United States Patent

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Continuation-in-part of application Ser. No. 604,017, Dec. 22, 1966, now Patent No. 3,475,767.

[54] **SANITARY DISPOSABLE RECEIVER FOR LIQUID AND SOLID WASTES**
29 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **4/110**
[51] **Int. Cl.** **E03d 13/00**
[50] **Field of Search** 4/110, 112; 229/53

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ABSTRACT: A sanitary disposable receiver for liquid and solid wastes, particularly for human wastes, is disclosed. The receiver is in the form of a sheet capable of being formed into a bag or pouch, which comprises a substrate of unbleached, nonporous, highly hydrated paper, preferably kraft paper, coated on at least one side with a hydrophobic surfactant. A tissue paper outer layer is glued, at its periphery, to the substrate such that an air space is left between two layers. The material of which the pouch is made can be made in sheets, rolls, or ready-formed.

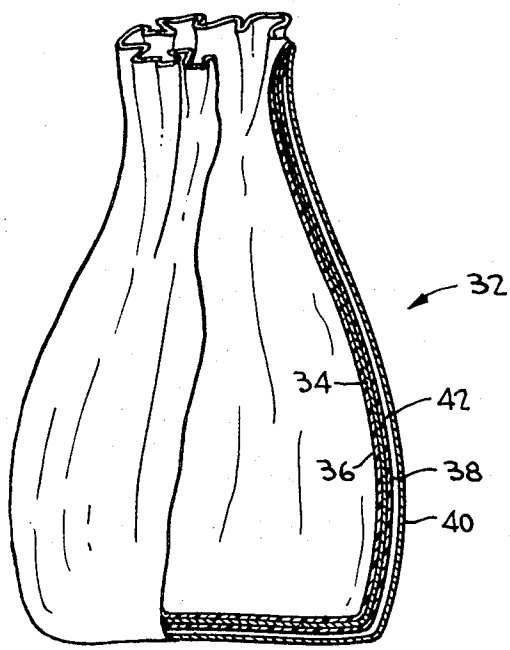


FIG. 1

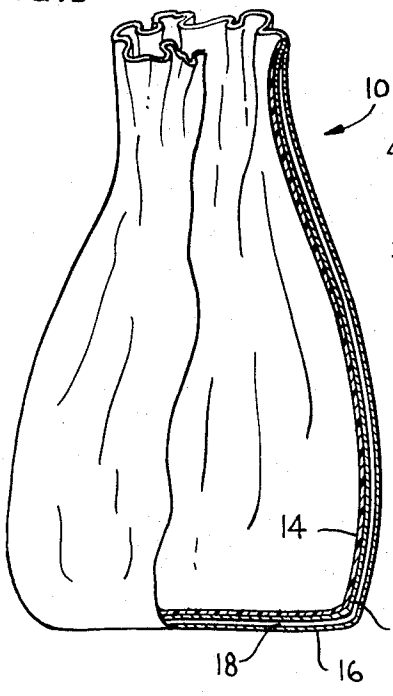


FIG. 2

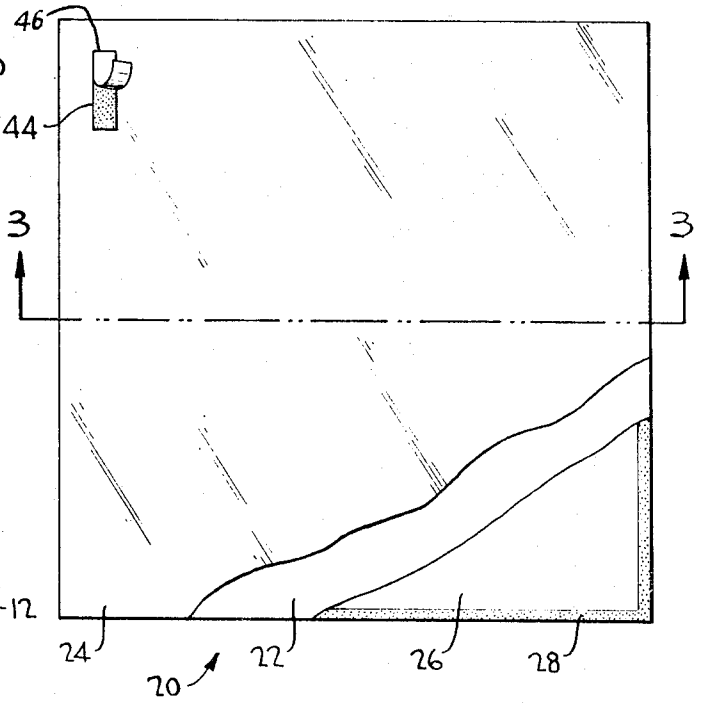


FIG. 3

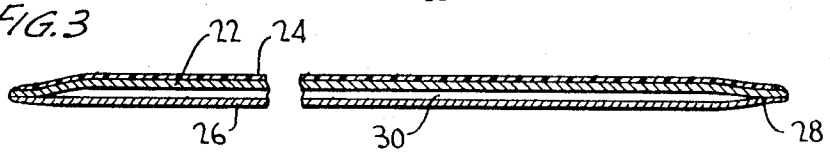
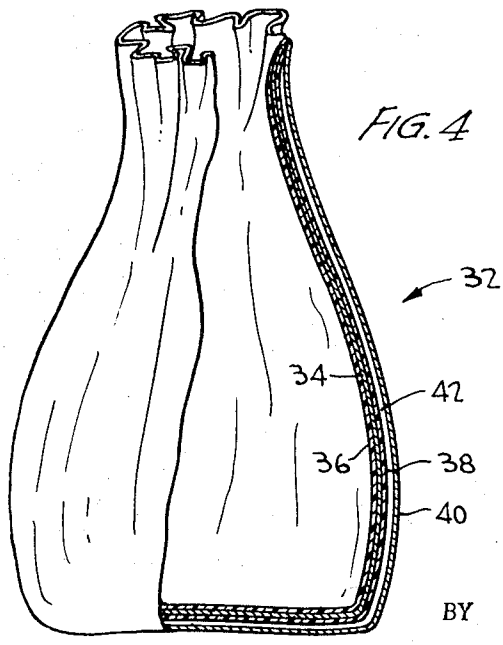


FIG. 4



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SANITARY DISPOSABLE RECEIVER FOR LIQUID AND SOLID WASTES

This invention is a continuation-in-part of our copending application Ser. No. 604,017 filed Dec. 22, 1966 now U.S. Pat. No. 3,475,767.

This invention generally relates to an improved container or receiver for waste materials and, more particularly, pertains to a new and improved sanitary disposable receiver for liquid or solid materials, or both, especially for containing and conveniently disposing of human waste, particularly the fecal, urinary and other wastes resulting from personal hygiene of humans, in particular patients in hospitals and those confined to their beds in homes. Although the aforementioned use of the inventive sanitary disposable receiver is one significant application, it can be utilized in other environments, for instance as a nausea-bag on public or private transportation facilities, such as airplanes, trains, cars, buses and the like, as liners for bird cages, and as a liquid takeup for sweating glasses.

Prior to the advent of disposable bags for bedpans or the like, it was necessary to empty and wash the pans after each use, and sterilization was necessary if they were to be successively used by different patients. Not only are these operations time-consuming and expensive since specially trained hospital personnel and equipment had to be employed, but there additionally existed the danger of germs spreading from the time the bedpans were used until they were emptied and sterilized.

In an attempt to overcome these drawbacks the prior art suggested the use of disposable bags in bedpans or other toilet "utensils." However, up to the present these bags were apparently associated with certain problems and disadvantages. They were usually lacking in one respect or another, particularly from the standpoint of ease and economy in manufacture, ability to effectively retain the waste material and prevent spreading of germs, difficulty in handling and disposal after use, and their tendency to clog the toilet or other disposal facility.

A careful consideration of the situations encountered during normal use of a sanitary disposable bag, especially for confining human wastes, and the conditions which it should be able to fulfill, leads to the determination that, in the main, at least the following requirements should be complied with:

a. It most possess the ability to retain the waste materials without any leakage until the hospital attendant or other authorized person has had an opportunity to dispose of the bag and its contents. Hence, it should be completely watertight, preferably retaining this property for at least 24 hours.

b. It should be stable during normal conditions of use, especially possess a certain degree of thermal resistance to temperatures, particularly body temperatures, preferably up to about 110° F., and stable when contacted by a medium having a pH in the range of about 4 to 9, preferably 5 to 8, inasmuch as such is the pH range for urine and blood normally encountered in patients.

c. It must possess sufficient strength, especially wet strength, so that it can be removed from the bedpan or other holder, if one is used, and carried to a place of disposal without rupturing.

d. It must be disposable or capable of being reduced to a condition for disposal which can be effectively handled by conventional drainage systems without clogging or otherwise fouling the plumbing hardware.

e. It must be able to meet all requirements for contact with humans, and must be attractive and appealing enough so that there is no aversion to its use.

The sanitary disposable receivers, as sheets or bags, of the present invention effectively overcome the drawbacks of the prior art structures while complying with the aforementioned requirements. Specifically, the sanitary disposable bag of the invention may be used as an inner liner for bedpans, urinal holders, wash basins, spittle collecting devices and so forth,

and is especially useful without any additional support structure. Yet, in all instances it retains the bag contents until the hospital attendant or other person can close and dispose of such bag together with its contents. Accordingly, it provides extreme convenience to hospital personnel, professional attendants and to patients alike, and specifically, affords a very practical, labor-saving expedient which avoids cleaning and sterilizing of the hospital "utensils" or toilet facilities for bedridden patients. Since these disposable bags can be quickly and easily closed, any noxious and unpleasant matter is confined within the bag. This ability to effectively confine potentially infectious diseases is of great significance when the bags are used with patients, especially those in hospitals or similar institutions since it reduces the likelihood of spreading disease germs and noxious odors, at the same time relieving professional service personnel for more effective attention to the patients's needs. Moreover, the waste contents contained in the disposable bag can be immediately reduced to an innocuous condition by disposal thereof through the sanitation sewers of the hospital or otherwise.

Generally speaking, the sanitary disposable receiver of the invention described in the aforementioned application, Ser. no. 604,017 is manifested by the features of a substantially baglike carrier of fibrous material into which the material to be contained is deposited directly by the person or patient, said baglike carrier being provided with means for confining the material therein. Such means comprises a coating on said baglike carrier which is stable in a pH range of about 4 to 9 and is resistant to thermal decomposition at least up to temperatures of about 110° F. The carrier may be formed of a suitable paper material or a nonwoven fabric. According to one embodiment of the invention as described in application Ser. No. 604,017, this coating is formed of wax which may be liquified at elevated temperatures or solubilized in a medium having a given pH, in order that the entire sanitary disposable receiver can be conveniently flushed away or otherwise appropriately disposed of. The coating material also may be a hydrophobic surfactant, such as a silicone oil or a fluorocarbon, or it may be a suitable hydrophobic polyhydrocarbon or polyhydrocarbon derivative.

More particularly, the sanitary disposable receiver of the present invention is a sheet, capable of being formed into a substantially baglike carrier, of fibrous material into which the material to be contained is disposed directly by the person or patient. The baglike carrier is formed as a unitary structure embodying a top layer or substrate composed of unbleached, nonporous, highly hydrated paper, particularly kraft paper. Such kraft paper is principally a cellulose paper which is extremely thin, with a thickness preferably beneath about 0.0006 inch. A clear advantage of making the substrate extremely thin resides in the fact that it can be easily formed and molded to the desired contour of a container, such as a bedpan, into which it can eventually be inserted for use. The unbleached kraft paper is coated with a suitable surfactant which also is extremely thin and can be on one or both sides of the kraft paper. If both sides are coated, the coating must be of a type which is compatible with the adhesive which is described more fully hereinbelow. The coated kraft paper is then laminated with a suitable backing, preferably ordinary toilet tissue, using a water soluble glue which is suitable to human contact. The lamination is such that the coated kraft paper is not in overall contact with the backing paper but is only "spot" laminated, thereby leaving an air space between the substrate and the backing material.

The provision of such an air cushion provides the advantage of avoiding a continuous path for penetration of liquid through the substrate, and thus improves the protection against leakage. An obvious advantage, of course, is that the overall strength of the pouch is considerably increased to facilitate handling of the product as well as increasing the physical properties thereof. Various additives such as germicides may be included in either the substrate or the backing paper. The baglike carrier is such that after use it may be

disposed of, in toto, by dropping it into an ordinary toilet facility without fear of fouling or clogging the same and without the necessity of using any other means for assisting in the disposal. Alternatively, the bag may be held by the top portion with the bottom and contents in the water and given a sharp jerking motion to rupture the same, depositing its contents in the bowl, with the top dry portions of the bag then disposed of as waste paper or other means. Flushing however, is preferred. Unless treated in a vigorous manner, the baglike carrier of this invention is sufficiently strong to contain fecal matter, blood, urine or other waste of human body origin for a considerable period of time without leakage or rupturing.

Accordingly, it is a primary object of the present invention to provide an improved sanitary disposable receiver in the form of a bag or the like which reliably confines materials therein for considerable lengths of time without leakage and wherein such bag can be easily disposed of after use.

Still a further, more specific object of the present invention relates to an improved sanitary disposable receiver which is stable during normal conditions of use, possesses a high degree of resistance to leakage, can be easily handled without spillage of its contents, and disposed of after use without danger of fouling the sanitary equipment or other disposal apparatus.

Other significant objects of the present invention concern the provision of an improved sanitary disposable receiver which: (a) can be mass-produced economically; (b) is easy to use; (c) capable of retaining its contents without leakage; (d) can be easily handled and is attractive in appearance; and (e) generally simplifies the work of hospital attendants or the like concerned with the toilet habits of patients.

Still a further object of the present invention, concerns the material which finds use in the sanitary disposable receiver of this invention, which material is provided in sheet form.

The invention will be better understood, and objects other than those set forth above will become apparent, when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. 1 is a schematic view partially in cross section of a disposable bag constructed according to this invention;

FIG. 2 is a plan view of a blank or sheet suitable for forming the sanitary disposable bag of this invention;

FIG. 3 is a cross section of the blank taken on the line 3–3 of FIG. 2; and

FIG. 4 is a schematic view, partially in cross section, showing another embodiment of the sanitary disposable bag of this invention.

Turning now to FIG. 1, there is shown a sanitary disposable bag which is primarily useful in a situation wherein after use of the same it may be conveniently flushed down a toilet, complete with its contents, without any further treatment or manipulation. Alternatively, it may be held over any receiver for its contents and given a sharp jerk whereupon the extreme forces applied thereby will cause it to tear and empty its contents into the other receptacle. The bag itself may then be disposed of in any suitable manner. The bag may be used alone since it possesses an extreme amount of coherence or toughness while wet, or it may be used in conjunction with a bedpan, urinal or any other suitable type of container as described in the aforementioned copending U.S. Pat. application Ser. No. 604,017, which is embodied herein in its entirety by reference.

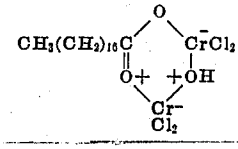
The bag, generally designated by the numeral **10**, comprises a substrate **12** which is composed of unbleached, nonporous, highly hydrated kraft paper. This kraft paper substrate is extremely thin, and is preferably less than about 0.0006 inch. More preferably, the kraft paper substrate **12** should have a thickness between about0.003 and 0.0006 inch. It has been found that this thin paper, despite the fact that paper is generally considered to be water permeable, has extremely good water retention characteristics. Further, this paper is unusually strong, contrary to what would be predicted. The reasons for these unusual characteristics are not clear, but it is believed that the paper itself is a "film" of cellulose fiber reinforced water, although this theory should not be taken as a definitive explanation of the phenomena exhibited by this paper. A critical feature of this product is the imperviousness as demonstrated by the porosity values in Table I. Typical characteristics of varying thicknesses of an unbleached kraft paper according to the foregoing description appear in Table I.

TABLE I

Nominal thickness (inches×10⁻³)	Coverage (sq. in./lb. dry)	Basis weight 24×36/500 7% moisture	Dry tensile [1] lb./in. MD	Dry tensile [1] lb./in. CMD	Porosity,[2] Gurley sec./100 cc.
0.30	92,200	5.0	5.0	2.0	0
0.35	79,000	5.9	5.5	2.3	0
0.40	69,200	6.7	6.0	2.5	0
0.45	61,500	7.5	6.5	3.2	0
0.50	55,300	8.4	7.0	3.5	0
0.55	50,300	9.2	7.5	3.7	0
0.60	46,100	10.0	7.8	3.6	0

[1] ASTM D-828.
[2] ASTM D-726.
NOTE: Apparent density for all=0.95–1.05 gm./cc.; Moisture content for all=4.5–7.0%; Ash=0.35% maximum; pH=6.3–7.0; Chlorides=4–8 p.p.m. maximum.

Continuing with the description of the sanitary disposable receiver **10**, the substrate **12** is coated on the inside surface with a thin layer of hydrophobic surfactant **14**. This coating comprises any suitable such surfactant, as described in the aforementioned copending application Ser. No. 604,017. Such materials include hydrocarbon polymers and various waxes as well as halogenated hydrocarbon polymers and other classes of compounds. The preferred such compounds, however, are fluorinated hydrocarbon, or fluorocarbon polymers such as that marketed as "FC 805" by the 3M Company, complex metallo hydrocarbons such as Dupont's "Quilon C" which is a stearic acid, chromium complex having the formula



or certain vinylidine chloride polymers such as "DARAN" or "SARAN." The preferred surfactants are water dispersable for ease in application. The coating **14** is extremely light and does not produce a noticeably continuous film, being the range of 0.01 to 0.5 pounds per thousand square feet. The preferable range is between 0.5 and 1 percent by weight of the substrate in the dry condition.

Finally, a backing **16** of ordinary toilet tissue paper is superimposed upon the kraft paper substrate. More precisely, the toilet tissue paper is tissue of about 5 to 15 pounds basis weight. An important feature of this disposable bag **10** is that an uneven air space **18** is left between the tissue **16** and the kraft paper **12**. The tissue is "spot" or "tack" glued to the kraft paper at the marginal regions or edges thereof in order to leave the air cushion or gap between the kraft paper substrate **12** and the tissue backing **16**. The advantage attained by leaving the air space **18** is that any liquid which may penetrate, or seep, through the substrate will not find a continuous path. Further, the overall strength of the pouch is increased many fold by having the extra layer of backing material so that the pouch will not burst during use and handling will be facilitated. The glue used to attach the backing **16** to the substrate **12** is a glue which is suitable for human contact and is preferably water soluble. A typical type of such glue is "Elmer's Glue All" manufactured by the Borden Chemical Company and readily available in retail stores. Of course, several layers of tissue backing could be used thereby providing additional strength or absorptivity.

Since the basic materials, particularly the kraft paper substrate, are extremely thin, the overall pouch is readily suitable

for being formed to the contour of a container for receiving the same. On the other hand, the pouch could be preformed into a desired shape by conventional paper forming methods and then inserted into such a container or, in an especially convenient mode of use, used without any supporting device at all.

One method of manufacture of the pouch-forming material, which is illustrative but by no means limiting, is to coat a continuous web of kraft paper substrate with the surfactant in conventional equipment, and rewind the same into rolls. The coating is applied by dipping, spraying, brushing, rollers or the like. The rolls of coated kraft paper are then combined with rolls of toilet tissue and suitably scored before being made into new rolls. The pouch material could then be handled as rolls of paper towels, or packaged as sheets and sold in a manner similar to napkins or facial tissue. Alternatively, a tube of the laminate could be made and packaged for sale. In FIG. 2 is shown a blank **20** suitable for forming into a sanitary disposable receiver as in FIG. 1, or for use in a receptacle such as a bedpan. The blank **20** is shown as rectangular, although it can be square or circular depending upon the final use to which it will be put. For the pouch **10** depicted in FIG. 1, the sheet **20** is typically about 24×36 inches. This blank **20** could be lifted by the edges to form a pouch, which will conform to the shape of any container into which it is placed or drawstrings (not illustrated) may be included around the periphery of the blank **20** in order to draw it up into a pouch shape and to seal it after use. Such an arrangement with drawstrings is shown in the aforementioned copending application Ser. No. 604,017. FIG. 3 depicts the blank of FIG. 2 in cross section, showing the kraft paper substrate **22** with its coating **24** and the tissue backing **26**. The tissue backing **26** is attached to the kraft paper substrate **22** by the glue **28** at the periphery of the laminate thereby leaving the air space **30** between the substrate **22** and the tissue backing **26**.

It has been found that in certain environments, such as when used with a bedpan, the sanitary receiver of the present invention may have a tendency to slip. This is especially true when the user moves about when sitting on the same. The use of the sanitary disposable receiver with a bedpan or the like involves placing a sheet **20** of the laminate, as shown in FIG. 2, in the bedpan and molding the same to the contour of the pan, while leaving a certain amount of overhang over the sides of the pan. When the user is finished, the receiver need only be lifted out by means of the overhang and then disposed of. It is the overhang which may tend to slide into the pan if the user is careless. To the end of obviating this possibility, several strips of conventional pressure sensitive adhesive transfer tape such as that which is a product of the 3M Company are applied to the sheet at properly spaced intervals. One such strip of tape is shown at **44** in FIG. 2. This tape has adhesive on both sides, one side being applied to the outer tissue surface **26** of the sheet **20** and the other side having a piece of removable backing **46** applied thereto.

The adhesive adheres more strongly to the tissue then to the backing. Accordingly, when ready to apply the receiver to the bedpan one need merely lift off the backing and apply the sheet to the pan. The tape then adheres to the bedpan and prevents slippage. After the bedpan is used, the receiver is lifted out, the adhesive on the tape easily releasing from the pan.

Turning now to FIG. 4, there is shown a pouch generally designated by the numeral **32** which includes a kraft paper substrate **34** having a coating **36** on the inner surface thereof in a similar manner as the bag **10** shown in FIG. 1. An additional coating **38**, however, is provided on the outer surface of the substrate **34** thereby imparting additional protection against liquid seepage. The tissue backing **40** is glued onto the substrate **34** in the manner previously described leaving an air gap **42** therebetween.

A germicide can be incorporated in any of the layers of the laminate by known means, that is, a suitable germicide could be included in the coating solution before applying it to the substrate, it could be included in the kraft paper itself, in the tissue backing, or in any combination of these suitable carriers. If a germicide is included in the substrate, for example, it should be present in an amount less than 0.01 percent of the weight of the kraft paper in dry condition. A suitable germicide which has been found to be safe for use with humans, and compatible with the various preferred coating materials, is that sold as "Hyamine 2389" manufactured by Rohm and Haas. This has been described as alkyl (c_9 to C_{15}) tolylmethyltri-methyl-ammonium chloride (s). Other deodorants and/or sterilants such as potassium permanganate, pine oil, camphor and various other metallo-organic antiseptics such as merthiolate and mercurochrome can also be included in the various layers of the laminate. Further, suitable dyes may be sued to provide an attractive appearance.

The pouch thus formed is of extremely light weight, but maintains its physical integrity in contact with water from one side so that it is readily capable of positively containing the body waste materials placed therein. Tests run with a pouch manufactured according to this invention have shown that it is readily capable of positively containing the body waste materials placed therein. Tests run with a pouch manufactured according to this invention have shown that it is readily capable of retaining liquid or solid materials, such as feces and urine, for as long as 42 hours. This provides a considerable safety factor when it is considered that generally the contents of the pouch are disposed of quite soon after they have been deposited therein.

A further, important, aspect of the present invention is the material from which the disposable pouch is formed. This material is readily produced in sheet form as described hereinabove. The thus-formed laminated coated kraft paper with tissue paper attached thereto can then find utility in other areas where its special characteristics make it particularly suitable.

It should be emphasized that the substrate of the inventive material is a mechanically obtained, nonporous, natural, highly hydrated cellulose film with a suitable kraft paper being preferably due to its low cost. The finished material, as is obvious from the foregoing description, is easily flushable thereby providing an important characteristic which is desirable in other uses besides disposable sanitary receivers.

It should be apparent from the foregoing detailed description, that the objects set forth at the outset to the specification have been successfully achieved.

What we claim is:

1. A sanitary flushable receiver for liquid or solid materials, or both, particularly for containing human excrement and other undesireable hospital domestic wastes of human origin, comprising a substantially baglike carrier, said baglike carrier comprising a laminate of:
   a. a substrate of unbleached, nonporous, highly hydrated paper;
   b. said paper being coated on at least one side with a hydrophobic surfactant;
   c. an outer layer of tissue paper;
   d. said tissue paper being secured to said hydrated paper at the marginal regions thereof.

2. A sanitary flushable receiver as defined in claim 1, wherein said hydrated paper is kraft paper.

3. A sanitary flushable receiver as defined in claim 2 wherein said kraft paper has a thickness less than about 0.0006 inch and said surfactant is present in a thickness of from about 0.01 to about 0.5 pound per 1,000 square feet.

4. A sanitary flushable receiver as defined in claim 3, wherein said kraft paper is from about 0.0003 to about 0.0006 inch thick.

5. A sanitary flushable receiver as defined in claim 4, wherein said kraft paper is about 0.0005 inch thick.

6. A sanitary flushable receiver as defined in claim 3, wherein said surfactant is selected from the group consisting of polyhydrocarbons, polyhalohydrocarbons, and complex metallo hydrocarbons.

7. A sanitary flushable receiver as defined in claim 6, wherein said surfactant is a fluorinated hydrocarbon polymer.

8. A sanitary flushable receiver as defined in claim 6, wherein said surfactant is vinylidine chloride polymer.

9. A sanitary flushable receiver as defined in claim 6, wherein said surfactant is stearic acid, chromium complex.

10. A sanitary flushable receiver as defined in claim 3, wherein said kraft paper is coated on both sides with said surfactant.

11. A sanitary flushable receiver as defined in claim 3, wherein said surfactant is present in a thickness of about 1 percent by weight of the substrate.

12. A sanitary flushable receiver as defined in claim 3, wherein said tissue is of about 5 to about 15 pounds basis weight

13. A sanitary flushable receiver as defined in claim 3, wherein said tissue paper is secured to said kraft paper with a water-soluble glue.

14. A sanitary flushable receiver as defined in claim 3, wherein said tissue paper is present in two layers.

15. A sanitary flushable receiver as defined in claim 1, further comprising at least one strip of pressure sensitive adhesive transfer tape adhesively affixed to said outer layer of tissue paper for removably affixing said receiver to the surface of a container for the same.

16. A sanitary flushable receiver as defined in claim 15, wherein said container is a bedpan.

17. A disposable and flushable laminated sheet material comprising:

a. a substrate of unbleached, nonporous, highly hydrated paper;

b. said paper being coated on at least one side with a hydrophobic surfactant;

c. an outer layer of tissue paper;

d. said tissue paper being secured to said hydrated paper at the marginal regions thereof.

18. A disposable and flushable laminated sheet material as defined in claim 17, wherein said hydrated paper is kraft paper.

19. A disposable and flushable laminated sheet material as defined in claim 18, wherein said kraft paper has a thickness less than about 0.0006 inch and said surfactant is present in a thickness of from about 0.01 to about 0.05 pound per 1,000 square feet.

20. A disposable and flushable laminated sheet material as defined in claim 19, wherein said kraft paper is from about 0.0006 inch thick.

21. A disposable and flushable laminated sheet material as defined in claim 19, wherein said surfactant is selected from the group consisting of polyhydrocarbons, polyhalohydrocarbons, and complex metallo hydrocarbons.

22. A disposable and flushable laminated sheet material as defined in claim 19, wherein said surfactant is a fluorinated hydrocarbon polymer.

23. A disposable and flushable laminated sheet material as defined in claim 19, wherein said surfactant is a vinylidine chloride polymer.

24. A disposable and flushable laminated sheet material as defined in claim 19, wherein said surfactant is stearic acid, chromium complex.

25. A disposable and flushable laminated sheet material as defined in claim 19 wherein said surfactant is present in a thickness of about 1 percent by weight of the substrate.

26. A disposable and flushable laminated sheet material as defined in claim 19, wherein said tissue is of about 5 to about 15 pounds basis weight.

27. A disposable and flushable laminated sheet material as defined in claim 19, wherein said tissue paper is secured to said kraft paper with a water soluble glue.

28. A disposable and flushable laminated sheet material as defined in claim 19, further comprising at least one strip of pressure sensitive adhesive transfer tape adhesively affixed to said outer layer of tissue paper for removably affixing said sheet material to the surface of a container for the same.

29. A disposable and flushable laminated sheet material as defined in claim 28, wherein said container is a bedpan.