United States Patent [19]

Kliemann

[11] **3,832,738**

[45] **Sept. 3, 1974**

[54] **MID-STREAM URINE COLLECTOR**

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[73] Assignee: **Kleen Test Products, Inc.**, Milwaukee, Wis.

[22] Filed: **Sept. 13, 1973**

[21] Appl. No.: **396,882**

[52] **U.S. Cl.** ..... **4/110,** 4/141, 220/38.5, 215/13 A, 220/85 SP

[51] **Int. Cl.** **E03d 13/00**

[58] **Field of Search** ..... 4/110, 111, 112, 113, 1, 4/137, 135; 220/38.5, 85 SP, 85 R; 215/13 A

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Attorney, Agent, or Firm—Gary, Juettner, Pigott & Cullinan

[57] **ABSTRACT**

A sanitary liquid collection device comprises a funnel-shaped member releasably connected to the open top of a container. A cap for the container is attached by a flexible member to the container and is held in a downwardly open compartment in the exterior wall of the funnel member. After collection of the liquid sample through the funnel member has been completed, the funnel member is removed from the container, thereby exposing the cap and enabling closure of the container. A visual pour line is provided to assist the user in pouring off excess liquid.

16 Claims, 9 Drawing Figures

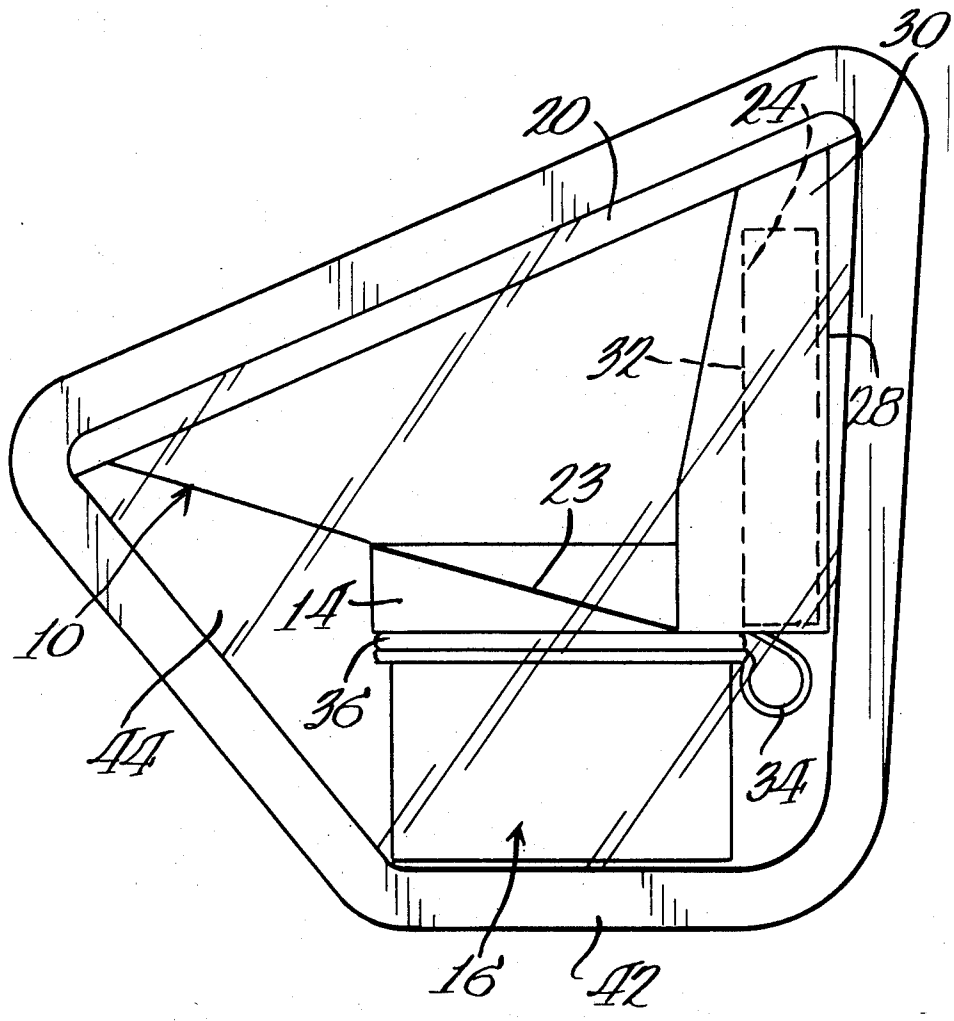


Fig. 1.

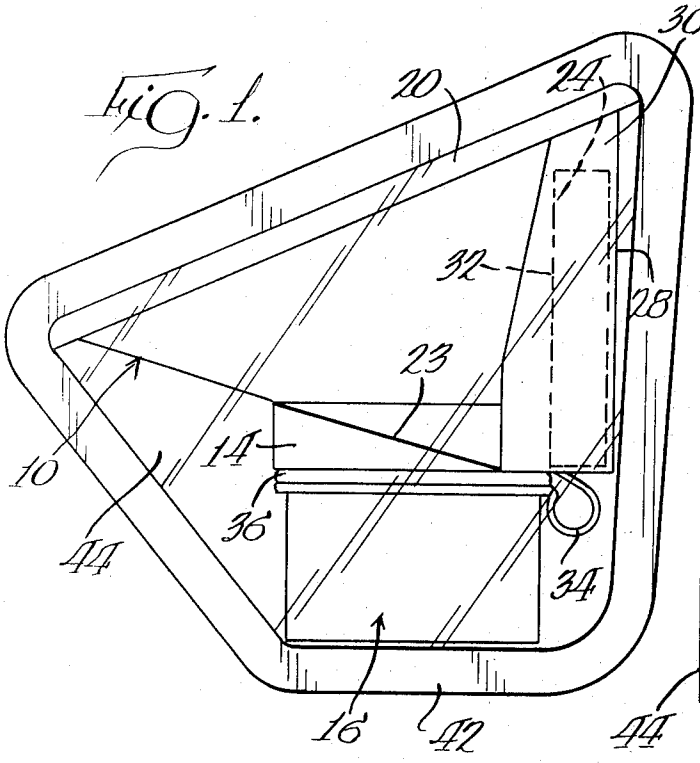


Fig. 2.

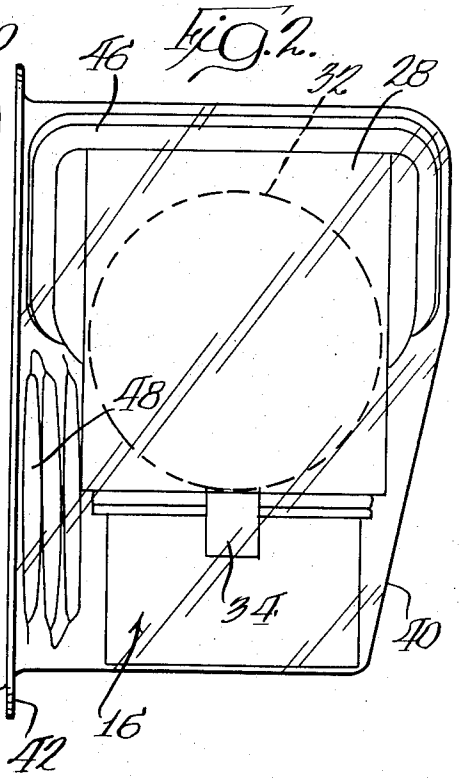


Fig. 3.

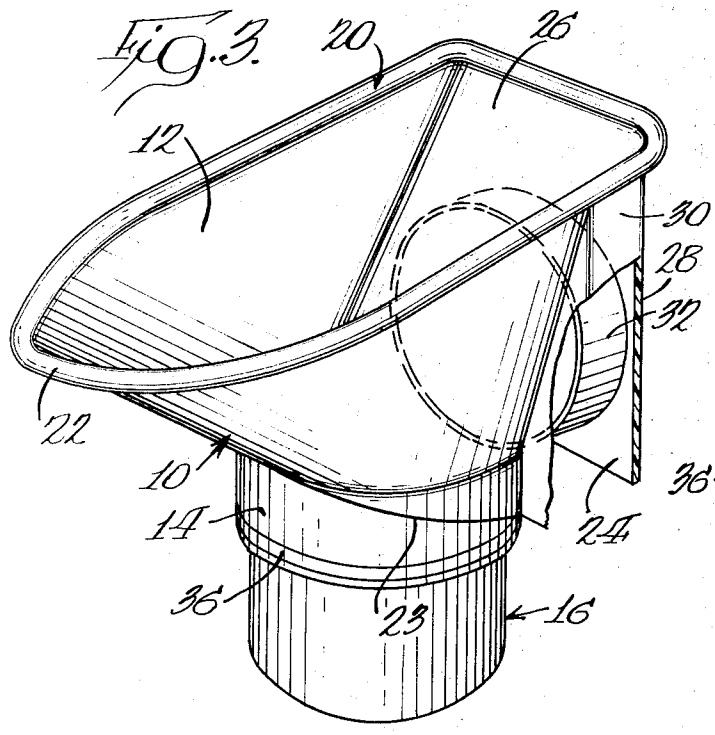


Fig. 4.

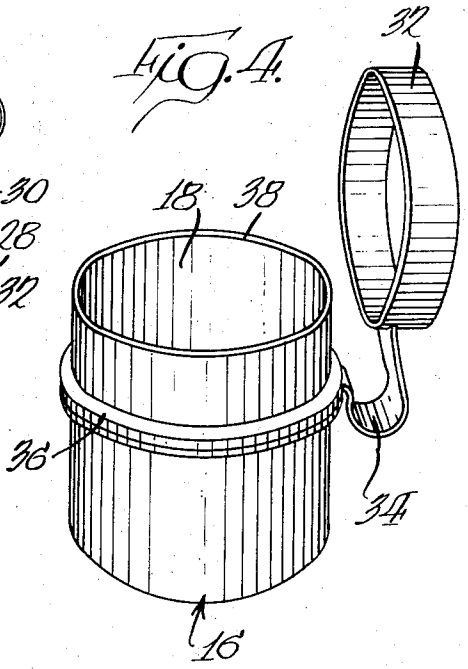


Fig. 5.

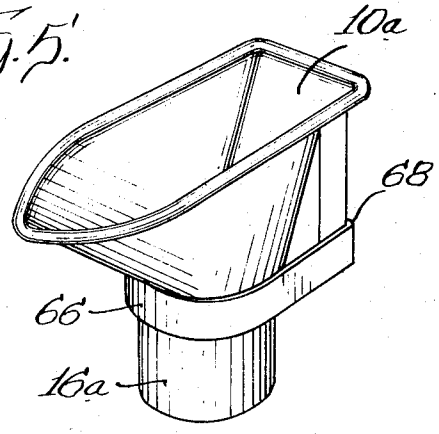


Fig. 6.

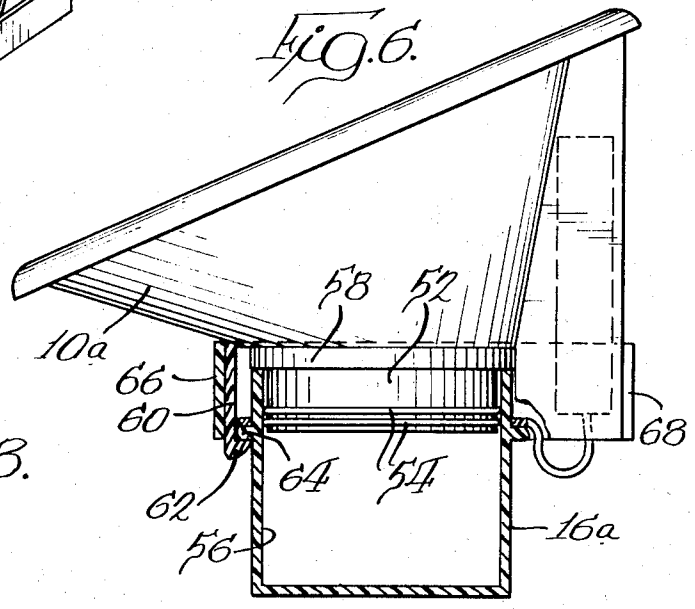


Fig. 7.

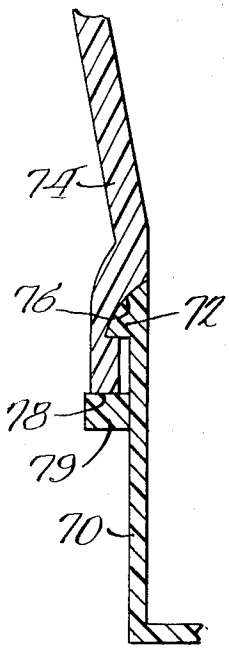


Fig. 8.

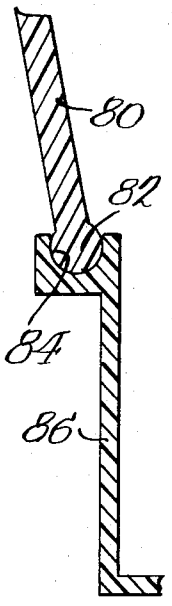
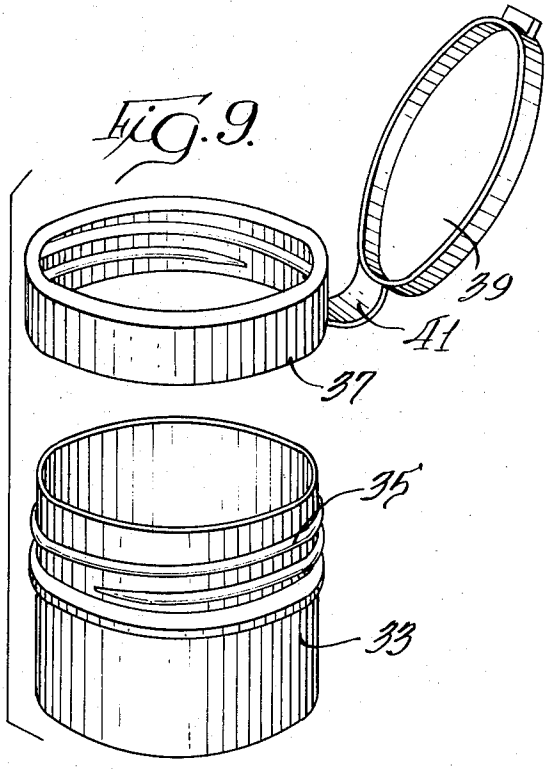


Fig. 9.



MID-STREAM URINE COLLECTOR

BACKGROUND OF THE INVENTION

It is frequently necessary or desirable to obtain a sample of urine which is representative of the urine in the bladder and free from bacteria which is present on the body and in the urethra. A representative and uncontaminated sample is essential, for example, when evaluating infections of the bladder. For this purpose, it is common to collect the specimen "in mid-stream" or in the middle of the period of urination, whereby the initial flow or urine entrains and washes away extraneous bacteria and generally results in a substantially reliable and representative sample of bladder urine.

In the collection of the sample, it is obviously imperative to maintain the exposed surfaces of the collection device as free as possible from contamination by bacteria, especially from the hands of the user and from surrounding objects. Contamination frequently occurs at the rim of the container during the collection procedure and also on the inside surfaces of the cap as it is being handled and applied.

Various devices have been proposed to minimize the possibility of contaminating the container and cap during use. The Sherin U.S. Pat. No. 3,711,871 discloses a urine collector composed of a funnel member connected to a container, along with a separate cap to be fitted over the container after the funnel has been removed. The lower end of the funnel is provided with an annular groove which fits over and covers the rim of the container, thereby minimizing contamination of the rim. Other similar devices include a separable funnel member which facilitates collection and serves to isolate the container from the body of the patient.

Other devices for the sanitary collection of urine samples may be found in the following U.S. Pat. Nos. 3,000,015; 3,161,891; 3,432,864; 3,432,866; and 3,625,064.

A major unsolved problem in connection with devices having a separable funnel or receptacle is the difficulty of reliably securing the cap onto the filled container without accidentally contaminating the interior of the cap or the exposed rim of the container. In all prior art devices, the cap is provided separately and contamination may occur as the cap is being handled or the cap is dropped. In many cases, the cap may be placed on the contaminated surface as the specimen is being collected, which may destroy the integrity of the liquid sample.

Difficulties are also encountered in obtaining a proper specimen level in the container, which is the limited capacity. Often, too much liquid is collected, and the liquid level rises above the rim of the container. Upon separation of the funnel from the container, liquid flows over the container rim and may create a bacteria path into the specimen. On the other hand, the user may pour off too much liquid after collection, which results in an inadequate sample.

SUMMARY OF THE INVENTION

The present invention provides an improvement to the type of collection device described in the aforesaid Sherin U.S. Pat. No. 3,711,871 by providing a cap which is connected by a flexible member to the body of the container and is concealed within a pocket in the device as the device is being used, thereby positively

eliminating the opportunity of contaminating the cap prior to and during the collection procedure, as well as eliminating the possibility of dropping the cap.

The collector preferably comprises a container having a separable sleeve or funnel member releasably fitted over the open top thereof, and the cap is preferably concealed in a downwardly open pocket in the funnel member. Upon vertical separation of the filled container and the funnel member, the cap, being connected to the container, is pulled from the pocket into an exposed position closely adjacent the container rim, which enables capping of the container with one hand in a sanitary manner.

Since the cap is self-contained in the device and is attached to the container, very little handling of the cap is required, and the cap cannot be dropped or placed on a contaminated surface. Also, the arrangement encourages the taking of the sample, removal of the funnel member and capping in an uninterrupted sequence and minimizes the possibility of any and all of the contamination errors mentioned above.

The collector also has a pour line that establishes a sighting level as excess liquid is being poured from the funnel. The pour line is on the funnel and is sloped relative to a horizontal plane. When the pour line is brought into register with a horizontal plane, the correct amount of liquid will be poured off, thereby assuring a precise liquid level in the container when the collection device is returned to an upright position.

THE DRAWING

FIG. **1** is a plan view of a transparent container enclosing and showing a side view of the improved mid-stream urine collector of the present invention;

FIG. **2** is an end view of the container and collector shown in FIG. **1**;

FIG. **3** is a perspective view of the collector of the present invention certain portions of the structure being broken away to reveal hidden internal portions thereof;

FIG. **4** is a perspective view of the container and cap portion of the collector shown in FIGS. **1–3.**

FIG. **5** is a perspective view of another embodiment of the present invention;

FIG. **6** is an elevational view, partly in cross section and with certain parts removed, of the embodiment shown in FIG. **5**;

FIGS. **7** and **8** are fragmentary sectional views of two types of joints suitable for use in connection with the devices shown in FIGS. **3** and **5**; and

FIG. **9** is a perspective view of another embodiment of a container and cap that may be employed in connection with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The liquid collector of the present invention is best illustrated by reference first to FIGS. **3** and **4.** The collector in general comprises a funnel or receptacle means **10** having a top inlet opening **12** and a bottom outlet opening **14** spaced from the inlet opening, and container means **16** having an open top **18** in separable communication with the bottom outlet of the receptacle means. The receptacle means **10** serves as a conduit between the source of supply of the liquid sample and the container and preferably comprises a funnel-shaped member wherein the inlet **12** is larger in diame-

ter than the outlet **14,** and the upper portion being in the form of an inverted frustum and the lower portion being cylindrical.

The inlet **12** of the receptacle means **10** is preferably defined by a continuous over-turned rim or flange **20** of the body thereof, said rim presenting an opening in the form of a long oval and being slanted downward from horizontal relative to the vertical axis of the container, as shown in FIG. **1.** The forward lowermost portion **22** of the rim **20** preferably extends beyond the vertical extension of the edge of the container means and is narrower than other portions or pointed, which facilitates collection of liquid in mid-stream and pouring off of any excess liquid, although other configurations may be beneficially employed.

A visible pour line **23** is provided on the body of the receptacle means **10** in order to provide a sighting level for the user to determine how much excess liquid must be poured from the receptacle to assure a correct level in the container means **16.** The pour line **23** is straight but is angularly disposed relative to a horizontal plane and preferably slopes upward toward the forward pointed portion **22** of the receptacle rim **20.** The slope of the pour line is such, that when the pour line is brought substantially into register with a horizontal plane, the container and receptacle means will hold only enough liquid to fill the container, with excess liquid being poured off from the pointed rim. Preferably, the pour line **23** is visible from both the exterior and the interior of the receptacle means.

A pocket **24** having a downwardly facing opening is provided at the rear of the receptacle means, said pocket preferably being elongated vertically and located beneath a rear portion of the receptacle flange **20.** The pocket is enclosed at the top and may be formed by the combination of the rear wall **26** of the receptacle means, a second wall **28** spaced from the rear wall and depending from the flange **20,** and a pair of side walls **30** connecting the rear and second walls.

Although the location of the pocket **24** at the rear of the receptacle means is preferred, it is apparent that other locations may be employed, since the primary purpose thereof is to enclose and protect the cover or cap **32** for the container means **16** from contamination until the container means has been filled with liquid. In the same connection, the pocket **24** may be omitted and replaced by an annular boss projecting from the receptacle means, with the cover being snapped or screwed onto the boss and held thereon until needed.

In the preferred embodiment, the cap **32** is connected to the container means **16** by a flexible member or strip **34,** said strip being of sufficient length to allow the cap to lie in the pocket **24** when the receptacle means **10** is joined to the container means **16.** The flexible strip is preferably formed of a plastic material, and one end thereof may be formed into a loop **36** which fits snugly around the exterior surface of the container means, is spaced from the rim **38** thereof, and forms an outwardly projecting flange or shoulder. In the alternative, the cap **32** may be provided with a graspable tab which extends from the open end of the pocket and allows withdrawal of the cap by pulling on the tab.

The cap **32** is adapted to fit through the open end of the pocket into the interior thereof and is also adapted to snugly fit over the open top of the container. If the flexible strip **34** is secured to the cap, the cap is preferably slidably engageable over the rim of the container, although other means may be employed to cap the container, including a cap with screw threads.

Another version of a suitable container and cover assembly is shown in FIG. **9.** A cup-shaped jar **33** has an externally threaded top **35** adapted to receive an internally threaded ring **37.** A snap-on cap **39** having a diameter large enough to fit over and seal against the top of the ring **37** is connected to the ring by a flexible member **41.**

The outlet **14** of the receptacle means **10** is releasably joined to the open top of the container means. In the embodiment shown, the inside diameter of the outlet **14** is slightly larger than the diameter of the container rim **38,** such that the outlet portion is slidable over the rim with the lower surface of the outlet being abuttable with the flange **36** extending around the container. In the alternative, the receptacle outlet **14** may be adapted to slidably received within the rim **38** of the container, or the outlet may be surrounded by an annular groove adapted to fit over the container rim.

Two other configurations for releasably sealing the receptacle outlet to the container rim are shown in FIGS. **7** and **8.** As shown in FIG. **7,** the container **70** may have a flange or a boss **72** extending radially outward around the circumference of the container rim. The receptacle outlet **74** is adapted to slide over the exterior surface of the container rim and has a complementary internal groove **76** which receives the boss and provides a primary seal therebetween. The interior wall of the receptacle opening is preferably flush with the interior wall of the container, and this feature is provided by shaping the boss to taper outward from the rim edge, as shown. The lower end of the receptacle **74** preferably terminates in an annular surface **78** which abuts and seals against a flexible ring seal **79** disposed around the container body.

As shown in FIG. **8,** the portion of the receptacle **80** defining the outlet opening may terminate in an annular wall **82** of reduced thickness. An upwardly facing annular groove **84** is provided in the rim of the container **86** and is adapted to snugly receive the end of the annular wall **82,** thereby defining a seal.

As shown in FIGS. **1** and **2,** a container **40** may be provided to hold the assembly of the receptacle means **10,** container means **16** and cover **32** in a sanitary manner until the collection device is used. The container and collection device are preferably made from disposable materials such as plastic because of the desirability to provide the collector in an unused and sterile condition.

The container **40** has an open top with a flange **42** extending outward from the periphery thereof. A cover **44** in the form of a sheet is provided over the open top and sealed to the flange **42,** thereby providing a sealed enclosure. Also, a liner **46** may be provided over a portion of the collector, and one or more packaged towelettes **48** may be provided between the cover and the liner to enable cleansing of the perineal area before collection of the sample. A label and instructions for use may also be provided in the container.

In assembly, the collector is assembled into the form shown in FIGS. **1-3,** and is inserted into the container **40,** together with the liner **46,** towelettes **48** and label. The cover **44** is then applied and sealed, and the container and contents may then be sterilized with ethyl-

ene oxide or by another known technique. The contents of the container will then remain sterile until the container is opened.

In order to use the collection device, the cover **44** is stripped away, and the perineal area is cleaned with the toweletts **48.** The collector is then removed from the container and is employed to obtain a urine sample in mid-stream.

During the collection procedure, it is typical that liquid will be collected in excess of the volumetric capacity of the container, and the excess will reside in the receptacle means **10.** The excess liquid is then poured off over the forward rim **22** by tilting the container and receptacle assembly. The assembly is tilted until the pour line **23** approximately coincides with a true horizontal plane. When the assembly is righted, the liquid level will fall to a measured level below the container rim, thereby preventing an excessive or inadequate sample. Thereafter, the container **16** is held in one hand and the receptacle **10** in the other hand, and these components may be separated vertically without spill-over of liquid.

Upon separation of the container **16** from the receptacle **10,** the cap **32** is pulled out of the pocket **24** and may then be snapped directly over the rim **38,** thus avoiding excessive handling of the cap. A label may then be placed on the sealed container for identification purposes.

Another embodiment of the invention is shown in FIGS. **5** and **6,** such embodiment being identical to the embodiment shown in FIGS. **1-4** except with respect to the joint between the receptacle means **10**a and the container means **16**a, and therefore for the sake of brevity only the joint will be described in detail.

As shown in FIG. **6,** receptacle **10**a has an outlet defined by a reduced diameter tube **52** adapted to fit into the open top of the container **16**a and having spaced annular sealing rings **54** which bear against the inner wall **56** of the container, thereby providing a seal. The rim of the container abuts against a shoulder **58** projecting from the tube **52** and sapced from the free end thereof.

In order to retain the container **16**a on the receptacle **10**a, an arm **60** is secured to the receptacle and depends downward therefrom in spaced relation to the tube **52.** The arm **60** terminates in an inwardly hooked end **62** which hooks over an axially projecting flange **64** on the container, thereby releasably holding the container to the receptacle until separation thereof are required.

In order to prevent contamination of the joint during handling and use, a removable U-shaped shield **66** (FIG. **5**) may be provided to cover the joint. The shield **66** is shaped to conform to and overlie the components of the joint shown in FIG. **5,** and may have inwardly turned ends which clip over the rear wall **68** of the receptacle.

The operation of the embodiment shown in FIGS. **5** and **6** is identical to the operation of the embodiment of FIGS. **1–4.**

It may be seen that the design and construction of the collector of the present invention encourages use with a minimum of instructions while greatly minimizing the possibility of contamination from the hands or body of the user, particularly contamination of the cap and the rim of the container.

I claim:

1. A liquid collection device comprising receptacle means having an inlet and an outlet spaced from the inlet, a container having an opening therein, means for releasably joining the outlet of the receptacle means to the container opening, cap means adapted to cap the container opening, and means on said receptacle means for releasably holding said cap means and protecting the interior surface thereof whereby to prevent contamination of said interior surface during liquid collection.

2. The device of claim **1** wherein the means for holding said cap means is an enclosed pocket having an opening therein adapted to receive said cap means.

3. The device of claim **1** wherein the opening in said pocket faces downward toward said container means.

4. The device of claim **3** wherein a flexible member is connected between said cap means and said receptacle means, whereby said cap means is withdrawn from said pocket by the separation of said receptacle means from said container means.

5. The device of claim **1** wherein the inlet of the receptacle means is larger than the outlet thereof and wherein said inlet is slanted downward from horizontal relative to the vertical axis of said container means.

6. The device of claim **1** wherein the outlet of said receptacle means fits over the open top of said container means.

7. The device of claim **6** wherein an annular shoulder projects outward around the rim of said container means and wherein said receptacle means has a groove near the outlet thereof complementary with said boss.

8. The device of claim **6** wherein an annular ring is provided around said container means and the outlet of said receptacle means terminates in an annular surface abutting and sealing against said ring.

9. The device of claim **1** wherein said container means has an upwardly facing groove receiving the outlet end of said receptacle means.

10. The device of claim **1** wherein the outlet end of said receptacle means is received within said container means.

11. The device of claim **10** wherein arm means depends from said receptacle means for holding said container means to said receptacle means.

12. The device of claim **1** wherein a separate shield is provided around at least a portion of the joint between said receptacle means and said container means.

13. The device of claim **1** wherein a pour line is provided on said device, said pour line being slanted from horizontal to indicate the degree of tilting of the device required to pour off excess liquid therein.

14. The device of claim **13** wherein the inlet of said receptacle means is shaped with a narrow pour lip and the pour line is provided on said receptacle means and slopes upward toward said lip.

15. A liquid collection device comprising receptacle means having a first opening and a second opening spaced from said first opening, an open top container, means for releasably joining the second open end of the receptacle means to the container top, cap means for closing the open top of said container, and a visible pour line on said receptacle means disposed on an angle with respect to the top edge of said container said device holding only enough liquid to fill said container when said device is tilted and said pour line coincides with the liquid level therein.

16. The device of claim **15** wherein said cap means is carried by said device.

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