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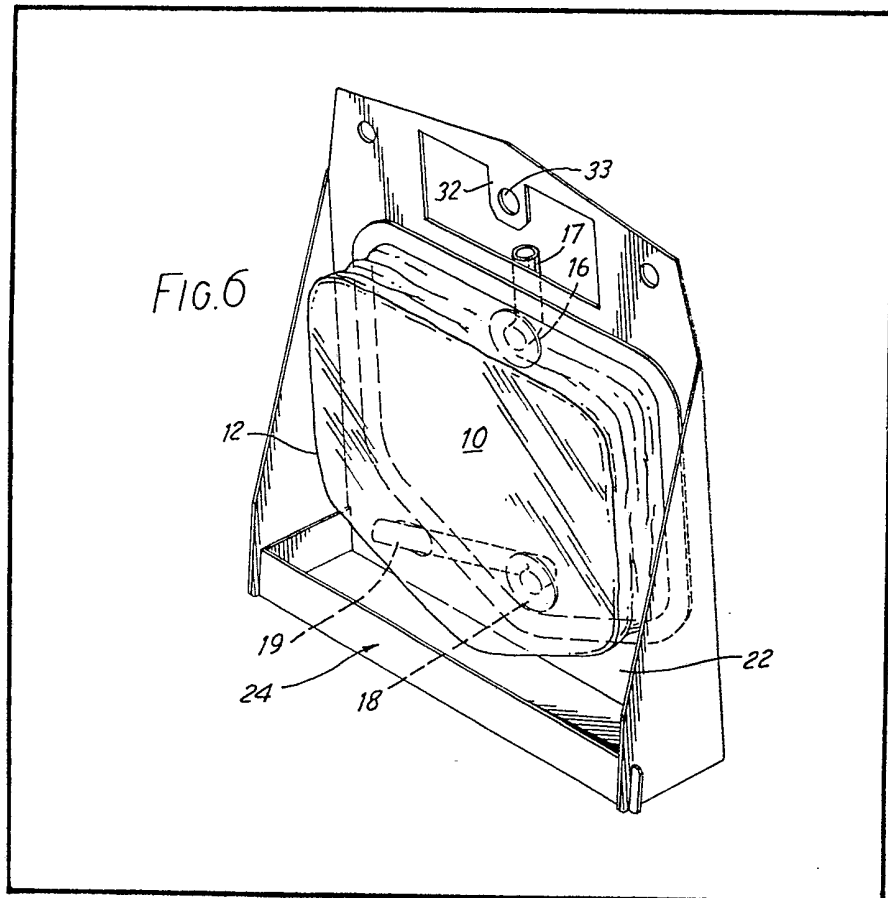
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(54) **Drainage bag and manufacture of same**

(57) A drainage bag for the collection of urine from hospital patients or incontinent persons has one wall of a substantially rigid sheet of liquid-impermeable material, and a second wall of flexible liquid-impermeable

material secured thereto to define a container. There are at least two apertures in the rigid sheet to one of which is fixed an inlet fitting 16 and to the other of which is fixed an outlet fitting 18. A drip tray 24 may be defined by an extension of the rigid sheet below the lower edge of the flexible wall.



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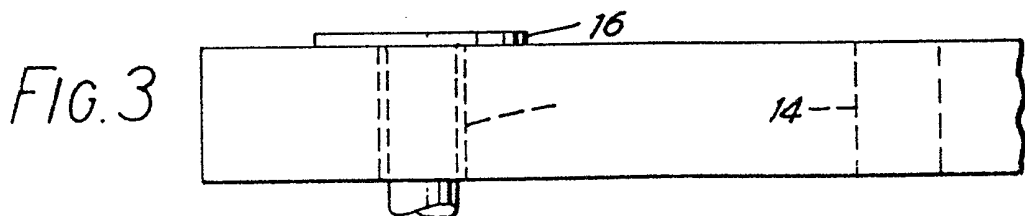
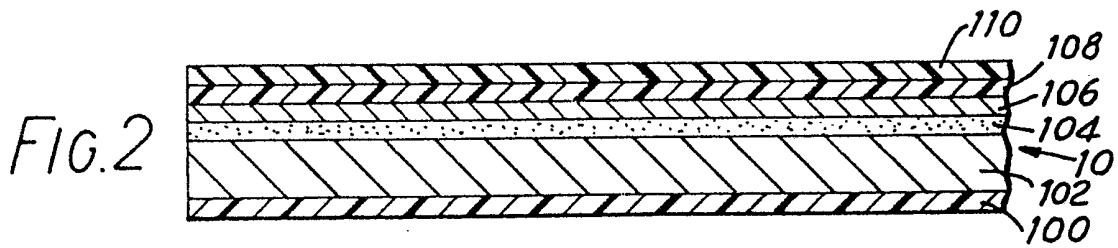
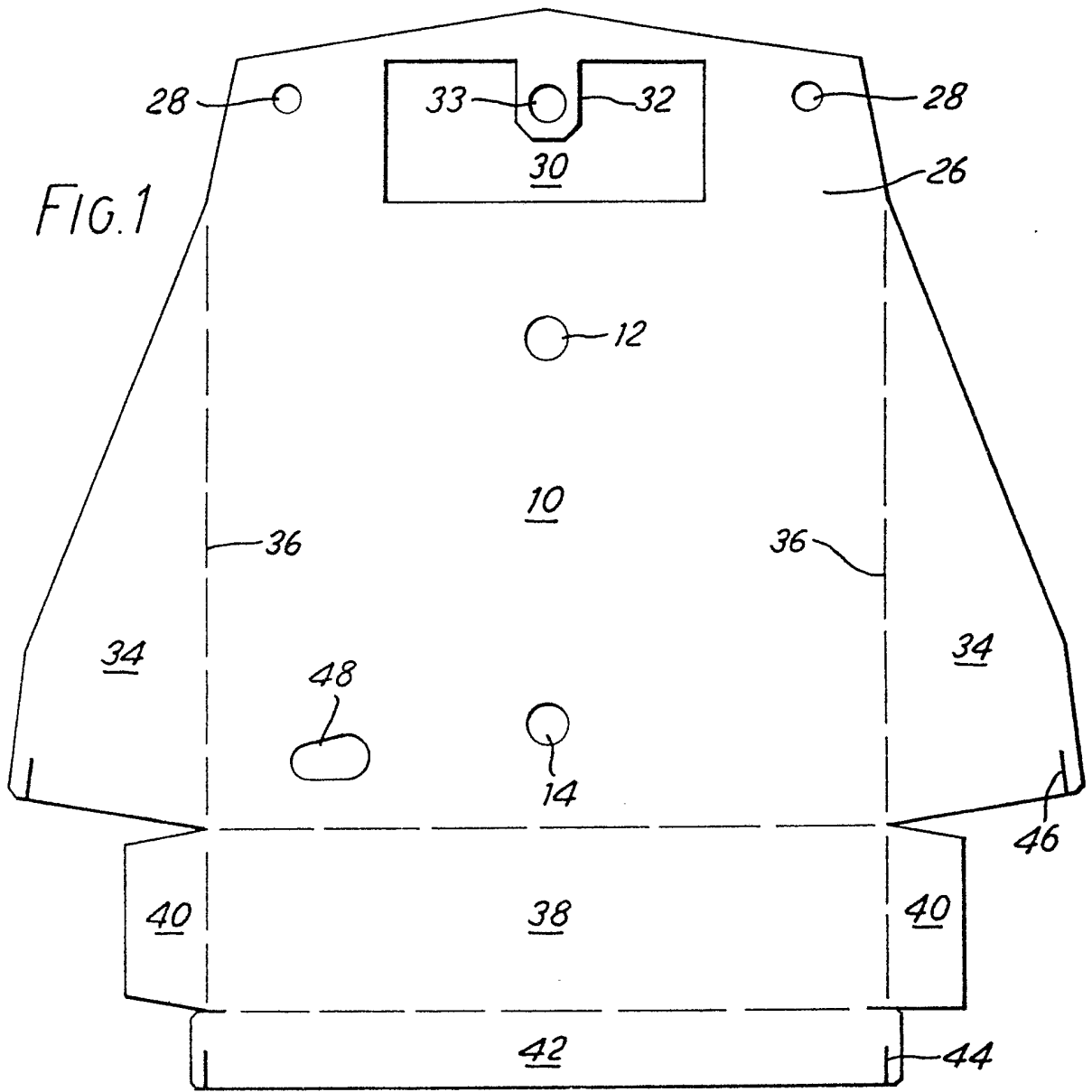


FIG. 6

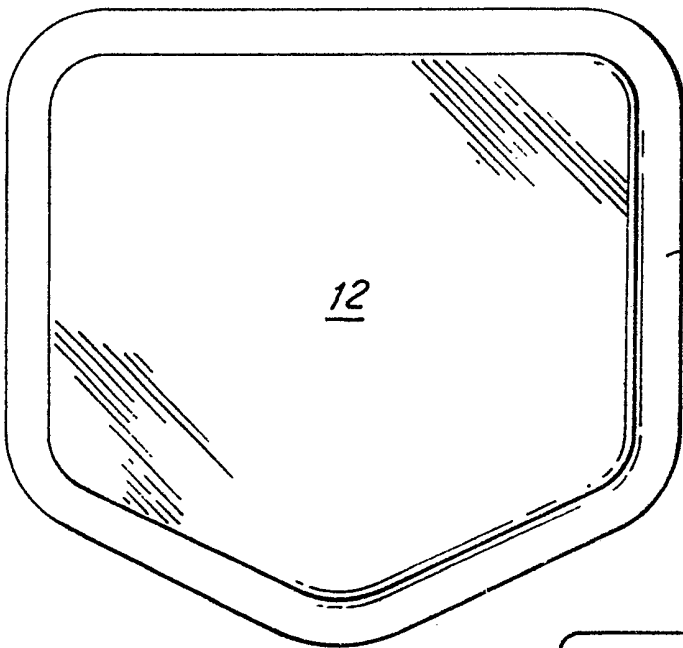
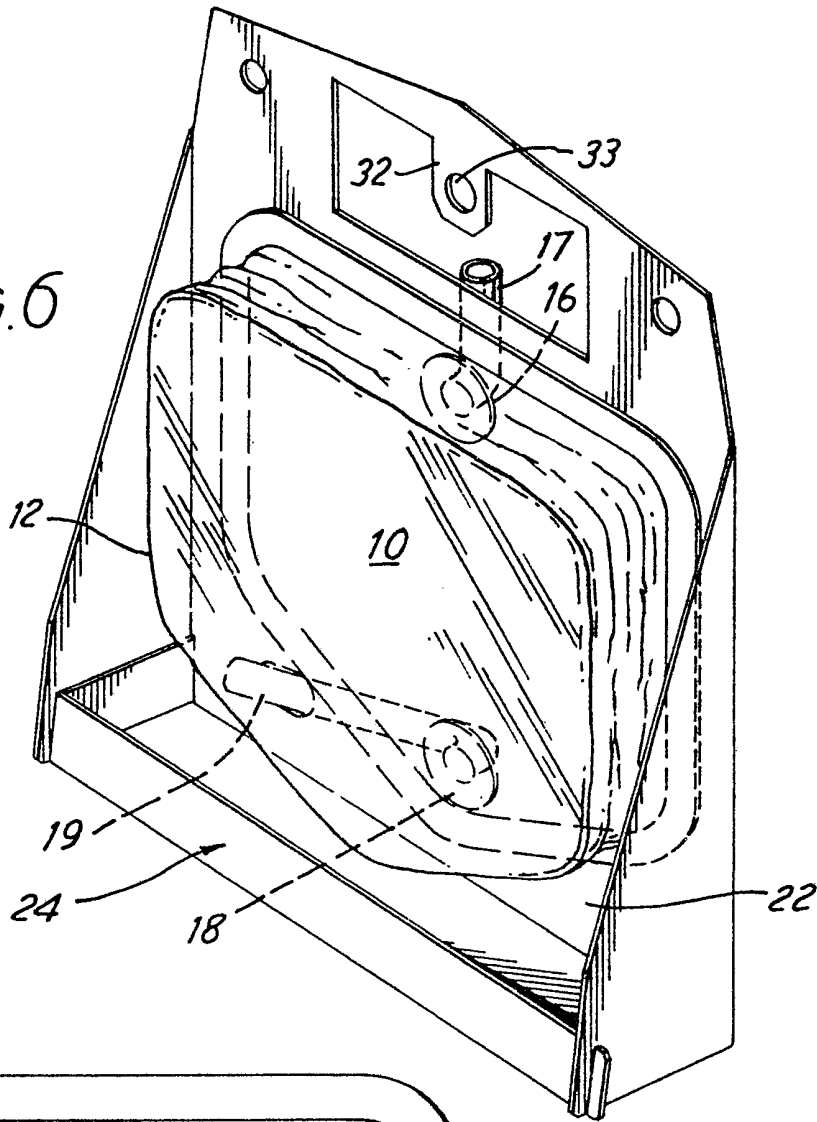


FIG. 4

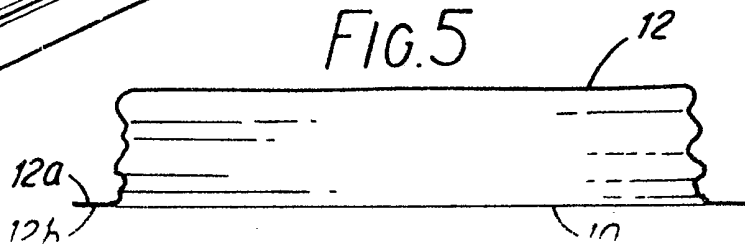


FIG. 5

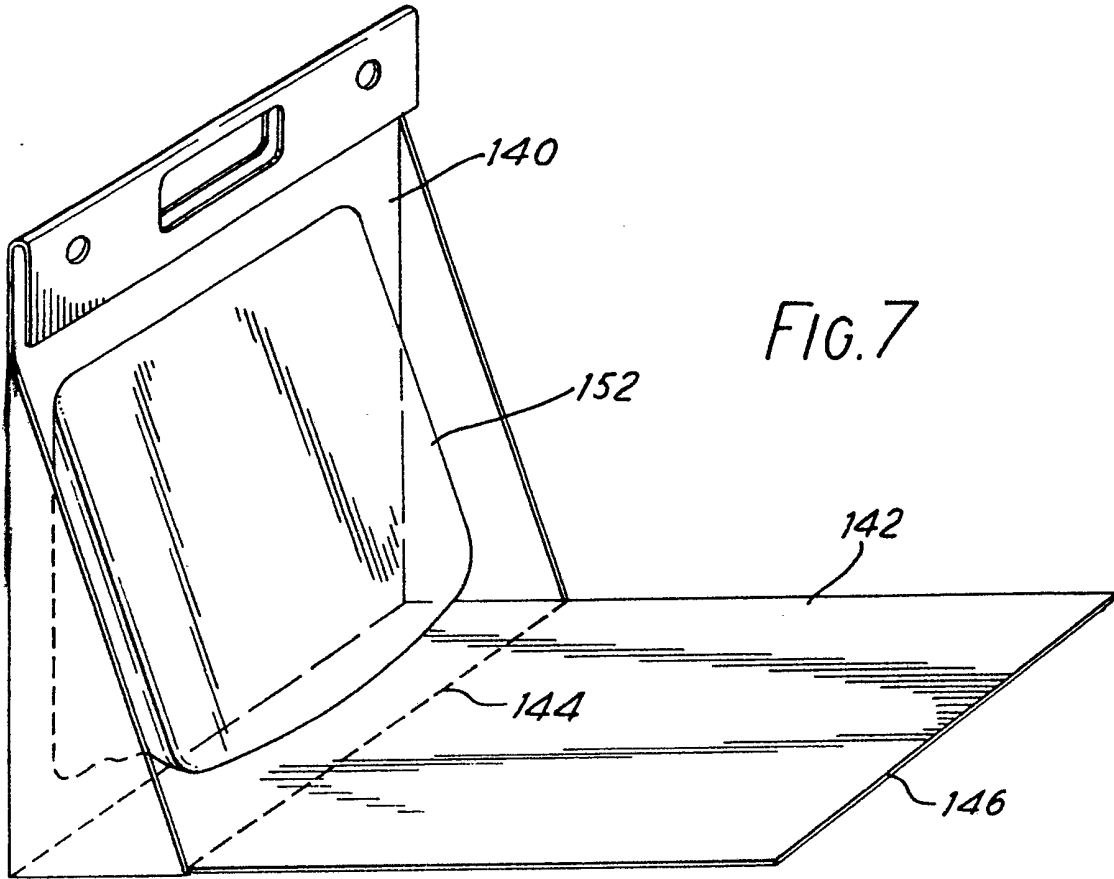


FIG. 7

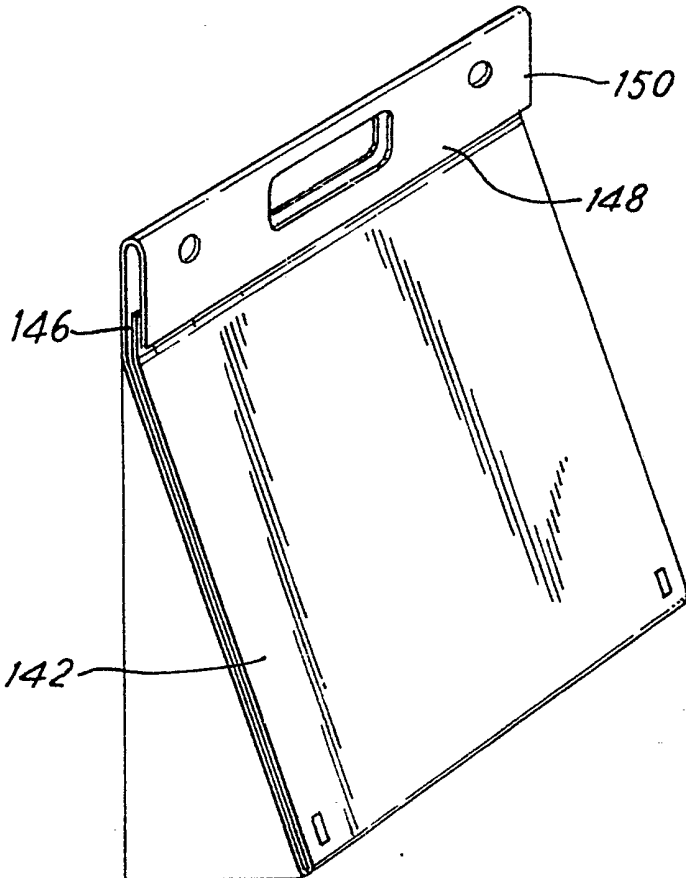


FIG. 8

SPECIFICATION

Drainage bag and manufacture of same

This invention relates to a drainage bag such as may be used for the collection of urine from hospital patients or incontinent persons.

Any such bag which is to be re-used must have an inlet, and a chamber or space to receive the liquid and an outlet so that the bag can be emptied at a convenient time and place. Present drainage bags have the liquid-receiving space defined by two superposed sheets of plastics material welded or otherwise secured to each other around their edges. Difficulties arise in securing the inlet and outlet fittings to the superposed sheets and it has not been found possible to do so, up to date, in an entirely satisfactory manner without increasing the number of manufacturing steps and so increasing the complexity and cost of the manufacturing process. For example, see British Patent Specification No. 1 308 519 (Hollister) for a description of measures taken to fit an outlet valve to a prior art bag. A disadvantage of known urine bags is that they are not self-supporting and so have to be provided with a hanger or other support, or a stand if they are to be placed on a surface such as the floor.

The present invention is a radical departure from the above-described design of drainage bags, and has been made with a view to achieving significant simplification of manufacture and a bag which can support itself.

According to the invention in its broadest aspect, there is provided a drainage bag having one wall of a substantially rigid sheet of liquid-impermeable material and a second wall of flexible liquid-impermeable material secured thereto to define a container, there being at least two apertures in a rigid sheet to one of which is fixed an inlet fitting and to the other of which is fixed an outlet fitting.

In a preferred embodiment of the invention, the rigid sheet is extended below the lower edge of the flexible wall and defines a drip tray. An aperture may be provided above the base of the tray so that the end of an outlet tube can be tucked into the aperture, so ensuring that any drips from the outlet tube fall into the tray.

The rigid sheet may be extended above the upper edge of the flexible wall and may serve as a hanger. For this purpose it may have holes punched in it by which the bag may be suspended from one or more hooks on a stand. The tray beneath the bag, formed by the rigid sheet, extends beneath the bag and constitutes a stable base when the bag is placed on a flat surface. In these respects a bag according to the invention differs from prior art drainage bags (e.g. those shown in U.S.A. Patent Specification Nos. 3 661 153, 4 126 135 and 4 192 295).

The rigid sheet which forms one wall of the bag, and which also forms the tray base may for example be of cardboard laminated to one or more liquid-impermeable films. Since urine has

corrosive properties, the laminating layer or layers should be suitably chosen. For example, the following 6-layer laminate would be suitable, the layers being stated in order:—

	Polythene	14 gms/sq. metre
70	Cardboard	290 gms/sq. metre
	"Surlyn"	18 gms/sq. metre
	Aluminium foil	
	(Standard 009)	24 gms/sq. metre
	"Surlyn"	10 gms/sq. metre
75	Plastics layer	25 gms/sq. metre

Other laminates are equally suitable, and cardboard-based laminates which are corrosion resistant and liquid-impermeable are available on the open market.

Also according to the invention, there is provided a method of manufacturing a drainage bag which includes the following steps:—

(a) providing at least two apertures in a substantially rigid sheet of material which is to constitute one wall of the bag,

(b) securing an inlet and an outlet fitting to the sheet at these apertures,

(c) forming or shaping a sheet of flexible material to constitute a second wall of the bag,

and

(d) securing the periphery of the second wall to the first wall to define a liquid-containing space.

In a preferred embodiment of the invention, the substantially rigid sheet is cropped, in step (a), to provide a blank having such a shape that a lower part of the sheet can be folded up to form a drip-tray, and this folding up operation is carried out after step (d). As an additional (and optional) feature a liquid-absorbent and disinfectant or anti-bacterial substance may be placed or fixed (e.g. adhesively) in the tray so formed.

The second wall may be formed by injection moulding of plastics material, or by vacuum-forming, or in any other suitable way. It is advantageous that it be formed in a shape which is to some extent expansible, for example there may be some part of the wall made in a bellows-like configuration. There may be a tab on an upper portion of the substantially rigid sheet to hold and guide a tube leading to the inlet fitting. It will be understood that normally the inlet fitting will be in the upper region of the completed bag and the outlet fitting in the lower, but this may be varied in special circumstances.

In this specification, the words "substantially rigid" and "rigid" when applied to the sheet or laminate forming the first wall of the bag are intended to mean rigid in the sense of not deforming or collapsing under forces such as those which would be applied by the weight of urine in the bag when it is full.

The invention will be better understood from the following description of an illustrative embodiment, given by way of example and with reference to the accompanying drawings:—

Figure 1 is a plan view of one form of flat blank

from which may be formed the first wall of the bag and the tray therebeneath;

Figure 2 is a cross-section through one example of a laminate which may be used as the aforesaid substantially rigid sheet;

Figure 3 shows in cross-section a later step in the manufacture, namely the insertion of the inlet and outlet fittings;

Figure 4 shows a front view of a vacuum-formed flexible sheet to constitute the second wall of the bag,

Figure 5 shows diagrammatically in cross-section the uniting of the first and second walls around the periphery of the latter, so defining a liquid-receiving space,

Figure 6 is a perspective view of one example of bag according to the invention made by the method briefly described above.

Figure 7 is a perspective view of a liquid-containing bag in accordance with a further embodiment of the invention; and

Figure 8 is a similar view of the bag as shown in Fig. 7, illustrating its flap in a folded-up position.

The drainage bag illustrated in Figure 6, and part of which is illustrated in Figure 1, has one wall 10 of a substantially rigid sheet of liquid/impermeable material and a second wall 12 of flexible liquid-impermeable material secured thereto to define a container secured thereto to define the container. There are two apertures 14, 16 in the rigid sheet 10 to one of which is fixed an inlet fitting 16 (Figures 3 and 6) and to the other of which is fixed an outlet fitting 18 (seen only in Figure 6). As seen in Figure 6, a rigid sheet 10 is downwardly extended at 22 and when appropriately folded constitutes a drip tray 24.

One suitable form of blank is illustrated in Figure 1 and is constituted by a central portion having the inlet and outlet apertures 12, 14, an upper portion 26 which serves as a hanger having two circular holes 28 and a rectangular hole 30, there being a fold-over tab 32 having a central hole 33 therein through which can be threaded an inlet tube 17 to be connected in use to the inlet fitting 16. The blank also includes wing portions 34 which (during manufacture or prior to use) may be folded forwardly about fold lines 36, a drip tray base portion 38, drip tray sidewall portions 40, and drip tray front wall portion 42. Slots 44 in the drip tray front wall portion 42 engage with slots 46 in the wing portions 34 so that the drainage bag may be assembled in a self-standing manner as illustrated in Figure 6. A slightly elongated aperture 48 is provided in an area of the blank outside the confines of the container defined by walls 10 and 12. This aperture 48 serves as a retaining hole for a tube 19 which is connected to the outlet fitting 18 and as seen in Figure 6 this tube 19 extends through the hole 48 to a position where its open end is above the drip tray 38. The base of the drip tray forms a stable support by which the bag may be placed on a horizontal surface, and due to the presence of the wings 34 the stability of the bag is not adversely

affected when it is filled with liquid. The top surface of the base of the tray may be covered with a layer of absorbent or germicidal or odour-absorbing material.

As discussed above, an important advantage of the invention is that the bag may be manufactured without difficulties of sealing inlet and outlet fittings between superposed sheets of plastics material, in respect of which the reader is referred to British Patent Specification No. 1 308 519 for a description of the measures taken in the prior art to deal with this sealing problem, which though not especially difficult of itself, complicates the sequence of manufacturing steps and necessitates a slower and less efficient production method than otherwise could be employed.

According to one embodiment of the present invention, a drainage bag as described above may be made by the follow steps. Firstly a blank 10 is cut out according to Figure 1, from a starting material constituted by a laminate (2) seen in Figure 2 and having the following layers:—

	<i>gms. per sq. metre</i>
90 Layer 100, polythene	14
Layer 102 cardboard	290
Layer 104 "Surlyn" or other adhesive layer for laminating	
95 aluminium foil to other materials	18
Layer 106 aluminium foil (standard .009)	24
Layer 108 "Surlyn" or equivalent	10
100 Layer 110 synthetic plastics layer	25

At the same time as the blank is punched out and creased, the apertures 30, 33, 12, 14 and 48 are punched therein. Thereafter, inlet and outlet fittings 16, 18 are applied and their flanges are heat welded to the blank 10. In a separate operation, the second wall 12 is formed by vacuum forming, injection moulding, or other suitable manufacturing method, from flexible liquid-impermeable material, preferably a heat-weldable synthetic plastics material. This wall is formed in the shape illustrated in Figures 4 and 5 and has a marginal edge portion 12a whose surface 12b is then presented to the flat surface of the blank, these two walls are then united by one heat welding operation with no problems of sealing or positioning of inlet and outlet fittings 16, 18. As shown in Figure 5, it is preferred that part of the second wall 12 should be of concertina or bellows form so that some expansion of internal volume can be achieved.

Thereafter, the wing portions 34 and the drip tray portions are folded into their positions as illustrated in Figure 6, so producing a stand-alone drainage bag made of relatively inexpensive materials and with a simplified manufacturing procedure.

Advantages of the invention as particularly disclosed and illustrated herein include:—

(a) the rigid sheet may be made in one cropping operation,

(b) the flexible wall may be cheaply made by vacuum forming and may be configured (tapered) to lead liquid to the outlet,

(c) the bag is versatile and can be hung up or placed on any relatively flat surface

(d) the flexible (second) wall may be produced according to a number of different designs, so that the same basic manufacturing process can be used for bags intended for different end uses or different customers; for example (i) an entry chamber could be moulded or vacuum formed, into which the inlet fitting would lead directly, or (ii) a conventional flap valve can be readily included, or (iii) an air vent can be included by appropriately shaping and punching a hole in the second wall;

(e) a special connector (e.g. the connector disclosed and claimed in U.K. patent applications Nos. 8101034 and 8120083) can be permanently secured to each of the inlet and outlet fittings: in this way the drainage bag becomes part of a modified system and is easily connected to and disconnected from other equipment such as a catheter with consequent saving of nurses time and reduced risk of leakage;

(f) the bag can be transported in flat condition with consequent saving in space; and

(g) calibrations can be readily included on the rigid wall so that the bag can be used to measure the volume of urine discharged.

In the foregoing specification, there has been described and illustrated a bag in which the substantially rigid sheet is of a 6-layer laminate. In one alternative embodiment of the invention, to save cost, the sheet may be a two-layer laminate of cardboard and polyethylene. In another alternative embodiment, the substantially rigid sheet may be a 2-layer laminate of cardboard and polyvinyl chloride.

In yet another embodiment of the invention, illustrated in Figures 7 and 8, the rigid sheet has a first portion 140 which is laminated to a plastics material to render it liquid-impermeable and a second portion 142 which is plain cardboard and is connected to the first portion at a fold-line 144. There may but need not be perforations or weakening along the fold line 144 so that the second portion can be torn off if desired, or, if not torn off, can be folded up as indicated in Figure 7, so that its end 146 is tucked under a suitable flap 148 in the handle portion 150. In this way the contents of the bag, contained within the space defined by the first wall 140 and a second wall 152, are hidden from view.

According to yet a further embodiment of the invention, the wing flaps 34 (Figure 1) may be joined to the portion 10 by fold lines which are also a line of weakening, so that the flaps 34 can be torn off if it is desired to have a simple, light, cheap bag without the stand-up feature.

It will be understood that if minimum initial cost is the aim, the bag can consist merely of the

liquid-containing chamber defined by a first liquid-impermeable sheet laminated to a second vacuum-formed liquid impermeable and flexible sheet, there being at least an inlet to the interior formed by an inlet fitting located at or in an aperture in the first sheet.

Claims

1. A drainage bag having one wall of a substantially rigid sheet of liquid-impermeable material and a second wall of flexible liquid-impermeable material secured thereto to define a container, there being at least two apertures in the rigid sheet to one of which is fixed an inlet fitting and to the other of which is fixed an outlet fitting.

2. A bag according to claim 1 in which the rigid sheet is extended below the lower edge of the flexible wall and defines a drip tray.

3. A bag according to claim 2 in which an aperture is provided above the base of the tray so that the end of an outlet tube can be tucked into the aperture, so ensuring that any drips from the outlet tube fall into the tray.

4. A bag according to claim 1, 2 or 3 in which the rigid sheet is extended above the upper edge of the flexible wall and has at least one hole therein above said edge so that it serves in use as a hanger.

5. A bag according to claim 1, 2, 3 or 4 in which the rigid sheet is of cardboard laminated to one or more liquid-impermeable films.

6. A bag according to claim 5 in which the rigid sheet is a 6-layer laminate, the layers being as follows stated in order:—

100	Polythene	14 gms/sq. metre
	Cardboard	290 gms/sq. metre
	"Surlyn"	18 gms/sq. metre
	Aluminium foil	
	(Standard 009)	24 gms/sq. metre
105	"Surlyn"	10 gms/sq. metre
	Plastics layer	25 gms/sq. metre

7. A bag according to any of claims 1—5 in which the rigid sheet is a laminate of cardboard and p.v.c.

8. A bag according to any one of claims 1—5 in which the rigid sheet is a laminate of cardboard and polyethylene.

9. A bag according to any one of claims 1—8 in which the second wall is of vacuum-formed plastics material.

10. A bag according to any preceding claim in which the second wall defines a downwardly-tapering lower region of the container, the outlet fitting being located in the lowermost zone of said region.

11. A method of manufacturing a drainage bag which includes the following steps:—

(a) providing at least two apertures in a substantially rigid sheet of material which is to constitute one wall of the bag,

(b) securing an inlet and an outlet fitting to the sheet at these apertures,

(c) forming or shaping a sheet of flexible material to constitute a second wall of the bag, and

5 (d) securing the periphery of the second wall to the first wall to define a liquid-containing space.

10 12. A method according to claim 11 in which the substantially rigid sheet is cropped, in step (a) to provide a blank having such a shape that a lower part of the sheet can be folded up to form a drip-tray, and this folding up operation is carried out after step (d).

15 13. A method according to claim 12 in which a liquid-absorbent and disinfectant or anti-bacterial substance may be placed or fixed (e.g. adhesively) in the tray so formed.

14. A method according to claim 11, 12 or 13

in which the second wall is made by injection moulding a plastics material.

20 15. A method according to claim 11, 12 or 13 in which the second wall is made by vacuum forming a plastics material.

25 16. A method according to claim 14 or 15 in which part of the second wall is made in bellows-like configuration so that the resulting bag can be expanded in internal volume.

17. A method according to any one of claims 12—16 in which a tab is provided in the cropping step, positioned to hold an inlet tube.

30 18. A drainage bag substantially as herein described with reference to and as illustrated in the accompanying drawings.