

[54] **MOISTURE INDICATING STRIP FOR DIAPERS AND SURGICAL DRESSINGS**

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[51] Int. Cl.A61f 13/16
[58] Field of Search.....128/284, 287, 296; 116/114 AM

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[57] **ABSTRACT**

A moisture indicating strip for use with diapers, surgical dressings and the like. One end of the strip is attached to the garment whose wet condition is to be detected. The other end of the strip is impregnated with a chemical which changes color when wet. The strip is capable of supporting capillary action so that moisture in the garment is transported to the chemical which then changes color so that the wet condition of the garment can be verified visually.

19 Claims, 5 Drawing Figures

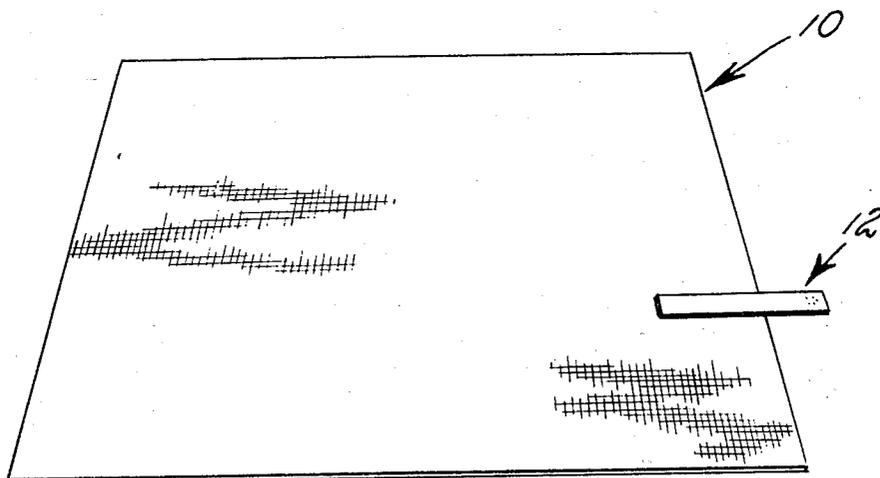


Fig. 1

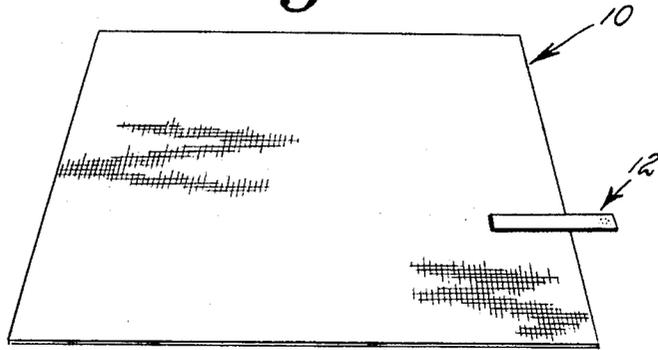


Fig. 2

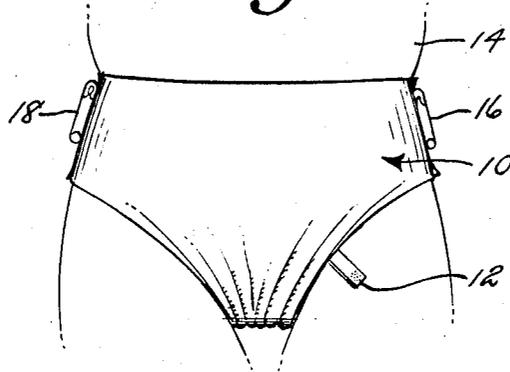


Fig. 3

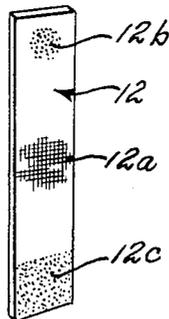


Fig. 4

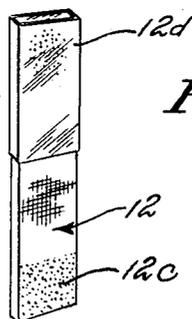
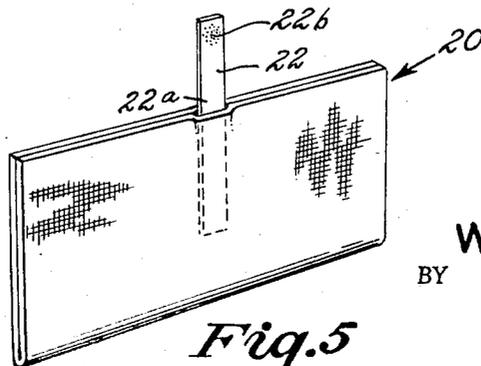


Fig. 5



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MOISTURE INDICATING STRIP FOR DIAPERS AND SURGICAL DRESSINGS

This invention relates to moisture indicators, and more particularly to moisture indicators suitable for use with diapers, surgical dressings and the like.

A diaper or surgical dressing does not provide a readily visible indication of the presence of moisture or excretions. Because it is usually determined that a "wet" diaper must be changed only by feeling the diaper (this is especially true if rubber pants are put on a baby over the diaper), very often quite some time elapses before a wet diaper is changed. This can lead to skin irritation. A similar problem exists in connection with surgical dressings which are used following kidney, bladder or other urinary surgical procedures, particularly in the case of elderly patients.

The aforesaid problems can be overcome if a diaper or surgical dressing is provided with a moisture indicator if the diaper or surgical dressing is wet, this condition is readily determined simply by looking at the moisture indicator. However, prior art moisture indicators have not been capable of cheap manufacture so that many of them could be used in a single day (for example, one for each diaper change) without significantly adding to the cost of each change.

It is a general object of the invention to provide a highly reliable moisture indicator for diapers, surgical dressings and the like which is capable of being manufactured cheaply and can be treated as a single-use, throw-away item.

Briefly, in accordance with the principles of the invention, a strip or tab of material is provided, one end of which is attached to the garment whose wetness is to be detected and the other (free) end of which contains a chemical which changes color when wet. The strip can be made of surgical gauze, and should be capable of allowing a liquid (urine, surgical excretion, etc.) to flow by capillary action from that end attached to the garment to the free end. The strip is attached to the garment such that its free end is exposed to view. For example, in the case of a baby diaper, even though a pair of rubber pants may be placed over the diaper, the free end of the moisture indicating tab extends outside the rubber pants so that it can be seen easily by an adult caring for the baby. As soon as the diaper is wet, the urine is transported by capillary action along the strip to its free end. The change in color of the strip is an indication that a diaper change is necessary.

A tab or strip of this type is capable of only a single use. In the case of a throw-away diaper, the tab may be attached (for example, by stitching) to the diaper by the manufacturer. In the case of a re-usable diaper, a new tab can be attached to the diaper before each new use. The tab for a re-usable diaper is preferably provided with a pressure-sensitive adhesive at that end which is to be attached to the diaper. All that is required is to press the adhesive end of a new tab against the diaper prior to each new use thereof. (Each tab could be packaged in a paper wrapper such as that used for Band-Aid bandages.) The tab should be attached to the potentially wettest part of the diaper so that there will be a large supply of "moisture" to be transported to the chemical at the free end of the tab as soon as the diaper becomes wet.

The chemical itself can be of many different types. For example, litmus is adequate for most applications. Although litmus turns red when moistened by an acid and blue when moistened by an alkali, since any liquid is usually one or the other (its degree merely affects the color saturation), litmus is a satisfactory moisture-responsive chemical for use in the invention. Another chemical which has been found to be adequate is ordinary food coloring particles. These particles may be impregnated in the free end of a gauze strip.

It may be desirable not to allow the free end of the strip to be exposed because the colored wet tab might stain a baby's or patient's clothing, skin or bed covering. For this reason, if staining of this type is to be avoided, it is desirable to wrap the free end of the moisture indicating strip in a transparent plastic sleeve. The sleeve does not interfere with the capillary action or the color change, and permits viewing of the free end of the strip at the same time that it prevents dripping from it.

It is a feature of the invention to provide a moisture indicating strip having a chemical disposed at one end thereof which changes color when wet, the strip being capable of supporting capillary action.

It is another feature of the invention to attach the other end of the strip to a garment whose wet condition is to be detected, either by permanently securing this other end to the garment or providing a pressure-sensitive adhesive at this other end so that it can be attached to the garment simply by pressing it against the garment.

It is still another feature of the invention, in one embodiment thereof, to provide a transparent plastic sleeve over that end of the strip containing the moisture responsive chemical so that the free end of the strip, when wet, will not stain a baby's or patient's clothing, skin or bed covering.

Further objects, features and advantages of the invention will become apparent upon consideration of the following detailed description in conjunction with the drawing, in which:

FIG. 1 depicts a clean diaper together with a moisture indicating strip of the invention attached thereto;

FIG. 2 illustrates the manner in which the diaper of FIG. 1 is used;

FIG. 3 illustrates the moisture indicating strip of the invention;

FIG. 4 illustrates the moisture indicating strip of the invention when a transparent sleeve is placed over the free end thereof; and

FIG. 5 illustrates the use of the moisture indicating strip of the invention with a surgical dressing.

The moisture indicating device 12 shown in FIG. 3 consists of a gauze-like strip of material 12a which is capable of supporting capillary action. One end of the strip is impregnated with a moisture responsive chemical 12b. In the case of a typical food coloring agent, without close examination the chemical is not even visible until it is wet. The other end of the strip is coated with a pressure-sensitive adhesive 12c.

In a re-usable diaper application, the end 12c of the strip is pressed against diaper 10 (FIG. 1) so that the chemical-impregnated end of the strip extends beyond the edge of the diaper. In FIG. 2, the diaper is shown

placed around a baby 14, two pins 16, 18 being used to secure the diaper. The chemical-impregnated end of the moisture indicating strip extends out of the diaper as shown in the drawing. Because the adhesive end of the strip is attached to the inside of the diaper as it is placed around the baby, and is attached to a region which gets very wet, there is a large moisture supply for the strip when the diaper is first wet. The urine is transported by capillary action along the strip to its free end, and when the chemical-impregnated end gets wet there is a sharp visible difference in the color of the free end. It should be noted that the strip extends out past the diaper in such a way that even if rubber pants are placed over the diaper, the strip extends out beyond the bottom of the rubber pants.

Although the chemical 12b which is used should be water soluble so that if the colored liquid drips on the baby or its clothes it can be washed away, any mess can be avoided in the first place by providing a transparent plastic sleeve 12d as shown in FIG. 4. This plastic sleeve, while not interfering with the capillary action and allowing the free end of the strip to be viewed, does prevent dripping from the free end. The plastic sleeve can be attached to the free end of the strip during manufacture by placing a small amount of adhesive on the free end before the transparent sleeve is placed over it.

FIG. 5 shows how a moisture indicating strip 22 can be used with a surgical dressing 20. In the case of a surgical dressing, as in the case of a disposable diaper, it is preferable to attach the strip to the dressing during manufacture. The moisture indicating strip consists of a piece of gauze 22a, one end of which is inserted between two layers of the dressing. The strip can be sewn to the dressing rather than using an adhesive. The free end of the strip is impregnated with a moisture responsive chemical 22b which serves the same function as chemical 12b of FIG. 3.

Although the invention has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the application of the principles of the invention. Numerous modifications may be made therein and other arrangements may be devised without departing from the spirit and scope of the invention.

What is claimed is:

1. A moisture indicating device for attachment to a garment such as a diaper, surgical dressing or the like comprising a strip of material having an elongated body which supports capillary action, means for securing one end portion of said strip within said garment in an area having an anticipated wet condition to be verified visually, and chemical means disposed at the other end portion of said strip, said elongated strip body being of sufficient length such that when said one end portion is secured within said garment, said other end portion extends outwardly beyond the edge of the garment and is exposed to view outside said garment, said chemical means comprising a moisture-responsive chemical impregnating said exposed end portion for presenting a visible color indication on said exposed end portion when contacted by moisture travelling by capillary action from said first end portion within the garment along the length of said strip body to said other end portion outside said garment.

2. A moisture indicating device in accordance with claim 1 wherein said securing means is a pressure-sensitive adhesive coated on said one end portion of said strip.

3. A moisture indicating device in accordance with claim 2 further including a transparent plastic sleeve around said other end portion of said strip for preventing dripping of liquids therefrom.

4. A moisture indicating device in accordance with claim 3 wherein said strip is made of a long narrow length of gauze-like material and said chemical means is impregnated therein.

5. A moisture indicating device in accordance with claim 2 wherein said strip is made of a continuous length of gauze-like material and said chemical means is impregnated therein.

6. A moisture indicating device in accordance with claim 1 further including a transparent plastic sleeve around said other end portion of said strip for preventing dripping of liquids therefrom.

7. A moisture indicating device in accordance with claim 6 wherein said strip is made of a continuous length of gauze-like material and said chemical means is a substantially colorless water-soluble agent which will provide a color stain when wet.

8. A garment having a moisture indicating device attached thereto, said moisture indicating device comprising an elongated strip of material which supports capillary action and having one of its ends attached within said garment at a part thereof which it is anticipated will become internally wet, and chemical means disposed at the other end of said strip for changing color when moisture in said garment is transported thereto along the length of said strip by capillary action, the length of said strip being sufficient to locate said other end thereof with said chemical means externally of said garment in an exposed position in which color changes in said chemical means are visible from outside said garment.

9. A garment in accordance with claim 8 further including a transparent plastic sleeve around said other end of said strip for preventing dripping of liquids therefrom.

10. A garment in accordance with claim 9 wherein said strip is made of gauze-like material and said chemical means is impregnated therein.

11. A garment in accordance with claim 10 wherein said garment is a baby diaper.

12. A garment in accordance with claim 10 wherein said garment is a surgical dressing.

13. A garment in accordance with claim 9 wherein said garment is a baby diaper.

14. A garment in accordance with claim 9 wherein said garment is a surgical dressing.

15. A garment in accordance with claim 9 wherein said garment is a baby diaper.

16. A garment in accordance with claim 8 wherein said garment is a surgical dressing.

17. A garment in accordance with claim 8 wherein said strip is made of gauze-like material and said chemical means is impregnated therein.

18. A garment in accordance with claim 17 wherein said garment is a baby diaper.

19. A garment in accordance with claim 17 wherein said garment is a surgical dressing.