July 7, 1964 M. B. NETTLESHIP 3,140,007

SPECIMEN CONTAINER

Filed Sept. 7, 1962

FIG. 1

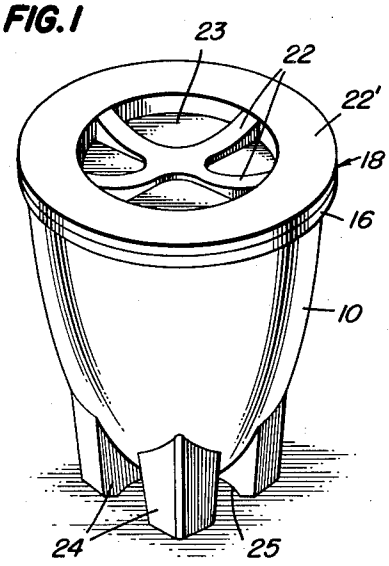


FIG. 3

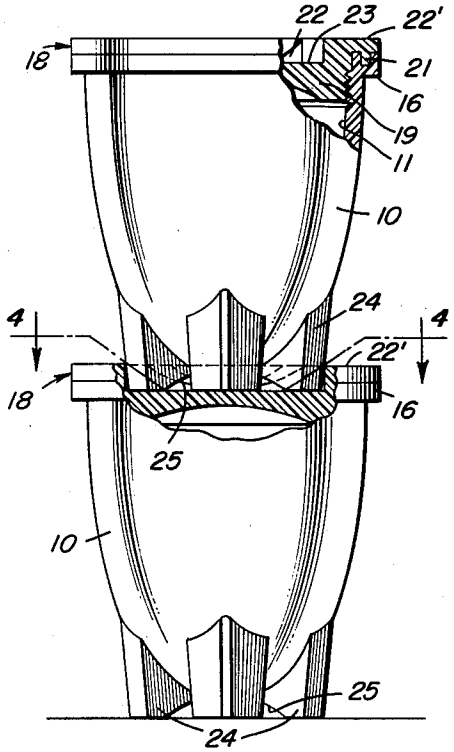


FIG. 2

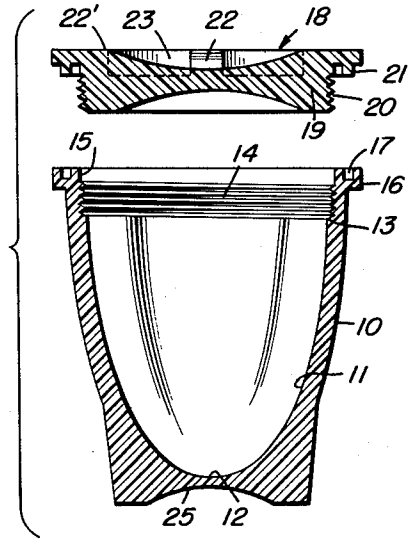
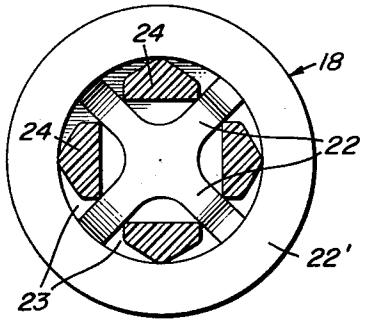


FIG. 4



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SPECIMEN CONTAINER

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This invention relates to specimen containers and particularly to the construction of a container for holding pathological specimens and the liquid which is used for their fixation or preservation.

Containers for use in laboratories and for shipping pathological specimens generally are not truly fluid-tight, so that often, during shipping and use in laboratories, formaldehyde, alcohol, or similar fixatives or preservatives seep through the lids of the containers and soak into surrounding materials. Furthermore, quite often these containers are made of glass which may be easily broken during such use. In addition, the preservatives in conventional specimen containers often evaporate to a great extent, since the containers actually are not fluid-tight. Moreover, containers generally have shoulders which overhang inwardly of the container at the open end thereof. These shoulders or similar contours generally do not interfere with the insertion of organic specimens into the containers, since such specimens usually are soft and slip into the container easily but, following fixation, become hardened so that it is often impossible to remove the fixed specimen from the glass container such that it becomes necessary to break the container in order to remove the specimen.

An object of the present invention is to provide an improved specimen container.

Another object of this invention is to provide an improved container which allows the easy insertion of a specimen into a container and its ready removal therefrom.

A further object of the present invention is to provide an improved container which is truly fluid-tight.

Yet another object of the present invention is to provide an improved fluid-tight container which may be readily stacked in tandem upon another and constructed to minimize relative lateral movement when thus stacked.

A still further object of this invention is to provide an improved fluid-tight container in which a specimen may be visually examined through the container walls and which is formed with a body having an inner surface which flares continuously outwardly toward the open end of the container body.

Further objects and advantages of this invention will become apparent from the following description referring to the accompanying drawing, and the features of novelty which characterize this invention will be pointed out with particularity in the claims appended to and forming a part of this specification.

In the drawing:

FIG. 1 is a perspective view of an embodiment of an improved specimen container made in accordance with the present invention;

FIG. 2 is a sectional view of the container illustrated in FIG. 1, showing the cover removed from the body of the container, and both in section along a vertically extending diametrical plane therethrough;

FIG. 3 is a side elevational view of two of the containers shown in FIG. 1, arranged in tandem-stacked relation and partially broken away, to illustrate various details thereof; and

FIG. 4 is a sectional view, taken along line 4—4 of FIG. 3, illustrating the nested relationship of the legs of an upper container in sockets of the cover of a lower container so as to minimize relative lateral movement between the stacked containers.

Referring to the drawing, a container embodying the present invention is illustrated which is preferably made of a transparent or semi-transparent linear polyethylene, low density, plastic. This material is especially practical for containers of this type, as it is very resistant to weak acids and to strong and weak alkalies. In addition, it is only attacked very slowly by strong acids. This latter characteristic is desirable in some instances, although none of the solutions used in the preservation of pathological specimens contain strong acids. Furthermore, this material has been found to have excellent molding qualities.

In accordance with the present invention, the container is formed with a hollow body **10** which is molded preferably sufficiently thin so that a specimen in the container can be seen through the sides and cover thereof. In order to assure the easy insertion of a specimen into the container and also facilitate its removal from the container after it has become rigid by its fixation therein, the inner surface **11** of the container is flared continuously outwardly from its lowermost point to the upper open end thereof. It has been found that this flared inner surface **11** very satisfactorily provides all of the desired characteristics if it is formed substantially as a paraboloid, with the vertex thereof at the innermost point or bottom of the container and the base **13** of the paraboloid at the open upper end thereof. This assures against any overhang of any part of the inner surface, so that a specimen which is rigidified in the container can always be readily removed from the open end of the container.

In order to make the container fluid-tight and to maintain the ease of removal of a specimen from the container, a screw-threaded portion **14** is formed in the inner surface of the body of the container which extends into the inner surface of the container adjacent to the outer end thereof, and this inner surface is relieved, as shown at **15**, between the outer end of the screw thread and the outer edge of the open end to a relief depth of at least the depth of the screw thread. An annular flange **16** extends outwardly around the upper outer open end of the container and is formed with an annular sealing groove **17** extending axially thereinto. A cover **18** is provided for the container which is adapted to have a fluid-tight sealing engagement therewith. This cover is formed with an inner axially extending cylindrical flange portion **19** on one side thereof which is threaded externally, as shown at **20**, to provide a substantially fluid-tight snug threaded fit with the screw-threaded portion **14** in the body of the container. The fluid-tight seal is further assured by an outer axially extending cylindrical flange **21**, spaced radially outwardly from the inner flange portion **19**, which is formed so as to provide a sealing engagement with the sealing groove **17** when the cover **18** is screwed tightly into the open end of the container.

In order to facilitate the securing of the cover **18** in fluid-tight engagement with complementary parts on the body of the container, a plurality of finger holds are formed on the top side of the cover away from the sealing flange **21**. These finger holds comprise a plurality of outwardly extending ribs or spokes **22** which extend outwardly to a rim **22'**. These ribs preferably are formed by relieving the central portion of the cover **18** to a uniform predetermined desired depth on each side of the ribs, as shown in FIGS. 2 and 3, and the ribs extend from the outer periphery of the relieved central portion of the cover and intersect at the center thereof, forming a plurality of sockets **23** therebetween. As shown, the ribs **22** also preferably are formed to the full depth of the relieved portion at the outer ends thereof and gradually taper inwardly to substantially the bottom surface of the

relieved portion near the center of the cover. This configuration of the ribs provides a full depth at the portions which normally will be engaged by the fingers in screwing the cover **18** into and out of engagement with the threaded portion **14** of the container, while the relatively shallow portion of the ribs at the center of the cover will minimize the collection of fluids in any one of the sockets and also facilitate removal of such fluid from the top of the cover.

The end of the container opposite the open end thereof is closed and is formed wth a plurality of feet **24** thereon corresponding to the number of cover finger holds formed by the ribs **22**. These feet **24** extend both axially and outwardly from the center of the underside of the container body and are formed of a size and configuration to provide a substantially three point contact, as is best seen in FIG. 4, so as to fit snugly when nested in engagement with finger hold sockets of a container cover, as is more clearly shown in FIG. 4. The plastic material of which the containers are made also permit easy nesting by fitting the feet **24** in the sockets **23**, even if these are not exact complementary fits. The undersides **25** of the feet **24** preferably are formed on a smooth curve so as to raise these undersurfaces to provide for clearance of the ribs **22** when a container is placed in tandem above a cover with the feet arranged in the sockets in the top of the lower cover. Furthermore, the sides of the feet **24** preferably taper slightly inwardly, as is best shown in FIG. 3, so as to facilitate the insertion of these feet into the sockets of a container cover. This greatly aids in providing a stable stacking of containers in tandem, one above the other, with the feet of an upper container nested in the cover of a lower container, as shown in FIG. 3, in a manner which minimizes relative lateral movement therebetween.

While a particular embodiment of this invention has been illustrated and described, modifications thereof will occur to those skilled in the art. It is to be understood, therefore, that this invention is not to be limited to the particular details disclosed, and it is intended in the appended claims to cover all modifications within the spirit and scope of this invention.

What is claimed is:

1. An open end container having a body with a continuously outwardly flared inner surface with the widest portion at the open end thereof, a cover for said container having means for securing it in fluid-tight engagement with said container body, the top side of said cover having therein a plurality of finger holds comprising outwardly extending ribs forming sockets therebetween of uniform depth with the ribs tapering gradually inwardly from the full depth of the sockets at the outer ends thereof to substantially the bottom surface of the sockets near the center of the cover, and the closed end of said container having on the outside thereof a plurality of feet corresponding to said plurality of cover sockets and extending axially and outwardly, each of said feet having a substantially triangular cross section and of a size so as to provide for a substantially three-point contact snug fit nested engagement with the outer and side edges of one of said cover sockets for stacking of containers on each other with the feet of an upper container nested in the cover of a lower container in a manner to minimize relative lateral movement therebetween.

2. A container as set forth in claim 1 wherein said flared inner body surface is substantially a paraboloid with the vertex at the innermost point and the base at the open end, a screw thread extending into said paraboloid inner surface adjacent to the open end of said container with all surfaces of said screw threads on a larger diameter than any part of the inner surface inwardly thereof, a flange extending radially outwardly around said open end of said container, an annular sealing groove extending axially into said groove, said cover securing means comprising an external thread on said cover for threaded engagement with said container inner surface screw threads, and an outer flange on said cover spaced radially from said external threaded securing means and formed to provide a sealing engagement wth surfaces of said sealing groove when said cover is in covering position on said container.

3. A container as set forth in claim 2 formed of a linear polyethylene low density plastic of a transparency and thickness allowing visual observation of the contents thereof, wherein a relieved inner surface is formed extending axially between the outer edge of the open end of said container of a relief depth at least to the depth of said screw threads, and a surface on said cover at the cover end of the threads thereon formed complementary to said relieved inner end surface of said container for forming a sealing engagement therewith.

References Cited in the file of this patent

UNITED STATES PATENTS

2,499,745	Gould	Mar. 7, 1950
2,527,908	Blitz	Oct. 31, 1950
2,533,757	Beauchemin	Dec. 12, 1950
2,556,547	Le Noir	June 12, 1951
2,887,244	Betner	May 19, 1959