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Inglish et al.

[11] **3,847,274**

[45] **Nov. 12, 1974**

[54] **CAPILLARY TUBE DISPENSING VIAL AND STAND**

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[73] Assignee: **Propper Manufacturing Co. Inc.,** Long Island, New York, N.Y.

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[21] Appl. No.: **290,990**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 135,916, April 21, 1971, abandoned.

[52] **U.S. Cl.**..... **206/44 R,** 206/45.14, 206/443, 206/523, 206/804, 312/73

[51] **Int. Cl.**..... **B65d 5/50,** B65d 5/52, B65d 85/20

[58] **Field of Search**..... 206/56 R, 56 AC, 45.14, 206/45, 44 R, 46 FC; 248/46, 44, 158, 174, 152; 312/73

[56] **References Cited**

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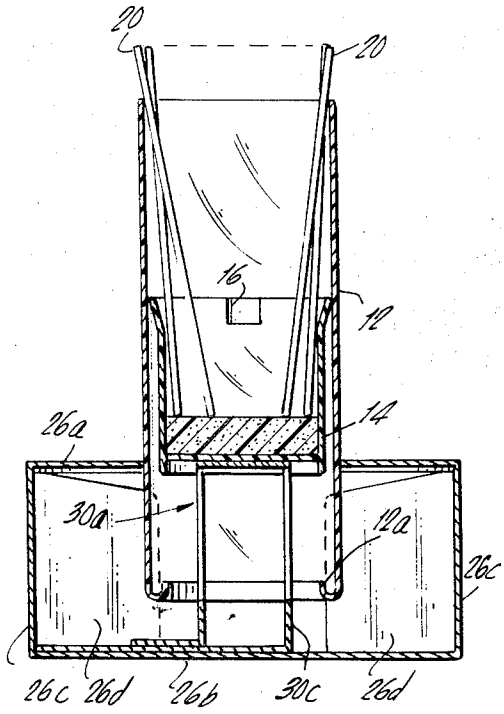
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Attorney, Agent, or Firm—Amster & Rothstein

[57] **ABSTRACT**

A vial for storing and dispensing capillary tubes includes an open ended housing having an internal cup slidably mounted therein. The vial cooperates with a foldable stand which supports the vial with the cup raised so that the upper ends of the capillary tubes flare radially outwardly, separating the exposed tube ends and facilitating easy removal of individual tubes.

1 Claim, 9 Drawing Figures



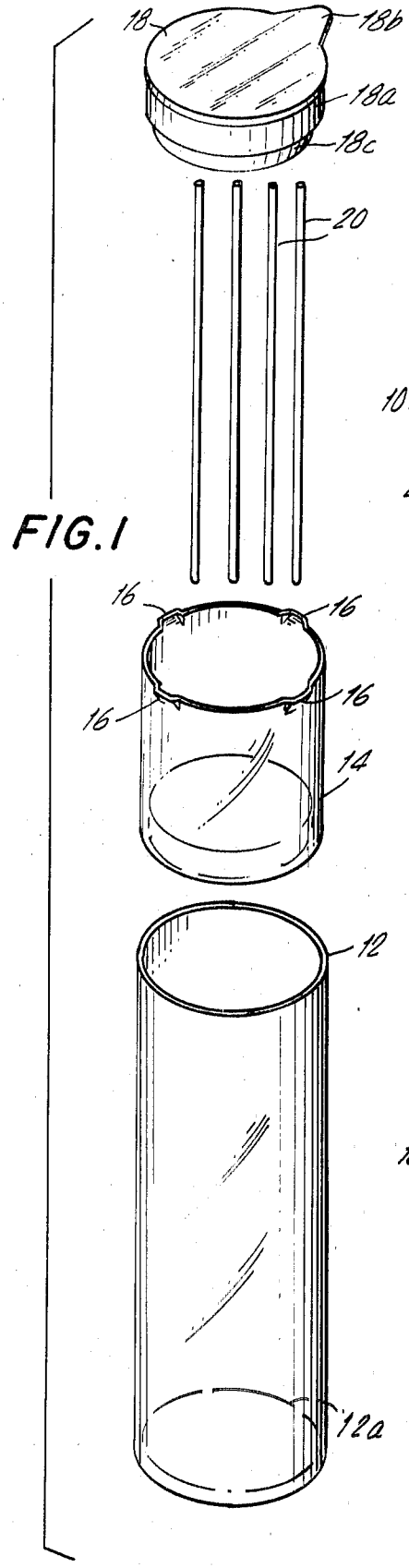


FIG. 1

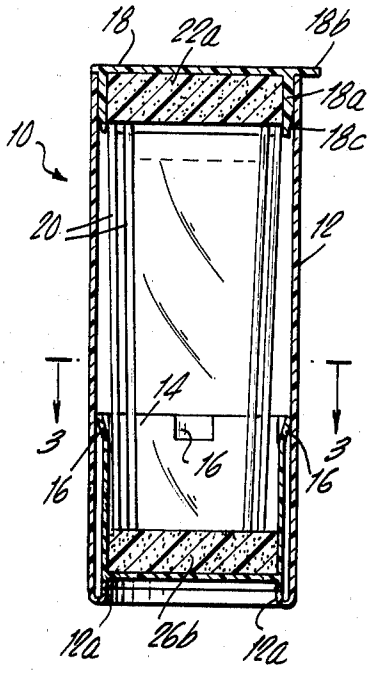


FIG. 2

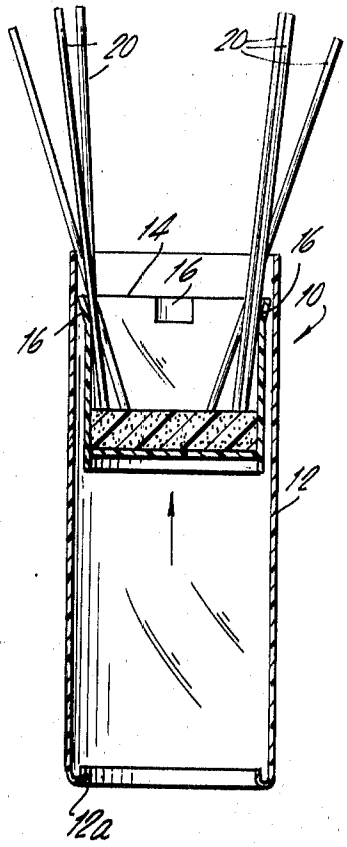


FIG. 4

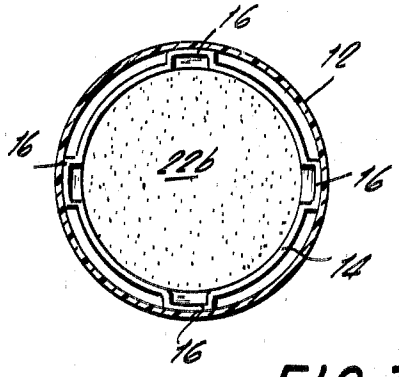


FIG. 3

FIG. 5

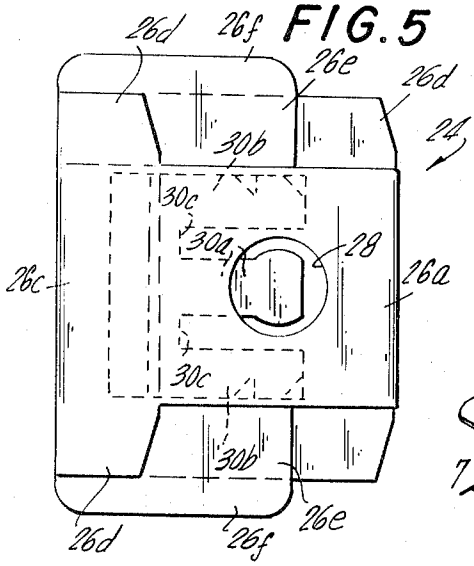


FIG. 6

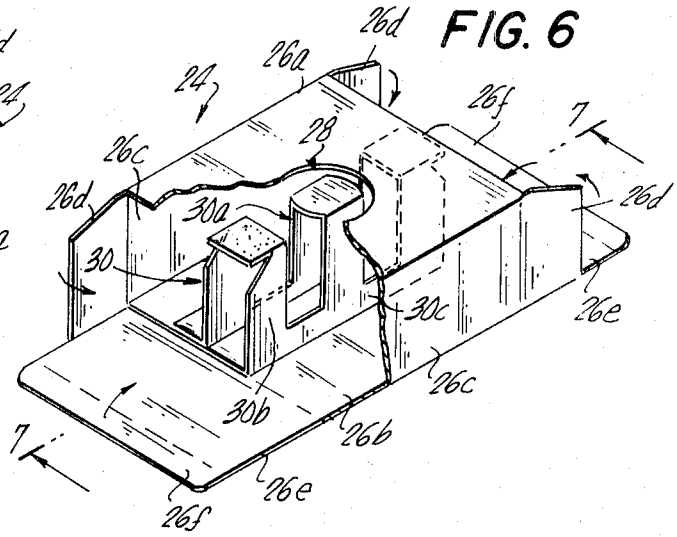


FIG. 7

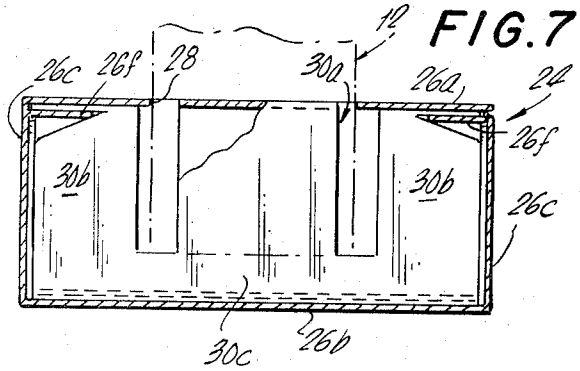


FIG. 9

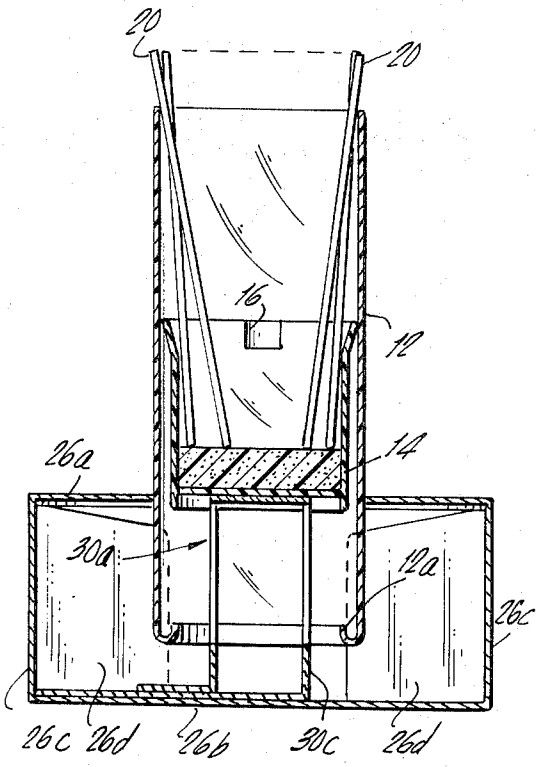
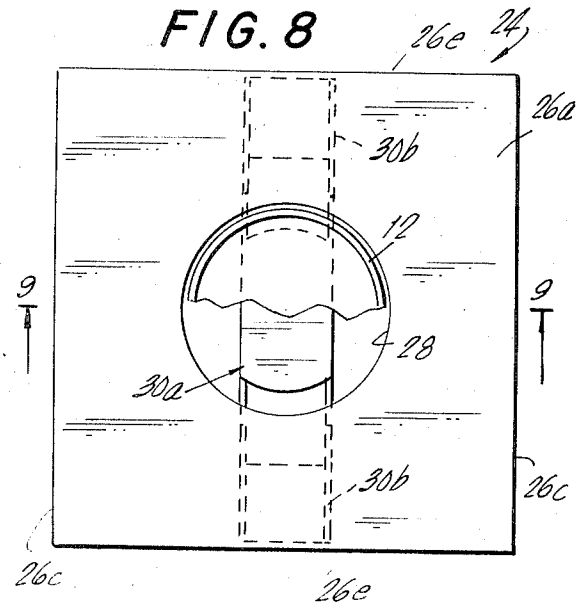


FIG. 8



CAPILLARY TUBE DISPENSING VIAL AND STAND

This is a continuation-in-part of application Ser. No. 135,916 filed Apr. 21, 1971 now abandoned.

This invention relates generally to laboratory diagnostic equipment and more specifically to a vial and vial stand for storing and conveniently dispensing capillary tubes.

Glass capillary tubes are used in a variety of medical laboratory procedures, including, for example, the centrifuge separation of various blood components and the analysis of clotting time of blood. In the latter procedure, the tip of a capillary tube is immersed in a blood specimen, drawing the specimen into the tube by capillary action. The tube is then broken at different locations along its length at selected time intervals to determine when clotting occurs. In this procedure capillary tubes are used one at a time and are destroyed during use. In other procedures, used tubes may be stored for reference. In either case, the laboratory technician must have a supply of tubes conveniently available within easy reach on the technician's laboratory table.

Capillary tubes are generally packaged in units of 100 in a conventional vial or carton. Each time the technician removes a tube for use from a conventional package, the entire vial or package must be handled with the technician shaking out a number of tubes so that a single tube can be separated. This procedure requires that a technician use both hands and frequently results in tubes being spilled and broken.

It is thus an object of applicants' invention to provide a vial for storing and dispensing capillary tubes which is more convenient and safer than prior packaging.

It is a related object of the present invention to provide a single package for shipping, storing and safely dispensing capillary tubes in a manner that permits a technician to withdraw one tube at a time with one hand, leaving the other hand free to prepare the specimen or other aspects of the test.

In accomplishing these and other objects in accordance with the present invention, a vial for storing and dispensing capillary tubes comprises an open-ended housing enclosing a slidable cup. For shipping and storage, the cup is positioned against a stop at the base of the housing and the open housing top is covered. For use as a dispenser, the cover is removed and the cup is raised in the housing permitting the upper ends of capillary tubes to flare radially outwardly, separating individual tubes so that they may be easily grasped. The vial may be used in combination with a foldable stand including an aperture for receiving the vial and an upstanding projection adapted to support the cup in its elevated position.

Further objects, features, and advantages of the present invention will be appreciated by reference to the following detailed description of a presently preferred but nonetheless illustrative ebodiment thereof, when taken in conjunction with the appended drawings, wherein:

FIG. 1 is an exploded perspective view of applicants' capillary tube dispensing vial;

FIG. 2 is a cross-sectional view of applicants' vial in its storage configuration;

FIG. 3 is a cross-sectional view taken along lines 3—3 in FIG. 2; and

FIG. 4 is a cross-sectional view of the vial in its dispensing configuration;

FIG. 5 is a top view of a foldable stand for use in combination with the vial in its flat folded configuration;

FIG. 6 is a perspective view, partially cut-away, of the stand in upright position with the end flaps open;

FIG. 7 is a cross-sectional view taken along line 7—7 in FIG. 6 with the end flaps in folded position;

FIG. 8 is a top view of the box in its erect condition; and

FIG. 9 is a cross-sectional view taken along line 9—9 in FIG. 8.

Referring to the drawing, vial **10** includes an outer housing **12** which, in the preferred embodiment, is an open-ended cylinder of plastic or other suitable material, preferably transparent. The housing **12** is adapted to receive a cylindrical cup **14** having a closed bottom and open top. The diameter of cup **14** is sufficiently smaller than the diameter of housing **12** to permit the cup to be easily received within the housing. The housing is provided with an upturned ledge **12***a* along its lower edge to engage the bottom of cup **14** and to act as a stop preventing cup **14** from sliding through the open bottom of cylinder **12.** In addition, cup **14** includes four shims **16** extending radially outwardly from its upper lip to assure positive engagement between cup **14** and the inner surface of cylinder **12.** Shims **16** are preferably created by deforming the upper lip of cup **14** so that the cup will be easily received into cylinder **12** through the cylinder's open top. The vial is provided with a cap **18** having a depending cylindrical section **18***a* adapted to be received within the open top of housing **12** and a tab portion **18***b* extending from the top of the cover to permit easy removal of the cover from the vial. The cylindrical cap section **18***a* includes a beveled lower edge **18***c* to permit easy insertion of the cap.

A plurality of conventional capillary tubes **20** are received within housing **12** with one end thereof being positioned in cup **14** as shown in FIG. **2.** Capillary tubes **20** are of a type well-known in the art and generally comprise small diameter glass tubes approximately 3 inches in length used in various laboratory diagnostic procedures. Although only representative capillary tubes **20** are shown in the drawing, it is to be understood that the vial is intended to be filled with a sufficient number of tubes to cover approximately one-half to three-fourths of the cross-sectional area of the vial. The tubes should not be packed too densely to permit easy access as described below.

Discs of foam material **22***a*, *b* are positioned within cup **14** respectively to more securely retain the individual tubes during shipping and storage and to prevent breakage. Foam discs **22** are resilient and are dimensioned so that the distance between the lower face of disc **22***a* and the upper face of disc **22***b* (when the vial is closed) is slightly less than the length of the capillary tubes so that the tubes are retained under slight axial tension. The tensed engagement of the capillary tubes with discs **22***a* and **22***b* prevents excessive vertical and/or lateral movement of the tubes and this significantly reduces breakage during handling.

FIGS. **5–8** show a foldable stand for supporting vial **10** in an erect dispensing configuration on a table or other work surface. Stand **24** comprises a foldable box **26** of paper-board or other similar material including a top section **26***a*, a bottom section **26***b*, side sections **26***c* and a conventional box end construction including side

flaps **26***d* and a large closing flap **26***e* having a folded portion **26***f* adapted to be closed in normal box fashion.

The top surface **26***a* of the box includes an aperture **28** which is dimensioned to receive the outer shell **12** of vial **10.** Stand **24** includes a foldable rigidifying and vial supporting structure **30** which is preferably formed integrally with the box structure when the box is assembled. In the preferred embodiment shown in the drawings, the entire stand structure is fabricated from a single piece of paperboard appropriately cut and folded.

Support section **30** (in its upstanding configuration as shown in FIGS. **6, 7, 8** and **9**) includes an upstanding central portion **30***a* and two upstanding lateral portions **30***b*. The upstanding central portion **30***a* is aligned so that when the box is in an upstanding position, central portion **30***a* is centrally located with respect to aperture **28.** The diameter of central portion **30***a* is selected to be received within the bottom of housing **12** as shown in FIG. **9.** At the same time, the side members **30***b* are fastened by adhesive or other appropriate means to the interior of the top surface **24***a* of the box. The side members tend to strengthen and rigidify the box structure. Side members **30***b* are connected to central portion **30***a* by connecting sections **30***c* which raise central portion **30***a* when the box stand is erected and maintain central portion **30***a* in an essentially vertical position while the stand is in use. Connecting sections **30***c* also support the outer wall **12** of the vial when the vial is in position on the stand.

As is apparent from the drawing, stand **24** can be conveniently folded into the flat configuration of FIG. **5** for packaging in a larger container with one or more of applicant's dispensing vials. The stand may then be assembled by folding the box sides **26***c* into their upright position, closing the end flap **26***d* and the closing flap **26***e* with section **26***f* being inserted above side flaps **26***d* and under the box top section **26***a* in conventional fashion. Since structural members **30***b* are secured to top section **26***a* by sections **30***c*, the entire central support structure becomes erect when the box is assembled with upstanding member **30***a* being aligned with aperture **26.** The dispensing vial (with its top removed) may then be set into aperture **26** with upstanding member **30***a* driving cup **14** upwardly with respect to the sleeve **12.** In this dispensing configuration the upper end of capillary tubes **20** are permitted to flare radially outwardly as shown in FIG. **9,** separating the two ends and permitting the individual capillary tubes to be conveniently grasped for use. The height of cup **14** obviously must be substantially less than the height of housing **12** to permit this flaring effect. Alternately, the vial may be used without the stand.

It is to be understood that the above-described arrangements are merely examples of the application of the principles of applicants' invention. Numerous additional embodiments will be obvious to those skilled in the art without departing from the spirit or scope of the present invention as defined in the appended claims.

What is claimed is:

1. In combination, a vial for storing and dispensing capillary tubes comprising an open-end housing with its height greater than twice its diameter and having upper and lower ends, a cup having a cross-section substantially conforming to the cross-section of said housing and being received within said housing for sliding movement therein, the height of said cup being less than one-half the height of said housing, a stop at the lower end of said housing preventing said cup from passing through said lower end, a top closure for said vial adapted to overlay the upper end of said housing, sections of resilient material in the base of said cup and on the underside of said top closure, the spacing between said sections of resilient material when said vial is closed being slightly less than the length of said capillary tubes so that said tubes tightly engage said resilient material when said vial is closed preventing axial and lateral movement of said tubes and reducing breakage during handling, and a stand for said vial, said stand including a support ledge for engaging the lower portion of said housing and for supporting said vial in a substantially upright position and an upstanding projection mounted on said stand adjacent said ledge, said projection being received within the lower end of said housing and passing through said lower end of said housing to engage the lower end of said cup, said cup when in position on said projection being elevated by a height sufficient to cause the upper ends of said tubes to flare radially outwardly, separating individual tubes for easy removal.

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