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(12) # EUROPEAN PATENT APPLICATION

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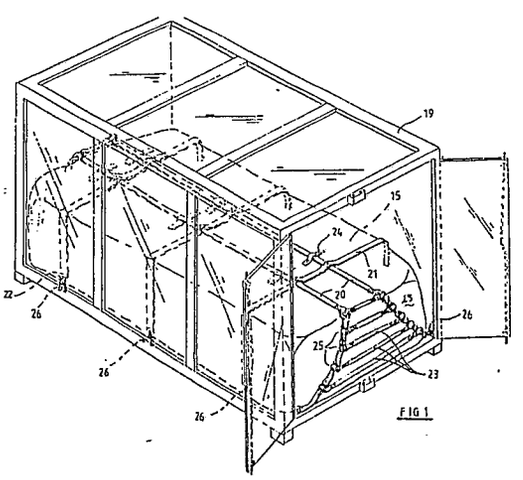
(54) **Liquid storage bag.**

(57) The invention provides a storage bag (10-15) of flexible sheet material (16) characterised in that it is of generally rectangular configuration comprising a planar base section (10), opposed generally vertically disposed side wall sections (11)(12), opposed generally vertically disposed end wall sections (13)(14) and a generally planar roof section (15). The invention also provides a harness (20, 21, 22, 23, 25) for containing the storage bag (10-15) within a standardised container (19) for transport purposes. The invention further provides a blank (16) for forming the storage bag (10-15) and a method of folding and joining the blank (16) to form the storage bag (10-15).



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Description

LIQUID STORAGE BAG

This invention relates to a storage bag which is particularly suitable for transportation in a container. The bag of the invention will mainly find application in the storage of liquids, but is not limited to such application.

Conventionally when liquid storage bags are housed within ISO containers, a bulkhead / pallet is provided with the bulkhead disposed adjacent to and supported by the doors of the container, such bulkhead / pallet serving to prevent the bag from bulging out of the container during filling and discharge operations. It will be appreciated that such a bulkhead / pallet arrangement adds weigh to a load, and is also space consuming particulary in relation to an empty storage bag. It is accordingly an object of the present invention to provide a novel storage bag and accessories therefore which it is belied will overcome or at least minimise the difficulties mentioned above.

According to the invention, a storage bag made of flexible sheet material is characterised in that it is of generally rectangular configuration, comprising a generally planar base section, opposed generally vertically disposed side wall sections, opposed generally vertically disposed end wall sections, and a generally planar roof section. The term "generally vertically wall section" herein is meant to include an upwardly directed slanting wall section.

In a preferred arrangement the bag will comprise a tubular section defining the base side walls and roof, with rectangular end wall sections being secured to each end of the tubular section. Preferably the end wall sections will be constituted by two sections which fold towards one another from the side wall sections or alternatively from the roof and base sections.

In one arrangement where the side wall sections and end wall sections are substantially vertically disposed, the end wall sections will be constituted by two half sections of substantially equal size. Alternatively, where the side wall and the end wall sections either converge or diverge upwardly, the end wall sections will be constituent by unequal sections.

Where the bag is housed in a rigid container, it may further include a reinforcing harness comprising a plurality of strap elements whereof the free ends are adapted to be secured to the container, preferably to the floor thereof. In a preferred embodiment, the reinforcing harness will include two or more longitudinal straps extending over the end sections and the roof of the bag, and one or more transverse straps extending over the side wall sections and the roof of the bag. Preferably two longitudinal straps will be provided, the straps diverging outwardly at the end panels towards the lower bottom corners of the bag. With the latter arrangement a series of cross-brace straps will preferably be provided to link the outwardly diverging straps together at intervals at one or both end zones thereof.

Also included within the scope of the invention is a blank of elastomeric or plastic sheet material which may or may not be reinforced with fabric for forming the bag of the invention, as disclosed herein.

In order to illustrate the invention two embodiments thereof will be described hereunder purely by way of example with reference to the accompanying drawings wherein:

Figure 1 is a schematic perspective view of a storage bag in accordance with the invention positioned within a container;

Figure 2 is a perspective view of a bag in accordance with the invention together with a harness therefore;

Figure 3 is a plan view of the harness for use with the bag of the invention;

Figure 4 is a plan view of a blank of elastomeric or plastic sheet material for use in the formation of the bag of the invention. Such a blank may consist of one or more panels joined by suitable seams;

Figure 5 is a schematic illustration of the blank which has been joined together to form a sleeve or tube open at each end which has then had the corner cutouts removed providing tongues to form end panels;

Figure 6 illustrates the horizontal seam joining the tongues to form the end panel;

Figure 7 is a schematic illustration of the folded end of the bag with the cutouts arranged to provide the seams which form the end of the side or vertical panels;

Figure 8 is a schematic illustration of the bag with all panels seamed to constitute the storage bag of the invention;

Figure 9 is a perspective schematic view of a different embodiment of the arrangement shown in figure 8, with the side and end wall sections of the bag converging upwardly;

Figure 10 is a schematic illustration of a blank for forming the bag in Figure 9, which has been joined longitudually to form a sleeve;

Figure 11 is a schematic illustration of the blank in Figure 10 which has had corner cutouts removed therefrom to provide tongues to form the end panels; and

Figure 12 is a schematic illustration of the folded end of the bag in Figure 9 arranged to provide the seams at the junction between the end and side panels.

Referring to Figures to 8 of the drawings, one embodiment of a liquid storage bag in accordance with the invention is characterised in that it is of generally rectangular configuration comprising a base panel 10, a pair of opposed side panels 11 and 12, a pair of opposed end panels 13 and 14 and a roof panel 15.

With reference to Figure 4 the bag will be formed from a blank 16 which is of rectangular shape. By means of a longitudinal joint 29 this blank is formed into a tubular configuration. Square cutouts 31 are

made in the tube to form a pair of tongues 17 at each end as illustrated in Figure 5. The tongues 17 are joined by seams 30 to make the end panel 13 as shown in Figure 6.

The ends are folded as shown in Figure 7 in such a manner that the pair of cutouts 31 are transformed into two openings 27 lying one above the other each of which can be joined to form the vertical end seams 18 of the bag.

The seams of the bag will be sealed in a conventual manner with additional reinforcement where necessary. A bag formed as above and depicted in Figure 8 will be of a generally rectangular profile and particularly suitable for housing within a rigid container 19 such as a conventional ISO container. It is envisaged that the bag will be dimensioned to be a snug fit within the container 19.

The bag shown in Figure 8 will preferably be provided with a harness as described in more detail below and housed within the container 19, An alternative arrangement is shown in Figures 9 to 12 which show a version of the bag having side and end walls which slope upwardly in a convergent fashion and which is designed to be free standing within a container 19 without the need for a harness or other supporting devices. It will be noted that the bag is of generally trapezoidal profile. The bag is formed in a similar manner to the bag shown in Figure 8, by utilizing a blank of rectangular shape, not shown, which is formed into a tubular configuration by means of a longitudinal joint 29a, Figure 10. The difference in construction is found in the cutouts 31a which were not square, but of angled shape as shown in Figure 11. As a result of the cutouts 31a, tongues 17a are of unequal size. The tongues 17a are joined by a seam 30a and the ends folded in the manner shown in Figure 12 to provide angled end seams 18a. The seams 18a will be sealed in a conventional manner with additional reinforcement where necessary.

It has been found that the bag of Figure 9 is substantially self supporting and when housed within a container will not impinge on the container wall. Accordingly the bag will usually not require constraining means such as a harness or the like.

As mentioned above the harness Figure 3, may be provided for the embodiment of the bag shown in Figures 1, 2 and 8 to control movement thereof, during filling, discharge and transportation. Loops 24 will secure the harness to the bag, Figure 2. In the preferred arrangement illustrated, the harness comprises a pair of longitudinal strap elements 20 and a plurality of transverse strap elements 21. The longitudinal strap elements extend from the lower corner zones of the container along one end panel 14 of the bag over the upper surface 15 thereof, and along the other end panel 13 of the bag. A suitable hook, clasp of the like formations 22 will be provided for securing the ends of the strap elements to eye formations 26 or the like provided on the floor of the container 19 and adjacent to the walls. The longitudinal strap elements 20 are reinforced at least at the door side of the container by means of a plurality of spaced transverse linking straps 23 provided in the zone of the end panel of the bag. It has been found that the longitudinal straps 20 together with these linking straps 23 will limit excessive surge movement of the end preventing the bag from exerting undue stress on or even bulging out of the door of the container.

It will be appreciated that the linking straps 23 define the contour of the end portions of the strap elements 20. Ring elements serve to link the various strap elements together as shown in Figure 2. The transverse straps 21 of the harness extend transversely across the roof 15 of the bag and down each side panel 11 and 12 thereof as illustrated.

The advantages of the arrangement of the invention will be apparent to persons skilled in the art. It will be readily apparent that by dispensing with the conventional pallet/bulkhead, both the transportation of full storage bags as well as the return of empty bags will be more economical and less problematic.

Clearly many variations of the invention exist without departing from the principles set out in the consistory clauses. The invention relates to a novel storage bag, a blank for forming such a bag, a harness for use with the bag as well as a transportation system comprising the bag with or without the harness of the invention in combination with a rigid container.

Claims

1. A storage bag of flexible sheet material characterised in that it is of generally rectangular configuration comprising a planar base section, opposed generally vertically disposed side wall sections, opposed generally vertically disposed end wall sections and a generally planar roof section.

2. A bag of flexible sheet material characterised in that it is of generally trapezoidal configuration comprising a generally planar base section, opposed inwardly converging side wall sections, opposed inwardly converging end wall sections and generally a planar roof section.

3. The bag according to claim 1 or claim 2 comprising a tubular sleeve defining the base side walls and roof sections, with end wall sections being secured to each end of the tubular section.

4. The bag according to claim 1 or claim 3 wherein the end wall sections are constituted by two substantially rectangular half sections which fold towards one another from the side wall sections or alternatively from roof and base sections to define a substantially rectangular end wall section.

5. The bag according to claim 2 or claim 3 wherein end wall sections are constituted by two unequal part sections which fold towards one another from the side wall sections or alternatively from the roof and base sections to define a truncated triangular end wall section.

6. A storage bag substantially as herein described and exemplified with reference to the

accompanying drawings.

7. In combination the bag according to any one of claims to 6 and a reinforcing harness comprising a plurality of strap elements whereof the free ends are adapted to be secured to the interior of a container, preferably to the floor thereof.

8. The combination according to claim 7 wherein the reinforcing harness includes two or more longitudinal straps extending over the end sections and roof of the bag and one or more transverse straps extending over the side wall sections and the roof of the bag.

9. The combination according to claim 8 wherein the harness comprises two longitudinal straps which diverge outwardly at the end panels of the bag towards the lower bottom corners of the bag, with a series of cross-brace straps being provided to link the outwardly diverging straps together at intervals at one or both the end zones.

10. The combination according to claim 7 substantially as herein described and exemplified with reference to the accompanying drawings.

11. A blank for forming the storage bag claimed in any one of claims 1 to 6 comprising a rectangular panel having opposed side edges and opposed end edges, and a pair of spaced part end wall panel sections projecting from each end edge, each part and wall panel sections defining side edges and an end edge adjacent part end wall panel sections being arranged so that the end edges can be joined together to constitute an end wall section of the bag.

12. The blank according to claim 11 wherein the end wall panel sections are rectangular.

13. The blank according to claim 11 wherein at each end edge of the rectangular panel the side edges of one part end wall panel section diverge outwardly towards the end edge, while the edge wall sections of its adjacent end wall section converge inwardly towards the edge section, the length of the edge sections being substantially equal.

14. A blank of sheet material for forming the storage bag claimed in any one of claims 1 to 6 substantially as herein described and exemplified with reference to the accompanying drawings.

15. A method of forming the bag claimed in any one of claims 1 to 6 comprising the steps of providing a blank of sheet material substantially as claimed in any one of claims 11 to 14, folding the rectangular panel onto itself and joining the side edges thereof to form a tubular sleeve, joining the end edges of the part and wall sections to one another to form an end wall section at each end of the tubular sleeve, and joining the side edges of the end wall sections to the end wall edges of the rectangular panel to form corner seams of the storage bag at the junction between the end wall sections and the side wall sections.

16. A method of forming the storage bag claimed in any of claims 1 to 6 substantially as herein described with reference to the accompanying drawings.

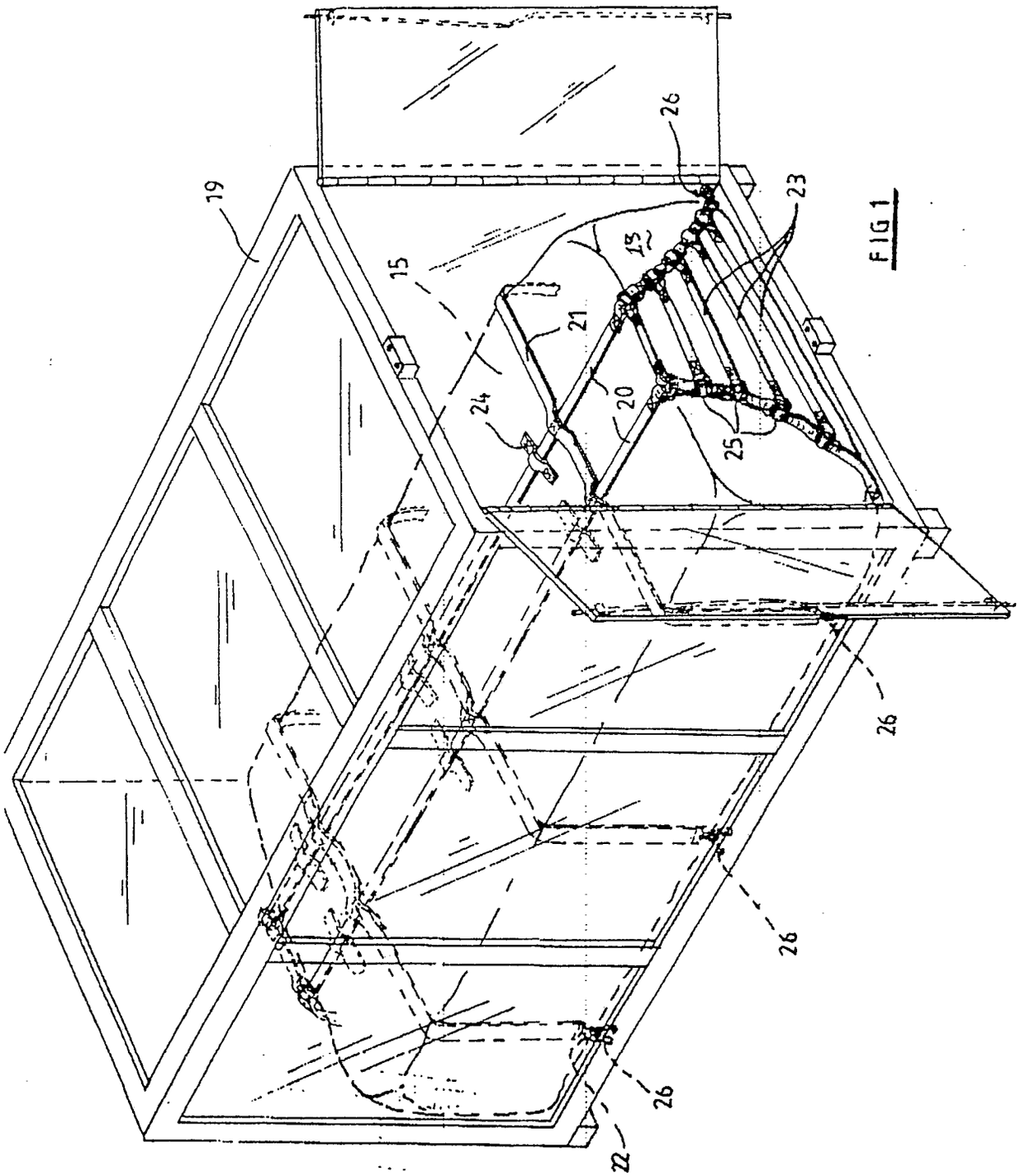


FIG 1

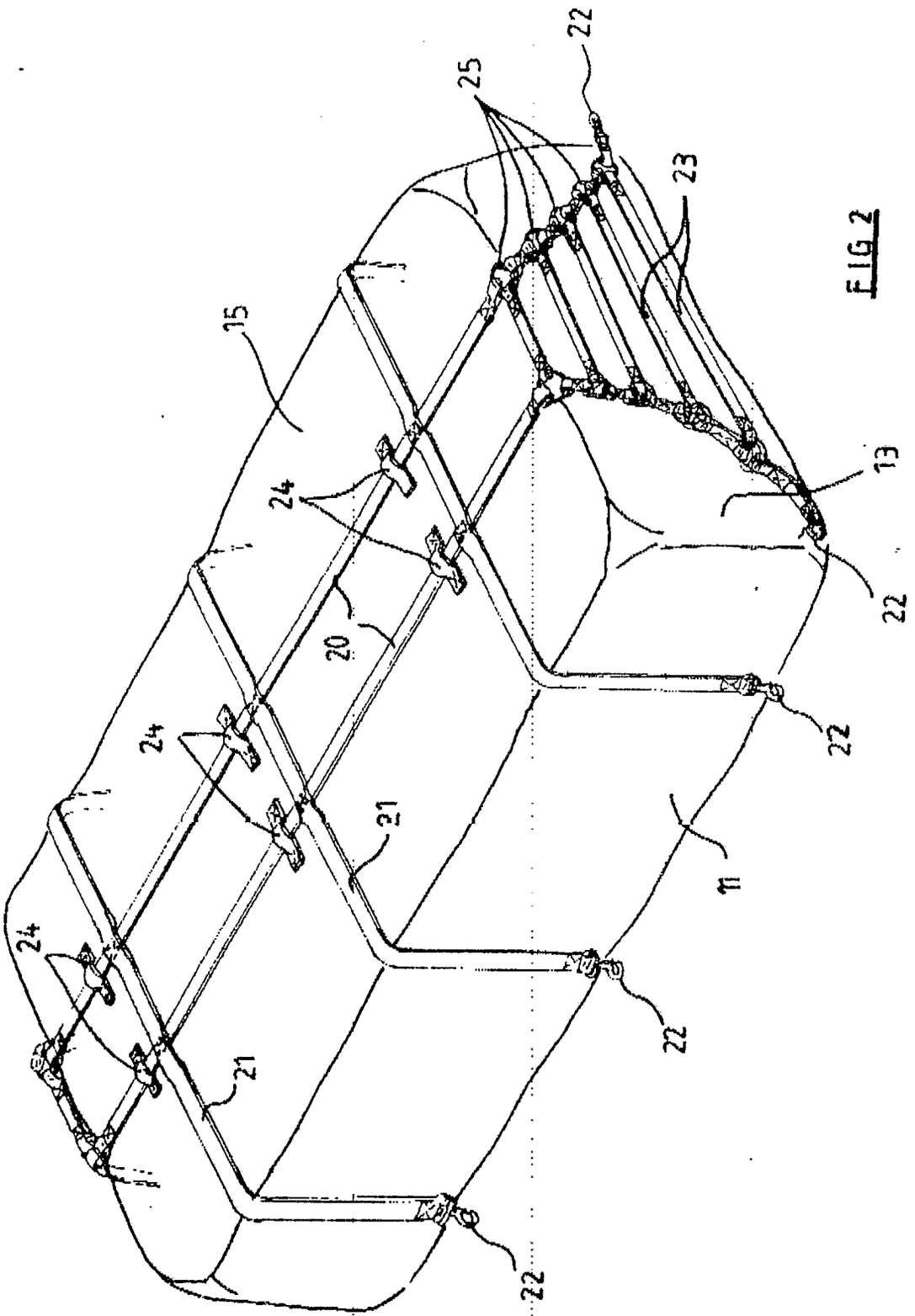


FIG 2

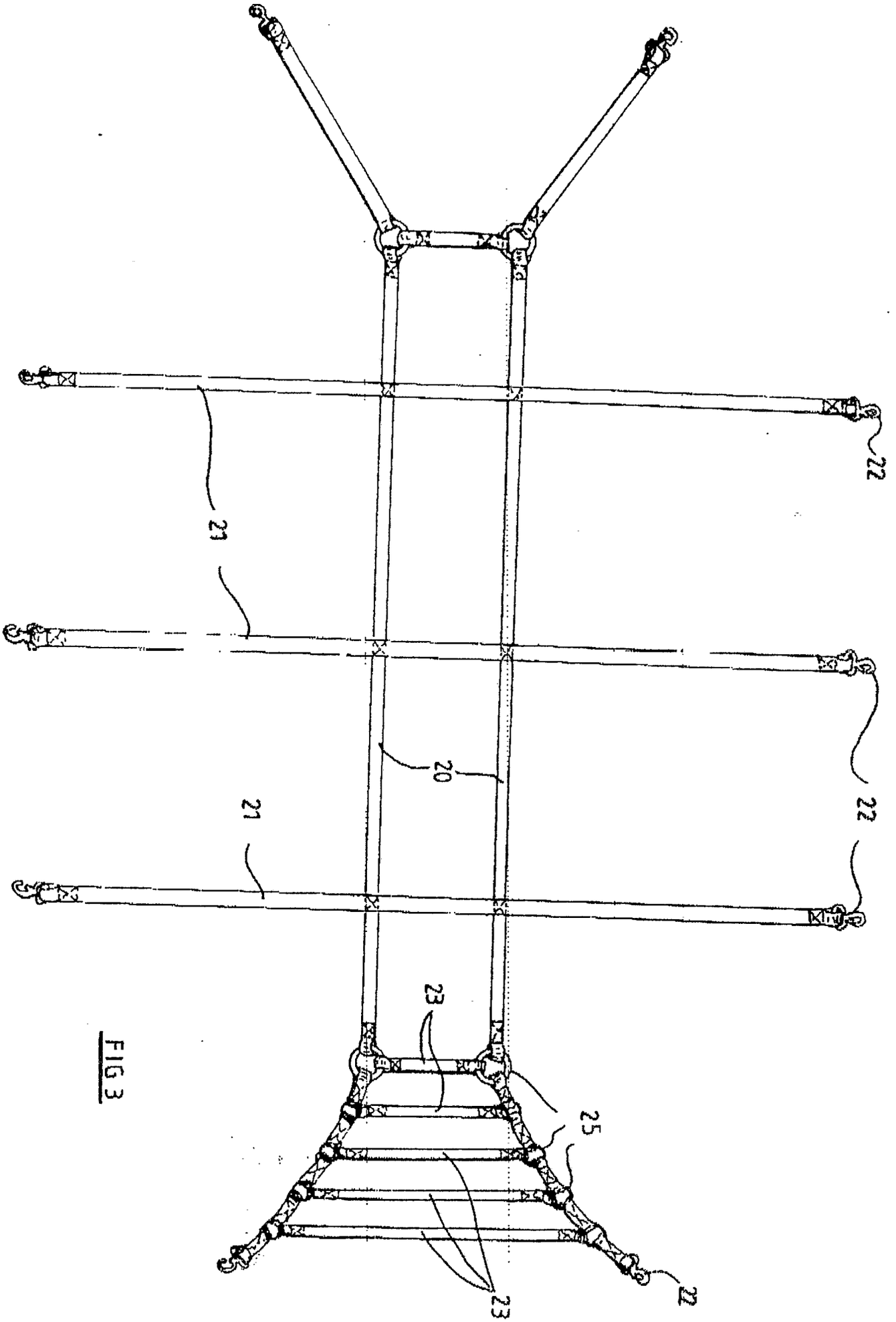


FIG 3

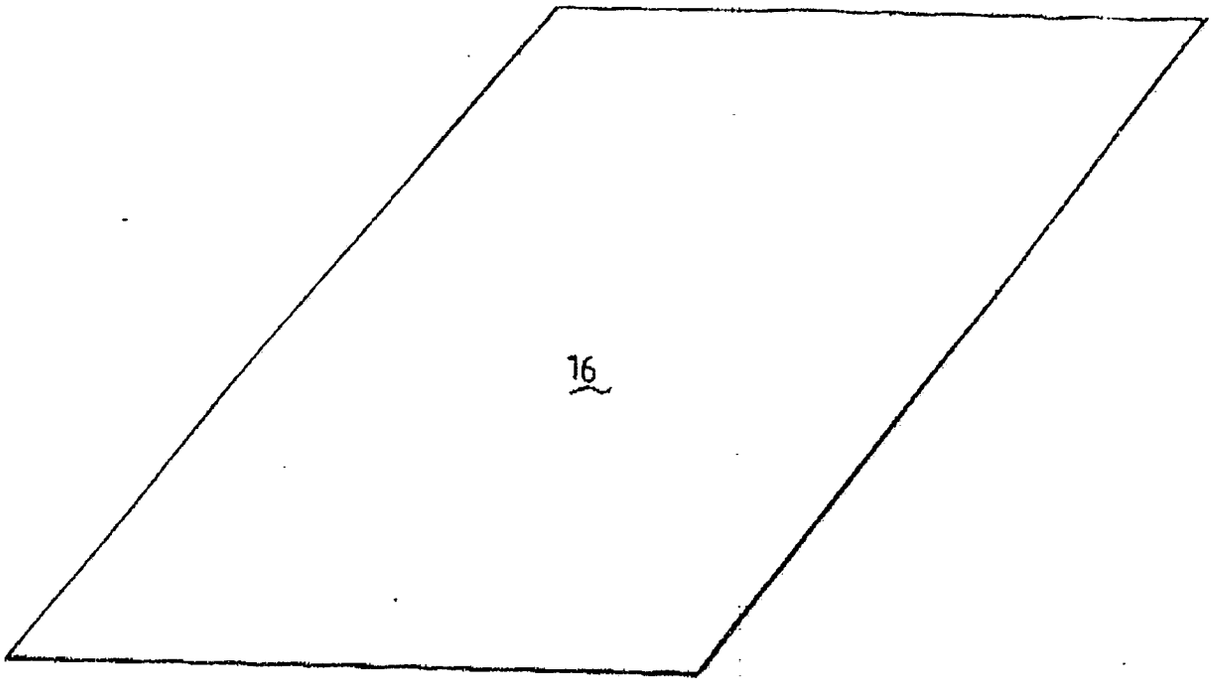


FIGURE 4

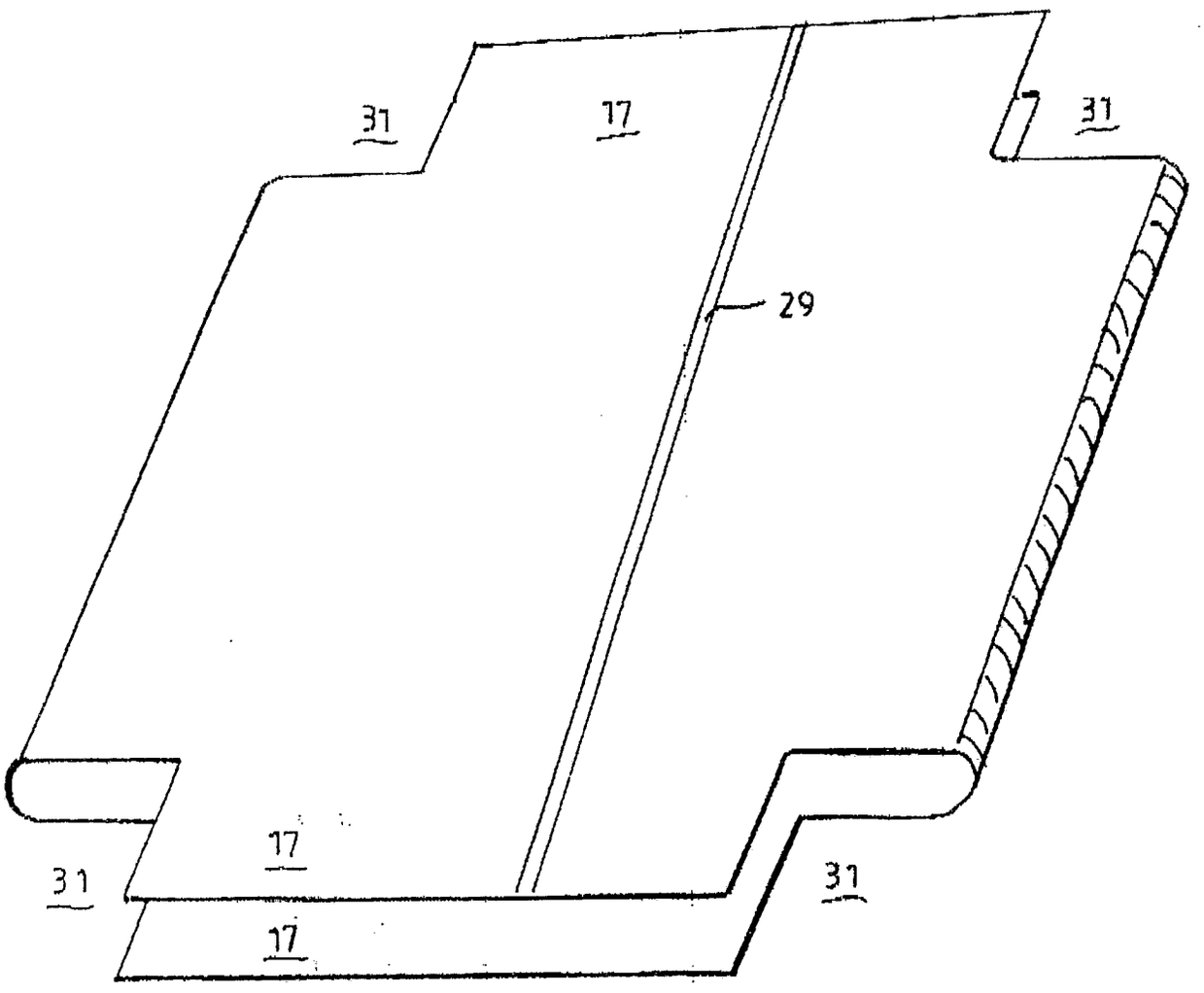


FIGURE 5

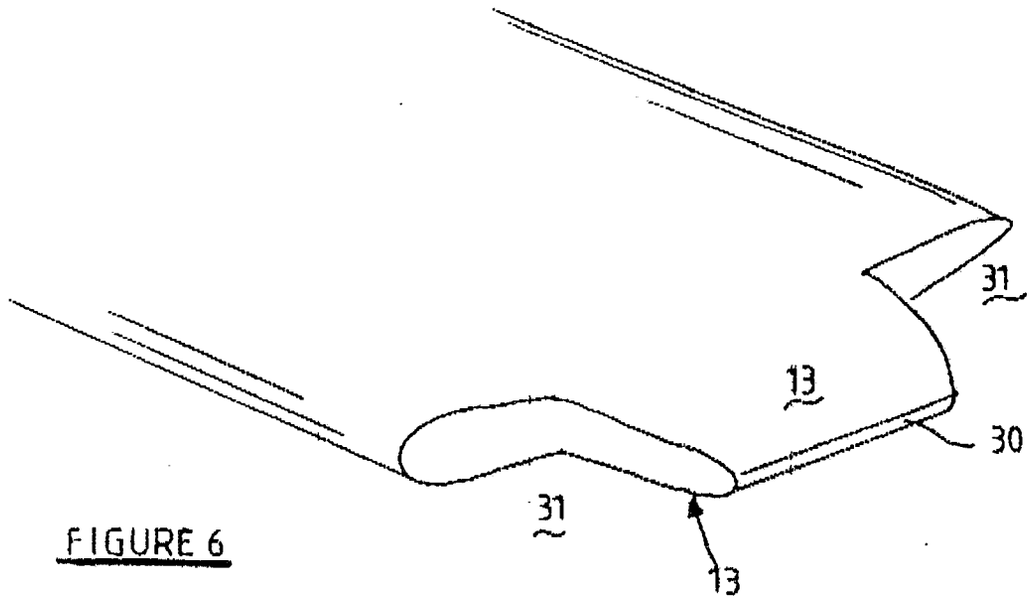


FIGURE 6

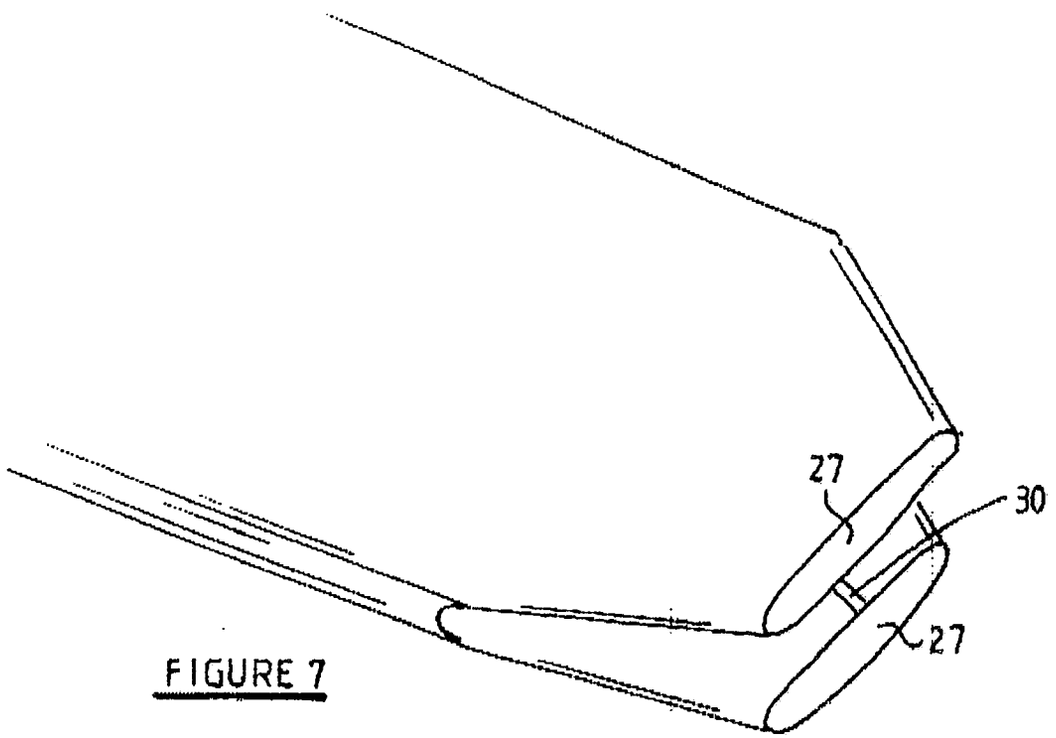
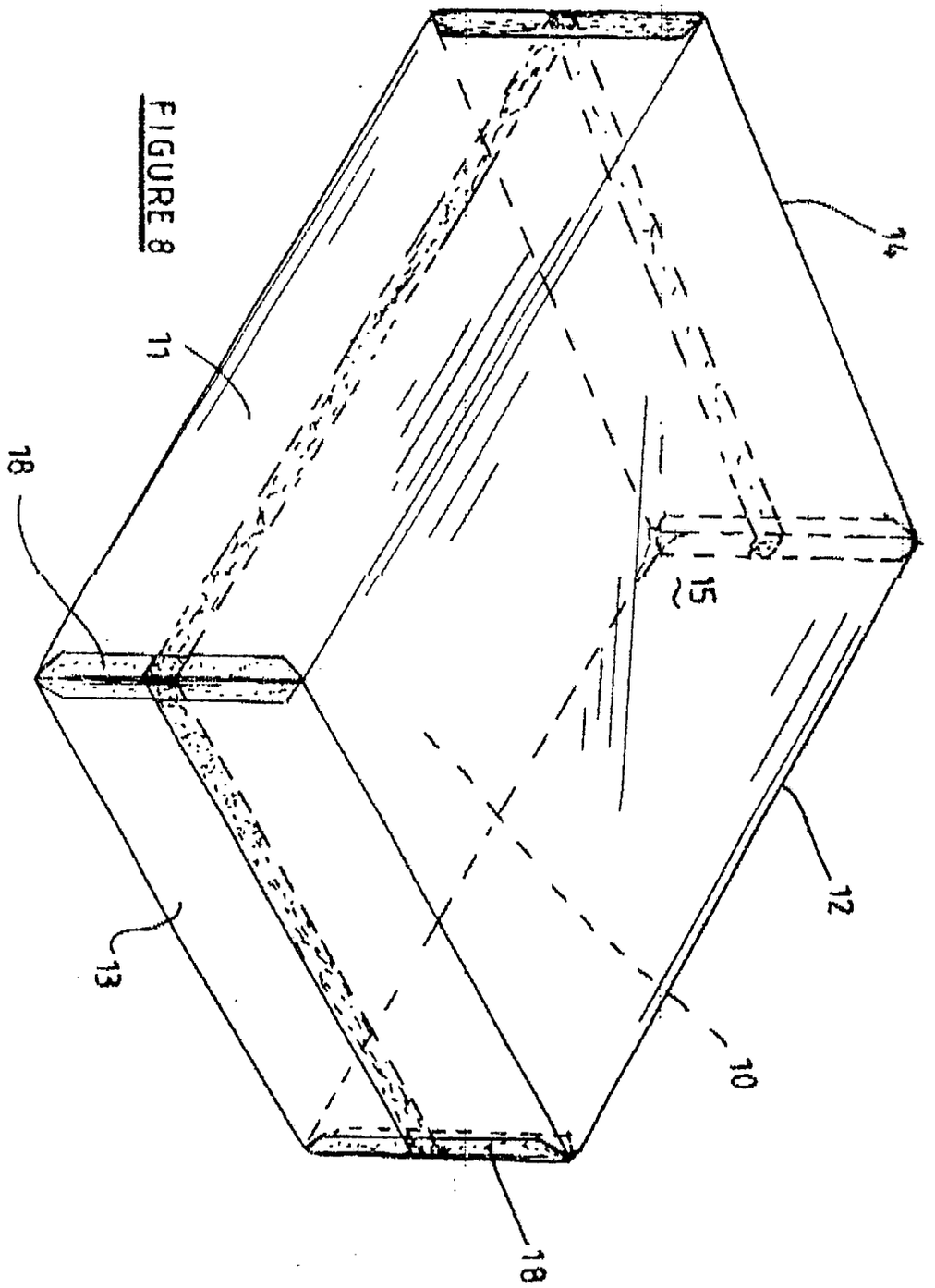


FIGURE 7

FIGURE 8



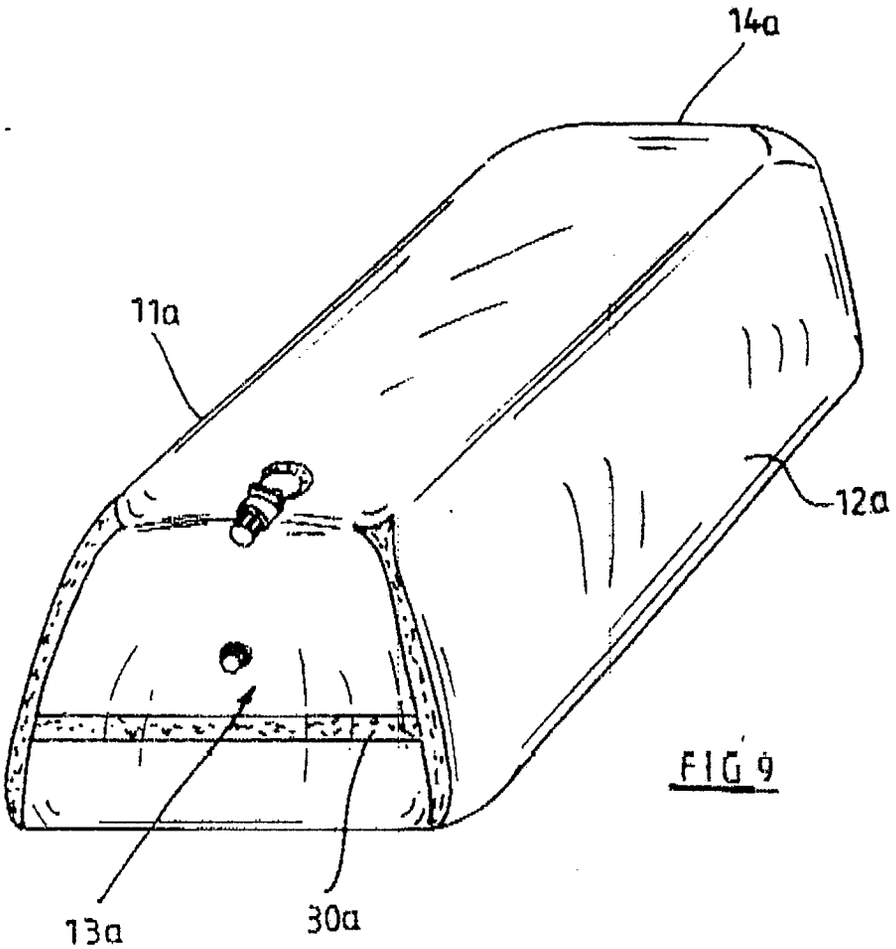


FIG 9

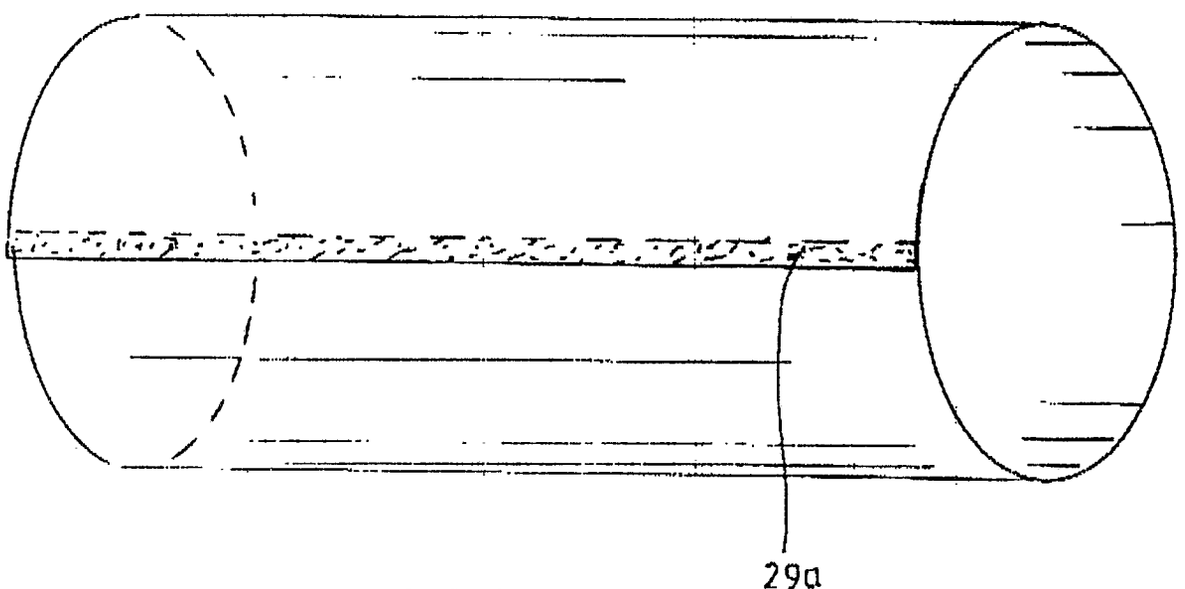


FIG 10

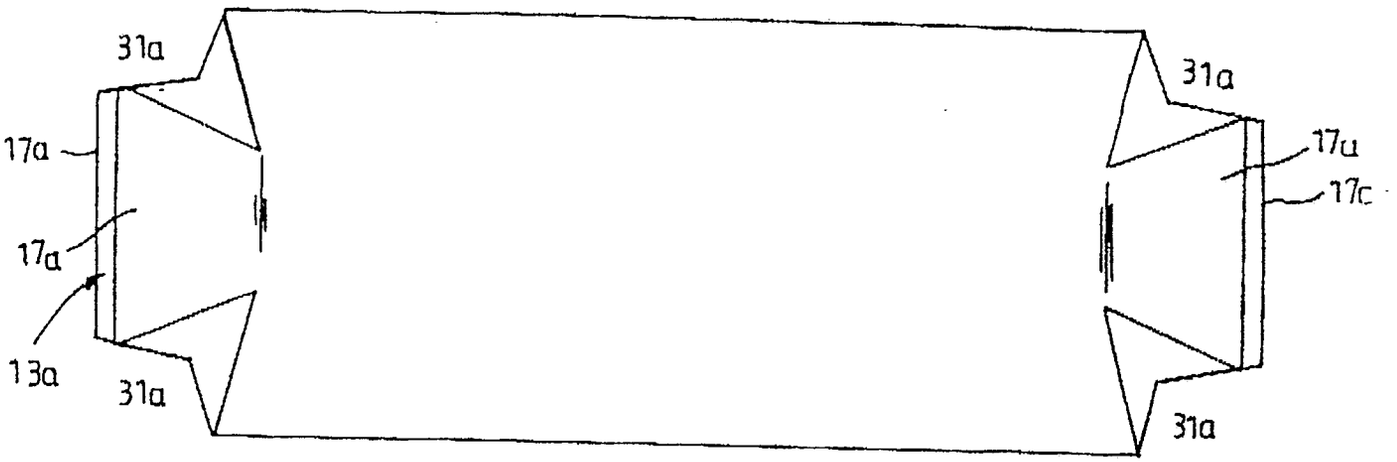


FIG 11

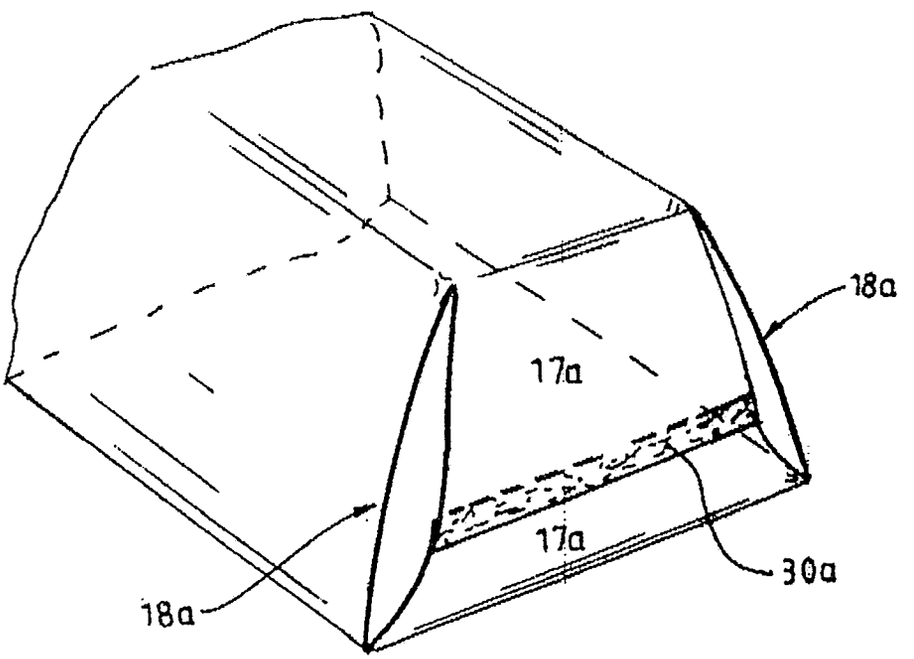


FIG 12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 2089

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	FR-A-1 290 641 (BALLONFABRIK AUGSBURG VORM. A. RIEDINGER) * Page 2, column 1, lines 6-25; figures *	1	B 65 D 88/22 B 65 D 88/16
A	---	4,6	
Y	FR-A-2 351 855 (UNIROYAL INC.) * Page 4, lines 14-23; page 5, line 25 - page 6, line 24; figures *	1	
A	---	6,7,8, 10	
A	AU-B- 117 765 (FIREPROOF TANKS LTD) * Column 3, line 14 - column 4, line 2; figures *	2,5,6	
A	---		
A	DE-A-3 123 150 (H. LISSNER) * Page 11, lines 3-9; page 14, lines 18-23; figures *	3	
A	---		
A	GB-A-1 595 227 (BRITISH HOVERCRAFT CORP.) * Page 2, lines 43-60; figures *	7,8,9, 10	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-06-1989	VAN ROLLEGHEM F.M.

CATEGORY OF CITED DOCUMENTS

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