United States Patent [19]

Korodi et al.

[11] **3,918,454**

[45] **Nov. 11, 1975**

[54] **SOILAGE-INDICATING DIAPER**

[76] Inventors: **Miklos B. Korodi,** 440 E. 79th, New York, N.Y. 10021; **Frederic C. Dreyer,** 2111 Jeff. Davis Hwy., Arlington, Va. 22202

[22] Filed: **Mar. 2, 1973**

[21] Appl. No.: **337,767**

[52] **U.S. Cl.** **128/287;** 128/284

[51] **Int. Cl.** **A61f 13/16**

[58] **Field of Search** 128/287, 284, 295

[56] **References Cited**

UNITED STATES PATENTS

3,612,055	10/1971	Mesek et al.	128/287
3,675,654	7/1972	Baker et al.	128/287
3,731,685	5/1973	Eidus	128/284

FOREIGN PATENTS OR APPLICATIONS

1,355,018	2/1964	France	128/284

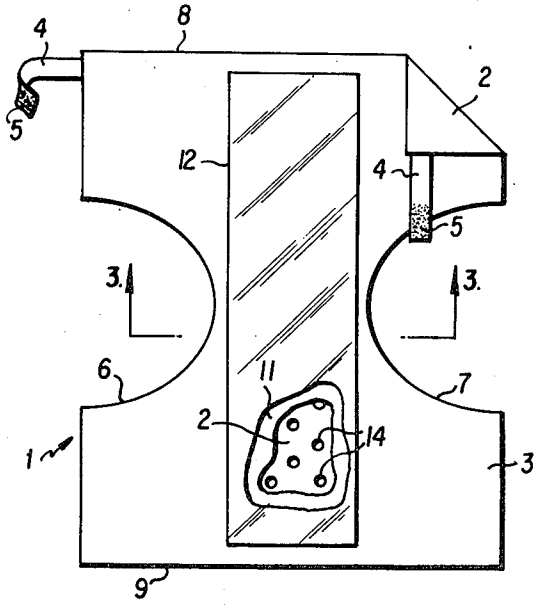
Primary Examiner—Aldrich F. Medbery

Attorney, Agent, or Firm—Frederic C. Dreyer

[57] **ABSTRACT**

A diaper which is self-indicating to an observer when it is soiled by its wearer. The indicator layer is protruded or ruptured through the absorptive layer to provide contact with excreta such as fecal matter and conduction of the moisture of the excreta through to the visible portion of the indicator layer.

5 Claims, 9 Drawing Figures



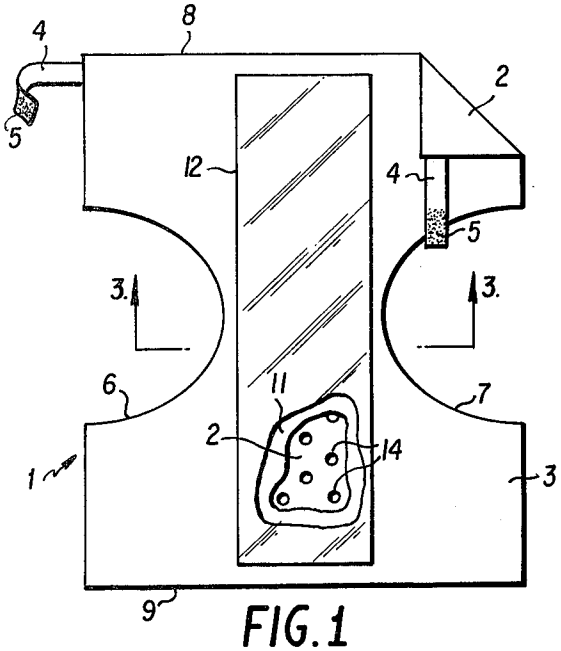


FIG. 1

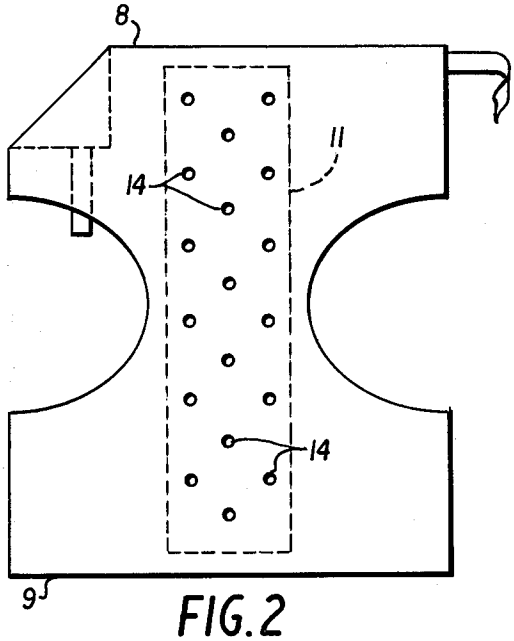


FIG. 2

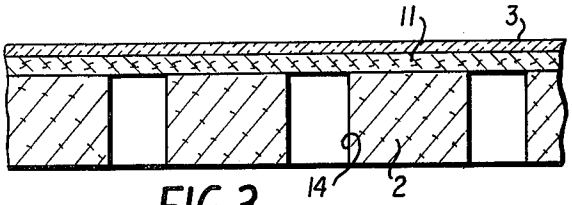


FIG. 3

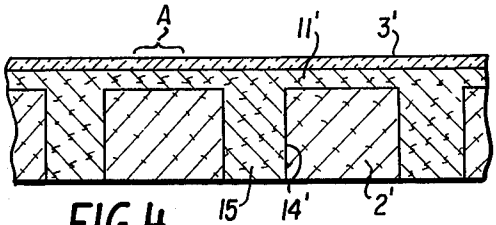


FIG. 4

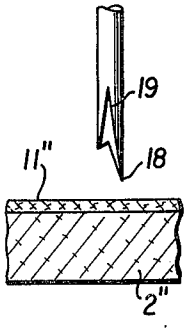


FIG. 5

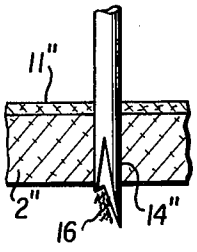


FIG. 5a

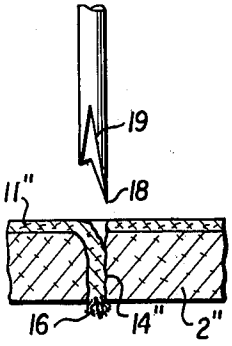


FIG. 5b

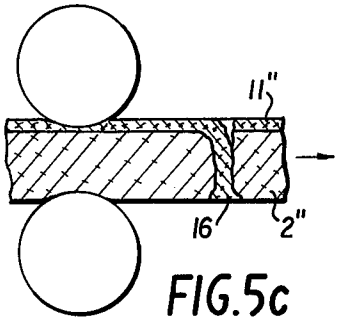


FIG. 5c

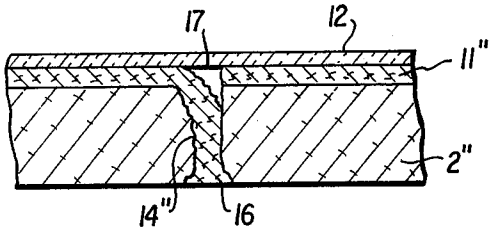


FIG. 6

SOILAGE-INDICATING DIAPER

BACKGROUND OF THE INVENTION

The present invention relates to diapers having soilage indicators incorporated therein and is concerned more particularly with diapers having means for exposing the soilage-indicating material to direct contact with the soiling excreta.

BRIEF DESCRIPTION OF THE PRIOR ART

None of the prior art means for indicating soilage of diapers to observers has been found to be entirely satisfactory.

In an application filed concurrently herewith, Ser. No. 337,771 filed Mar. 2, 1973, Miklos B. Korodi has set forth a unique diaper which includes an externally-visible indicating layer which signals the presence of excreta in the diaper. Although this diaper is a distinct improvement over the prior art, it may not yield the desired result under certain circumstances. In particular, "dry" fecal-matter, of relatively low free-moisture content, may contain insufficient moisture to "wet" through the first, absorbent layer or layers adjacent the skin in order to contact the indicator layer.

This problem becomes most important when the infant, or incontinent person wearing the diaper, has the skin irritation familiarly known as "diaper rash." The fusel oil, ammonia and other corrosives found in excreta are available for attack on, and further complication of, the sore area.

Also, with some diseases, the excreta of humans is abnormally high in corrosive matter and may be abnormally low in free-moisture content. This combination of circumstances is particularly dangerous and problematical.

SUMMARY OF THE INVENTION

In general, the preferred form of the present invention comprises an improvement in the diaper disclosed in the aforementioned application by Miklos B. Korodi, and includes exposure means such as apertures in the basic absorbent layer of the diaper to provide direct contact of the indicator-layer with the fecal matter or other excreta.

Preferably, a portion of the indicator-layer is protruded through the apertures to present direct contact areas with the excreta.

The preferred method of forming a diaper according to the invention includes a simultaneous protrusion of the indicator-layer into the absorptive layer as the apertures are formed therein.

Therefor, the present invention provides for "triggering" at least a portion of the soilage-indicator even when relatively small amounts of moisture are excreted by the body.

A better understanding of the invention may be derived from the following description and accompanying drawings, in which:

FIG. 1 is a view of the exterior side or "outside" of a diaper according to the invention;

FIG. 2 is a view of the inner side of the diaper of FIG. 1;

FIG. 3 is an oversize section of a portion of FIG. 1 taken on the lines 3—3;

FIG. 4 is a section similar to that of FIG. 3 and showing a modified form of the invention;

FIGS. 5 through 5c are similar, schematic views showing successive steps in forming a diaper in accordance with the invention, and

FIG. 6 is an oversize view of a portion of FIG. 5c.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in the drawings, the preferred form of the invention comprises a diaper **1** having an absorbent inner wall **2** formed of any of several suitable materials. A substantially impervious backing sheet or outer ply **3** serves to confine dampness within the absorbent layer **2.**

Suitable means, such as snaps, ties, or the tabs **4** with adhesive areas **5,** are used to secure the diaper to the person. The diaper may be cut out, as at **6** and **7,** to provide leg clearance, and includes ventral and dorsal portions **8** and **9,** respectively.

It is to be understood that the particular shape of the diaper is not critical to the invention, and that reversible shapes may be used.

A strip of bibulous material **11,** in accordance with the aforementioned application of Miklos B. Korodi, is oriented between the ventral and dorsal waist portions, extending through the crotch area, and is impregnated with a suitable soilage-indicating composition such as food coloring or a dye such as set forth in U.S. Pat. No. 3,675,654.

Preferably, the indicator layer **11** is displayed to the exterior of the diaper by means of a transparent window **12,** which need be only transparent enough to permit the visible change to be observed.

The inner, absorbent wall **2** carries a series of perforations **14** therethrough which provides direct access between the indicator layer **11** and the soilable surface of the diaper. This provides for direct contact and permits "wicking" of moisture to the readily-visible indication areas in the ventral and dorsal, waist ares.

An alternate form of the invention is shown in FIG. **4,** in which the same numerals, primed, are used to denote elements similar to those of FIG. **1.** However, a portion of the material of the indicator layer **11** is protruded as plugs **15** into the apertures **14** of the absorbent wall **2.**

The embodiment of FIG. **4** provides immediate contact of excreta with the bibulous indicator layer via the plugs **15,** to permit triggering of the indicator by the excreta.

A further embodiment of the present invention is shown in FIGS. **5** through **6,** in which a punch **13** is used to draw fibers or strands **16** from the bibulous indicator-layer **11** to protrude through an aperture **14** which is simultaneously formed by the punch **13.**

Preferably, the punch **13** includes an initial cutting edge **18** and a groove **19** for accomodating the strands **16** as they are forced through the layer **2.**

If necessary, and as shown in FIG. **5***c*, the stock material may be smoothed, such as by rollers **20,** to flatten any protruding tufts of strands **16.** A harmless pocket **17** remains in the indicator layer.

Preferably, the indicator layer **11** is then covered by a window layer **12** which is sufficiently transparent to the visible signal in accordance with the aforementioned Miklos B. Korodi invention.

With the method depicted in FIGS. **5** through **6,** plugs are provided which are similar to the plugs **15** of FIG. **4,** but the operation is much more suited to high-speed, autimatic production.

When certain, staining chemical-indicators are used in the indicator layer **11**, it is preferable that the indicator be impregnated only in selected areas of the waist portions, in order to avoid a "measled" effect on the infant when he is changed.

To this purpose, I prefer to impregnate local zones "A." of the indicator layer **11**, in between the aperture areas **14**, (FIG. **4**), to minimize dye transfer to the facing area adjacent the skin.

However, it is to be understood that a chemical indicator which is non-marking to skin need not be so localized, as long as it meets the requirement of being non-toxic.

Thus, it is apparent that the present invention provides an improved, spoilage-indicating diaper which is sensitive to, and triggered by even minimum amounts of excreta, and which signals the presence of such minor soilage to areas which are visible regardless of the position of the wearer.

We claim:

1. A soilage-indicating diaper having an absorbent body,

opposed waist portions adapted to cover ventral and dorsal areas of the body,

a crotch area in said body and joining said waist portions, an indicating layer of bibulous material adjacent the outer surface of the absorbent body extending between the waist portions and through said crotch area,

said bibulous layer being impregnated with indicator means for causing a visible indication upon soilage of said body,

means for exposing a portion of said bibulous layer through said absorbent body, said exposure means including

at least one aperture through said absorbent body, and a portion of said bibulous material being positioned within said absorbent body aperture.

2. The soilage-indicating diaper of claim **1** in which strand portions of said bibulous layer are deformed through said absorbent-body aperture.

3. The soilage-indicating diaper of claim **1** in which the bibulous layer is extended into the aperture as a plug.

4. The soilage-indicating diaper of claim **1** in which said bibulous layer is impregnated only in selected areas, and said portions in said absorbent-body apertures are free of the impregnant.

5. The soilage-indicating diaper of claim **4** in which the portion of the bibulous layer at the crotch area is free from the impregnant.

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