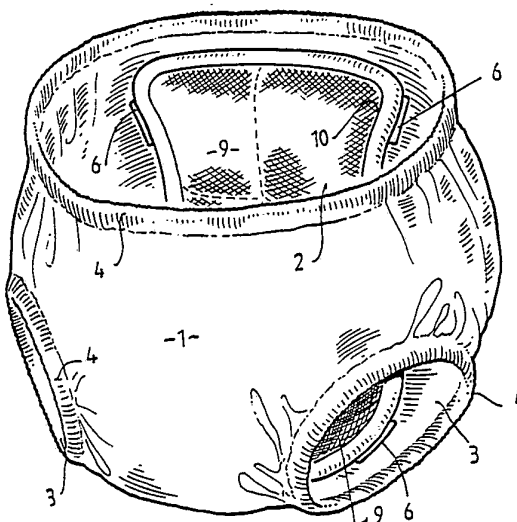




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>5</sup> : <b>A61F 13/46, 13/72</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 90/08524</b> (43) International Publication Date: 9 August 1990 (09.08.90)</p>
<p>(21) International Application Number: PCT/AU90/00038 (22) International Filing Date: 5 February 1990 (05.02.90) (30) Priority data: PJ 2579 6 February 1989 (06.02.89) AU (71)(72) Applicant and Inventor: TWIKLER, Megan [AU/AU]; Lot 10, King Street, Flinders, VIC 3929 (AU). (74) Agent: CHRISTIANSEN, John; Smith Shelston Beadle, 207 Riversdale Road, P.O. Box 410, Hawthorn, VIC 3122 (AU). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI pa- tent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OA- PI patent), GB, GB (European patent), HU, IT (Euro- pean patent), JP, KP, KR, LK, LU, LU (European pa- tent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p>		<p><b>Published</b> <i>With international search report.</i> <i>With amended claims.</i></p>

(54) Title: DISPOSABLE ABSORBENT PAD WITH UNDERGARMENT



## (57) Abstract

A highly absorbent disposable insert adapted for incorporation with a standard or waterproof undergarment comprising a compact pad having a super absorbent material (7) which may be backed by a waterproof layer (8) and may incorporate self adhesive tabs (6) for attachment to said standard undergarment (1).

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**Disposable Absorbent Pad with Undergarment**

This invention relates to a disposable highly absorbent and waterproof insert for attachment to a standard undergarment.

This invention also relates to a disposable highly absorbent and waterproof garment.

The problems of bed wetting, infant toilet training and related bladder management difficulties is generally dealt with by one form or another of absorbent and waterproof nappy, diaper or incontinent like garment.

The need for infant toilet training and the corresponding problems are well understood by any parent, and the marketplace has seen the emergence of a wide range of products to deal with these problems.

The development and regular production of disposable diapers began in about 1965 with a multitude of paper manufacturers entering into the market. The original product was a very bulky item based on a paper pulp passive absorbent. The production involved three basic steps. The first step was the pulverization of fluff or pulp as the passive absorbent material, which was covered with crepe material or tissue paper. The second step involved covering of the absorbent with both tissue paper and waterproof paper. The third step involved a final layer of rayon paper or non-woven fabric.

A further development followed where a thin polyethylene film was added to the outside in order to eliminate the need for a diaper cover.

Disposable diapers therefore began to appear as a viable alternative to reusable products and consisted of a fairly common design using three materials:-

- 1) facing
- 2) absorbent material
- 3) liquid-proofing material

For the facing material, non-woven fabrics were used, due to their air permeability, soft touch and high wet strength. Polyester and polypropylene are the most common types of facing material in use.

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For absorbent materials, pulverized (fluff) pulp and creped tissue paper were used due to their softness, high speed of absorbency and high liquid retention capacity. For liquid proofing material polyethylene were commonly used.

A more recent development around 1980 saw the development of "super absorbents" and their application to disposable diapers by Schikedanz and Beghin-Say in Western Europe. In 1982 Uni-Charm was the first Japanese manufacturer to use a super absorbent as well as a spun-lace coverstock. The combination proved to be very successful and consequently the use of super absorbents has effectively displaced much of the initial production of disposable diapers.

The effect of super absorbents is to allow a reduction in bulk of the absorbent material and hence the product itself, but consumer demand has not utilized the full benefit of such an advantage to date. Unlike sanitary napkin purchases, diaper users are not diaper purchasers. Parents traditionally associate high bulk with high absorbency and are less concerned with the wearing comfort of the baby than with the perceived holding capacity of the product.

The super-absorbents provide a much higher urine capacity than conventional cellulose absorbents alone. Diapers of lower bulk and/or high capacity can be constructed. The concentrated capacity of super-absorbents allow changes in the location of absorbed fluid in the diaper.

As with sanitary napkins, many diaper failures occur due to leakage before full absorbent capacity is utilized. Fluff pulp diapers can absorb large quantities rapidly, but can release the fluid under pressure. Super-absorbents have a much higher retention characteristic. Diapers with super-absorbents will retain a much higher percentage of the absorbed urine than a non super-absorbent diaper. Leakage due to external pressure is much reduced.

Wicking is also a problem in diaper performance. Urine wicks relatively easily. However, in a diaper large

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quantities of urine have to be absorbed in a very short period of time to prevent leakage. The better performing super-absorbents need to have fast rates of absorption, high capacity and resistance to gel blocking.

To date, the products available have not fully utilized the super-absorbents and have taken the form of an assemblable absorbent pad designed to wrap around the infants crotch and fasten at either side around the legs. This garment is typically known as a nappy and suffers from numerous drawbacks. Principally, a nappy is difficult to both fit to and remove from an infant who is half asleep, ill or otherwise unco-operative, unless they are placed on the ground or a table. Furthermore, this type of garment is only suitable for an infant or very small child, children from 18 months and older are generally of a size and height that renders them difficult to lay down so as to apply or remove a nappy, particularly if they are unco-operative.

A child of over 2 years old is not well catered for by a conventional nappy and hence, an older child experiencing either bed wetting or other bladder control problems, necessitating the use of a waterproof garment or accessory suffers a number of inconveniences, for example:

a) the nappy is usually not the correct size to accommodate a child over 2 years old.

b) a child over 2 years old will generally be aware of their older siblings and friends outgrowing nappies and be reluctant to continue wearing the garment.

Other forms of nappy exist whereby the absorbent pad is separated from the waterproof body and requires assembly prior to placement on the infant. Such a garment has similar drawbacks to the conventional nappy.

Another form of absorbent garment are incontinent products used as an accessory to conventional adult clothing consisting of a pad of absorbent material designed to be worn underneath conventional underclothing. However, this type of accessory is not ideally suited to young children as it is cumbersome to fit and remove and is generally not compatible with young children's clothes.

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Disposable pants and briefs are also available but these do not have any absorbency or waterproofing to facilitate use with a child.

One object of the present invention is to provide a waterproof and highly absorbent compact pad for attachment to the inside of a conventional undergarment.

Accordingly, the invention provides a disposable undergarment insert comprising:

- a) a highly absorbent and waterproof pad for attachment to the inside of a conventional undergarment,
- b) securing means to attach said pad to said undergarment.

The insert may be secured to the garment by a self-adhesive strip or multiple strips or by way of tie on tabs or fittings.

Preferably the pad comprises a layer of absorbent material backed by a layer of waterproof material whereby the securing means are attached to the waterproof layer.

Preferably the absorbent material comprises a super-absorbent applied to a layer of pulverized pulp.

Preferably the pad further comprises a facing layer to provide an interface between the absorbent layer and the wearer's skin.

Preferably the facing material is polypropylene.

Preferably the waterproof layer is polyethylene film.

A further object of the present invention is to provide a self-contained waterproof highly absorbent garment designed to be disposable after use.

Accordingly, the invention further provides a waterproof highly absorbent undergarment comprising:

- a) a waterproof undergarments having means for snugly fitting around the upper thighs and waist of wearer, and
- b) a highly absorbent inner pad attached to said undergarment so as to effectively render at least the crotch area of the inside of the garment absorbent.

The undergarment preferably includes an elastic band or strip around the waist and thigh regions of the garment. The absorbent inner pad is preferably attached to the inner

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surface of the garment:

Preferably the absorbent material comprises a super-absorbent applied to a layer of pulverized pulp.

Preferably the pad further comprises a facing layer to provide an interface between the absorbent layer and the wearer's skin.

Preferably the facing material is polypropylene.

Other objects, features and advantages of the present invention shall become apparent from the following description of preferred embodiments and the accompanying drawings where figures 1 and 2 show two particularly preferred shapes of the insert of the invention. Figure 3 shows a cross-section of an insert. Figure 4 shows a garment with an integral insert. Figure 5 shows a garment with a separate insert in situ.

The invention shall now be described in greater detail with particular reference to the figures which depict only one particularly preferred embodiment of the invention.

Figures 1 and 2 depict two preferred shapes of diaper insert designed for placement inside a conventional pair of undergarments as worn by a young child of two to six years of age. When viewed in conjunction with figure 3, the structure of the insert is evident.

Figure 3 shows a cross-section of the insert where the waterproof backing 8 provides the basis for the insert and also a point of anchorage for the fastening means 6. The backing material may be any waterproof material but preferably a lightweight polymer-like material for example polyethylene film which serves to resist the passage of fluid to the undergarment and also provide a locating point for the fastening means 6 which may be tabs, buttons, "Velcro" (registered trade mark), type fastening means or preferably a self adhesive tab for quick and simple attachment and removal. Laminated or attached to the waterproof backing layer 8 is the absorbent material 7 which consists of a highly absorbent material like fluff pulp but preferably combines the use of super-absorbents, for example "Enkas Aquacell" (registered trade mark) starch grafts and

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acrylates. The starch graft made by Sanyo and Grain Processing combine good wicking with high capacity and retention. The acrylates from Stockhansen, Sectetsu Kagaku and Dow Chemcial in sheet form combine rapid rates of absorption with high capacity and good wicking. More preferably still the fluff pulp is eliminated altogether with the use of just super-absorbent material to reduce the bulk of the insert to a minimum.

Figure 4 shows a garment 1 utilizing the absorbent material of the invention but in a permanent attachment to the undergarment. Such a disposable diaper uses only highly absorbent super-absorbents and greatly reduces the bulk of the diaper and hence renders a garment of similar appearance to a standard undergarment but with high absorbancy and therefore suitable for use by a young child of 2 to 6 years.

The garment is a one-piece bonded and elastisized disposable and waterproof undergarment where the body of the garment is a waterproof outer layer having an absorbent inner layer 5 welded thereto; wherein a waist region 2 and leg regions 3 are incorporated and delineated by elastic means 4.

Figure 5 shows the insert of the invention in situ in a standard undergarment 1.

The resultant insert in this particular embodiment provides a re-usable but ultimately disposable garment for children ranging in size from about 2 years to 6 years.

It can be seen from the foregoing description and preferred embodiment, that the garment and insert of the instant invention provide a bridge between the available nappy garment or diapers and conventional clothing which, in the instance of a child with bladder-control problems, provides a garment of similar appearance to conventional clothing along with the facilities of a nappy. This ability to provide a child with clothing similar to their peers offers an enormous confidence boost to a young child while offering the parents all the conveniences of the earlier type of garment.

The garment can be seen to have distinct advantages



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over conventional garments, namely;

a) the instant garment is an undergarment and not a nappy; and

b) the undergarment has the ability to be re-used more than once.

c) the insert can be manufactured cheaply as an insert for use in conventional undergarments.

d) once the insert is soiled it can be disposed and replaced with minimum inconvenience.

The disposable nature of the garment limits the lifespan of the garment, but does allow re-use on several occasions provided it does not become wet or soiled.

To date such a purpose manufactured insert of high absorbency for specific use in conventional garments has not been available for use, particularly in the case of young children of an age of two to six years. Such a purpose made insert, would be recognized as providing a different use to that of a conventional disposable nappy and hence the social conditioning of "a nappy must be bulky to absorb more" would not prejudice the consumer and allow the insert and undergarment to enter the marketplace and provide a much needed product.

The instant invention therefore provides a much needed article for use as an alternative to disposable nappies and conventional diapers.

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CLAIMS

1. An undergarment insert comprising:
  - a) A highly absorbent and waterproof pad for attachment to the inside of a conventional undergarment,
  - b) Securing means to attach said pad to said undergarment.
2. An insert according to claim 1 wherein the pad comprises a layer of absorbent material backed by a layer of waterproof material whereby the securing means are anchored to the waterproof material.
3. An insert according to claim 2 wherein the absorbent material is unbleached.
4. An insert according to any one of claims 1 to 3 wherein the absorbent material comprises a super-absorbent as hereinbefore defined applied to a layer of pulverized pulp or tissue paper.
5. An insert according to claim 4 wherein the absorbent material is super-absorbent material alone.
6. An insert according to any one of claims 1 to 5 wherein the pad further comprises a facing layer to provide an interface between the absorbent layer and the wearer's skin.
7. An insert according to any one of claims 1 to 6 wherein the facing layer material is polypropylene film.
8. An insert according to any one of claims 1 to 7 wherein the waterproof material is polyethylene film.
9. An undergarment comprising:
  - a) a waterproof undergarment having means for snugly fitting around the upper thighs and waist of the wearer,
  - b) a highly absorbent inner pad attached to said undergarment so as to effectively render at least the crotch area of the inside of the garment absorbent.
10. An undergarment according to claim 9 including an elastic band or strip around the waist and thigh regions with the absorbent inner pad attached to the inner surface of the garment.
11. An undergarment according to claim 9 or 10 wherein the absorbent pad comprises unbleached absorbent material.
12. An undergarment according to any one of claims 9 to 11.

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wherein the absorbent material comprises a super-absorbent as hereinbefore defined applied to a layer of pulverized pulp or tissue paper.

13. An undergarment according to any one of claims 9 to 12 wherein the absorbent material is super absorbent material alone.

14. An undergarment according to any one of claims 9 to 13 wherein the absorbent pad further comprises a facing layer to provide an interface between the absorbent layer and the wearers skin.

15. An undergarment according to any one of claims 9 to 14 wherein the facing layer material is poly propylene film.

## AMENDED CLAIMS

[received by the International Bureau on 20 June 1990 (20.06.90);  
original claims 1-15 replaced by amended claims 1-17 (2 pages)]

1. An undergarment insert comprising:
  - a) A highly absorbent and waterproof pad for attachment to the inside of a conventional undergarment,
  - b) Securing means (6) to attach said pad to said undergarment (1), characterised in that the pad has a crotch region and a front and rear region wherein said crotch region is centrally disposed with respect to said front and rear regions and having sufficient transverse dimension to seal against the wearers inner thighs and wherein the said front and rear regions have greater transverse dimension than the crotch region sufficient to allow the front and rear regions to wrap around the wearer's waist.
2. An insert according to claim 1 wherein the pad comprises a layer of absorbent material (7) backed by a layer of waterproof material (8) whereby the securing means (6) are anchored to the waterproof material (8).
3. An insert according to claim 2 wherein the absorbent material (7) is unbleached.
4. An insert according to any one of claims 1 to 3 wherein the absorbent material (7) comprises a super-absorbent as hereinbefore defined applied to a layer of pulverized pulp or tissue paper.
5. An insert according to claim 4 wherein the absorbent material (7) is super-absorbent material alone.
6. An insert according to any one of claims 1 to 5 wherein the pad further comprises a facing layer (9) to provide an interface between the absorbent layer (7) and the wearer's skin.
7. An insert according to any one of claims 1 to 6 wherein the facing layer (9) material is polypropylene film.
8. An insert according to any one of claims 1 to 7 wherein the waterproof material (8) is polyethylene film.
9. An undergarment comprising:
  - a) a waterproof undergarment having means for snugly fitting around the upper thighs and waist of the wearer,
  - b) a highly absorbent inner pad attached to said undergarment so as to effectively render at least the crotch area of the inside of the garment absorbent.
10. An undergarment according to claim 9 including an elastic band or strip (4)

around the waist (2) and thigh (3) regions with the absorbent inner pad attached to the inner surface of the garment.

11. An undergarment according to claim 9 or 10 wherein the absorbent pad comprises unbleached absorbent material.

12. An undergarment according to any one of claims 9 to 11 wherein the absorbent material comprises a super-absorbent as hereinbefore defined applied to a layer of pulverized pulp or tissue paper.

13. An undergarment according to any one of claims 9 to 12 wherein the absorbent material is super absorbent material alone.

14. An undergarment according to any one of claims 9 to 13 wherein the absorbent pad further comprises a facing layer (9) to provide an interface between the absorbent layer (7) and the wearers skin.

15. An undergarment according to any one of claims 9 to 13 wherein the facing layer (9) material is poly propylene film.

16. An undergarment insert according to any one of claims 1 to 8 substantially as hereinbefore described with particular reference to figures 1, 2, 3 or 5.

17. An undergarment according to any one of claims 9 to 15 substantially as hereinbefore described with particular reference to figure 4.

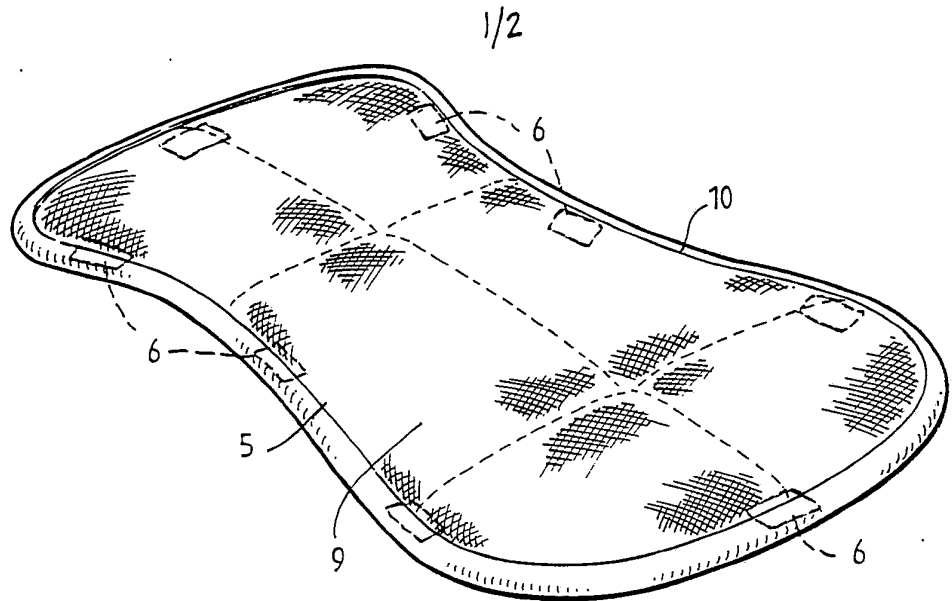


FIG. 1.

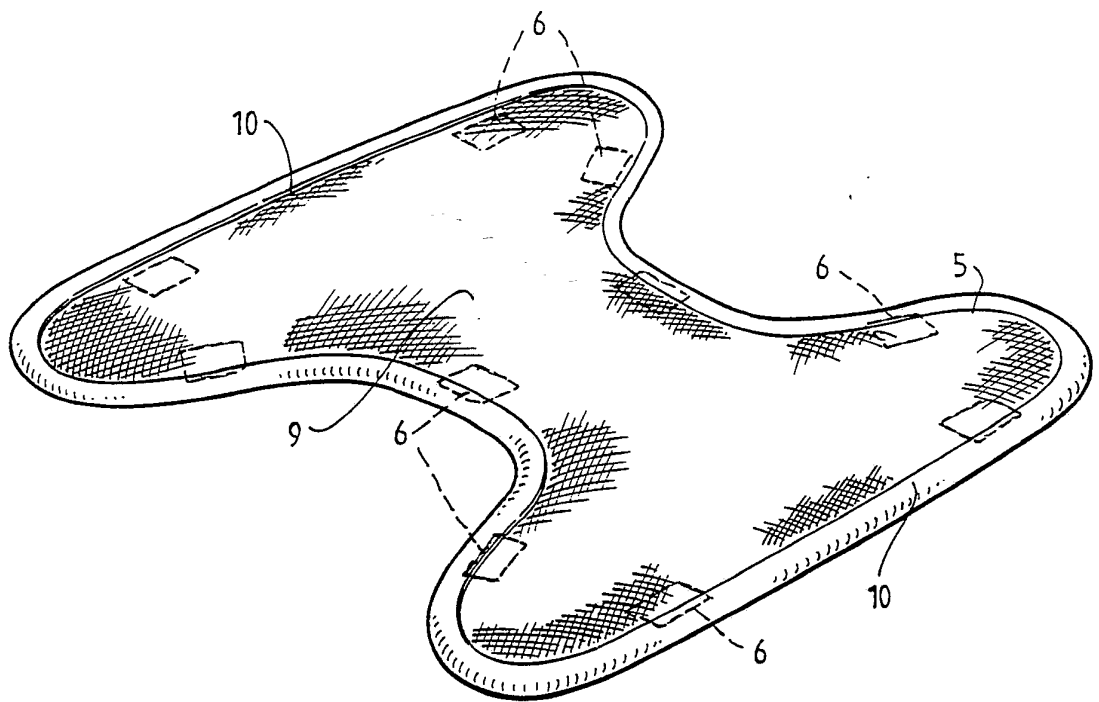


FIG. 2.

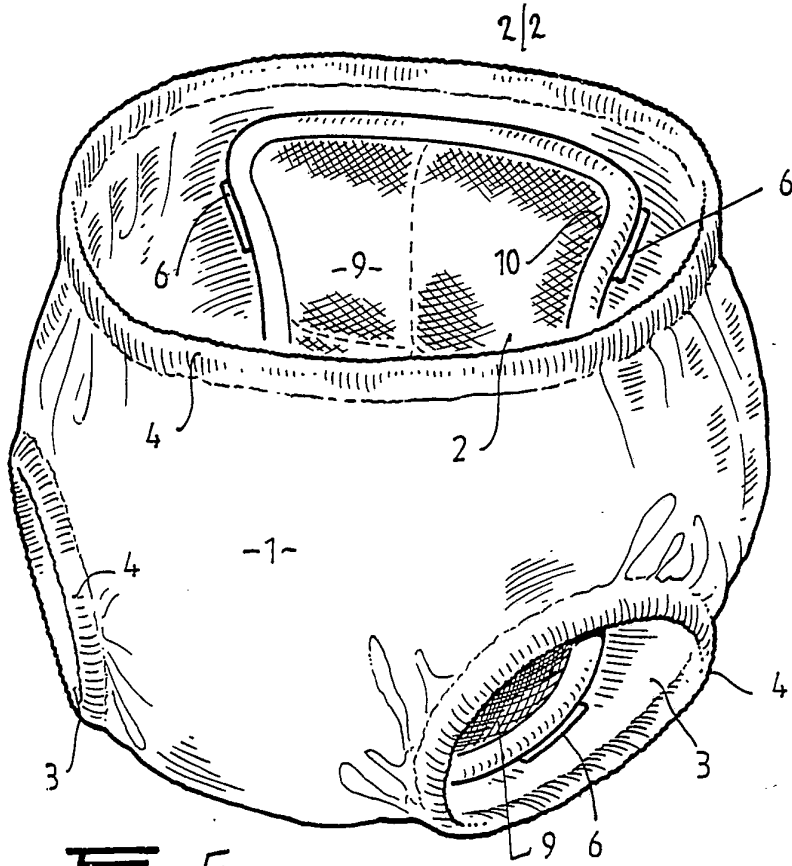


FIG. 5.

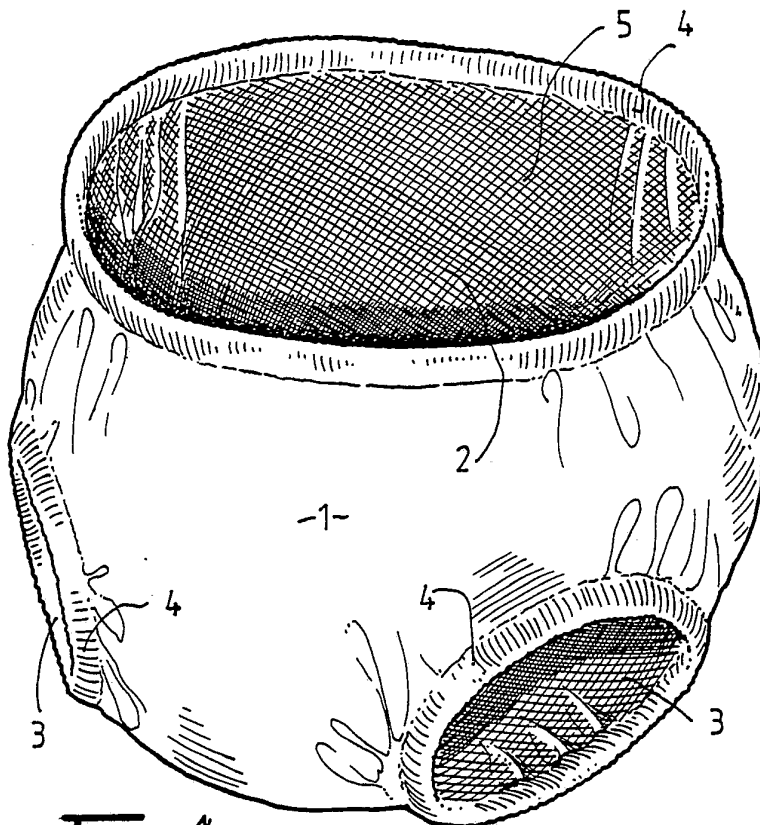


FIG. 4.

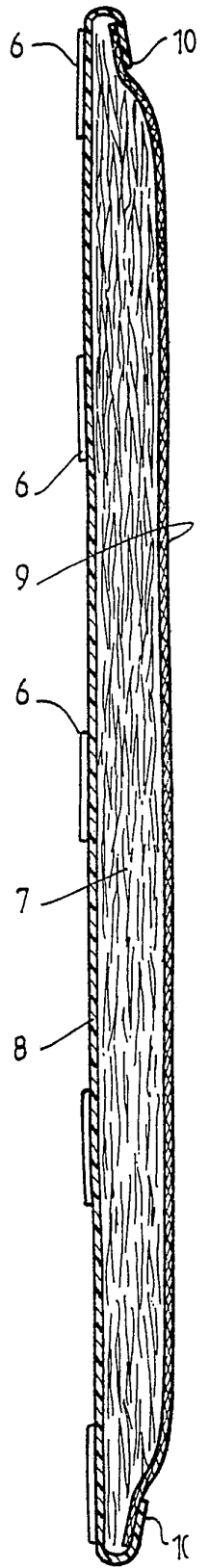


FIG. 3.

SUBSTITUTE SHEET

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00038

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. <sup>5</sup> A61F 13/46, 13/72		
II. FIELDS SEARCHED		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	A61F 13/18, 13/16	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8		
AU: IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 9		
Category*	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
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P,X P,Y	US,A, 4850992 (AMARAL et al) 25 July 1989 (25.07.89)	(1, 9-10) (12)
X	US,A, 2838047 (SIDNELL) 10 June 1958 (10.06.58)	(1, 9-10)
X	GB,A, 2159693 (KIMBERLY-CLARK CORPORATION) 11 December 1985 (11.12.85)	(1, 9-10)
(continued)		
* Special categories of cited documents: 10		
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family	
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 3 April 1990 (03.04.90)	Date of Mailing of this International Search Report 20 April 1990	
International Searching Authority  Australian Patent Office	Signature of Authorized Officer <i>Peter T. West</i> PETER T. WEST	



III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 90/00038

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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INTERNATIONAL APPLICATION NO. PCT/AU 90/00038 (CONTINUED)

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Patent Document  
Cited in Search  
Report

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END OF ANNEX