This invention relates generally to the field of mailing containers, and more particularly to an improved synthetic resinous container construction particularly adapted for the mailing of fluids in small quantities.

For a long period of time, postal authorities have frowned upon the mailing of small liquid specimens, such as those used in connection with urinalysis, owing to the difficulty of fabricating a suitable container which will be leakproof and sufficiently resistant to damage caused by normal handling. Where containers containing such specimens are broken, not only the container itself is destroyed, but the liquid contents of the container are often spread over other packages. Since such containers are usually sent by first class mail, valuable correspondence is almost invariably reached as well.

Aside from breakage of non- resilient containers such as glass, and the breaking of fibrous containers owing to lack of sufficient mechanical strength, the principal problem in shipping liquid specimens has been the possibility that the cap will either loosen in transit or be engaged by other articles such that it is broken or snapped away from the body of the container. Either happening results in the spillage of the specimen, with the above described deleterious effect.

It is therefore among the principal objects of the present invention to provide an improved mailing container construction of the class described, in which the above mentioned disadvantages have been substantially eliminated.

Another object of the invention lies in the provision of a mailing container construction including first and second container elements, one being disposed within the other in such a manner that damage to the outer container element is not imparted to the inner container element.

Another object of the invention lies in the provision of an improved container construction of the class described in which the screw caps used for sealing the containers may be closed to a predetermined degree, thereby avoiding the possibility of breaking the container owing to excessive tightening and assuring, at the same time, that a sufficient degree of tightness has been obtained.

Yet another object of the invention lies in the provision of an improved mailing container construction, in which the cost of fabrication may be of a reasonably low order, with consequent wide sale, distribution and use.

A feature of the invention lies in the fact that a single outer container element may be used in conjunction with a variety of sizes of inner container elements, interchangeably.

Another feature of the invention lies in the fact that use of the invention construction requires no tools and no more than ordinary skill.

These objects and features, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawing, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIGURE 1 is a view in elevation, partly broken away to show detail, of an outer container element embodying the invention.

FIGURE 2 is a view in elevation showing one size and configuration of inner container element used in conjunction with the outer container element shown in FIGURE 1.

FIGURE 3 is a view in elevation showing a second size and configuration of inner container element, selectively used in lieu of the inner container element shown in FIGURE 2.

FIGURE 4 is a transverse sectional view as seen from the plane 4—4 in FIGURE 6.

FIGURE 5 is a view in elevation showing the inner surface of a cap element shown in the upper portion of FIGURE 1.

FIGURE 6 is a longitudinal sectional view showing the container element of FIGURE 2 installed within the container element of FIGURE 1.

FIGURE 7 is a similar sectional view showing the container element of FIGURE 3 installed within the container element of FIGURE 1.

FIGURE 8 is a fragmentary enlarged sectional view as seen from the plane 8—8 in FIGURE 5.

In accordance with the invention, the device, generally indicated by reference character 10 is used in conjunction with standard specimen container tubes illustrated in FIGURES 2 and 3, and identified by reference characters 11 and 12, respectively. The tubes 11 and 12 are substantially similar as to mechanical details, the tube 11 including a cylindrical body 13 having a screw cap 14 thereon and the tube 12 having a somewhat differently configured cylindrical body 15 and a corresponding screw cap 16.

The device 10 comprises broadly: a cylindrical body element 18 and a screw cap element 19.

The body element 18 includes a bottom wall member 20 having an outer surface 21 and inner surface 22, and a cylindrical wall member 23 having an outer surface 24 and inner surface 25. The outer surface 24 may contain suitable printing (not shown) in the form of a prepaid mailing label or other suitable indicia. The inner surface 25 defines a cylindrical cavity 26 into which either of the first and second tubes 11—12 may be positioned. Extending upwardly from the inner surface 22 from the bottom wall member 20 are four short partial septums or projections 27, 28, 29, and 30, the inner edges 31, 32, 33, 34 respectively of which define lines on an imaginary cylinder corresponding in diameter to the outer surface of the second tube 12 to position the same against radial movement. The upper surfaces 35 of each of the septums lie in a single plane, and are adapted to engage the bottom wall of the first tube 11 to accomplish a similar positioning.

Disposed at the upper or open end of the body element 18 is an annular flange 36 having a tapered outer surface 37 and a radial surface 38 forming a redbet into which the screw cap element 19 may be positioned. Disposed above the surface 38 is a threaded portion 39 having a continuous single thread 40 thereon terminating at the lower end thereof at 41. Positioned immediately adjacent the terminal 41 is a radially extending button-like projection 42 of height greater than the thread 40.

The screw cap 19 includes an end wall 44 having an inner surface 45 (see FIGURE 5) as well as an outer surface 46. The wall 44 is molded integrally with a cylindrical wall 47 having an outer surface 48 and a correspondingly threaded inner surface 49. Extending radially into the inner surface is a recess or detent 50 corresponding to the projection 42, and so positioned as to provide for mutual engagement when a proper degree of tightness of the cap 16 upon the body 15 is attained. This
engagement is accomplished in a clearly observable manner by the user, and if desired, the recess 50 may be carried through the wall 47 so as to permit visible observation of the projection 42. When this condition has been obtained, the free cylindrical edge of the cap 16 is positioned adjacent the radial surface 38, thereby allowing the tapered outer surface 37 to prevent the engagement of an article beneath the edge of the cap to possible damage the same or force the cap from engagement with the body 15. This is accomplished by making the effective diameter of the flange 36 equal to, or slightly greater than, the diameter of the cap 19, as best seen in FIGURES 6 and 7.

Referring to FIGURE 5, the inner surface 45 of the end wall 44 is provided with a first or outer arcuate flange 52 and a second or inner arcuate flange 53. The flange 52 includes an outer surface 54 which forms a seal with the cylindrical body 15 by defining a groove existing between the surface 54 and the inner surface 55. This seal is accomplished irrespective of the size and configuration of the tube 11 or 12 which is used with the device 10. The inner surface 55 of the flange 52, additionally provides a locating means for the cap 14 of the tube 11 as seen in FIGURE 6, as well as means for limiting to a substantial degree the movement in a radial direction which is possible with the screw cap 16 of the tube 12.

The flange 53 is shorter in a longitudinal direction than the flange 52, and includes an inner surface 56 having a plurality of projections 57 located thereon of sufficient height to contact the upper surface 51 of the inner cap 14, or the upper surface 62 of the inner cap 16 when either of the tubes 11 and 12 are positioned within the device 10 and the cap 16 is tightened.

The result of this operation will be to prevent the inner tube 11 or 12 from loosening from a previously tightened condition while in transit, and in addition to prevent any relative movement between the first and second tubes 11 and 12 and the device 10.

From a consideration of FIGURES 6 and 7, it will be observed that should the device 10, which is formed from suitable synthetic resinaous material, become cracked or otherwise damaged, such damage is not normally transmitted to the inner tube which must be punctured before breakage can result. In addition, once the cap 16 has been suitably tightened owing to the presence of projection 42 and corresponding recess 50, it will not accidentally vibrate loose, and in tightened condition will effectively prevent any loosening of the cap 14 or 16 wherein leakage could result.

We wish it to be understood that we do not consider the invention limited to the precise structures shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

We claim:
1. In a synthetic resinous tubular mailing container, a hollow cylindrical body having a first closed sealed end and a second open end, said open end having a threaded outer surface, and an annular flange adjacent said threaded surface; and a correspondingly internally threaded cap selectively engageable upon said open end, said annular flange being in abutted relation with respect to said cap when the latter is in engaged condition, and having an external effective diameter substantially equal to that of said cap; and resilient detent means for indicating when said cap is properly located with respect to said flange.
2. In a synthetic resinous tubular mailing container, a hollow cylindrical body having a first closed end and a second open end, said open end having a threaded outer surface, and a correspondingly internally threaded cap selectively engageable upon said body to effect a seal therewith, said cap and body having resilient detent means for indicating a predetermined degree of mutual engagement.
3. In combination, a synthetic resinous mailing container including a first cylindrical body, a cap selectively threadedly engageable upon said body, a second cylindrical body selectively positioned within said first cylindrical body, a second cap selectively threadedly engageable upon said second body, said first cap having an inner surface, said second cap having an outer surface, said last mentioned inner surface having means projecting therefrom for engaging said last mentioned outer surface; whereby upon the positioning of said second body and engaged second cap within said first body, and the tightening of said first cap upon said first body, said last mentioned means may maintain said second cap in tightly closed relation upon said second body.

References Cited by the Examiner
FOREIGN PATENTS
1,030,686 6/1953 France.

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