INTEGRAL EDGE STRUCTURE FOR URINE COLLECTION BAG

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ABSTRACT

A liquid collection bag combining a rigid support member with flexible side walls, the support including as an integral part thereof a drip site chamber. A similar support member can also be utilized at the opposite end to complete the closure of the bag, with the drip site chamber functioning as an exit portal.

20 Claims, 3 Drawing Figures
INTEGRAL EDGE STRUCTURE FOR URINE COLLECTION BAG

BACKGROUND OF THE INVENTION

Urine collection bags having flexible side walls which collect and confine urine require certain elements to properly achieve their intended function. These are an entry port for connection to an inlet tube for drainage of the urine to the bag, a drip site at the entry port to receive the urine into the bag from the tube, and supporting means to permit the bag to be vertically mounted when in use, such as by hanging from a bed rail or other structure. Some conventional collection bags provide these elements as individual parts rather than as an integral assembly, thus necessitating assembly steps in the manufacture of the bag which increase the cost of the bag. Still other collection bags, in forming the above-named elements as an integral piece, provide a supporting edge which lacks rigidity or stiffness. Such a flexible supporting edge has the disadvantage of permitting the bag to be flexed during use, and in some cases the lack of stiffness permits a collapsing of the flexible side walls. Such flexing or collapsing of the side walls tends to cause unwanted displacement of the urine confined by the walls, such as a refluxing of the urine back to the drip site.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a liquid collection unit having flexible side walls and including a support member, entry port, and drip site as an integral piece which is sufficiently rigid to prevent undesired fluxing or collapsing of the bag.

It is a related object of the invention to provide such a liquid collection unit which is inexpensively manufactured and assembled.

This invention relates to a liquid collection bag inexpensively manufactured with a substantially rigid top edge which holds the flexible walls of the bag in proper position during the use of the bag. More specifically, there is provided a liquid collection unit comprising a bag with flexible side walls sealed on their side and bottom edges to define a liquid collection chamber therebetween. A substantially rigid support member is positioned between the top edges of the side walls and is sealed to the interior surfaces of the side walls to support the side walls extending therealong and suspended therefrom. At least one surface of the support member is exterior to the liquid collection chamber, and at least one other surface of the support member is interior to the collection chamber. The support member includes a drip site chamber extending through its interior. The drip site chamber has an inlet port at the surface of the support member exterior of the liquid collection chamber adapted to receive a fluid conducting tube and an exit port at the surface of the support member located interiorly of the collection chamber, thereby providing a passageway from the exterior to the interior of the bag.

The support member may also include means for attaching the support member to a hanger for hanging the liquid collection unit from a supporting structure, such as a bed rail.

Optionally, a liquid collection unit in accordance with this invention may include a second substantially rigid support member, which may be substantially identical to the support member previously described, positioned between the bottom edges of the flexible side walls of the bag and sealed to the interior surfaces of the side walls, with a drainage chamber having an inlet port disposed to the interior of the liquid collection chamber and an exit port disposed to the exterior of the liquid collection chamber.

Additional objects and advantages will become apparent upon reference to the following drawings and detailed discussion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a urine collection unit constructed in accordance with the invention;
FIG. 2 is an end perspective view of the support member of the unit shown in FIG. 1; and
FIG. 3 is a sectional view taken along the lines 3—3 of the urine collection unit of FIG. 1, the drainage shut-off clip at the bottom end having been omitted.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Although the preferred embodiment specifically described hereafter relates to a urine collection bag, it is not intended that the invention be limited thereto. This invention is intended to include any liquid collection unit which may profitably employ the elements of the invention as described and claimed herein.

Referring particularly to FIG. 1, there is provided a urine collection bag 10 having in combination flexible liquid-confining walls 12 and 14, a bottom edge member 16 having a drainage chamber 18 having an exit port 20, and support member 22. The flexible walls 12 and 14 comprise generally flat thermoplastic sheets which are sealed to both the support member 22 and the bottom edge member 16 at top edge portions 24 and bottom edge portions 26, respectively, and to each other at side edges 28. There is thus defined by the bag 10 a liquid collection chamber which may be filled at one end and emptied at the other end in a manner hereinafter described. A vent 30 is conventionally provided near the top portion of either or both of the walls 12 and 14 so as to permit the steady filling of the bag 10 with urine collected by the fluid conducting inlet tube 32.

Referring to FIGS. 1, 2, and 3, support member 22 is characterized as the element of the bag structure which provides the means for hanging or otherwise supporting the bag 10, preferably vertically, from a hook or string when the bag is in use. The support member 22, as shown best in FIG. 2, is a substantially rigid, one-piece, elongate bar having an expanded portion 34 with a curvilinear exterior surface traversing the width of the bar substantially mid-way between its ends and having flat wing-like portions 36 and 38 extending from expanded portion 34. Apertures 40 extending through the support member 22 are provided in each of the wing portions to provide means for attaching the support member 22 to a hanging means, such as twine or other rope-like material, for hanging the unit from a supporting object. The support member 22 is positioned between the top edges 24 of the side walls 12, 14 of the bag and is sealed to the interior surfaces thereof, such that one surface 42 of support member 22 is exterior of the liquid collection chamber defined by the bag and another surface 44 of support member 22 is interior to the liquid collection chamber. In the embodiment illustrated in the drawings, the sides of support member 22 positioned between the top edges 24 of the side walls
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taper inwardly toward each other such that surface 44 is a narrow edge-like surface. Referring to the expanded portion 34, as shown best in FIG. 3, there is provided therein a drip site chamber 46 providing a passway from the exterior to the interior of the bag and, to this end, having an inlet port 48 at the surface 42 of the support member which is adapted to receive a fluid conducting tube 32 and an exit port 50 at the surface 44 of the support member. The inlet port 48 is narrower than portions of the drip site chamber adjacent thereto so that the walls of the inlet port are spaced inwardly from adjacent walls of the drip site chamber. Thus, when fluid conducting tube 32 is positioned in the drip site chamber 46, as shown in FIG. 3, the end 52 of tube 32 is spaced from the walls of chamber 46, providing a free fall zone between the liquid or urine flowing in the inlet tube 32 and the liquid within the collection bag and thereby preventing a continuous liquid pathway to a type which would permit undesirable retrograde bacterial migration from the interior of the bag back into the tubing 32. In the embodiment of this invention illustrated in the drawings, the walls 54 of the support member 22 forming the drip site chamber extend from the exterior surface 42 of the support member to the surface 44 interiorly of the bag at the exit port 50 whereby there is provided a circular opening 56 at the exterior surface 42 having cross-sectional dimensions substantially the same as the cross-sectional dimensions of the drip site chamber. An annular spacer member 58 seamlessly engages the edges of the opening 56. The spacer member 58 has a passageway 60 therethrough narrower than opening 56 at located such that the peripheral edges of the passageway 60 are spaced inwardly from the adjacent walls of the drip site chamber to thereby form the inlet port 48.

Inasmuch as the support member 22 includes the apertures 40, inlet port 48, and the drip site chamber 46 as integral parts thereof, the support member can be inexpensively formed by such processes as extrusion or injection molding. Thus, the support member 22 is preferably formed from a thermoplastic material. It will be readily appreciated that the spacer member 58 can be a separate washer which is thereafter fixedly inserted within the chamber 46 or it can be formed as an integral part of the chamber 46 during the extrusion or injection molding. Because the support member 22 is preferably of a thermoplastic material, it is readily sealed at its two outside surfaces 62 (FIG. 2) to the top edge portions 24 of the thermoplastic walls 12 and 14 by conventional techniques such as heat sealing, impulse sealing, or radio frequency sealing.

In accordance with another aspect of the invention, a second edge support member 16 is provided at the bottom edge which may be substantially identical with the support member 22, thereby eliminating a separate manufacturing process for the formation of that member. In that case, the second support member 16 is substantially rigid and has a portion thereof forming a drainage chamber 18 which has an inlet port 64 and an exit port 20 and is substantially identical to the drip site chamber 46 of support member 22 with the exception that the spacer member optionally may be left out since a drip site is unnecessary in support member 16. The second support member 16 is positioned between the bottom edges 26 of the side walls 12, 14 and is sealed to the interior surfaces thereof, with its inlet port 64 disposed to the interior of the liquid collection chamber and its exit port 20 disposed exterior thereto. A conventional drainage tube 68 is inserted into the exit port 20, there being conveniently included openable closure means, such as clip 70, of the type which allows the bag 10 to be drained through tube 68 when desired. The bottom edge member 16, particularly when it is identical to the support 22, is also formed from a thermoplastic material such as by injection molding. Thus, the member 16 is readily sealed to the walls 12 and 14 at portions 26 using the same techniques set forth above concerning the sealing of the walls to the support 22.

Because of the integral nature of the support member 22 and drip site chamber 46, the flexible liquid-containing bag 10 can be inexpensively manufactured. At the same time, the stiffness provided by the rigid rod-like nature of the support member 22 insures that the bag 10 incurs a minimum of accidental flexing or collapsing during use, thus preventing undesired refluxing of the urine within the bag 10 back to the drip site. Although the invention has been described in connection with a preferred embodiment, it is not limited to that particular embodiment. Rather, it is intended that the invention include all embodiments, alternate arrangements, and equivalents as may be included within the scope of the following claims.

1. A liquid collection unit comprising:
   a bag having flexible side walls sealed on the side edges;
   a substantially rigid lower support member positioned between the bottom edges of said side walls and sealed to the interior surface of the side walls adjacent the bottom of said bag, with said side bag edges and lower support member defining a liquid collection chamber in the bag, and said lower support member providing support for the side walls;
   a substantially rigid upper support member positioned between the top edges of said side walls and sealed to the interior surface of the side walls such that said upper support member has a surface exterior of the collection chamber and a surface interior of the collection chamber, said upper support member providing a support for the side walls from which the flexible side walls are suspended and held extended therealong; and
drip site chamber extending through the interior of the upper support member and providing a passway from the exterior to the interior of the bag.

2. A liquid collection unit in accordance with claim 1 wherein said drip site chamber includes, an inlet port at the surface of said upper support member exterior of the liquid collection chamber adapted to receive a fluid conducting tube, and an exit port at the surface of said upper support member located interiorly of said collection chamber and axially aligned with said inlet port.

3. A liquid collection unit in accordance with claim 2 wherein said inlet port is narrower than portions of the drip site chamber adjacent thereto so that the walls of the inlet port are spaced inwardly from the adjacent walls of the drip site chamber.

4. A liquid collection unit in accordance with claim 2 wherein the walls of the upper support member forming the drip site chamber extend from the exterior surface of said upper support member to the surface interiorly of the bag at the exit port whereby there is provided an opening at the exterior surface having cross-
sectional dimensions substantially the same as the cross-sectional dimensions of the drip site chamber, said opening having a spacer member sealingly engaging at least the edges of said opening at the exterior surface of the upper support member, said spacer member having a passageway therethrough narrower than said opening and located therein so that the peripheral edges of said passageway are spaced inwardly from the adjacent walls of the drip site chamber to thereby form said inlet port.

5. A liquid collection unit in accordance with claim 2 wherein the drip site chamber has a circular crosssection, and said spacer member is an annular member positioned in said opening at the exterior surface of the support member in sealing engagement with the walls of said opening.

6. A liquid collection unit in accordance with claim 1 having a drainage tube connected to said bag at the bottom portion thereof and in communication with said liquid collection chamber therein to provide a passageway for the drainage of liquid from said chamber.

7. A liquid collection unit in accordance with claim 1 wherein said lower support member includes a drainage chamber having an inlet port and an exit port, the inlet port of said lower support member being disposed to the interior of the liquid collection chamber and the exit port thereof being disposed to the exterior of said chamber.

8. A liquid collection unit in accordance with claim 2 wherein said upper support member comprises an elongate bar extending across the top of the bag from one side edge to the other, said bar having an expanded portion thereof traversing the width of the bar to accommodate said drip site chamber.

9. A liquid collection unit in accordance with claim 8 wherein said expanded portion is located substantially midway between the ends of the elongate bar and has a curvilinear exterior surface, said expanded portion having a section at the bottom thereof adjacent the exit port which is tapered toward said exit port.

10. A liquid collection unit in accordance with claim 9 wherein the bottom portion of the remainder of the bar is tapered to provide an edge-like surface with sloping walls therealong, the interior surface of the side walls of the bag at the top edges thereof being sealed to the sloping walls along the bottom of the bar and to the walls of the tapered section at the bottom of said expanded portion of said bar.

11. A liquid collection unit in accordance with claim 9 wherein the walls of the upper support member forming the drip site chamber extend from the exterior surface of said upper support member to the surface interiorly of the bag at the exit port, whereby there is provided an opening at the exterior surface thereof having cross-sectional dimensions substantially the same as the cross-sectional dimensions of the drip site chamber, said opening having a spacer member sealingly engaging at least the edges of said opening at the exterior surface of the upper support member, said spacer member having a passageway therethrough narrower than said opening and located therein so that the peripheral edges of said passageway are spaced inwardly from the adjacent walls of the drip site chamber to thereby form said inlet port.

12. A liquid collection unit in accordance with claim 10 wherein said lower support member is substantially identical to said elongate bar.

13. A liquid collection unit in accordance with claim 1 wherein said upper support member includes means for attaching said support member to a hanger for hanging the unit form a supporting structure.

14. A liquid collection unit in accordance with claim 13 wherein said means comprises at least one aperture through the upper support member on each side of the drip site chamber.

15. A liquid collection unit in accordance with claim 1 wherein said lower support member comprises an elongate bar having a drainage chamber.

16. A liquid collection unit in accordance with claim 15 wherein said bar has an expanded portion to accommodate said drainage chamber.

17. A liquid collection unit in accordance with claim 16 wherein said expanded portion is located centrally between the ends of the bar.

18. A liquid collection unit in accordance with claim 15 wherein the bottom portion of the bar is tapered to provide an edge-like surface with sloping walls therealong.

19. A liquid collection unit in accordance with claim 1 wherein said lower support member has a drainage chamber extending through the lower support member, and including a drainage tube received in the lower end of the drainage chamber.

20. A liquid collection unit in accordance with claim 19 including closure means for opening and closing the drainage tube.