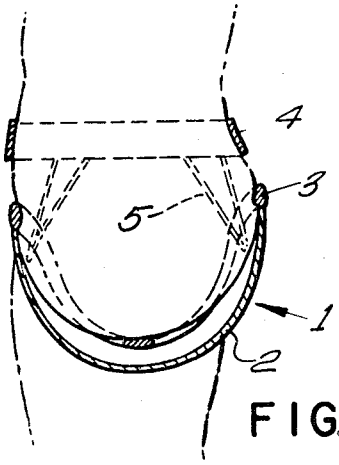


FIG. 1

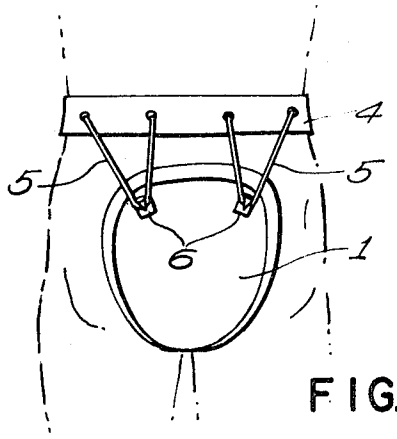


FIG. 2

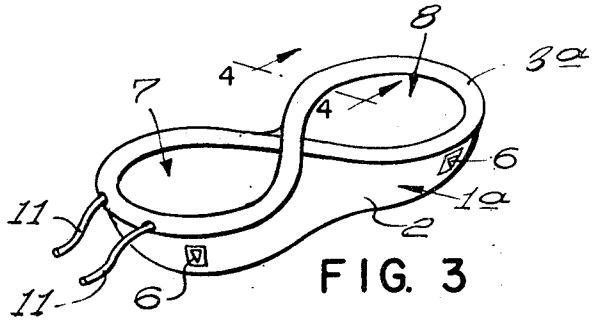


FIG. 3

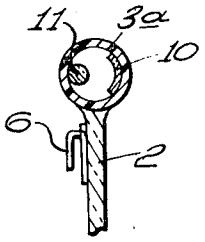


FIG. 4

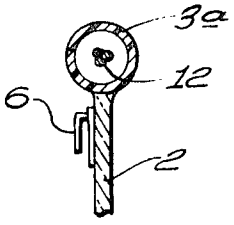


FIG. 5

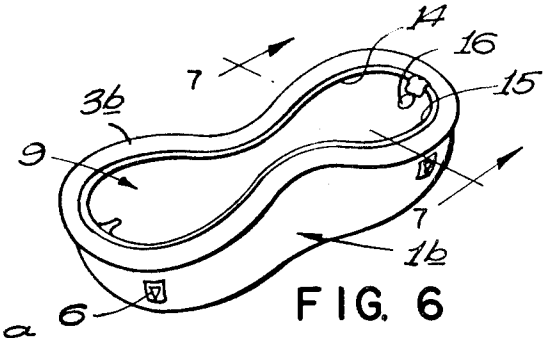


FIG. 6

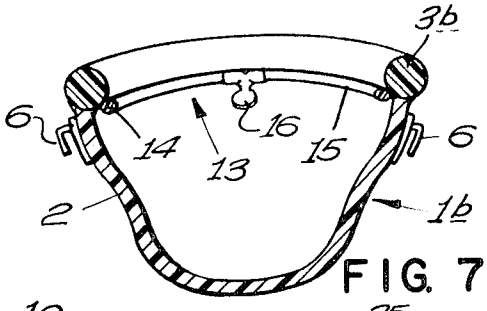


FIG. 7



FIG. 8



FIG. 9

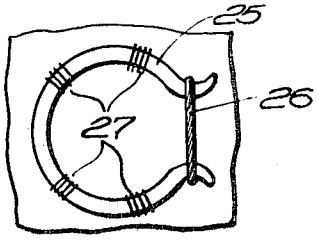


FIG. 11

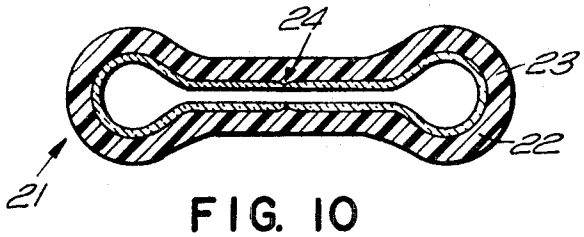


FIG. 10

INVENTOR.

Gurdon S. Worcester

United States Patent

[11] 3,626,943

[72] Inventor **Gurdon S. Worcester**
High St., Gloucester, Mass. 01930

[21] Appl. No. **18,599**
[22] Filed **Mar. 11, 1970**
[45] Patented **Dec. 14, 1971**
Continuation-in-part of application Ser. No. 842,817, July 8, 1969, which is a continuation-in-part of application Ser. No. 591,725, Nov. 3, 1966, now abandoned. This application Mar. 11, 1970, Ser. No. 18,599

[54] SANITARY CLOTHING ARTICLE

15 Claims, 15 Drawing Figs.

[52] **U.S. Cl.** **128/286**
[51] **Int. Cl.** **A61f 13/16**
[50] **Field of Search** 128/283, 287, 286, 290, 295, 296

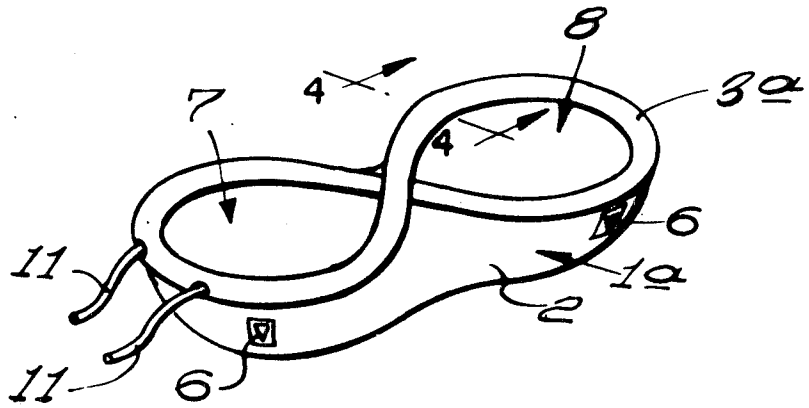
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Primary Examiner—Charles F. Rosenbaum
Attorney—James H. Grover

ABSTRACT: A sanitary clothing article is formed by a bag having flexible walls adapted to fit between the user's legs or buttocks with front and back portions extending upwardly toward the user's waist. The bag has soft pad means forming a lip opening into the bag and is adapted to fit in a position on and around an excretory organ of the body to hold the bag in direct communication therewith. Means are provided for holding the bag with said opening in said position, thereby to bar excreta from issuing exteriorly of the bag, these means including a belt to be worn on the user's waist, and either split band means cooperating with the lip, or fastener means on portions of the bag cooperating with said belt for supporting the bag by the belt. A check valve of flexible material attached inside the lip opening, or constricting closure means within the lip, are provided for closing the lip opening and confining the contents of the bag after detachment from the body. The flexible walls are made from a material substantially water-impenetrable from the inside, the outside of the walls being water-softenable to permit said walls to substantially disintegrate by placing them in water.



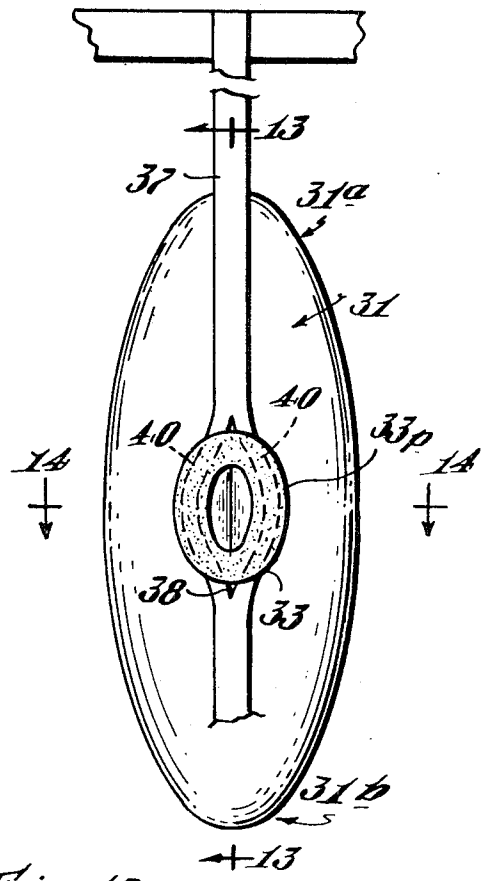


Fig. 12

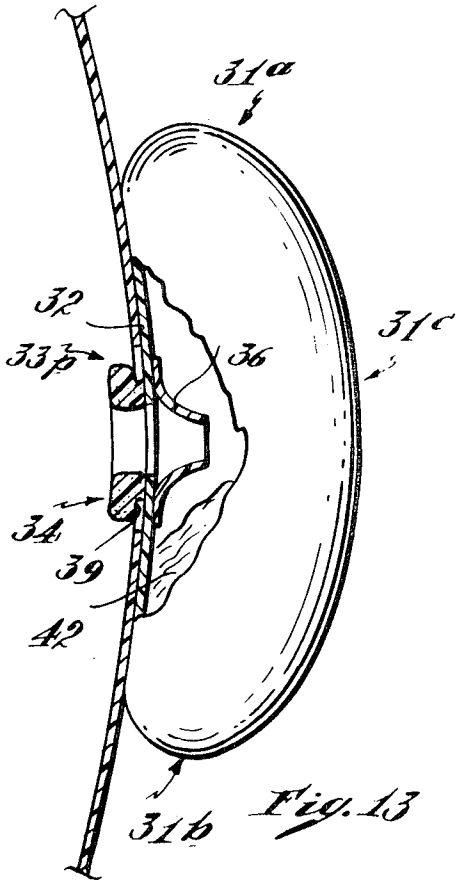


Fig. 13

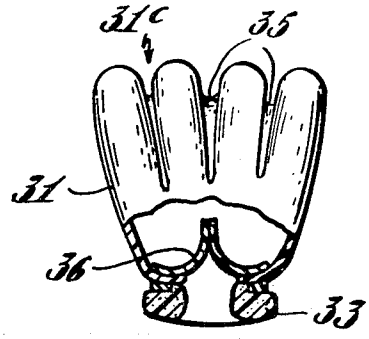


Fig. 14

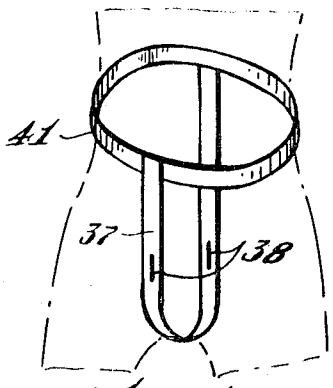


Fig. 15

SANITARY CLOTHING ARTICLE

CROSS-REFERENCE TO RELATED APPLICATION

This application constitutes a continuation-in-part of subject matter from Ser. No. 842,817, filed July 8, 1969, now U.S. Pat. No. 3,522,808, which was in turn a continuation-in-part of, Ser. No. 591,725, filed Nov. 3, 1966 and now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to an article of clothing adapted to be worn by infants, incontinent persons, persons who may have to remain unduly long in public view, and persons such as marine divers or astronauts who are unable to undo their clothing for long periods.

For such persons means are needed whereby excreta may be cleanly collected in inoffensive packages, which packages may be required to remain inoffensive for long periods until disposal is possible. For some uses, the package should then be disposable down ordinary toilets without clogging, while for other uses the package may simply be discarded.

SUMMARY OF THE INVENTION

Accordingly, the object of the invention is to provide a sanitary clothing article which can cleanly collect excreta and can render it inoffensive until disposal is possible, which is simple and economical to manufacture, and which can be adapted to easy disposability without danger of clogging sewage pipes.

According to the invention, a sanitary clothing article comprises a bag having flexible walls adapted to fit between the legs or buttocks, said bag having means forming a lip opening into the bag located between said walls and adapted to fit in a position and around an excretory organ of the body to hold the bag in direct communication therewith; means to hold the bag with said opening in said position and to bar excreta from issuing exteriorly of the bag; and means associated with said lip for closing said lip and confining the contents of the bag after detachment from the body.

For easy disposability, the walls of the bag may have an outer zone of water-softenable material which dissolves for easy flushing.

DESCRIPTION OF THE DRAWING

FIG. 1 is a sectional view illustrating one form of sanitary clothing article according to the invention and its position on the user's body;

FIG. 2 is a back view of the sanitary clothing article of FIG. 1;

FIG. 3 is an isometric view of the sanitary clothing article of FIG. 1;

FIG. 4 is a section on line 4—4 of FIG. 3;

FIG. 5 is a section like FIG. 4 of another form of sanitary clothing article;

FIG. 6 is an isometric view of still another form of sanitary clothing article;

FIG. 7 is a section on line 7—7 of FIG. 6;

FIG. 8 is a partial sectional view through one form of the wall of the sanitary clothing article;

FIG. 9 is a view like FIG. 8 of another form of wall;

FIG. 10 is a sectional view of a fluid capsule adapted to be used in the sanitary clothing article; and

FIG. 11 is a view of disintegrating spring means adapted for use on the sanitary clothing article;

FIG. 12 is a view of another sanitary clothing article according to the invention;

FIG. 13 is a partial section on line 13—13 of FIG. 12;

FIG. 14 is a partial section on line 14—14 of FIG. 12; and

FIG. 15 is an isometric view of means for supporting the sanitary clothing article of FIG. 12 on the user's body.

As shown in FIGS. 1 and 2, one form of sanitary clothing article comprises a bag 1 adapted to be worn over an excretory region of the user's body, for example between the legs or buttocks and on or around excretory organs of the body. The bag 1 has flexible water-impenetrable walls 2 and a lip 3 around the opening of the bag 1 defined by walls 2 and in contact with the wearer. The lip holds the bag in direct and exclusive communication with the wearer's excretory organs. The lip may be simply the edge of the walls 2, or the lip may be a doubled-over portion of the walls 2 forming a hollow or solid pad, or the lip may be of different material from the walls 2 and adhered thereto. For comfort, the lip 3 is preferably soft and nonabrasive with an outer waterproof covering.

The bag 1 is supported on the body of the wearer so that the bag opening is in communication with the wearer's excretory organs by a belt 4 around his waist. Cooperating fastening means on the belt 4 and bag 1 hold the bag in place. Such fastening means may be, as illustrated, stretchable loops 5 on the belt and hooks 6 on the outside of the bag 1 and engaging the loops 5. Especially where the walls 2 of the bag are adapted to be easily disposed of by flushing, it is desirable to make the hooks 6 from a material such as methyl cellulose, gelatin or polyvinyl alcohol, which weakens and ultimately dissolves in water.

Alternatively, the bag 1 may be held in place by a reuseable cloth bag or net (not shown) attached to a belt.

FIGS. 3 and 6 illustrate two contemplated shapes for the bag 1. In FIG. 3, the bag 1*a* has lip 3*a* in figure-eight configuration to form two openings 7 and 8 for the bag. The bag 1*a* may form two compartments beneath the openings 7 and 8, in which case the walls 2 of the bag 1*a* might be sealed together beneath the point where lip 3*a* crosses over itself. Or the bag 1*a* may form a single compartment beneath openings 7 and 8.

In FIG. 6 a different form of bag 1*b* has a lip 3*b* which does not intersect itself but has an hourglass configuration and forms a single opening 9 for the bag 1*b*. Beneath the single opening 9, the bag may be formed into one or two compartments as desired.

Associated with the lip 3*a* or 3*b* are closure means which enable the bag to be sealed off to confine excreta therein to render it inoffensive.

FIGS. 3, 4 and 5 illustrate closure means adapted for use with a lip which is hollow. One such closure means (FIGS. 3 and 4) comprises a resilient band 10, such as elastic webbing, located in a hollow lip 3*a*. The resilient band 10 is normally held under tension, and the bag is normally held open, by semirigid splines 11 located in hollow lip 3*a*. Preferably these splines are shaped to conform to the shape of the wearer's body so that no discomfort results from their pressure, and preferably the ends of the splines 11 protrude slightly through the lip 3*a* (FIG. 3) so that they may be easily gripped for extraction from the lip 3*a*. When the splines 11 are extracted, resilient band 10 constricts and puckers the lip 3*a* to a watertight closure. The withdrawn splines have had no contact with excreta and they are thus clean and can be disposed of in a waste container. The splines 11 can be made of wood, metal or plastic. Their removal can be facilitated by providing notches (not shown) at various points which enable the splines to be easily broken for removal in smaller pieces, or pieces of lesser curvature.

Another closure means for use with a hollow lip 3*a* is shown in FIG. 5. This closure means comprises a drawstring 12 in the hollow lip 3*a* which can be grasped and pulled through an opening in the lip similar to that through which splines 11 extend in FIG. 3. Pulling the drawstring constricts the lip and thereby forms a watertight closure.

FIGS. 6 and 7 illustrate still another closure means. This closure means comprises a slide fastener or zipper 13 having mating parts 14 and 15 mounted on opposite portions of the lip 3*b* and a slide 16 engaging mating parts 14 and 15. The zipper 13 is preferably plastic and the type whose mating parts 14 and 15 have interlocking grooves instead of intermeshing teeth. Naturally, the use of zipper 13 as closure means does not require a hollow lip on the bag.

It should be apparent that any of the above-described closure means could be used in association with either the figure-

eight shaped lip shown in FIG. 3 of the hourglass-shaped lip shown in FIG. 6, the only requirement being that resilient band 10 and drawstring 12 require a hollow lip. If used on a figure-eight shaped lip, two zippers 13 can be used for separate closure of the two bag openings 7 and 8, or a single zipper 13 can be used.

FIGS. 8 and 9 illustrate two materials suitable for the walls 2 of the bag 1. FIG. 8 shows a portion of a wall 2*a* which is a laminate of a thin inner layer 17 of waterproof material which is preferably weak enough that it can be disintegrated by the normal mechanical stresses involved in flushing it down a toilet; and an outer supporting layer 18 of water-softenable material which is strong until acted upon by water, whereupon it first weakens and then dissolves to leave the inner layer vulnerable to disintegration or at least able to be flushed without clogging sewage pipes. Materials suitable for inner waterproof layer 17 are plastic films; for example, polyethylene films or polyvinyl chloride films of sufficient thinness to be easily flushed or of sufficient weakness to mechanically disintegrate in a toilet. Also suitable for inner layer 17 are fibrous or textile sheets, of paper for example, coated or impregnated with waterproof plastics. Materials suitable for outer water-softenable layer 18 are methyl cellulose, polyvinyl alcohol, gelatin, or a fabric of yarns of artificial wool, all of which are first weakened and then dissolved by water.

FIG. 9 shows a portion of a wall 2*b* of a water-softenable or soluble material 19 treated to provide a thin superficial zone 20 on the inside of the wall 2*b* which is substantially water impenetrable. The wall 2*b* remains water-soluble or water-weakened on the outside, whereby the wall substantially dissolves upon being placed in water and leaves only a thin residue easily flushed or disintegrated during flushing. An example of a water-softenable material 19 which can be treated to provide a waterproof zone 20 is a gelatin sheet sprayed or bathed with an aqueous solution of formaldehyde. The formaldehyde reacts with the gelatin to form a thin waterproof zone 20. Polyvinyl alcohol can also be reacted with formaldehyde to produce a thin waterproof zone 20. Other plastic sheets can be given a thin waterproof zone by irradiating one side with a stream of electrons of such energy as to penetrate the sheet about one-thousandth of an inch.

The walls 2 of the sanitary clothing article can also be made by eliminating the thin superficial zone 20 described above, where the water-softenable material 19 is substantially impervious to penetration from the inside by the limited quantity of moisture present, but susceptible to dissolution when placed in a larger quantity of water. Thus walls 2 can be made from a layer of material such as polyvinyl alcohol (preferred for lack of bacterial action, low cost, and ease of thermoplastic bonding) or gelatin without reacting with formaldehyde to produce a more water resistant zone 20. As described above with reference to FIG. 8, such layers may be laminated to moisture absorbing and spreading fibrous or textile sheets, or may be flocked with fibrous materials as described in my U.S. Pat. No. 3,183,543, omitting a separate waterproofing treatment or layer of material.

Instead of relying on water to dissolve or help disintegrate the wall 2, other chemicals could be released within the bag to attack, weaken, or destroy the material of the bag. For example, acetone could be used to weaken a bag made of polyvinyl alcohol; a strong alkali such as sodium hydroxide could be used to weaken a bag made of gelatin or artificial wool; or a strong acid such as sulfuric acid could be used to weaken a bag made of methyl cellulose. In some cases it may be desirable to combine within the bag chemicals which, after a suitable time delay, suddenly liberate gas which blows the bag apart. Such action may be provided by sulfuric acid on lithium carbonate or sodium hydroxide on powered zinc. It may also be desirable to release chemicals within the bag which disinfect or deodorize the excreta, as a mild solution of carbolic acid.

It is contemplated that such attacking, weakening, destroying, deodorizing, disinfecting or gas-liberating chemicals can be supplied in the sanitary article of clothing in one or more capsules 21 (FIG. 10). The illustrated capsule 21 comprises an inner glass layer 22 impervious to chemicals therein and an outer protective plastic layer 23 of a type which is unaffected by water but which is destroyed when chemicals within the capsule are released by breaking the glass layer 22. The glass layer 22 is conveniently constricted and notched at 24 to make it easy to break. The capsule 21 is suitably fastened, by adhesive for example, inside the bag and after the bag has been sealed the capsule is broken to release the chemical by the action of the fingers through the wall of the bag.

Instead of in capsule 21, chemicals could be provided in the bag in a bare glass capsule in a pocket attached to the inner surface of the bag (not shown), or in a plastic or soft metal envelope which can be torn through from outside the sealed bag.

The bag can also be disintegrated by mechanically rupturing the walls of the bag at close intervals through the use of springs 25 (FIG. 11) which are straight when unstressed but held in a stressed position by water softenable yarn or thread 26. The stressed spring 25 is secured to the wall 2 of the bag at several points by water insoluble thread 27. When the bag is placed in water, the water-softenable yarn 26 parts to release the spring 25 which tears wall 2 as it straightens out.

FIGS. 12–15 illustrate a different form of bag 31 with flexible walls 32 and lip 33 secured to the bag walls 32 around the opening of the bag 31 and made from a resilient foamed material, such as polyurethane foam, and covered or treated to have a water impervious surface 34 in contact with the wearer. The water impervious surface may be a thin sheet of plastic adhered to the foam or the foam itself may have its pores closed at the surface to prevent admission of water. As FIGS. 12, 13, and 14 illustrate, the bag 31 is substantially in the shape of a spherical wedge or lune, except that its end portions 31*a* and 31*b* are rounded rather than pointed. The bag 31 thus closely resembles a citrus fruit segment, for example from a tangerine or orange. As shown in FIG. 14, the bag 31, along its spherical surface portion 31*c*, includes a number of longitudinal expansion pleats 35 provided to permit the bag to expand as excreta are admitted therein.

As shown in FIGS. 13 and 14, a fishtail valve 36 is fastened to the interior of bag wall 32, at the opening of lip 33 so as to close said lip opening and to confine the contents admitted to the bag 31. The fishtail valve 36 is typically made from a plastic material and may be thermally bonded to the bag wall 32.

Within the bag 31, where urine is collected, there may be placed means for neutralizing the effects of urine, thereby to reduce irritation to the skin of the wearer. As illustrated, the preferred irritation reducing means comprises a cotton (or other fibrous material) pad 42 which has been treated by saturating it with a 1 percent solution of boric acid followed by drying.

The sanitary clothing article in FIGS. 12–14 is held on the user's body by means of a band 37 provided with one or more lengthwise slits 38. The lip 33 is secured to bag wall 32 so that its outer periphery 33*p* overhangs or overlies the bag wall 32 and forms a recess 39 therebetween. The slit 38 in the band thus receives the lip 33 with the band portions 40 along said slit lying in the recess 39. As shown in FIG. 15, the slit band 37 is secured to a belt 41 which fits around the user's waist, the band 37 serving to hold the bag with the lip fitting on and around an excretory organ of the body to hold the bag in direct communication therewith.

As disclosed in connection with other embodiments, the bag walls 32 are preferably made from materials which facilitate disintegration or dissolution by water, such as the materials shown and described with reference to FIGS. 8 and 9. The lip 33 is preferably a resilient foamed material both for reasons of comfort and secure lodging of the article without slippage, but it may be formed of other materials as well. The fishtail valve 36 may have substituted therefor another sort of check valve, such as a sphincter valve. To facilitate connection of the band 37 with a belt 41, the two may be made from interconnecting materials of commercially available type in which one materi-

al has a surface of minute hooks, and the other material has a surface of minute loops which interconnect with the hooks but which can be separated therefrom for removal. The band **37** and belt **41** are also preferably elasticized to permit them to stretch to provide a firm fit for different sized wearers and during movement of the body.

It should be understood that the foregoing description and examples are for the purpose of illustration only and that numerous modifications are possible, for example, instead of using a drawstring or zipper to close the lip of the bags of FIGS. **1–7**, a check valve of flexible material such as the fishtail valve of FIGS. **12–14** may be attached inside the lip. The water-softenable materials disclosed for walls **2** of the sanitary clothing article of FIGS. **1–7** can be used in the embodiment of FIGS. **12–14**, and in other sanitary clothing articles having the need to collect excreta without water penetration but which need easy disposability, such as in other diapers or sanitary pads conventionally worn by a user. Other modifications of the embodiments will be similarly apparent.

What is claimed is:

1. A sanitary clothing article comprising flexible walls adapted to fit between the legs or buttocks in a position on or around an excretory organ of the body with portions lying along the body and extending upwardly toward the user's waist, said walls being substantially water-impenetrable from the inside, the outside of the walls being water-softenable to permit said walls to substantially disintegrate by placing them in water, said walls comprising a water-softenable layer of material selected from the group consisting of polyvinyl alcohol, gelatin and methyl cellulose.

2. A sanitary clothing article according to claim **1** wherein said water-softenable layer of material is gelatin.

3. A sanitary clothing article according to claim **1** wherein said water-softenable layer is polyvinyl alcohol.

4. A sanitary clothing article according to claim **1** wherein said walls further comprise an inner layer of waterproof material laminated to said water-softenable layer of material.

5. A sanitary clothing article according to claim **1** wherein said walls further comprise an inner layer of fibrous material laminated to said water-softenable layer of material.

6. A sanitary clothing article according to claim **1** wherein said walls further comprise an inner layer of waterproof material formed as a zone at the surface of said water-softenable layer of material.

7. A sanitary clothing article according to claim **6** wherein said water-softenable layer of material is polyvinyl alcohol and said layer of waterproof material is formed by reacting said layer of polyvinyl alcohol with formaldehyde.

8. A sanitary clothing article according to claim **6** wherein said water-softenable layer of material is gelatin and said layer of waterproof material is formed by reacting said layer of gelatin with formaldehyde.

9. A sanitary clothing article according to claim **1** wherein said water-softenable layer of material is polyvinyl alcohol and wherein said walls further comprise an inner layer of fibrous material laminated to said polyvinyl alcohol layer.

10. A diaper comprising flexible walls adapted to fit in a position on and around an excretory organ of the body and having a central portion fitting between the legs or buttocks and end portions lying along the body and extending upwardly toward the user's waist, said walls being substantially water-impenetrable from the inside, the outside of the walls being water-softenable to permit said walls to substantially disintegrate by placing them in water, said walls comprising a water-softenable layer of material selected from the group consisting of polyvinyl alcohol, gelatin, and methyl cellulose.

11. A diaper according to claim **10** wherein said water-softenable layer of material is polyvinyl alcohol, and wherein said walls further comprise an inner layer of fibrous material laminated to said polyvinyl alcohol layer.

12. A diaper according to claim **10** wherein said water-softenable layer of material is polyvinyl alcohol, and wherein said walls further comprise an inner layer of waterproof material formed at the surface of said polyvinyl alcohol.

13. A diaper according to claim **10** wherein said water-softenable layer of material is gelatin, and wherein said walls further comprise an inner layer of waterproof material formed at the surface of said gelatin layer.

14. A sanitary clothing article comprising a bag having flexible walls adapted to fit between the legs or buttocks, said bag having means forming a lip opening into the bag located between said walls and adapted to fit in a position on and around an excretory organ of the body to hold the bag in direct communication therewith;

means to hold the bag with said opening in said position and to bar excreta from issuing exteriorly of the bag; and

means associated with said lip for closing said lip and confining the contents of the bag after detachment from the body,

said walls being water-impenetrable from the inside, the outside of said walls being water-softenable to permit said walls to substantially disintegrate by placing them in water.

15. A sanitary clothing article comprising a bag having flexible walls adapted to fit between the legs or buttocks, said bag having means forming a lip opening into the bag located between said walls and adapted to fit in a position on and around an excretory organ of the body to hold the bag in direct communication therewith;

means to hold the bag with said opening in said position and to bar excreta from issuing exteriorly of the bag; and

means associated with said lip for closing said lip and confining the contents of the bag after detachment from the body,

said walls being laminate of an inner layer of waterproof material, and an outer support layer of water-softenable material, whereby said bag substantially disintegrates upon being placed in water and can be disposed of in a sewage system.

* * * * *