(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 072 168**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **82304062.1**

(22) Date of filing: **02.08.82**

(51) Int. Cl.³: **B 65 D 33/14**, B 65 D 88/22

(30) Priority: **03.08.81 GB 8123645**

(43) Date of publication of application: **16.02.83 Bulletin 83/7**

(84) Designated Contracting States: **AT BE CH DE FR IT LI NL SE**

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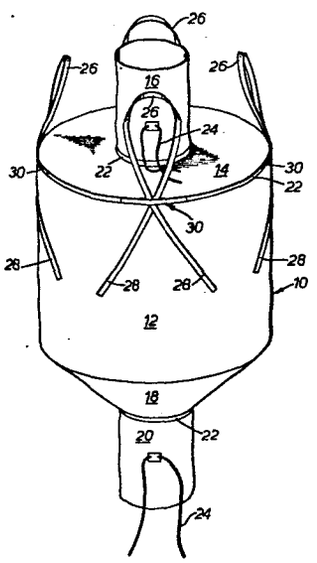
(54) Improvements in bulk transport bags.

(57) A bulk transport bag comprises a bag body (10) made of a flexible fabric coated with a plastics material such as PVC, and lifting webs defining lifting loops (26), which lifting webs are made of a fabric web impregnated and/or coated with a plastics material such as PVC compatible with that coated on the body fabric, the lifting webs and bag body (10) being bonded together through said compatible plastics materials effectively to form an integral structure. Anti-peel devices (30, 34 or 38) are preferably provided at the upper periphery of the side wall (12) of the bag body (10), where the bonded regions of the lifting webs separate from the bag body (10) to form the lifting loops (26).



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Improvements in Bulk Transport Bags

This invention relates to a bulk transport bag, i.e. a bag of suitably treated flexible material especially intended for the transportation of flowable materials, i.e. materials such as pulverulent or granular or analogous materials which can be poured into and out of a bag, including liquid materials.

At the present time there exist relatively cheap, one-trip bags intended to be disposed of after one use, and expensive, multiple-trip bags capable of re-use many times. The latter bags are commonly made of plastics coated fabric, with a main materials-containing body, a top inlet chute and a bottom outlet spout. Means are incorporated in the bag to enable it to be lifted from the top, as by a fork lift truck, to facilitate filling with the top inlet open or emptying with the bottom outlet open, and to facilitate loading and unloading the bag on to or from a transporting vehicle or ship or plane or conveyor. Known lifting means comprise a steel band or collar around the top of the main body, and a yoke means which cooperates with the collar to support the bag. The yoke means may be a part of the bag assembly or be separable therefrom. In either case, the provision of the lifting means is a costly procedure in terms of labour and materials, and makes the re-usable bulk transport bag an expensive item. Multiple trip bags of the aforementioned type are known, in particular, from

U.K. Patent Specifications No. 1129917 and No. 1177745.

Another type of multiple trip bag is known from U.K. Patent Specifications No. 1455874 and No. 1484984. This bag has a stitched polypropylene body with lifting loops stitched thereto, and can be provided with an inner liner of impervious plastics material formed with an outlet chute which projects through an aperture in the bottom wall of the polypropylene body. The inner liner is for single trip or very limited multiple trip use. As is clear from the same patentees' earlier U.K. Patent Specifications No. 1431581 and No. 1431582, relatively complicated and costly hemming and stitching procedures are necessary in an endeavour to impart sufficient strength to the connections between the lifting loops and the body of the bag, having regard to the fact that a bag may carry a load of 1000 kg or more. Furthermore, the stitching renders the body of the bag pervious to moisture so that, for the transport of many materials, the provision of an impervious liner is essential for this reason alone, regardless of whatever other functions the liner may be intended to perform.

Simpler bulk transport bags, allegedly for multi-trip use but in practice much less durable than those referred to above, also employ lifting straps, for example stitched either directly to the wall of the bag or to a reinforcing patch secured to the wall of the bag, or being threaded through slots or channels incorporated in the body of the bag.

It is a general object of this invention to provide a re-usable bulk transport bag which is simpler and less costly to produce than known bags.

The bulk transport bag in accordance with the invention comprises a main materials-containing body with

a closable inlet and outlet for the material to be carried, and lifting means attached to said body, wherein the body is made of a fabric coated with a plastics material, and the lifting means comprises a plurality of fabric webs coated and/or impregnated with a plastics material compatible with the plastics coating on the body material, said plastics treated lifting webs being bonded to the plastics coated body through said compatible plastics materials.

In the bag in accordance with the invention, the lifting means effectively forms an integral part of the bag structure, as the plastics materials of the plastics coated bag body and of the plastics treated webs effectively tend to merge into one another when the body and bag are bonded together, as by plastics welding.

In use, when the bag is vertically lifted by the lifting webs, the stresses on the connections between the lifting webs and the bag body act substantially in the planes in which the webs are bonded to the body. In these planes, the strength of the bonds can be at least as great as that of the body and web fabrics, i.e. greatly in excess of the load of material carried in the bag. For example, each bond may be able to withstand a planar shear force of 10,000 kg.

Furthermore, the body of the bag is not penetrated

by stitching where the lifting means is connected. In a preferred arrangement, the body of the bag is not penetrated by any stitching or by any other fastenings, fixings or fittings other than the closable inlet and outlet, said inlet and outlet being sealed to the bag body so that the bag is thereby rendered wholly impervious to liquid when the inlet/outlet are closed. The bag can thus be used to carry materials which must be kept dry, such as hygroscopic materials. Furthermore, the bag may have suitable inlets and outlets sealed thereto to enable said bag to be used for the transportation of liquids.

Preferably, each plastics treated lifting web is bonded at both sides of an intermediate portion of the length thereof to the side wall of the main body, so that the intermediate portion forms a lifting loop at the top of the main body, the plurality of lifting loops being symmetrically disposed around the periphery of the main body. Four lifting loops at 90 degrees angular spacings will often be convenient.

Again, each lifting web is preferably bonded along two linear regions of the bag body spaced around the side wall thereof. Such linear bonding regions may be vertical in the upright condition of the bag body. However, more desirably, in order to distribute lifting forces more evenly around the bag body, said two linear bonding regions for each web are inclined when the bag is in its upright

condition. The two inclined linear bonding regions may meet at the upper periphery of the side wall of the bag.

Each lifting loop is preferably bonded to the bag body over its entire length on each side of the intermediate portion forming the lifting loop, and each end of each bonded lifting web can be covered by a bonded patch of plastics coated fabric, thereby to form an anti-peel device. In this way, risk of accidental or deliberate abuse of the bag, brought about by attempts to peel the bonded lifting web from the bag body, starting from the ends of the web, is minimised.

In this context, whereas the extremely high strength of the plastics bonds between the lifting webs and the bag body inthe planes of said bonds has been referred to, the strength of the bonds when subject to a peeling force is not so great, and may be less than 100 kg. It is therefore desirable to protect the bag against damage due, for example, to a peeling force applied to one or more of the bonds when, for example due to improperly applied lifting forces, one or more of the lifting loops is pulled outwardly from the bag. Thus, in a preferred arrangement, adjacent each point where a plastics treated web separates from the body of the bag to form the lifting means, the web passes through an anti-peel device for preventing tearing of the web from the body when the lifting means is subject to an outward

peeling force at an angle to the vertical. The anti-peel devices absorb the outward components of forces applied to the lifting loops, and ensure that the forces applied to the bonds are almost wholly restricted to stresses acting in the planes of said bonds.

Each said anti-peel device may comprise an eyelet in a rim of plastics material upstanding from the upper periphery of the side wall of the bag body, or it may comprise an aperture formed between an upper edge region of the side wall of the bag body and one or more strips of plastics coated fabric bonded around said upper edge region of the side wall, with non-bonded portions of said strip or strips defining said apertures.

Thus, according to a preferred aspect of the invention, the plastics treated webs constituting the lifting means are each bonded to the side wall of the bag body at an angle to the vertical, with web portions of each web crossing one another in the manner of braces to pass through a common anti-peel device at the periphery of the side wall of the bag.

As is generally conventional in a bag for bulk transportation of pulverulent, granular or like materials, the closable inlet and outlet may comprise a central inlet chute opening through a top wall of the bag body and a central outlet spout opening out of a bottom wall of the

bag body, all said parts of the bag body being made of pieces of the same plastics coated fabric bonded together to define a bag of predetermined shape. The said predetermined shape may be circular, polygonal or square, for example, but in all cases the bonding of the plastics coated fabric pieces together ensures that the bag remains impervious to liquid. For the transportation of liquids, however, the outlet spout will normally be omitted or permanently sealed, and a plug or spigot sealed in position, either in the bottom wall of the bag or at the bottom of the side wall thereof, to enable liquid to be poured off.

Preferably, the bag body is coated and the lifting webs are impregnated and/or coated with the same plastics material. By way of example, the bag body may be made of nylon or polyester fabric coated with PVC and the lifting webs made of polyester fabric impregnated and/or coated with PVC.

The invention will now be exemplified with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a bulk transport bag in accordance with the invention;

Figure 2 shows a detail of the bag of Figure 1; and

Figures 3 and 4 show possible modifications to the lifting means for the bag.

In Figure 1, the bulk transport bag comprises a bag

body, generally designated 10, made of a flexible fabric such as nylon or polyester fabric coated with a plastics material such as PVC. The bag body is generally of circular cross-section, with a side wall 12, top wall 14 to which is fitted a central inlet chute 16, and a bottom wall 18 to which is fitted a central outlet spout 20. All these parts of the bag are made of the same plastics coated fabric, and these plastics coated fabric parts are bonded together by plastics welding so as to form the bag body 10 of the predetermined shape illustrated. Welded regions are indicated by the reference 22. The bottom wall 18, which is likewise welded to the side wall 12, can be of conical form as illustrated, possibly with the angle of the cone selected to suit a particular material to be carried, or it can be flat.

Tie cords 24 are provided for closing the inlet chute 16 and outlet spout 20. However, if the bag is to be used for transportation of liquids, the outlet spout 20 may be omitted or sealed closed, and a plug or spigot sealingly fitted into the bottom wall 18, or into the bottom of the side wall 12.

In accordance with the invention, the bag body is provided with lifting loops 26. These are made of web fabric such as polyester web impregnated with a plastics material compatible with that coated on the body fabric.

Thus, the lifting webs may conveniently be impregnated with the same material as that coated on the body fabric, for example PVC. Depending on the nature of the web fabric, the lifting webs may be impregnated and/or coated with this plastics material. In all instances, the lifting webs have end portions 28 bonded, each over its entire surface area on one side thereof, to the side wall 12 of the bag body 10. This bonding operation is conveniently effected by plastics welding. As a result, the compatible plastics materials of the coated body fabric and the impregnated and/or coated lifting web fabric tend to merge into one another, effectively to form the bag body and the lifting webs into an integral structure. The intermediate portion of each lifting web between its bonded end portions 28 forms a corresponding lifting loop 26, which stands up from the upper periphery of the side wall 12 of the bag body 10.

In the embodiment illustrated in Figure 1, and as shown in enlargement in the detail of Figure 2, the end portions 28 of each lifting web are bonded to the bag body 10 along linear regions of the latter which are inclined to the vertical. These linear regions intersect at the upper periphery of the side wall 12 of the bag body 10, where the web crosses over itself in the manner of braces. The formation of the lifting loops 26 in this way, although not

essential, has the advantage that lifting forces acting through the bonded end portions 28 of the lifting webs are spread more evenly around the fabric forming the side wall 12 of the bag body 10.

In order that peeling forces acting on the bonded lifting webs, e.g. forces which can arise if the lifting loops 26 are pulled at least partially in a radially outwards direction during lifting, are adequately resisted, anti-peel devices are provided around the upper periphery of the side wall 12 of the bag body 10 at each point where the lifting web separates from the side wall to form the lifting loop 26. In the embodiment of Figures 1 and 2 each such anti-peel device comprises a strip 30 of plastics coated fabric, extending around part of the upper periphery of the side wall 12. Each strip 30 is bonded at its end regions 32 to the side wall 12, and has an intermediate unbonded portion 34 which in combination with the side wall behind it defines an aperture through which the lifting web passes at the point where it crosses over itself to form the lifting loop 26. It is at this cross-over point that the bonded end portions 28 of the lifting web terminate, and the anti-peel strip 30 thus absorbs radially outward forces acting on the lifting loop and substantially prevents any peeling-off force being applied to the bonded end portions at this point. It is thereby ensured that stress forces

acting on the bonds are restricted to the planes of the bonds, in which planes the bonds are more than adequately strong to resist such stresses.

Figure 3 shows a modification of the bag in which a different form of anti-peel device is employed at the upper periphery of the side wall 12 of the bag body. In this modification, the top wall of the bag body is plastics welded to the side wall to form an upstanding hem 36, and each anti-peel device comprises an eyelet device 38 incorporated in this hem. In addition, in the modification of Figure 2, each end 40 of each lifting web, where bonded to the side wall 12 of the bag body remote from the lifting loop 26, is protected by a patch 42 of plastics coated fabric plastics welded to the side wall so as to cover such end 40 of the web. This prevents access to the ends 40 of the lifting web and thus minimises risk of accidental or deliberate abuse by application of peeling-off forces to the lifting web, starting from these ends.

Figure 4 shows another modification in which the bonded end portions 28 of each lifting web are positioned vertically on the side wall 12 of the bag body. Anti-peel devices 42 similar to those shown in Figure 3 are employed at the lower ends 40 of each web. At the upper periphery of the side wall 12, two anti-peel devices are provided for each lifting loop 26, as the linear bonded regions 28 of

the web are spaced apart in parallel. Each such anti-peel device at the upper periphery of the side wall of the bag body is of similar form to that shown in Figure 2, but a single strip 44 of plastics coated fabric extending around the entire upper periphery of the side wall is used for forming all said anti-peel devices, said single strip having alternating bonded portions 46 and non-bonded portions 48.

Clearly, various other modifications of the above-described bag are possible within the scope of the invention defined by the appended claims, and the bulk transport bag in accordance with the invention is not restricted to use of the particular fabric materials and plastics coating and impregnating materials referred to. It is essential only that the body fabric and the lifting web fabric should be treated with compatible plastics materials which can be bonded together effectively to combine such fabrics into an integral structure.

In general, at the present time, it is practicable for the base fabric of the bag and/or lifting webs to be made of polyester, polypropylene or polyamide (nylon), or any combination thereof, and the plastics surface treatment to be an impregnation and/or coating of PVC, polyurethane or synthetic rubber (neoprene), or a laminant coating of such materials.

For the purpose of welding such materials together, hot arc welding, hot air welding, ultrasonic welding or pulse welding may be employed instead of the conventional high frequency welding technique which is usually to be preferred. It is required that the bonding technique employed should effectively merge one plastics coating material into the other; the use of plastics adhesive solvents is therefore sometimes practicable. Where neoprene is employed as a coating for the bag fabric, it will generally be necessary also to employ neoprene as the coating on the web fabric, in order to achieve the required bond, in particular by ultra high frequency welding. In other instances, however, it is possible to effect the bond between a PVC coating on the bag fabric and a polyurethane impregnation and/or coating on the lifting web fabric, or vice versa, or between a laminant coating of such materials on one fabric and a single coating or laminant coating of such materials on the other fabric.

Claims

1. A bulk transport bag comprising a main materials-containing body with a closable inlet and outlet for the material to be carried, and lifting means attached to said body, wherein the body is made of a fabric coated with a plastics material, characterised in that the lifting means comprises a plurality of fabric webs (26) coated and/or impregnated with a plastics material compatible with the plastics coating on the body material, said plastics treated lifting webs being bonded to the plastics coated body (10) through said compatible plastics materials.

2. A bulk transport bag according to claim 1, characterised in that each said plastics treated lifting web is bonded at both sides of an intermediate portion of the length thereof to the side wall of the main body, so that the intermediate portion forms a lifting loop at the top of the main body, the plurality of lifting loops being symmetrically disposed around the periphery of the main body.

3. A bulk transport bag according to claim 2, characterised in that each lifting web is bonded along two linear regions of the bag body spaced around the side wall thereof.

4. A bulk transport bag according to claim 3, characterised in that said two linear bonding regions are inclined when the bag is in its upright condition, and meet at the

upper periphery of the side wall of the bag.

5. A bulk transport bag according to claim 3 or claim 4, characterised in that each lifting web is bonded to the bag body over its entire length on each side of the intermediate portion forming the lifting loop, and each end of each bonded lifting web is covered by a bonded patch of plastics coated fabric, thereby to form an anti-peel device.

6. A bulk transport bag according to any one of claims 1 to 5, characterised in that the body of the bag is not penetrated by any stitching or by any other fastenings, fixings or fittings other than the closable inlet and outlet, said inlet and outlet being sealed to the bag body so that the bag is thereby rendered wholly impervious to liquid when the inlet/outlet are closed.

7. A bulk transport bag according to any of claims 1 to 6, characterised in that, adjacent each point where a plastics treated web separates from the body of the bag to form the lifting means, the web passes through an anti-peel device for preventing tearing of the web from the body when the lifting means is subject to an outward peeling force at an angle to the vertical.

8. A bulk transport bag according to claim 7, characterised in that the plastics treated webs constituting the lifting means are each bonded to the side wall of the bag

body at an angle to the vertical, with web portions of each web crossing one another in the manner of braces to pass through a common anti-peel device at the periphery of the side wall of the bag.

9. A bulk transport bag according to any one of claims 1 to 8, characterised in that the closable inlet and outlet comprise a central inlet chute opening through a top wall of the bag body and a central outlet spout opening out of a bottom wall of the bag body, all said parts of the bag body being made of pieces of the same plastics coated fabric bonded together to define a bag of predetermined shape.

10. A bulk transport bag according to any of claims 1 to 9, characterised in that the bag body is coated and the lifting webs are impregnated and/or coated with the same plastics material.

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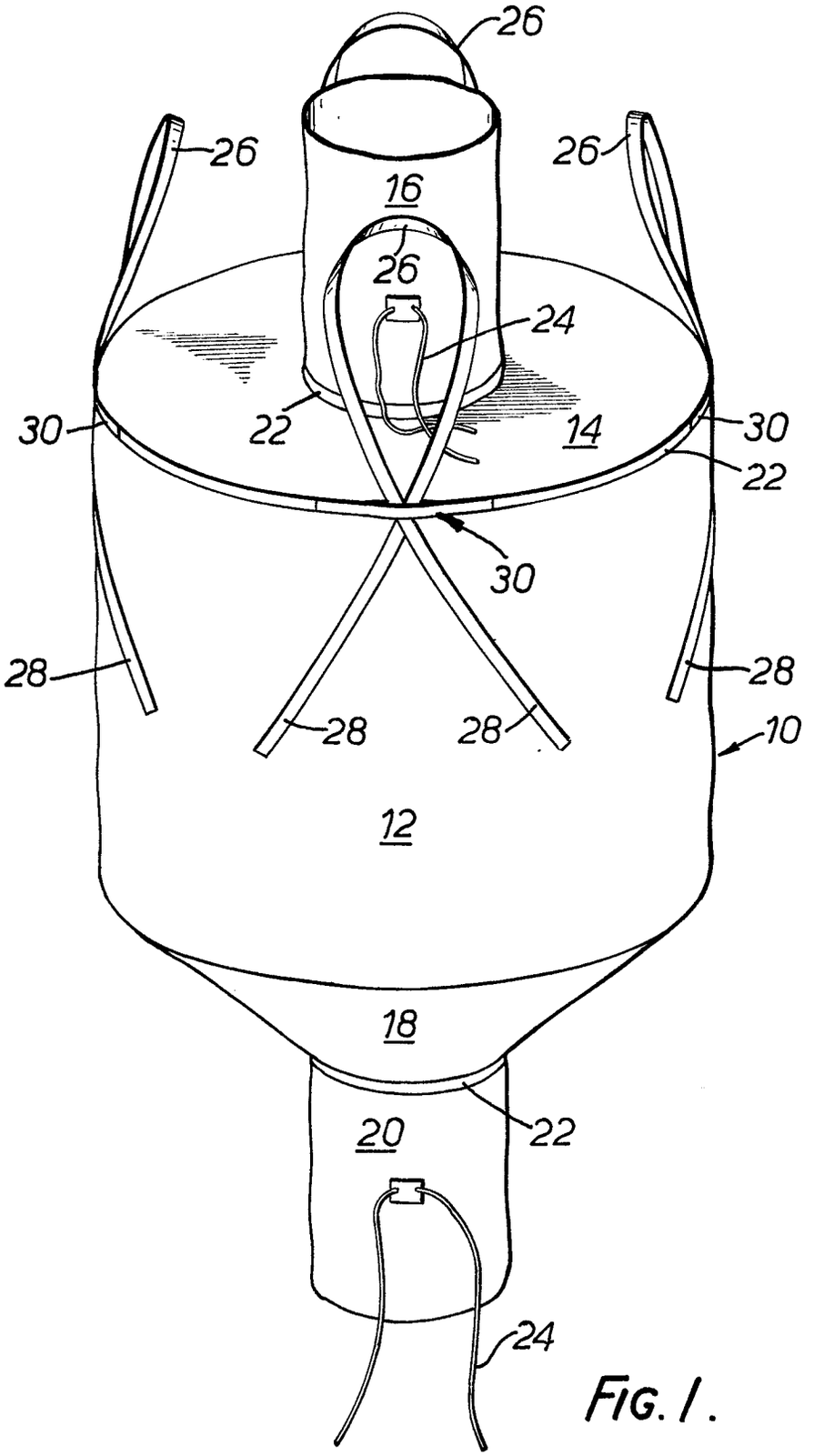

FIG. 1.

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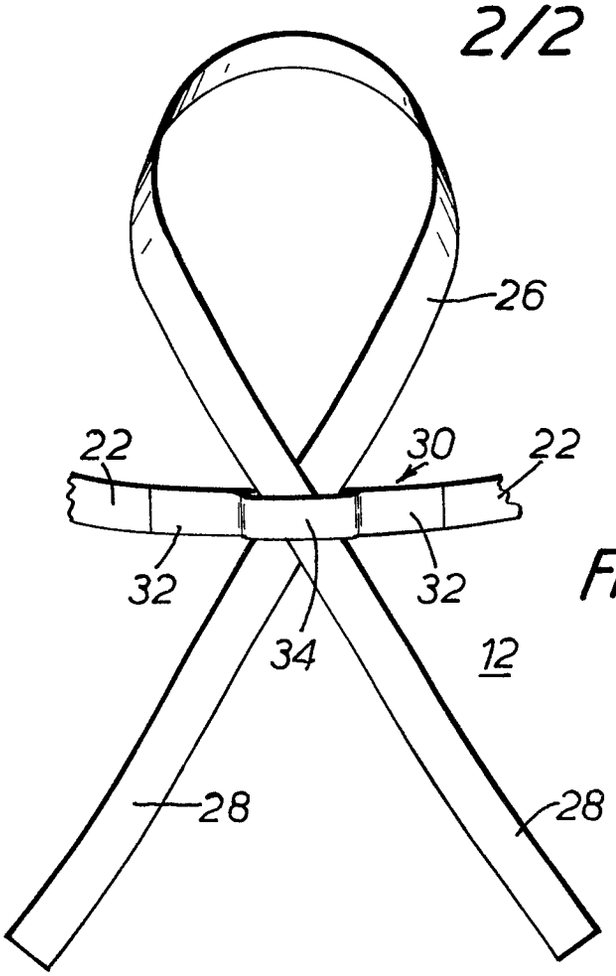

FIG. 2.

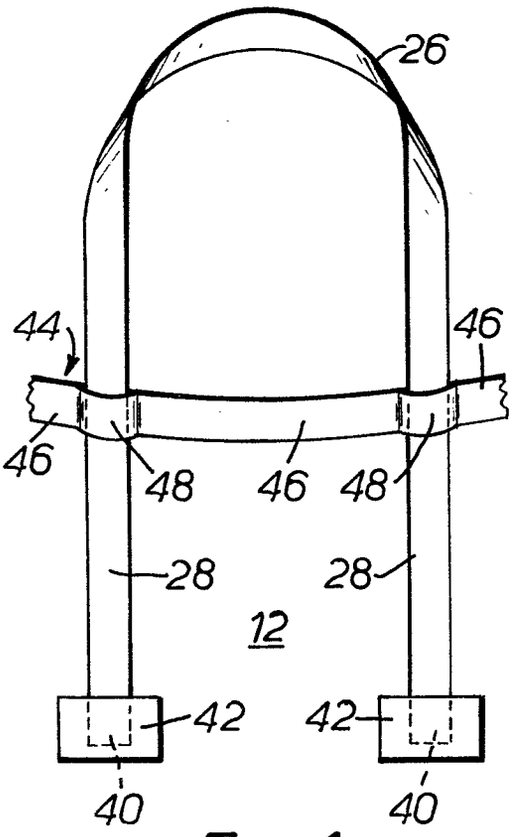

FIG. 4.

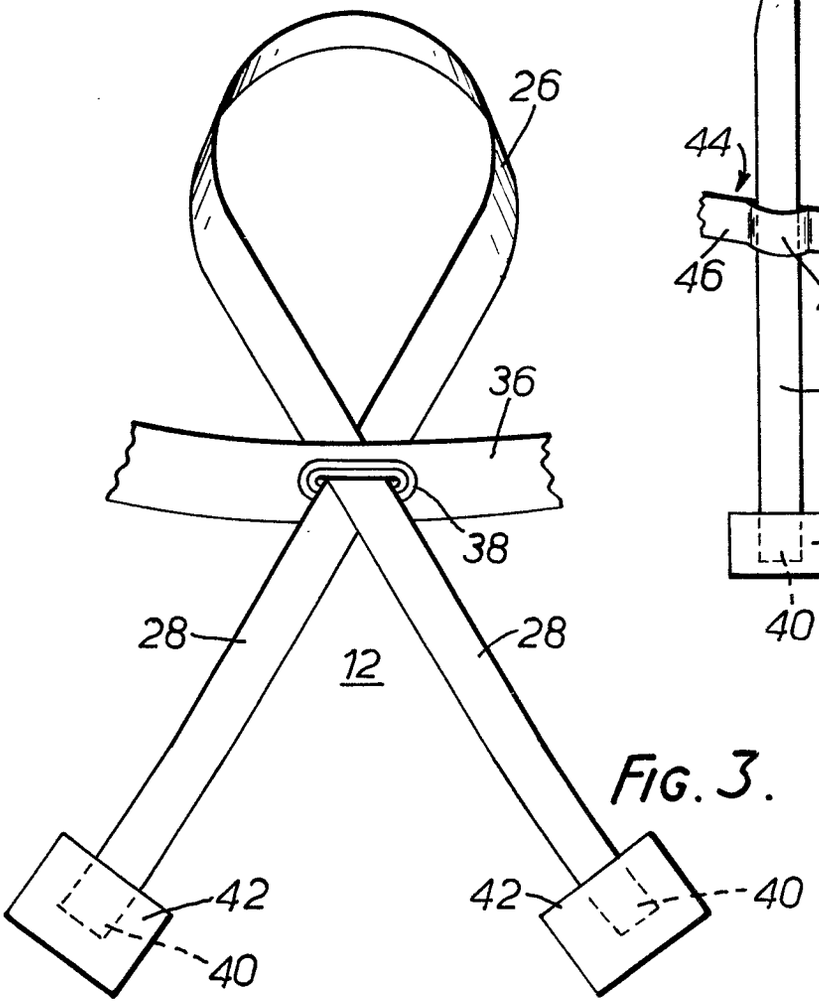

FIG. 3.

European Patent Office

EUROPEAN SEARCH REPORT

0072168
Application number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 82304062.1

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	US - A - 3 335 941 (GATWARD) * Fig. 1; column 2, lines 15-19 *	1,2,3, 5,6	B 65 D 33/14 B 65 D 88/22
A	GB - A - 1 206 918 (COLOROLL LTD) * Fig. 7; page 1, line 96 - page 2, line 11 *	1,2,3, 5,6	
A	DE - A - 1 761 625 (VEREINIGTE PAPIERWARENFABRIKEN) * Claims; fig. 2 *	1,2,3, 5,6	
D,A	GB - A - 1 431 581 (NATTRASS) * Fig. 1 *		TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
D,A	GB - A - 1 455 874 (NATTRASS) * Fig. 1 *		B 65 D 30/00 B 65 D 33/00 B 65 D 88/00
A	US - A - 4 211 266 (MASSEY) * Fig. 1 *		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	08-11-1982	CZUBA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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