



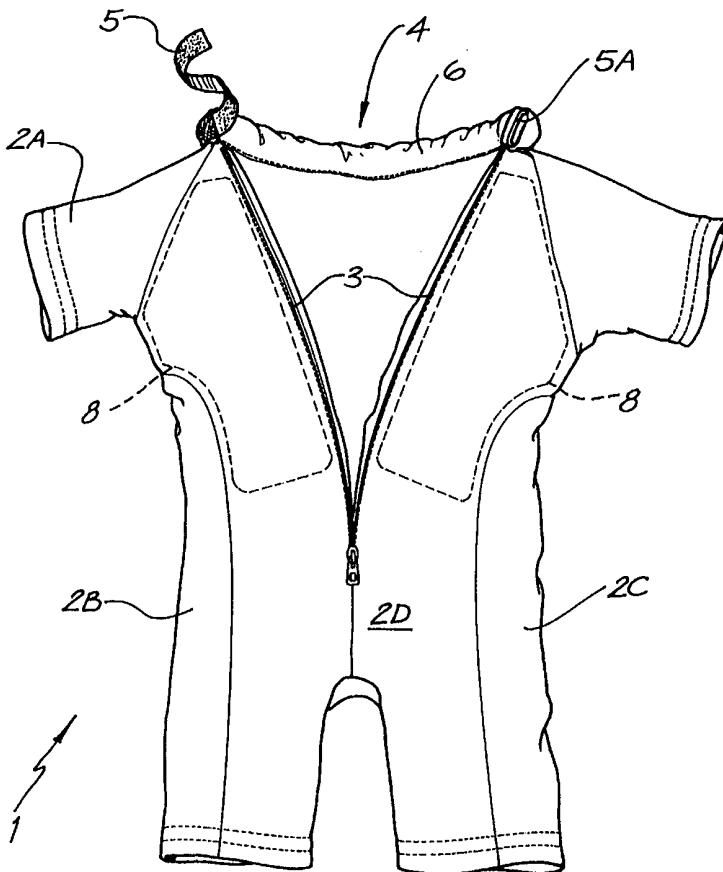
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: SWIMWEAR WITH BUOYANT NECK SUPPORT AND BODY PANELS

## (57) Abstract

A swimwear garment made of ultra-violet resistant material encloses the body of a child when fastened-up, and has a back zip (3), sleeves (2A), leg openings and a neck opening (4). The garment incorporates buoyant panels (8) at its back and a front panel (11) which are formed with crease lines (9, 10, 14, 16) enabling them to conform closely to the child's chest without obstructing its movements during swimming. A flexible soft neck roll (6) of closed-cell, buoyant, foamed plastics material encircles the child's neck and holds the chin above water.



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## SWIMWEAR WITH BUOYANT NECK SUPPORT AND BODY PANELS

Field of the Invention

THIS INVENTION relates to swimwear and is more specifically concerned with swimwear which serves three functions, namely, enhances buoyancy of a swimmer; is shaped to offer minimum obstruction to movements which the swimmer must learn in order to swim correctly; and, protects at least the central body of the swimmer from direct exposure to harmful solar radiation.

Start of the Art

10 Swimming costumes have been recently developed which cover at least the entirety of a swimmer's central body so that only the swimmer's head, arms and legs are directly exposed to harmful solar radiation. The material of the costume is chosen to provide at least some resistance to the penetration of harmful ultra-violet light. The arms and legs of the costume usually cover the upper portions of the swimmer's arms and legs. The costume itself has a neutral buoyancy and fits snugly on the swimmer. It is almost always held in place by a zip fastener extending from the swimmer's neck down to the lower back.

15 Various forms of flotation devices have also been developed to maintain a swimmer's head above water and to provide positive buoyancy. These devices may take the form of strings of buoyant beads, buoyant waist-coats, or flotation pads or blocks. attached to the outside of a garment worn by a swimmer. Although such devices prevent the wearer from sinking in the water, they do not leave the wearer's arms and

legs and head free to assume the positions and carry out the motions which are necessary in order to learn to swim.

#### Object of the Invention

An object of the invention is to provide a garment which will provide the wearer with 5 positive buoyancy and some degree of protection from solar radiation, and which will allow the wearer to carry out arm, leg and head movements necessary for swimming while allowing the wearer to assume the horizontal position in the water of a swimmer.

#### The Invention

10 In accordance with the present invention a swimwear garment designed to cover a child's body has arm, neck and leg openings to receive the child's arms, neck and legs respectively, a flexible buoyant neck support which locates beneath the child's chin and maintains it above water and, a buoyant flexible body panel or panels incorporated into the inside of the garment and surrounding the child's chest; the buoyancy of the 15 panel or panels and neck support being so selected that the child can move its arms and legs with a swimming action while the child's body can be maintained in a non-vertical position and its chin is always held above the water by the buoyant neck support beneath it.

#### Preferred Features of the Invention

20 The panels may be permanently secured by stitching them into pockets in the inside of the garment. The pockets may be permanently closed or designed with a closable opening to enable the panel or panels to be slid into their respective pockets and then retained in position.

The panels are so shaped that they do not materially interrupt the smooth external outline of the garment on the body of the wearer.

Preferably, the panels are made from soft, non-interlinked closed cellular foam, and each panel may be creased to provide it with a hinge line about which portions of the 5 panel can bend with respect to one another. The crease lines are positioned to coincide with those regions of the body about which other regions of the body move. The stiffness of the panels does not then impede the wearer from performing arm movements associated with swimming.

Suitably the panels cover the upper portions only of the back and front of the wearer 10 and do not extend down beyond the wearer's waist.

The swimwear is preferably made from material which provides a degree of protection against ultra violet light. One such material is Nylon Elastane (trade mark).

In the preferred arrangement a soft neck roll of flexible foamed plastics material is provided to encircle the swimmer's neck and which is positioned at the upper end of a 15 zip fastened extending down the back of the garment to the position of the wearer's waist.

#### Introduction to the Drawings

The invention will now be described in more detail, by way of example, with reference to the accompanying diagrammatic drawings, in which:-

In the Drawings

FIGURE 1 - is a back view of swimwear with a rear-opening closable by a zip;

FIGURE 2 - is a front view of the swimwear of figure 1;

5 FIGURE 3 - shows two buoyant foamed plastics panels which are respectively incorporated into opposite sides of the rear of the swimwear behind the wearer's chest;

FIGURE 4 - shows a buoyant foamed-plastics panel which is incorporated into the front of the chest portion of the swimwear;

10 FIGURE 5 - shows a neck support roll also made of buoyant soft cellular plastics material and which is incorporated into the neck of the swimwear;

FIGURE 6 - is a front view of a child wearing the garment; and

FIGURE 7 - is a rear view of the child of figure 6.

Description of Preferred Embodiment

Figure 1 shows a swimwear garment 1 made from stitched-together knitted external areas 2A, 2B, 2C and 2D of a material commercially known under the trade mark 15 NYLON ELASTANE. This material has a relatively high resistance to penetration by ultra violet light and therefore provides the wearer with some protection against skin damage from the sun's rays. The garment illustrated is designed for a child of between twelve and sixteen kilos weight and aged from three to four years old. It totally covers

the child's body when zipped up the back and has openings through which the child's neck, arms and legs can extend.

The garment is provided at its back with a zip fastener 3 for closing a back opening 4 when the child is dressed in the garment. A rip fastener strip 5, which is optional, is

5 made from VELCRO (trade mark) and is connected to one side of the neck opening of the garment and is designed to be passed through a plastics loop 5A attached to the other side of the neck opening and then folded back on itself in order to secure it to itself.

The strip 5 and loop 5A may be dispensed with if the zip fastener 3 extends fully up the back of the neck opening.

10 The neck portion of the garment is shown at 6 and incorporates a buoyant soft flexible roll 7 of circular cross-section and made from a closed-cell or non-linked polyethylene foamed material. This roll is shown more clearly in figure 5 and passes through a neck tunnel formed in the fabric of the garment.

The upper portion of the back of the garment shown in figure 1, incorporates two flat

15 flexible panels 8 (shown in figure 3) made of the same material as the roll 7. As shown in figure 3, the foamed material of each panel 8 is provided with broad crossing crease lines 9 and 10 formed by compressing the material of the panel flat along the

line of the crease, and which enable the panel to flex around the child's chest, and to flex when the child bends forwards, backwards or sideways. The former flexing

20 movement is permitted by the crease line 9, and the latter flexing movement is permitted by the crease line 10. The shape and positioning of these crease lines has

been found by experiment and testing to be the best to offer least resistance to the natural movement of the child's body when learning to swim. The crease lines are broad, being about 75mm wide and are formed by heat compression of the

25 panes so that they lie intermediate the front and back surfaces of the panels.

The front of the garment shown in figure 2, contains a six-sided flat chest panel 11 made from the same material as the panels 8. The panel 11 is shown in more detail in figure 4 and is provided with three upright crease lines referenced 12, 13 and 14 which permit the panel to snugly fit around the front of the child's chest. Two further 5 oppositely curved crease lines 15 and 16 allow the panel to yield when the child bends forwards or backwards. The edges and corners of the panel are rounded and are so positioned in the finished garment that they do not cause discomfort to the wearer. The thickness of the panels 8 and 11 is about 2.6 cm. and the diameter of the neck roll 7 is about 3 cm.

10 **Use of Preferred Embodiment**

Referring to figures 6 and 7, it will be seen that the child is fitted into the garment by placing its legs through the two leg openings, respectively, and then passing the child's arms through the two arm-openings. The zip 3 is drawn up so that the chest and back portions of the garment closely surround the child's body and the two ends of the neck 15 roll of the garment are drawn together by raising the back zip 3 to enclose the child's body snugly in the garment and then passing the rip fastener strip 5 through the loop 6 and folding it back on itself to adhere to a self-adhering portion of the strip. The roll 7 then encircles the child's neck beneath its chin to ensure that the child's chin is always 20 held above the level of the water.

It will particularly be noted that as the flat chest and back panels shown in figures 3 and 4 lie against the inside of the garment, the outside of the garment remains smooth and free of external projections which would otherwise interfere with the free movement of the child's arms and neck when learning to swim. Also the absence of

projections allows the movement of the child's body through the water to take place smoothly. This is not the case with garments having external buoyant projections.

The panels are contained in respective pockets in the garment and the fabric covering the panel on the inside and which is thus next to the child's body, is stitched to the rest 5 of the garment around the edge of the panel. The lines of stitching are spaced from the child's skin by almost the thickness of the panel, so that the stitchlines do not bear against the child's skin.

The above described garment is light and is safe for the child to use as it cannot ride up the child's chest, and the neck roll 7 is thus prevented from jolting the child's neck 10 upwardly, if the child jumps into the water. The child can also move its arms and legs freely as the buoyancy is provided by flat panels which fit snugly around the child's chest and do not project outwardly from the outside surface of the garment. This makes easier the task of teaching the child to swim as it can assume a nearly horizontal position in the water while its chin is still held above the water's surface. The child is 15 also well protected by the garment from solar ultra-violet radiation, and, when running around in the garment the buoyancy panels are not immediately visible or unsightly.

In one example of the swimwear illustrated, it is capable of supporting a four-year old child weighing about 14 kg without sinking, and weighs only about 160 grams. The 20 neck to crotch distance of the garment is 50 cms. and the circumference of the leg opening is about 23 cms. and that of the arm opening is about 20 cms. The inner circumference of the neck opening is about 30 cms.

Modification of Preferred Embodiment

In an unillustrated variation of the preferred embodiment the buoyancy panels are sold separately from the garment which is provided with open pockets on its inside for the reception of respective panels. The pockets can be closed after insertion of the 5 respective panels, by means of stud or "velcro" (trade mark) fasteners. This variation allows panels of the same external dimensions but of different thicknesses to be provided to suit children of the same size but of different weights. Thus a heavy four-year old child will be provided with thicker panels than a light four-year old, in order to provide more buoyancy.

10 A key feature in the pleasing external appearance of the garment when worn by a bather, is the inconspicuousness of the panels providing the buoyancy. The panels are not only free from external bulges which are unsightly and impede the flow of water over the surface of the garment, but also the absence of bulges enables a child being taught 15 how to swim to move its arms freely in the correct way to achieve a good stroke. The crease lines dividing the panels into separate zones lie about half a centimetre inwardly from the surface of the panel in contact with the outer fabric layer of the garment. Thus although the panel is normally flat when the garment is not being 20 worn, the panels flex into a concave shape to conform to the external profile of the child's body when the garment is being worn. This flexing, which is permitted by the crease lines acting as hinges between different zones of the panels, causes the outer surfaces of the panel zones to move apart slightly, while the inner surfaces of the zones 25 move slightly towards one another. Thus, to the child the crease lines are not noticed against its skin as they are cushioned by the inner fabric layer of the garment, but the outer fabric layer is pulled taut over the crease lines by the slight separation of the outside surfaces of the zones of the panels, to provide the garment with a 30 relatively smooth external appearance. The rounding of the corner edges of the panel zones assists the creation of the smooth external appearance of the garment when worn.

CLAIMS

1. A swimwear garment designed to cover a child's body, has arm neck and leg openings to receive the child's arms neck and legs respectively, a flexible buoyant neck support which locates beneath the child's chin and maintains it above water, and a  
5 buoyant flexible body panel or panels of flattened form incorporated into the garment and surrounding the child's chest; the buoyancy of the panel or panels and neck support being so selected that the child can move its arms and legs with a swimming action while the child's body can be maintained in a non-vertical position and its chin is always held above the water by the buoyant neck support beneath it.
  
- 10 2. A garment as claimed in claim 1, including a front panel and two back panels, each panel having crossing crease-lines to aid its flexibility and to offer low resistance to the movements of the child's body when learning to swim.
  
- 15 3. A garment as claimed in claim 1 or claim 2, in which the neck support comprises a buoyant flexible roll of soft foamed plastics material which is incorporated into a neck tunnel of the garment and which surrounds the child's neck.
  
4. A garment as claimed in claim 3, having a back opening closed by a zip fastener which, when fully drawn up, draws the neck roll around the child's neck.
  
5. A garment as claimed in any one of the preceding claims, made from knitted fabric resistant to the penetration of solar ultra-violet light, and the panels have zones  
20 separated by broad hinging crease lines formed by compression of the material of the panels along the lines of the creases so that the crease lines lie in the intermediate thickness of the panels.

6. A garment as claimed in any one of the preceding claims, in which the flattened form of the panels and their positioning on the inside of the garment, provides a relatively clean visual appearance to the outside of the garment.
  
7. A garment as claimed in any one of the preceding claims, provided on its 5 inside surface with pockets respectively containing buoyancy panels.
  
8. A garment as claimed in claim 7, in which the pockets are permanently closed and are stitched to the garment around the edges of the panels at positions set back from the inside surface of the panel so that the stich lines do not bear on the skin of the wearer.
  
- 10 9. A garment as claimed in any one of claims 1 to 7, in which the garment is provided on its inside with closable pockets for the reception of respective panels.
  
10. A garment as claimed in any one of the preceding claims, in which it 15 is provided with two back panels each having crease lines which cross one another and a chest panel having oppositely-curved crease lines extending from side-to-side, and a central back crease line following the direction of the wearers spine and flanked by two lateral crease lines spaced from the central crease line, each of the lateral crease lines crossing one of curved crease lines and terminating on the other curved crease line.

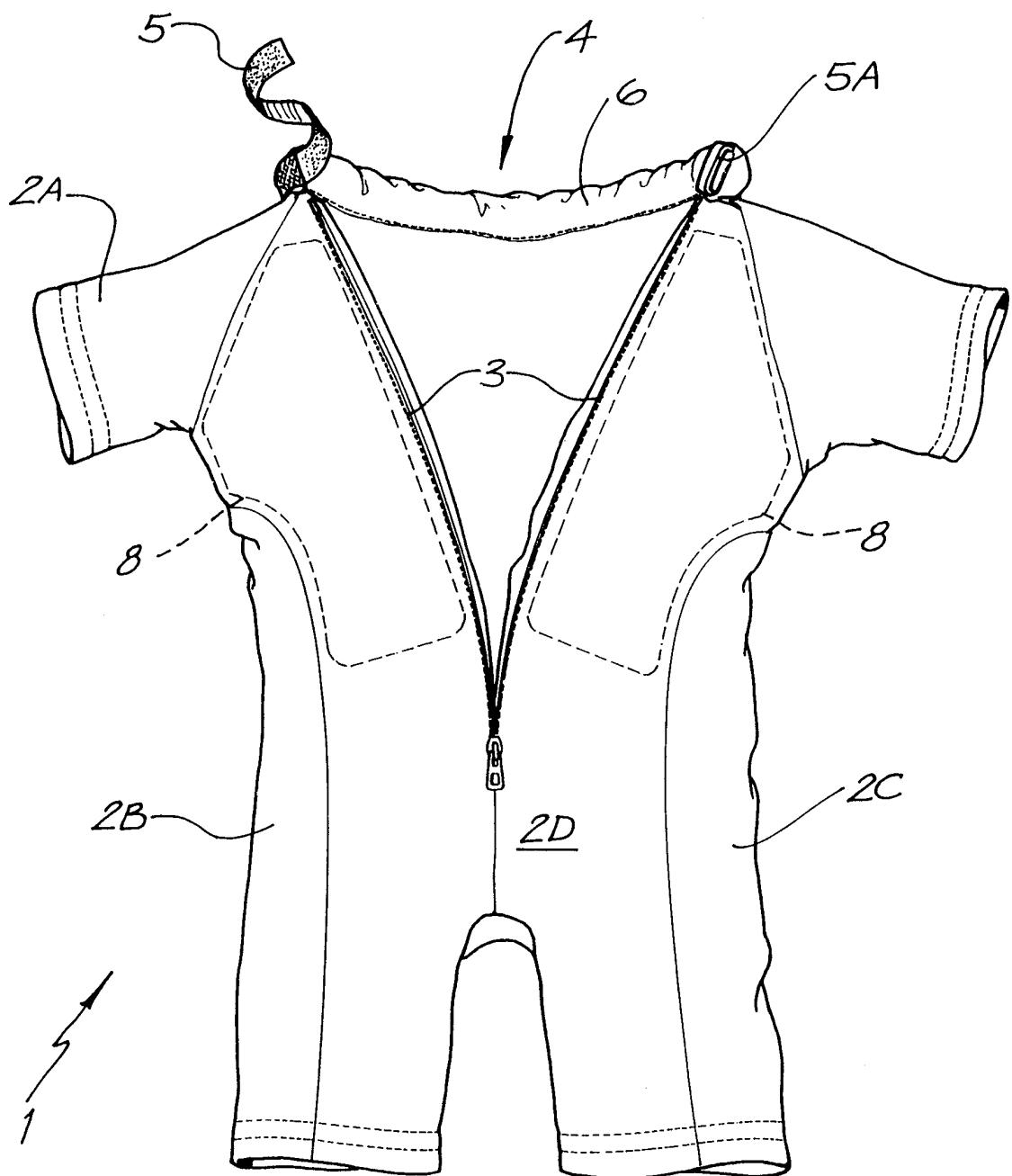


FIG. 1

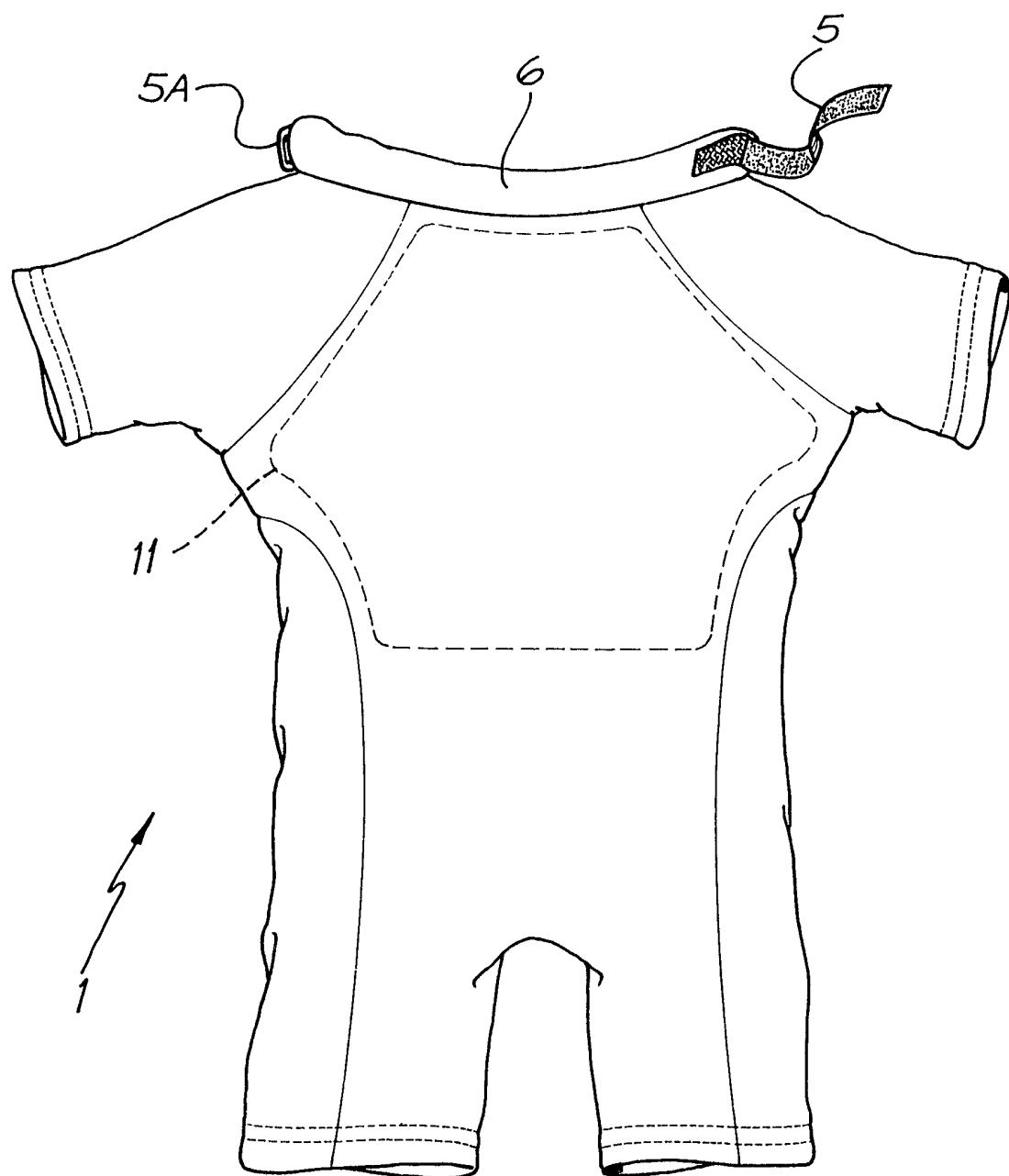


FIG. 2

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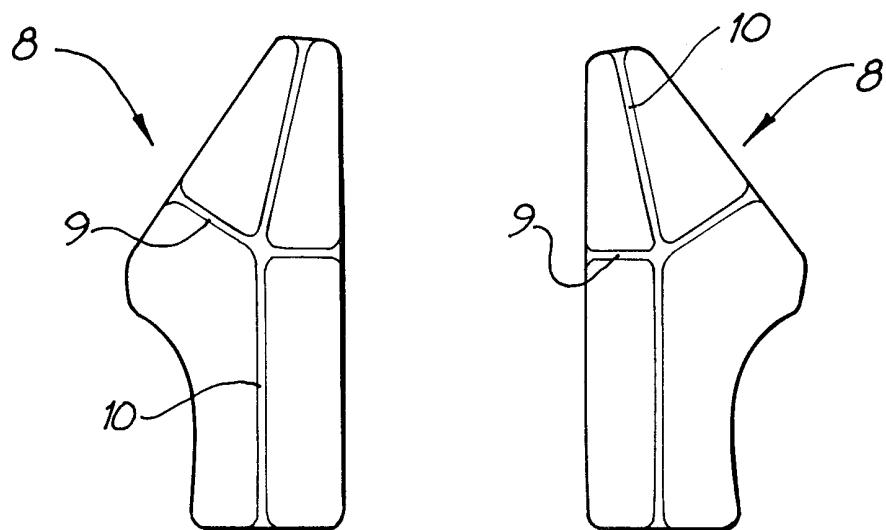


FIG. 3

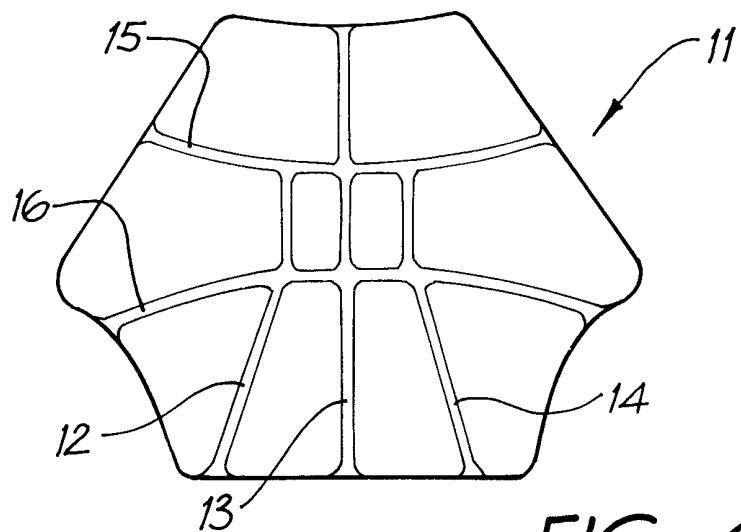


FIG. 4

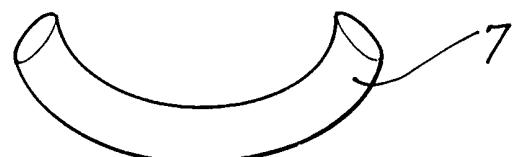


FIG. 5

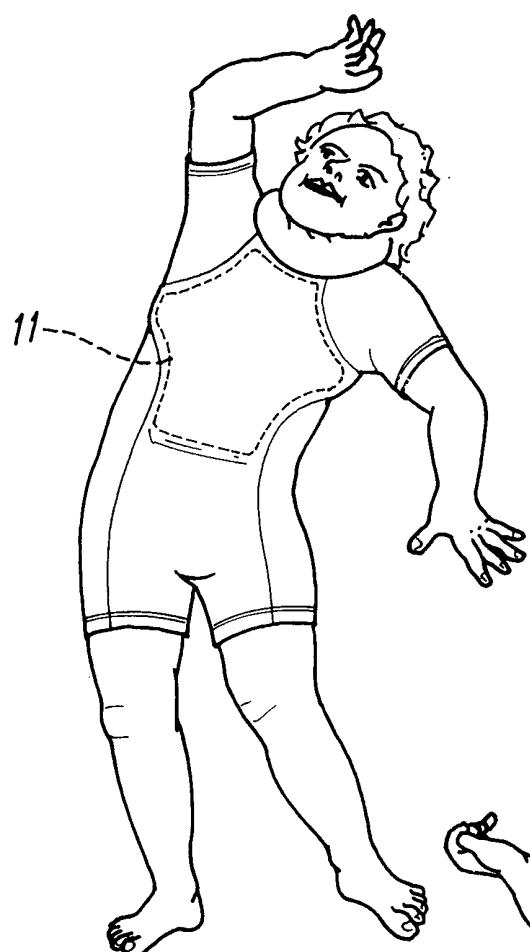


FIG. 6

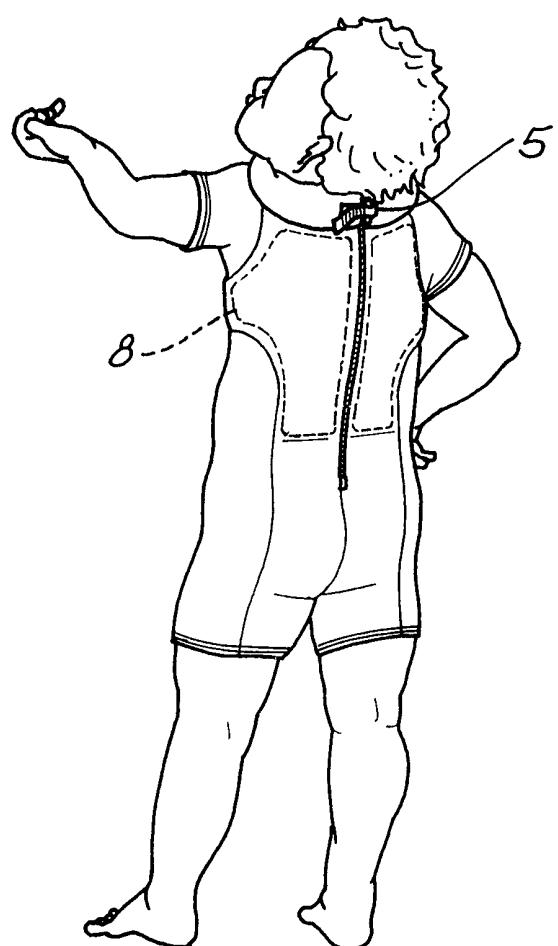


FIG. 7

## INTERNATIONAL SEARCH REPORT

 International application No.  
 PCT/AU 99/00007

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int Cl <sup>6</sup> : A41D 7/00, B63C 9/087, 9/08, A63B 31/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC A41D 7/00, A63B 31/00, 33/00, 69/12, B63B 35/72, 35/73, 35/74, 36/76, B63C 9/08, 9/10, 9/12, 9/14, 9/16, 9/087, 9/093, 9/105, 9/11, 9/115, 9/125, 9/13, 9/135, 9/15		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT, JPAT, USPM: IPC as above with keywords NECK, CHIN, CHILD:		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5588892 (McMAHON) 31 December 1996 Whole document	1, 3, 5
X	Patent Abstracts of Japan M-188, page 118, JP 57-175493 A (NOBUCHIKA SAITOU) 28 October 1982 Abstract; drawing	1
A	WO 95/10448 A (DENIS) 20 April 1995 Whole document	
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Date of the actual completion of the international search 8 February 1999		Date of mailing of the international search report <b>17 FEB 1999</b>
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer <b>RAJEEV DESHMUKH</b> Telephone No.: (02) 6283 2145

**INTERNATIONAL SEARCH REPORT**

International application No.

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<b>C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
<b>Category*</b>	<b>Citation of document, with indication, where appropriate, of the relevant passages</b>	<b>Relevant to claim No.</b>
A	US 3903555 A (BUSBY) 9 September 1975 Whole document	
A	FR 784624 A (CHAISEMARTIN) 22 July 1935 Whole document	
A	US 5030153 A (BAILEY) 9 July 1991 Whole document	
A	Patent Abstracts of Japan, M-90, page 80, JP 56-82694 A (KOUICHI TAKAGI) 6 July 1981 Abstract; drawing	

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU 99/00007**

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.

Patent Document Cited in Search Report				Patent Family Member			
WO	95/10448	AU	78055/94	CN	1133025	EP	720559
US	5030153	CA	2046936				

END OF ANNEX