

March 8, 1966

F. S. BUONO ET AL

3,239,096

CAPTIVE CAP ASSEMBLY

Filed Nov. 25, 1964

2 Sheets-Sheet 1

FIG. 2

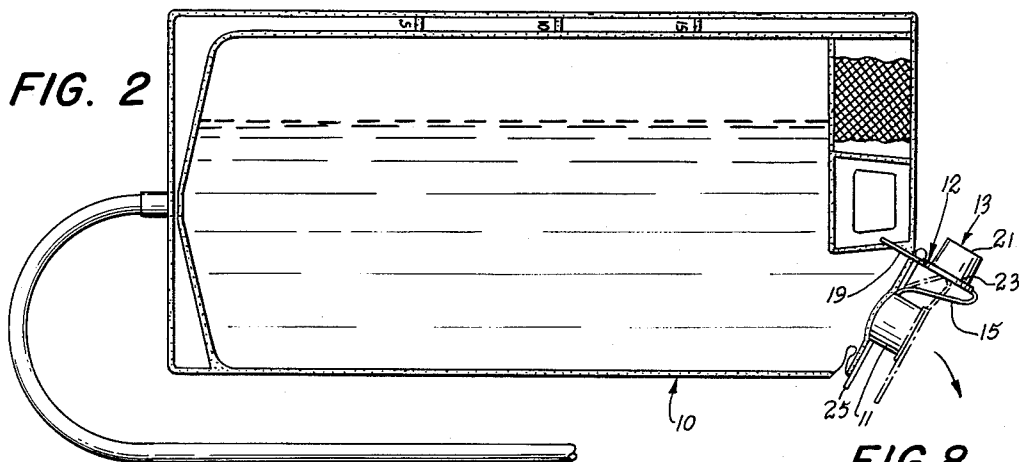


FIG. 8

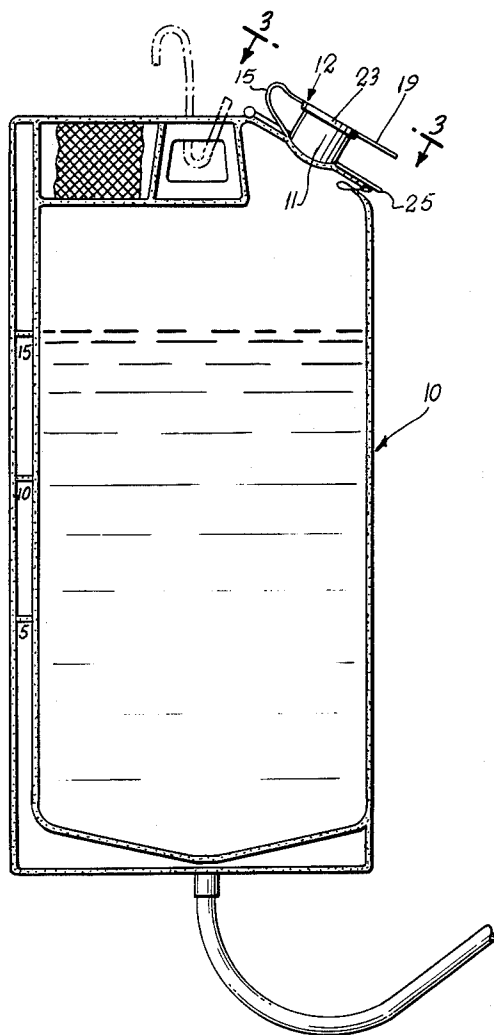
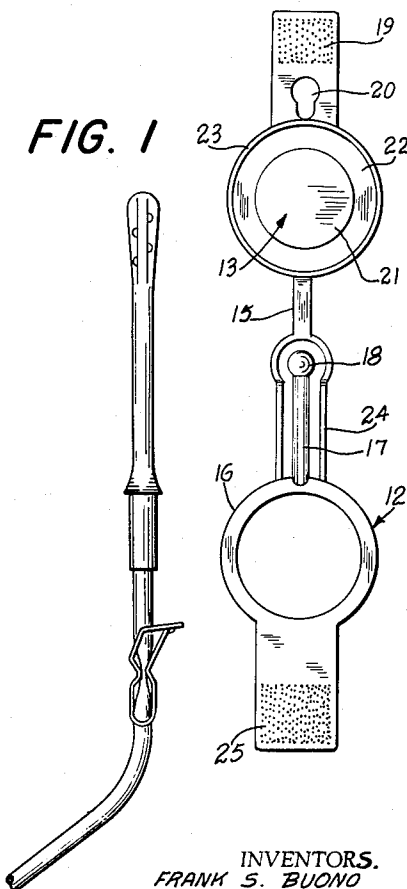


FIG. 1



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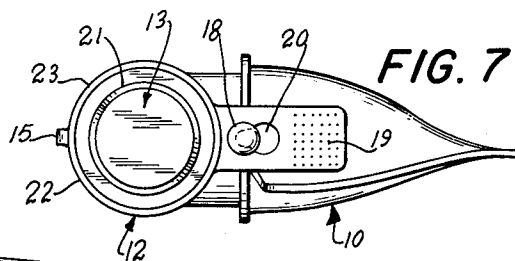
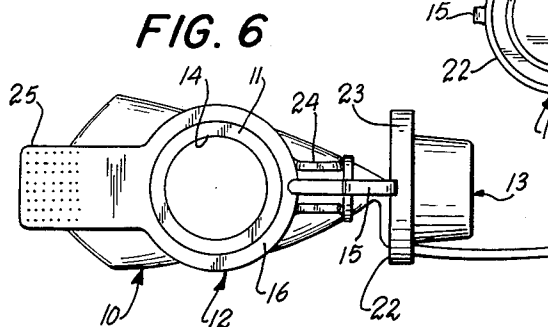
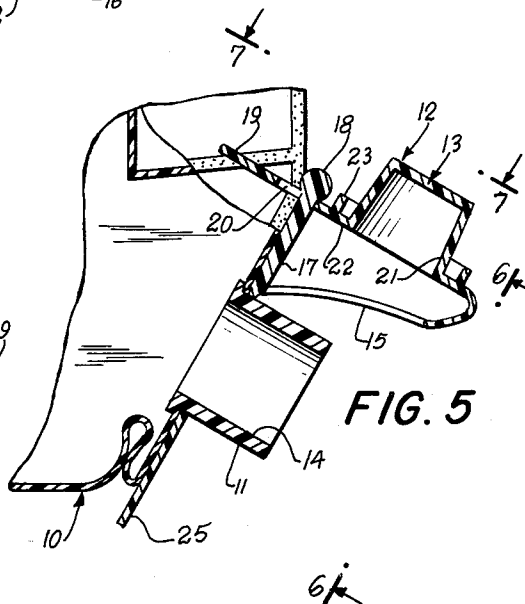
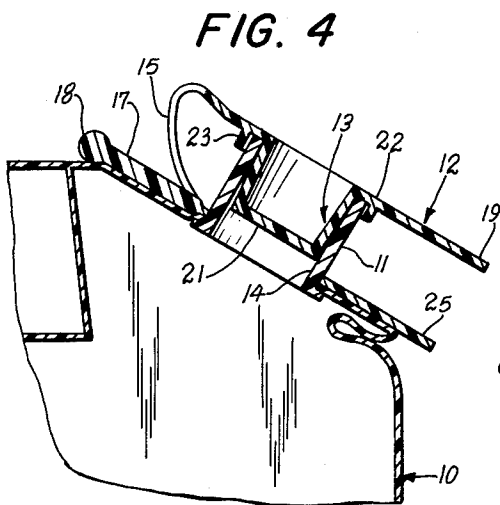
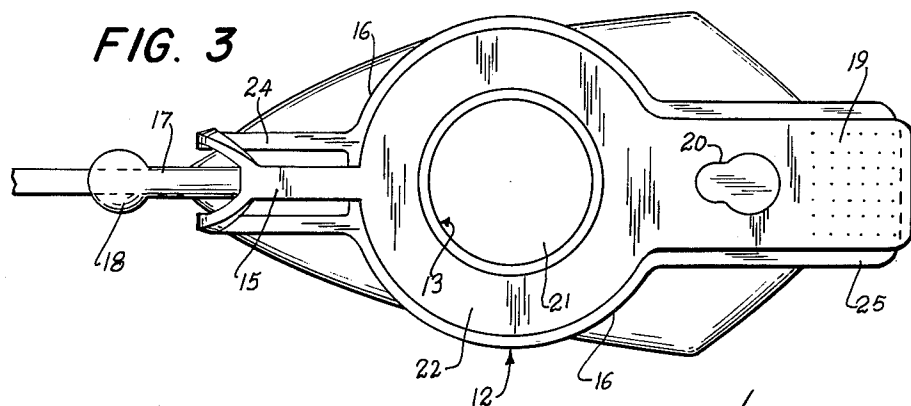
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3,239,096

CAPTIVE CAP ASSEMBLY

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7 Claims. (Cl. 220—38.5)

This invention relates to a structurally and functionally improved captive cap assembly capable of use in numerous different associations, but primarily intended to be employed in the sealing of fluid containers such as enema administration sets, vaginal irrigation sets, urinary drainage systems and the like.

By means of present teachings a closure is provided which may be either of the screw-on or plug-in type. Both present disadvantages. If they are not self-retaining, i.e. have means for retaining the closure assembly thereof to the receptacle when in open position, then it is necessary to remove the cap or the closure from the receptacle and either place it on some surface or hold it while manipulating the receptacle during the inlet or outlet of fluid therefrom. Obviously, the latter is cumbersome and the former is frequently unsanitary. Furthermore, if it is a captive cap assembly and therefore is self-retaining, then the closure portion frequently interferes with the passage of fluid into and out of the container. In this regard the retaining means serve only to keep the cap or closure member attached to the container. Thus, the closure member will frequently create problems by interfering with the introduction or the passage of fluid into or out of the container, bringing about a very unsatisfactory device. In addition, if the closure member is of the plug-in type, quite frequently it will not remain in the closed position but may tend to pop out of its placement in the container.

It is an object of this invention to provide an improved captive cap assembly for a fluid container which is self-retaining and thus unnecessary to remove from the container.

Another object of this invention is to provide a self-retaining captive cap assembly which may be releasably locked in an open position such that the cap or closure portion thereof will be retained in a position free from interference with the passage of liquid into or out of the fluid container.

It is a further object to provide a one piece flexible captive cap assembly, simple to use and economic to manufacture.

Another object of our invention is the provision of means for releasably locking the closure member in its fitting, thus preventing it from "popping" out of place.

With these and other objects in mind, reference is now had to the attached sheets of drawings illustrating practical embodiments of the invention and in which:

FIG. 1 is a side elevation of a container with the captive cap attached thereto in the closed position;

FIG. 2 is a side view of a container having the captive cap attached thereto in the open position;

FIG. 3 is a view from above in the direction of the arrows as indicated by the numerals 3—3 in FIG. 1 showing the captive cap in the closed position;

FIG. 4 is a fragmentary cross-sectional view showing the cap in closed position;

FIG. 5 is an enlarged view of the captive cap assembly in cross section as shown in FIG. 2;

FIG. 6 is a view of the cap assembly from above taken along the lines 6—6 in the direction of the arrows as indicated in FIG. 5;

FIG. 7 is a view of the cap assembly from the side

2

taken along the lines 7—7 in the direction of the arrows as indicated in FIG. 5;

FIG. 8 is a plan view of the preferred form of the captive cap assembly unattached to the container.

In the various views the numeral 10 indicates a container such as that mentioned above. In this particular case, a vaginal irrigation set is the subject of the application for our improved captive cap assembly. The container 10 is provided with an open ended tubular neck 11 to aid in the passage of fluid into and out of the body.

A captive cap assembly 12 is provided to keep fluid in the receptacle or to permit the passage of fluid therefrom. This unique assembly has a closure member 13 for removable application to the open end of the tubular neck. A flexible hinge strap 15 connects the closure member with a retaining ring 16. The ring is constructed and arranged with respect to the neck 11 such that it has a size and configuration to snugly surround and attach thereto. Thus, the retaining ring in its snug attachment around the neck of the container maintains the closure member captive so that it may be shifted between a closed position in superposed aligned position with the retaining ring 16, as shown in FIG. 4, to an open position offset to one side of the ring, as shown in FIGS. 2, 5 and 6. Latching means are provided for releasably holding the closure 13 in open position offset to one side of the retaining ring 16 free from interference with the flow of fluid into and out of the container. In the preferred form of our invention, the latching means are comprised of a stud 17 having an enlarged head 18 formed integrally with the retaining ring and projecting outwardly therefrom and a flange 19 having a cooperable opening 20 therein formed integrally with the closure member 13. The head portion 18 of the stud 17 is inserted by manipulation of the closure member into the cooperable opening 20 of the flange 19 of said closure member where it will be releasably retained in open position.

The flange 19 of the closure member 13 also serves an additional function. It serves as a tab which may be grasped and utilized as an aid in removing the closure member from the tubular neck. The advantage of this arrangement is that of stability during opening. Tab 25 may be held with the left hand in conjunction with bag opening to orient bag opening during filling or emptying. Tab 25 also aids in the placement or removal of the retaining ring 16 on the tubular neck. Both these flanges may be integrally formed with their respective members.

The closure assembly may be of various types designed to bring about effective sealing of the receptacle. However, we prefer a closure member having plug and head portions. The plug portion 21 may be removably inserted into the neck 11 of the container 10. In addition, the head portion 22 is of a circumferential configuration, and has a depending peripheral flange 23, the purpose of which will be later explained. It can be seen thusly that the closure assembly is inserted plug portion first into the tubular neck of the container.

Also, in the preferred form of our invention, the hinge strap or attachment means 15 is of a bifurcated configuration 24. It extends from and is formed integrally with the retaining ring 16. The projecting stud 17 is located between the ends of the bifurcated portion 24, extends laterally from the retaining ring and is formed integrally therewith. This arrangement facilitates the ease of placement of the closure member 13 to an open position. Thus the closure may be placed in a raised position on the laterally extending stud 17 of the retaining ring, again, as shown in FIG. 2.

The manner of attachment of the retaining ring to the tubular neck of the receptacle is also significant. The ring 16 as hereinbefore mentioned should be of a size

and configuration such that it snugly attaches around the neck 11 of the container. The neck may be made of a relatively flexible material. With this arrangement it is possible to lock the closure member in the closed position. When the retaining ring is positioned on the tubular neck of the container and the closure member is placed in the closed position by inserting the plug portion thereof in superposed relationship with the ring, the closure member will be releasably locked in position by the engagement of the ring and the outer surface of the tubular neck. Therefore, not only does the ring serve to retain the closure member in a captive position with relationship to the container, but it also serves to develop the required interference between the plug and the fitting to thereby releasably lock the closure member in closed position. To release the closure from this locked position, it is only necessary to slide the retaining ring away from the head portion of the closure member. If additional interference is desired, the plug portion 21 may be tapered outwardly towards the head portion so as to increase the engagement between the ring and the neck portion of the container.

As mentioned above, we prefer to have the closure member 13 comprised of a plug portion 21 and a circumferential head portion 22 having a depending peripheral flange 23. In providing for a head portion having a configuration of this type, the danger of direct bacterial fall-out on the intersection of the end of the plug fitting and the inner parallel portion of the plug is substantially eliminated. Thus, the head portion serves as an anti-contamination shield.

The captive cap assembly is preferably made in one piece of flexible resilient plastic material, such as polypropylene, polyethylene, polyvinyl acetate, ethyl vinyl acetate or polyvinyl chloride. It may be injection molded.

It will be thus seen that we have provided an improved captive cap assembly which can be employed with fluid containers and which is simple to use and economic to manufacture. It may be releasably locked in an open position, free from interference with the passage of fluid into and out of the container and also releasably locked in a closed position.

Thus, among others, the several objects of the invention as specifically aforementioned are achieved. Obviously, several changes in construction and rearrangement of parts might be resorted to without departing from the spirit of the invention as defined in the claims.

We claim:

1. An improved captive cap assembly for use with a container having an open ended tubular neck, said assembly comprising: a closure member for removable application to the open end of the neck, a retaining ring for attachment around the neck of the container to retain the assembly in position, a flexible hinge strap integrally connected between the closure member and the retaining ring for holding the closure member captive so that it can be shifted between a closed position in superposed aligned position with the retaining ring and an open position offset to one side of the ring and cooperable latching means formed on said retaining ring and closure member respectively for releasably holding the closure member in open position and offset to one side of the retaining ring, said assembly being formed in one piece of flexible, resilient plastic material.

2. An improved captive cap assembly as set forth in claim 1 in which the latching means comprises a projecting stud having an enlarged head integrally formed with the retaining ring and a flange having a cooperable opening for engagement with the stud integrally formed with the closure member.

3. A improved captive cap assembly as set forth in claim 2 in which the hinge strap has a bifurcated portion extending integrally from the retaining ring and the projecting stud is located between the ends of said bifurcated portion extending integrally from said retaining ring.

4. An improved captive cap assembly for use with a container having an open ended tubular neck, said assembly comprising: a closure member for removable application to the open end of the neck including a plug and a circumferential head portion having a depending peripheral flange, a retaining ring of a size and configuration to snugly attach around the neck of the container to retain the assembly in position, a flexible hinge strap integrally connected between the closure member and the retaining ring for holding the closure member captive so that it can be shifted between a closed position in superposed aligned position with the retaining ring and an open position offset to one side of the ring, a projecting stud having an enlarged head integrally formed with the retaining ring and a flange having a cooperable opening for engagement with the stud integrally formed with the closure member for releasably holding the closure member in open position offset to one side of the retaining ring.

5. An improved captive cap assembly for use with a container having a flexible open ended tubular neck, said assembly comprising: a closure member for removable application to the open end of the neck including a plug and circumferential head portion having a depending peripheral flange, a retaining ring of a size and configuration to snugly attach around the neck of the container to retain the assembly in position, a flexible hinge strap integrally connected between the closure member and the retaining ring for holding the closure member captive so that it can be shifted between a closed position in superposed aligned position with the retaining ring, and an open position offset to one side of the ring, said closure member being releasably locked in closed position by the engagement of the ring and the tubular neck, a projecting stud having an enlarged head integrally formed with the ring and a flange having a cooperable opening for engagement with the stud integrally formed with the closure member for releasably holding the closure member in open position offset to one side of the retaining ring.

6. An improved captive cap assembly as set forth in claim 5 wherein said plug portion is tapered outwardly towards said head portion so as to increase the engagement between the ring and neck portion of the container when said closure member is in the closed position.

7. An improved container and captive cap assembly comprising: a container having a flexible open ended tubular neck, a captive cap on the container comprising a closure member for removable application to the open end of the neck including a plug and circumferential head portion having a depending peripheral flange, a retaining ring on said neck and being of a size and configuration to snugly attach around the neck of the container to retain the assembly in position, a flexible hinge strap integrally connected between the closure member and the retaining ring for holding the closure member captive so that it can be shifted between a closed position in superposed aligned position with the retaining ring, and an open position offset to one side of the ring, said closure member being releasably locked in closed position by the engagement of the ring and the tubular neck, said cap having a projecting stud having an enlarged head integrally formed with the ring, and a flange having a cooperable opening for engagement with the stud and being integrally formed with the closure member for releasably holding the closure member in open position offset to one side of the retaining ring.

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