

DISPOSABLE DIAPERS

5 The invention relates to disposable diapers for use
by infants, adults or incontinent persons and is
concerned with such diapers of so-called shorts type.

10 In general, shorts type disposable diapers comprise,
as discussed in Japanese Early Laid-Open Patent
Publication No. Sho 61-207605, an elongate main body
including a liquid permeable topsheet, a liquid
impermeable backsheet and an absorbent member interposed
between them. The rear and front waist portions of the
diaper are connected and fixed together by a pair of
flaps on the left and right sides, which are formed along
15 both longitudinal sides of the main body, in order to
form left and right leg openings and a waist opening.

20 In such shorts type diapers, the areas surrounding
the pair of leg opening portions and the waist opening
portion are generally expansible in order to facilitate
the fit to the shape of the wearer's body. Usually, the
wearer can put the diaper on a standing attitude without
requiring the help of other persons. Shorts type diapers
are thus generally used as an aid to train an infant to
use no diaper at all or by incontinent persons or adults
25 who have the ability to walk.

30 A hydrophilic topsheet is located at the inner
surface of the waist portion in such diapers and the
surface which contacts the wearer's body is thus
hydrophilic.

 However, this conventional shorts type diaper has
the disadvantage that since the inner surface of the
waist portion is of hydrophilic material, leakage of
waste materials is likely to occur from the waist portion
while the diaper is being worn.

In order to prevent such leakage, the application of a water repellent treatment to the inner surface of the waist portion or the provision of a separate water repellent portion can be contemplated. However, it is in practice difficult to provide a water repellent portion on conventional shorts type diapers because the structure becomes too complicated or for other reasons.

It is therefore an object of the present invention to provide a shorts type disposable diaper which is of simple construction and which is readily capable of preventing leakage of waste materials from the waist portion.

According to the present invention a disposable diaper of shorts type, which has a front waist portion, a rear waist portion, a crotch portion, a waist opening and two leg openings, comprises a liquid permeable topsheet, a liquid impermeable backsheet and an absorbent member interposed between them, elastic expansible members extending around the waist and leg openings and forming gathers around the said openings and the backsheet having a portion which is folded back into the waist opening and overlies a portion of the top sheet and a portion of the absorbent member of the front or rear waist portion, the backsheet comprising a compound layer of a water repellent fibre aggregate layer and a resin film sheet, the water repellent fibre aggregate layer being located on the side opposite to the topsheet. In the preferred embodiment, the backsheet has two portions which are folded back into the waist opening and overlie a portion of the topsheet and a portion of the absorbent member of the front and rear portion, respectively.

Thus in the shorts type disposable diaper in accordance with the present invention, the waste materials which are discharged by the user are absorbed

by the absorbent member through the topsheet, in the usual manner. The absorbent waste materials gradually propagate or diffuse through the topsheet and absorbent member and have a tendency to leak out through the waist opening. However, the inner surface of the waist opening is afforded by a folded over portion of the impermeable backsheet on one and preferably both of the front and rear waist portions so as to cover and enclose the associated end of the absorbent member. The or each folded over portion thus acts as a liquid trap and prevents leakage of waste material out of the top of the diaper. Even if waste materials do diffuse through the absorbent member and the topsheet, leakage is prevented by the or each folded over portion due to its generally bag-like construction.

Further features and details of the invention will be apparent from the following description of certain specific embodiments which is given by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a first embodiment of disposable diaper in accordance with the present invention;

Figure 2 is a plan view showing the diaper of Figure 1 in the flat state;

Figure 3 is a sectional view of the diaper of Figure 2 on the line X-Y in Figure 2; and

Figures 4 and 5 are sectional views similar to Figure 3 of further embodiments.

Referring firstly to Figures 1 to 3, the shorts type disposable diaper 1 comprises a liquid permeable topsheet 2, a liquid impermeable backsheet 3 and an absorbent member 4 interposed between them. Elastic expansible members are provided along the front and rear waist portions 5a, 5b and around each leg opening portion 6, 7,

which are located at positions beyond the absorbent member 4, to form gathers around the waist and leg openings. The front and rear waist portions 5a, 5b are connected and fixed together at both ends, i.e. down the two sides of the diaper, by any convenient means. The improvement of the present invention resides in that the impermeable backsheet 3 includes a portion 3a at at least one end, and in this case at both ends which is folded back over the associated one of the front and rear waist portions 5a, 5b and overlies the surface of the topsheet 2 above a portion of the absorbent member 4. Furthermore, the backsheet comprises a compound layer of a water repellent fibre aggregate layer and a resin film sheet, the water repellent fibre aggregate layer being located on the side opposite to the topsheet. The layer of fibre aggregate, which is a non-woven fabric formed of water repellent fibres, need not extend over the entire area of the backsheet but it should extend over at least the folded back portions 3a of the backsheet. As a result the backsheet 3 has a feel which is soft and comfortable to the skin because only the folded-back portions 3a of the backsheet engage the skin of the wearer. In this embodiment, the backsheet 3 is a compound sheet formed of the above-mentioned fibre aggregate layer 20 and a resin film sheet 10 attached thereto over its entire area by an adhesive agent 12.

The topsheet 2 is formed of a liquid permeable material and is able to conduct waste materials to the absorbent member 4 and has a feel which is soft and comfortable to the skin. Examples of suitable materials for the liquid permeable sheet include a woven fabric, a nonwoven fabric and a perforated film.

The resin film sheet forming part of the backsheet 3 is a liquid impermeable and vapour permeable resin film

sheet 10 which is formed by adding a filler to a thermoplastic resin and then stretching it.

The longitudinal dimension of the backsheet 3 is thus longer than that of the topsheet 2. In other words, each folded-back portion 3a extends from the associated end of the topsheet 2 to a position where it overlies a portion of the absorbent member 4. The length of the absorbent member 4 which is overlapped by each folded-back portion 3a is 10mm to 80mm, and preferably 30mm to 50mm. If the dimension S is less than 10mm, the anti-leakage properties imparted to the diaper are not sufficient. On the other hand, if the dimension S is greater than 80mm, the absorptivity of the absorbent member is unacceptably reduced. The length L of each folded-back portion 3a is 20mm to 80mm, and preferably 30mm to 80mm, when the disposable diaper is for use by an infant.

Due to the fact that each end portion (folded-back portion) 3a of the backsheet 3 is folded back over the topsheet 2 and connected to it and has a length such that it overlies the associated end portion of the absorbent member 4, a portion of the water repellent backsheet 3 constitutes the inner surface of the waist portion, thereby forming a bag-like water repellent portion at the inner surface of the waist portion. Each folded-back portion 3a is connected to the topsheet 2 at both ends, that is to say at its right and left hand ends as seen in Figure 2.

The absorbent member 4 is preferably of hour glass configuration which, in use, is bent through approaching 180°, generally at its centre. The absorbent member 4 is preferably formed predominantly of an open cell pulp and also to a minor extent of a high molecular weight water absorbent polymer. The high molecular weight water

absorbent polymer may be located in the upper layer, intermediate layer or lower layer of the absorbent member. The high molecular weight water absorbent polymer may be mixed with a pulp. The high molecular weight water absorbent polymer is preferably in granular form with the ability to be gelled and to absorb and retain more than twenty times its own weight of liquid. Preferred examples of high molecular weight water absorbent polymer are a saponified material of a starch-acrylic (salt) graft copolymer, a bridged material of sodium carboxymethylcellulose, acrylic (salt) polymer and the like.

The elastic expansible members 8 which are stretched around the waist portions 5a, 5b and the leg portions 6, 7, have an expansibility of 200% or more, and are in a form of a plurality of yarns or strips formed of a natural rubber, synthetic rubber, urethane foam or the like and are continuously connected to the topsheet 2 and the backsheet 3.

In the manufacture of the illustrated diaper, the backsheet 3 is folded back at each end in the direction of the length of the topsheet 2. After the portions 3a have been folded back against the upper surface of the topsheet 2, they are connected to the topsheet 2, e.g. by adhesive, heat welding or the like.

When the diaper 1 is in the flat, semi-finished state shown in Figure 2, the associated side edges of the waist portions 5a, 5b are connected together by adhesive, heat welding or the like to make the diaper into the shorts configuration shown in Figure 1.

In use, the legs of the wearer are inserted through the waist opening and then the leg openings and the diaper is pulled up to the user's waist. Due to the fact that the inner surface of the waist portions 5a, 5b is

afforded by the water repellent folded-back portions 3a, leakage of waste materials is prevented.

The present invention is not limited to the embodiment described above but can be modified in various ways.

Thus, as shown in Figure 4, the backsheet 3 may be a compound sheet chiefly composed of the fibre aggregate layer 20, and the layer of the resin film sheet 10 is attached by an adhesive agent substantially only over the area where the absorbent member 4 is located, whereby there is no resin film sheet 10 in the folded-back portions 3a.

In the further alternative shown in Figure 5, the backsheet 3 is designed such that only the resin film sheet 10 is provided over the area where the absorbent member 4 is located and the fibre aggregate 20 is secured to the ends thereof by an adhesive agent 12 and constitutes the folded-back portions 3a.



CLAIMS

1. A disposable diaper of shorts type having a front waist portion, a rear waist portion, a crotch portion, a waist opening and two leg openings, the diaper comprising a liquid permeable topsheet, a liquid impermeable backsheet and an absorbent member interposed between them, elastic expansible members extending around the waist and leg openings and forming gathers around the said openings and the backsheet having a portion which is folded back into the waist opening and overlies a portion of the topsheet and a portion of the absorbent member of the front or rear waist portion, the backsheet comprising a compound layer of a water repellent fibre aggregate layer and a resin film sheet, the water repellent fibre aggregate layer being located on the side opposite to the topsheet.

2. A diaper as claimed in Claim 1 in which the backsheet has two portions which are folded back into the waist opening and overlies a portion of the top sheet and a portion of the absorbent member of the front and rear waist portions, respectively.

3. A diaper as claimed in Claim 2 in which the or each folded-back portion of the backsheet comprises only the water repellent fibre aggregate layer.

4. A diaper as claimed in any one of Claims 1 to 3 in which the or each folded-back portion of the backsheet overlies the absorbent member by a distance of between 10 and 80 mm.

5. A diaper as claimed in any one of Claims 1 to



3 in which the or each folded-back portion of the backsheet overlies the absorbent member by a distance of between 30 and 50 mm.

- 5 6. A disposable diaper of shorts type substantially as specifically herein described with reference to Figures 1 to 3, optionally as modified by Figure 4 to 5, of the accompanying drawings.