

**(12) PATENT**  
**(19) AUSTRALIAN PATENT OFFICE**

**(11) Application No. AU 199539133 B2**  
**(10) Patent No. 703302**

(54) Title  
Disposable diaper

(51)<sup>6</sup> International Patent Classification(s)  
A61F 013/56

(21) Application No: 199539133 (22) Application Date: 1995 .11 .30

(30) Priority Data

(31) Number (32) Date (33) Country  
6-301036 1994 .12 .05 JP

(43) Publication Date : 1996 .06 .13  
(43) Publication Journal Date : 1996 .06 .13  
(44) Accepted Journal Date : 1999 .03 .25

(71) Applicant(s)  
Uni-Charm Corporation

(72) Inventor(s)  
Takamitsu Igaue; Kouji Inoue; Tsutomu Kido

(74) Agent/Attorney  
PHILLIPS ORMONDE and FITZPATRICK,367 Collins Street,MELBOURNE VIC 3000



AU9539133

**(12) PATENT ABSTRACT (11) Document No. AU-A-39133/95**  
**(19) AUSTRALIAN PATENT OFFICE**

(54) Title  
**DISPOSABLE DIAPER**

International Patent Classification(s)  
(51)<sup>s</sup> **A61F 013/56**

(21) Application No. : **39133/95** (22) Application Date : **30.11.95**

(30) Priority Data

(31) Number (32) Date (33) Country  
**6-301036 05.12.94 JP JAPAN**

(43) Publication Date : **13.06.96**

(71) Applicant(s)  
**UNI-CHARM CORPORATION**

(72) Inventor(s)  
**TAKAMITSU IGAUE; KOUJI INOUE; TSUTOMU KIDO**

(74) Attorney or Agent  
**PHILLIPS ORMONDE & FITZPATRICK , 367 Collins Street, MELBOURNE VIC 3000**

(57)

A disposable diaper (1) having a first waist portion (11) and a second waist portion (12), wherein at least one of said first and second waist portions (11,12) is provided with an elastic member (13,14), and an elongation ratio of said elastic member (13,14) is adjusted to be gradually decreased from a transversely middle zone (17,18) toward transversely opposite side edges of said waist portion (11,12).

**CLAIM**

1. A disposable diaper including: a front section having a first waist portion; a rear section having a second waist portion; a crotch section having a pair of leg surrounding portions at lateral opposite sides thereof; an elastic member is provided along the leg surrounding portions and at least one of the first and second waist portions, respectively, and an elongation ratio of the waist portion along which the elastic member is provided being adjusted to be gradually decreased from a transversely middle zone to opposite side edges of the waist portion.

ABSTRACT

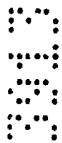
A disposable diaper (1) having a first waist portion (11) and a second waist portion (12), wherein at least one of said first and second waist portions (11,12) is provided with an elastic member (13,14), and an elongation ratio of said elastic member (13,14) is adjusted to be gradually decreased from a transversely middle zone (17,18) toward transversely opposite side edges of said waist portion (11,12).

5

10

15

20



25



30



35

40



## DISPOSABLE DIAPER

The present invention relates to a disposable diaper and, more particularly, to a disposable diaper for the absorption and containment of urine and other bodily exudates.

Conventional disposable diapers of open type or pants type are provided with tensioned elastic members substantially along the entire circumferences of the waist-hole and leg holes. This provides an improvement in the fit of the diaper to the infant's body, thereby preventing leakage of bodily exudates. These elastic members contract to form gathers around the waist-hole and around the leg-holes.

However, these known diapers have proven less than satisfactory. In this respect, when the open type diaper is put on the infant lying face up, it is difficult to seize waist side edges of a rear section of the diaper. This is because the rear section of the diaper tends to tightly contract to form gathers, thereby hiding under the infant's back. Therefore, the diaper is unable to be put on the infant rapidly. Also, the pants type diaper has been inconvenient from the point of view that both its waist-hole and its leg-holes tightly contract to form gathers, making it difficult to rapidly distinguish the waist-hole from the leg-holes.

In view of the problems of the prior art, it would be desirable to vary the elongation ratio of an elastic member attached to a waist portion of at least one of the front and the rear sections of the diaper.

According to the present invention, there is provided a disposable diaper including:

a front section having a first waist portion, and a rear section having a second waist portion, and each of the said waist portions having longitudinal ends;

a crotch section disposed intermediate the waist portions and having a pair of leg surrounding portions at laterally opposite sides thereof, with an elastic member extending along each of the respective leg surrounding portions; and

an elastic member extending along at least one of the first and second waist portions, wherein the elastic member extending along at least one of the

first and second waist portions has an elongation ratio that decreases between a middle zone and the longitudinal ends of the respective waist portion.

With the disposable diaper described above, gathers formed along the waist portion are concentrated in the middle zone and gradually decreased  
5 toward the transversely opposite sides of the waist portion.

A disposable diaper according to the invention will be better understood from the following description made with reference with the accompanying drawings, which illustrate an embodiment of the invention.

Fig. 1 is a perspective view showing a disposable diaper in its extended  
10 state as partially broken away; and

Fig. 2 is a perspective view showing the same in its unaffected state.

Referring to Figs. 1 and 2, a disposable diaper 1 of the open type includes a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed between the sheets 2 and 3. The diaper is  
15 longitudinally divided into a front section 6, a rear section 7, and a crotch section 8 interposed between sections 6 and 7. Waist portions 11, 12 of the front and rear sections 6, 7 are provided in the transverse direction with elastic members 13 and 14 respectively. A pair of leg surrounding portions 21, 22 are provided with elastic members 15 and 16 respectively. Well known tape  
20 fasteners 17 are attached to transversely opposite sides of the rear section 7.

The elastic members 13, 14 of the waist portions 11, 12 include a desired number of elastic elements and each of them is bonded in tension to an inner surface of the top or backsheet 2, 3. One of the elastic members 13, 14 has an elongation ratio of 1.5 to 2.5 in a transversely middle zone 17 or 18 of the  
25 diaper 1 but, in zones 19, 20 on either side of the middle zone 17 or 18, the elongation ratio gradually decreases to approximately 1.0 closely adjacent its transversely opposite sides. The middle zone 17 or 18 may occupy 1/5 to 1/2 of the full length of the elastic elements. When the elongation of the elastic member 13 or 14 is not adjusted to be higher in its middle zone 17 or 18, then  
30 preferably the elongation ratio of the elastic member 13 or 14 is substantially uniform over its full length. It should be understood that, when the elongation ratio is made uniform, the elastic member 13 on the front section should be altered in order to avoid the possibility that the wearer's belly might be locally compressed.

The elastic members 15, 16 for the leg surrounding portions 21, 22 also include a desired number of elastic elements each bonded in tension to the inner surface of the top or backsheet 2, 3 substantially along the leg surrounding portions 21, 22.

5           When diaper 1 is in its unaffected state, the waist portions 11, 12 contract mainly in the middle zones 17, 18 to form a plurality of fine gathers but, in the zones 19, 20 on either side thereof, the gathers are formed very sparsely, as shown by Fig. 2. Around the leg surrounding portions 21, 22, on the other hand, gathers are formed uniformly. When the diaper 1 is placed against the  
10           hips of the infant lying face up, the side zones 19, 20 can be reliably as well as rapidly seized to put the diaper 1 on the infant's body. This is because zones 19, 20 are free from significant contraction and are maintained in a flat state. When the invention is applied to the pants type diaper, many gathers are formed in the transversely middle zone of the waist portions but, in the side  
15           edge zones, the formation of gathers is very sparse. Thus, the waist portion can be easily distinguished from the leg surrounding portions which have an even spread of gathers.

          In the diaper 1 of the invention, materials usually employed in the relevant technical field may be employed for the top and backsheets 2, 3 and  
20           the liquid-absorbent core 4 and the elastic members 13, 14, 15, 16. Bonding of the respective members may be achieved by using a suitable adhesive agent such as hot melt adhesive or by using a heat sealing technique.

          With the inventive diaper, the formation of gathers can be concentrated in the transversely middle zone along the waist line. The zones on either side of  
25           this middle zone can be maintained in a substantially flat state by making the formation of gathers extremely sparse. This is achieved by having the elongation ratio of the elastic members extending along the waist lines of the front and rear sections adjusted to the maximum in the transversely middle zone and gradually decreased toward the transversely opposite side edges of  
30           the diaper. In the case of open type diaper, the lateral zones can be reliably as well as rapidly seized so that the diaper may be easily put on the infant's body. In the case of pants type diaper, the waist portions can be readily distinguished from the leg surrounding portions. This enables the pants type diaper to be easily placed on the infant's body.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

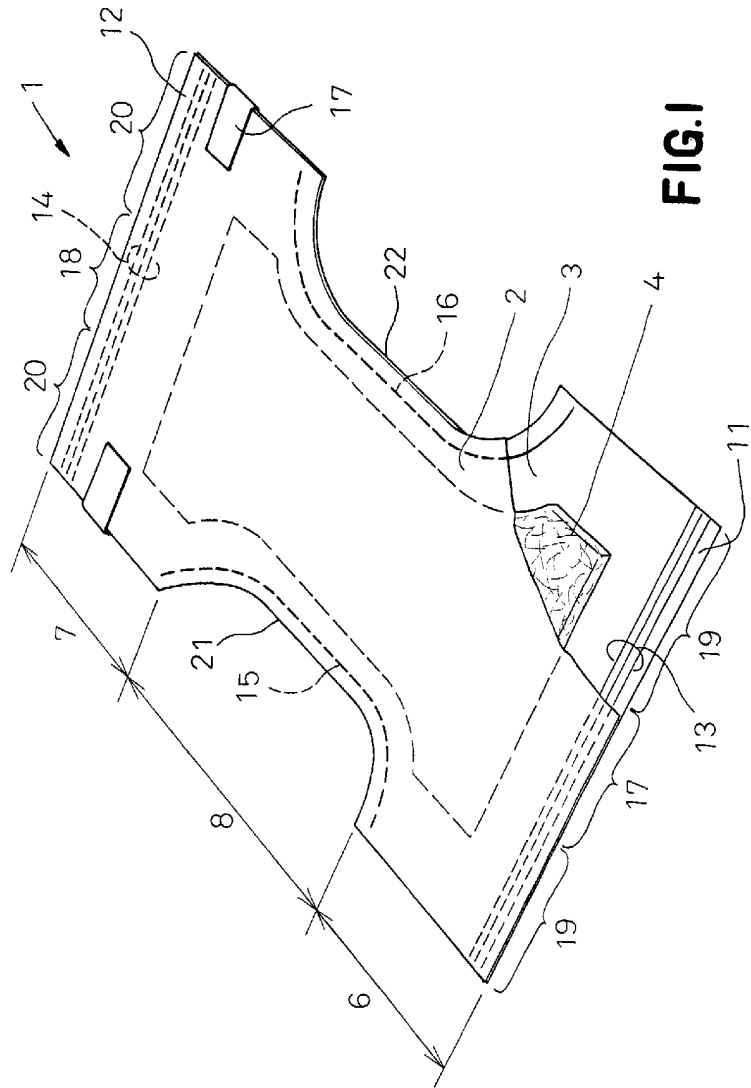
1. a disposable diaper including:  
a front section having a first waist portion, and a rear section having a second waist portion, and each of the said waist portions having longitudinal ends;  
5 a crotch section disposed intermediate the waist portions and having a pair of leg surrounding portions at laterally opposite sides thereof, with an elastic member extending along each of the respective leg surrounding portions; and  
10 an elastic member extending along at least one of the first and second waist portions, wherein the elastic member extending along at least one of the first and second waist portions has an elongation ratio that decreases between a middle zone and the longitudinal ends of the respective waist portion.
2. A disposable diaper according to claim 1, wherein said diaper includes a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between the topsheet and the backsheet.
3. A disposable diaper substantially as herein described with reference to the accompanying drawings.

20 DATED: 15 January 1999

PHILLIPS ORMONDE & FITZPATRICK

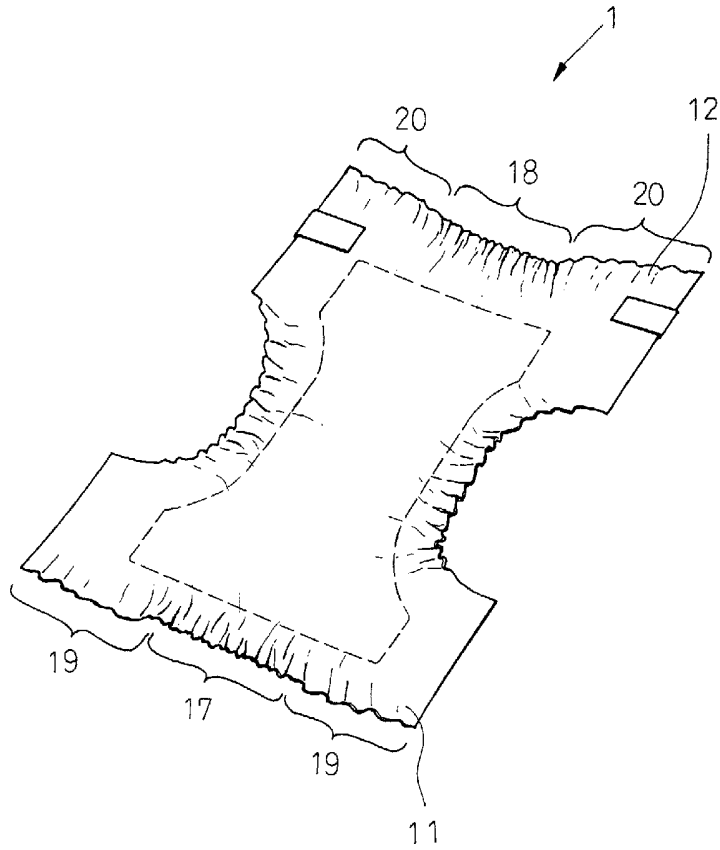
Attorneys for:

25 UNI-CHARM CORPORATION



**FIG. 1**

39133/95



**FIG.2**