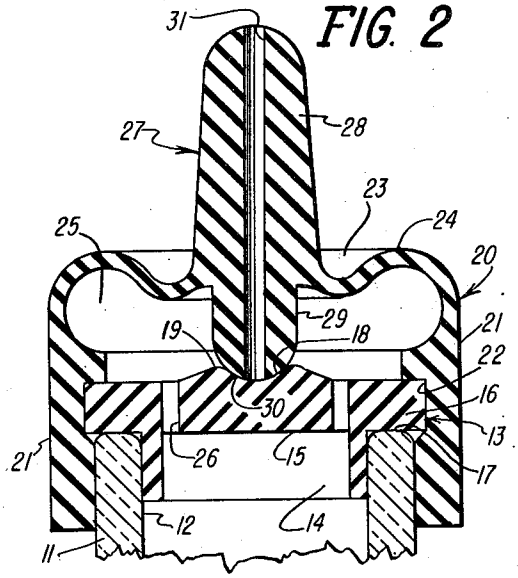


FIG. 4

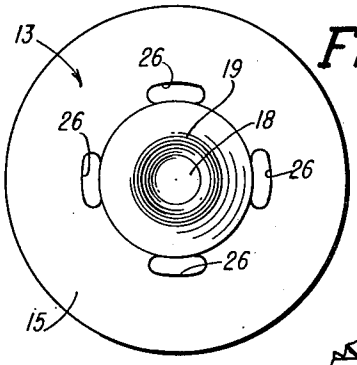


FIG. 3

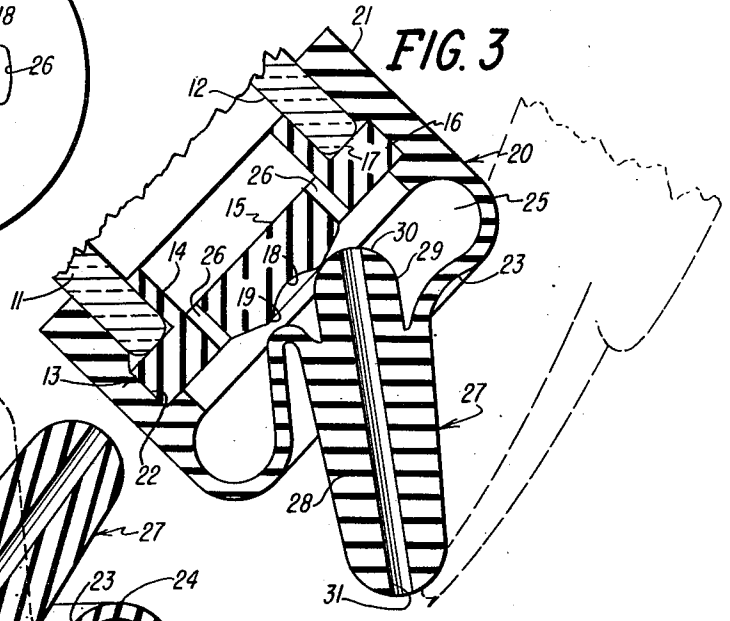
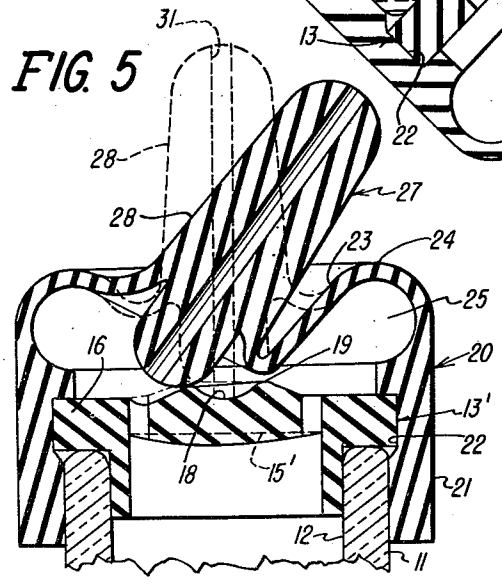


FIG. 5



INVENTORS
Raymond J. Olson
Donald R. Brandt
BY
Smith, Olson, Baird & Gulbrandsen
Attys.

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COMBINATION DISPENSING AND CLOSURE DEVICE

Raymond J. Olson, Skokie, and Donald R. Brandt, Arlington Heights, Ill., assignors to Federal Tool Corporation, Chicago, Ill., a corporation of Illinois

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10 Claims. (Cl. 222—498)

This invention relates to a combination dispensing device and closure for fluid containers of various kinds, and is particularly useful in connection with containers from which fluids are to be intermittently discharged or poured, the device being effective selectively to direct the discharge of the fluid in a desired direction and therafter to reseal or close the container after a desired amount of the fluid has been poured or discharged from the container through the device.

One of the objects of the present invention is to provide an inexpensive and easily mass-produced dispensing and closure device of the character just stated which may be quickly applied to fluid containers, reagent bottles, cigarette lighter fluid cans, and many other kinds of containers of the type having relatively narrow discharge mouths. Another object of the invention is to provide a combination closure and dispensing device that may be interchangeably applied to fluid containers, the device being easily removed from an empty container and installed on a full container. Still another object of the invention is to provide a dispensing and closure device of this kind that may be easily molded in two-piece form of resiliently flexible organic plastic or resin such as polyethylene or the like, the device being fluid-tight in its closed condition and without exteriorly exposed joints or relatively movable mating surfaces likely to permit leakage of the fluid.

These and other objects and advantages of the present invention will be apparent from the following description of a preferred embodiment of a combination dispensing device and closure embodying the features of the present invention, taken with the accompanying drawings wherein:

Fig. 1 is a fragmentary side elevational view of a bottle, can or other container, having an upwardly extending neck on which a combination dispensing device and closure of the present invention is mounted;

Fig. 2 is a vertical cross-section, on an enlarged scale, taken through the dispensing device and through the uppermost extremity of the neck of the container, the dispensing device being shown in its closed condition;

Fig. 3 is a view similar to Fig. 2 but showing the container tilted to a dispensing position, with the dispensing spout of the present device being flexed laterally to an open or pouring condition by the finger shown in broken lines, the contents of the container being free to flow outwardly through the spout when the spout is in the relative position illustrated;

Fig. 4 is a top plan view of a seat member seen in Figs. 2 and 3, the lower or inner end of the spout being shown in a seated position on this member in Fig. 2, and in a displaced position with respect thereto in Fig. 3, thereby permitting flow of the fluid from the container outwardly through the spout; and

Fig. 5 is a vertical cross-sectional view through a modified form of the present dispenser, the spout being shown in full lines in a dispensing position and in broken lines in its closed position.

The present dispenser and closure is shown in the drawings mounted upon a hollow can, bottle or other container 10 having an upwardly or outwardly extending neck 11 terminating in a mouth 12. A plug 13 covers this mouth, the plug being of collar-like construction having a downwardly extending annular collar 14 fitted in fluid-tight engagement with the inner walls of the mouth 12 and having an integral circular disk-like portion 15 extending across the exterior of the mouth with a radially extending circular shoulder 16 provided thereon and seated on the outer lip 17 of the neck. The disk-like portion of the plug has an axially disposed saucer-shaped seat 18 formed integrally therewith on its upper or outer surface, the perimeter 19 of the seat being raised with respect to the adjacent upper or outer surface of the disk.

A generally cylindrical, cup-shaped cap 20 is fitted over the plug 13 and has a downwardly extending skirt 21 provided with a circular inner groove 22 which is received upon the outer periphery of the shoulder 16 of the plug in fluid-tight engagement, the lower portion of the skirt 21 being received upon and closely fitted about the exterior of the neck 11 below the shoulder 16 of the plug. The upper or outermost portion of the skirt 21 with respect to the neck 11 is of reduced thickness and is turned radially inwardly where it merges integrally with a resiliently flexible outer end wall 23 of the cap, the end wall curving downwardly and then upwardly to provide a circular corrugation 24 therein that increases the flexibility of the wall. This outer end wall of the cap is spaced outwardly with respect to the outer surface of the disk-like portion 15 of the plug 13 and with respect to the seat 18 thereon, to provide a cavity 25 therebetween, the disk being provided with a plurality of openings 26 located about the saucer-shaped seat 18 through which fluid from the interior of the container 10 may flow freely into the cavity at any time the container is tilted, as shown in Fig. 3.

Integrally with the flexible outer end wall 23, at its axial center, there is provided a substantially rigid spout 27 having an outer portion 28 extending exteriorly of the end wall and having a shorter inner portion 29 extending interiorly of the wall, the inner extremity 30 of the inner portion 29 of the spout being rounded, as at 30, so as to cooperate with and to be seated upon the seat 18 to close an axial passage 31 that extends through the spout 27 from end to end.

The cap 20, including its outer end wall and the spout 27, is preferably molded as a single, integral piece, and may be of any suitable synthetic organic resin that is both resilient and flexible by nature, polyethylene being an example. The natural resilience of the outer wall 23 and its tendency to remain in the shape shown in Fig. 2, tends to retain the spout 27 in its axial position with the rounded inner extremity 30 of the spout seated on the seat 18. The inner end portion 29 of the spout is slightly longer than the normal free distance between the inner surface of the center of the outer wall 23 and the seat 18, so that when the inner extremity of the spout is seated upon the seat 18, the outer wall is flexed slightly outwardly in an axial direction, and its resilience therefore causes the inner extremity of the spout to bear against the seat and thereby insure effective sealing of the inner end of the passage 31. It will be seen, particularly in Fig. 2, that the contents of the container are effectively sealed when the spout is in its axial position, discharge of the contents from the cavity 25 being prevented by the closing of the passage 31.

When it is desired to pour from the container, the container is tipped to a position corresponding to that shown in Fig. 3, whereby the contents of the container will flow through the openings 26 in the plug 13 and into the

cavity 25. At the same time, the exterior end portion 28 of the spout 27 is moved laterally of the cap by the finger, as shown in Fig. 3. This lateral movement of the spout may be made in any radial direction with respect to the cap, and it causes the resiliently flexible outer end wall 23 to be flexed as shown in Fig. 3, thereby causing the inner extremity 30 of the spout to be displaced laterally in a radial direction off of the seat 18 and to be snapped across the upwardly extending perimeter 19 thereof, whereupon the perimeter of the seat will retain the spout in its displaced position. In this displaced position the inner end of the passage 31 is open for free discharge of the fluid contents from the cavity 25 and thus from the container itself. When a desired amount of the contents have been discharged, the spout is returned to its original axial position by the finger, the inner end of the spout again snapping across the upstanding lip or perimeter 19 of the seat and returning to its original seated position, thereby sealing the passage 31 against further discharge of fluid from the cavity 25 and from the interior of the container.

From the foregoing description, it will be understood that the exterior portion 28 of the spout 27 serves not only as a lever for operating the valving arrangement for opening and closing the passage 31 of the spout, but also serves as a means for directing the discharge of the contents in a desired direction, this being particularly desirable, for example, when the combination dispensing device and closure is employed upon containers for such fluids as inflammable cigarette lighter fluids and the like.

A modified form of the invention is shown in Fig. 5, wherein the assembly is identical to that shown in Figs. 1 to 4, inclusive, except for the fact that the central portion of the disk-like element 15' of the plug 13' is thinner than the disk-like portion 15 of the plug 13 shown in Figs. 2 and 3. The plug, in each instance, may be molded of the same material as the cap, that is, of a resiliently flexible synthetic organic resin such as polyethylene or the like. In such materials the flexibility of the item molded will depend, in part, upon the thickness of its walls. The provision of a disk-like portion 15' for the plug 13' of less thickness than that of the plug 13 shown in Fig. 2, renders the disk-like portion 15' flexible, thereby causing the seat 18 formed on the outer surface thereof to be moved or depressed in an axial direction when the inner extremity 30 of the inner portion 29 of the spout 27 is moved across the upstanding rim or perimeter 19 of the seat, as indicated by the solid and broken lines in Fig. 5. In the embodiment of the invention shown in Fig. 5, the pressure of the inner extremity of the spout upon the seat, when that end is seated upon the seat in sealing position, is preferably produced both by the resilience of the outer end wall 23 of the cap and by the resilience of the disk-like portion 15' of the plug 13', thereby producing effective and efficient sealing of the inner end of the passage 31. The provision of resilience in the disk-like portion 15' of the plug 13' in the embodiment of the invention shown in Fig. 5 also tends to reduce the amount of wear on the upstanding lip or perimeter 19 of the seat, and upon the inner extremity 30 of the spout, caused by sliding movement of the latter over the former. This tends to increase the effective life of the assembly.

It will be noted that the present dispenser and closure presents a pleasing symmetrical appearance when it is in its normal or closed condition, the spout 27 being axially disposed at this time and the resiliency of the outer end wall, as well as the coaction between the seat 18 and the innermost end of the spout, tending to retain the spout in its closed position, thereby making accidental opening of the closure most unlikely. At the same time, however, movement of the spout to its open position is easily accomplished by the finger, the spout acting as a lever in the displacement of its lower end from the seat. Furthermore, when the spout has been moved to its open position, the upstanding periphery of the seat acts against the inner end of the spout (Figs. 3 and 5) to retain the spout in its open position so that constant pressure of the finger on the spout during pouring is not required. Returning movement of the spout to its closed position is accomplished merely by "flipping" the spout from its open position toward its closed position, the resilience of the outer end wall 23 of the cap 20 and the curvature of the seat causing the spout automatically to be carried into its fully closed position once the inner end of the spout has been moved across the upstanding lip or perimeter 19 of the seat.

It will also be noted that in mounting the dispenser upon a container, the plug 13 or 13' may first be mounted on the mouth of the container and the cap 20 thereafter slipped over the plug and the container neck in the position shown in the drawing, the resilience of the walls of the cap being such as to permit receipt of the shoulder 16 of the plug into the circular groove 22 in the walls. Alternately, the plug may first be inserted into the cap and then the entire assembly may be slipped onto the container neck as seen in the drawing. In any event, it will be appreciated that the assembly may be pulled off the neck of an empty container and placed upon a full container whenever desired.

The foregoing description has been given for clearness of understanding only, and no unnecessary limitations should be implied therefrom, for it will be apparent to those skilled in the art that various changes may be made in the form and construction of the present dispensing and closure device without departing from the spirit and scope of the appended claims.

We claim:

1. A fluid dispenser and closure for a container having an outwardly extending discharge neck comprising, a cup-shaped cap having a relatively thin resiliently flexible diaphragm-like outer end wall closing the top of said cap, said cap being adapted to be fitted in inverted fashion over the outer end of said neck, a saucer-shaped seat transversely arranged within the cavity of said cap and spaced from said outer end wall thereof, and a substantially rigid dispensing spout fixedly secured in said flexible end wall with a discharge passage therethrough, said spout having an outer end portion extending exteriorly of said end wall and an inner end portion extending interiorly thereof for cooperation with said seat, the resilience of said outer end wall tending to retain said spout in a normal axial position wherein the end extremity of said end portion of said spout is seated on said seat to close said passage, said resilience and flexibility of said outer end wall being such as to permit tilting movement of said outer end portion of said spout in a lateral direction with respect to said cap to displace said inner end portion of said spout from said seat in the opposite lateral direction and thereby open said passage for discharge of said fluid.

2. A fluid dispenser and closure for a container having a discharge opening comprising, a cap having a resiliently flexible outer end wall, said cap being adapted to be fitted over said opening, an axially disposed saucer-shaped seat spaced inwardly from said outer end wall, and a substantially rigid dispensing spout integral with said flexible end wall and having a discharge passage therethrough through which said fluid may pass, said spout having an outer end portion extending exteriorly of said end wall and an inner end portion extending interiorly thereof for cooperation with said seat, the resilience of said outer end wall tending to retain said spout in a normal position wherein the end extremity of said inner end portion thereof is seated on said seat to close said passage, said resilience permitting manual movement of said outer end portion of said spout in a lateral direction with respect to said cap to displace said inner end portion of said spout from said seat laterally

in the opposite direction and thereby open said passage for discharge of said fluid.

3. In combination with a fluid container having an outwardly extending discharge neck, a fluid dispenser and closure for said container comprising, a cup-shaped cap having a resiliently flexible outer end wall, said cap being fitted in inverted fashion upon the outer end of said neck with said end wall spaced outwardly of the discharge mouth of said neck, a saucer-shaped seat transversely arranged within the cavity of said cap and spaced from said outer end wall thereof, and a substantially rigid dispensing spout fixedly secured in said flexible end wall with a discharge passage therethrough, said spout having an outer end portion extending exteriorly of said end wall and an inner end portion extending interiorly therefrom for seating cooperation with said seat, the resilience of said outer end wall tending to retain said spout in a normal position wherein the end extremity of said inner end portion of said spout is seated on said seat to close said passage, said resilience permitting manual tilting movement of said outer end portion of said spout laterally with respect to said cap to displace said inner end portion of said spout from said seat and thereby open said passage for discharge of said fluid.

4. A fluid dispenser and closure for a container having a discharge opening comprising, a plug adapted to be fitted into said opening, an axially disposed saucer-shaped seat on the outer face of said plug, a cup-shaped cap having a resiliently flexible outer end wall, said cap being arranged in inverted fluid-tight fashion over said plug with said outer end wall spaced from said outer face of said plug to provide a cavity therebetween, said plug having an unobstructed opening therethrough disposed laterally of said seat to provide communication between said cavity and the interior of said container whereby fluid may at all times flow freely from said container into said cavity, and a substantially rigid dispensing spout fixed in said flexible end wall of said cap with a discharge passage therethrough, said spout having an outer end portion extending exteriorly of said end wall and an inner end portion extending interiorly thereof for cooperation with said seat, the resilience of said outer end wall tending to retain said spout in a normal position wherein the inner extremity of said inner end portion of said spout is seated on said seat to close said passage, said resilience permitting manual tilting movement of said outer end portion of said spout in a lateral direction with respect to said cap to displace said inner end portion of said spout from said seat and thereby open said passage for discharge of said fluid.

5. A fluid dispenser and closure for a container having a discharge opening comprising, a plug adapted to be fitted into said opening, an axially disposed saucer-like seat on the outer face of said plug, a cup-shaped cap arranged in inverted fluid-tight fashion over said outer face of said plug with the outer end of said cap spaced from said outer face of said plug to provide a cavity therebetween, said plug having an unobstructed opening therethrough disposed laterally of said seat to provide communication between said cavity and the interior of said container whereby fluid may at all times flow freely from said container into said cavity, and a movable dispensing spout mounted in said outer end of said cap with a discharge passage therethrough, said spout having an outer end portion extending exteriorly of said cap and an inner end portion extending interiorly thereof for cooperation with said seat, said spout having an axial position wherein said inner end portion thereof is seated on said seat to close said discharge passage, said outer end portion of said spout being movable in a lateral direction with respect to said cap to displace said inner end portion of said spout from said seat in the opposite lateral direction, thereby opening said passage for discharge of said fluid from said cavity.

6. A fluid dispenser and closure for a container having a discharge opening comprising, a plug adapted to be fitted into said opening, an axially disposed saucer-shaped seat on the outer face of said plug, an inverted cap covering said plug, the outer end of said cap being spaced from said outer face of said plug and providing a cavity therebetween, said plug having an unobstructed opening therethrough disposed laterally of said seat to provide communication between said cavity and the interior of said container whereby fluid may at all times flow freely from said container into said cavity, and a movable dispensing spout mounted in said outer end of said cap with an axial discharge passage therethrough, said spout having an outer end portion extending exteriorly of said outer end of said cap and an inner end portion extending interiorly thereof with a convexly rounded inner extremity adapted to cooperate with said saucer-shaped seat, said spout having an axial position wherein said inner extremity thereof is seated on said seat to close said discharge passage, said outer end portion of said spout being movable in a lateral direction with respect to said cap to displace said inner extremity of said spout from said seat in the opposite lateral direction, thereby opening said passage for discharge of said fluid from said cavity.

7. A fluid dispenser and closure for a container having a discharge opening comprising, a plug adapted to be fitted into said opening, an axially disposed concave seat on the outer face of said plug, the periphery of said seat being raised with respect to said outer face, a cup-shaped cap having a resiliently flexible outer end wall, said cap being arranged in inverted fluid-tight fashion over said plug with said outer end wall spaced from said outer face of said plug to provide a cavity therebetween, said plug having an unobstructed opening therethrough disposed laterally of said seat to provide communication between said cavity and the interior of said container whereby fluid may flow freely from said container into said cavity, and a substantially rigid dispensing spout fixed in said flexible end wall of said cap with an axial discharge passage therethrough, said spout having an outer end portion extending exteriorly of said end wall and an inner end portion extending interiorly thereof for cooperation with said seat, the resilience of said outer end wall tending to retain said spout in an axial position wherein the inner end of said spout is forcefully urged by said resilience into seated engagement with said seat to close said passage, said resilience permitting manual movement of said outer end portion of said spout in a lateral direction with respect to said cap to displace said inner end of said spout from said seat and to snap the same radially outwardly over said raised periphery of said seat to open said passage for discharge of said fluid, said raised periphery of said seat tending to retain said spout in its displaced position.

8. The combination set forth in claim 7, wherein said outer face of said plug is resiliently flexible to permit axial movement of said seat during the displacement of said inner end of said spout from said seat.

9. The combination set forth in claim 7, wherein said outer end wall of said cap is provided with a circular corrugation about said spout to permit ready lateral flexure of said spout in said wall.

10. The combination set forth in claim 7, wherein said spout and said outer end wall of said cap are integrally formed of a moldable synthetic organic resin.

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