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(54) Emergency evacuation harness.

(57) An emergency evacuation harness, such as is used for evacuating immobile patients, or similar persons, comprises longitudinal straps (14, 15) and transverse straps (11, 12) forming a grid-like structure of longitudinal and transverse loops. Attachment means (17, 18) are provided at each side of each transverse loop. Further longitudinal straps (20) extend from one end, having fastening means (21, 22, 24, 25) which are aligned with and connect to the attachment means (17, 18) when the further longitudinal straps (20) are pulled over the transverse loops to hold the patient in position. The further longitudinal straps (20) extend to form a handle loop (27). Lateral loop belts (21, 24) extending between the fastening means (22, 25) have releasable tightening means (23, 26).

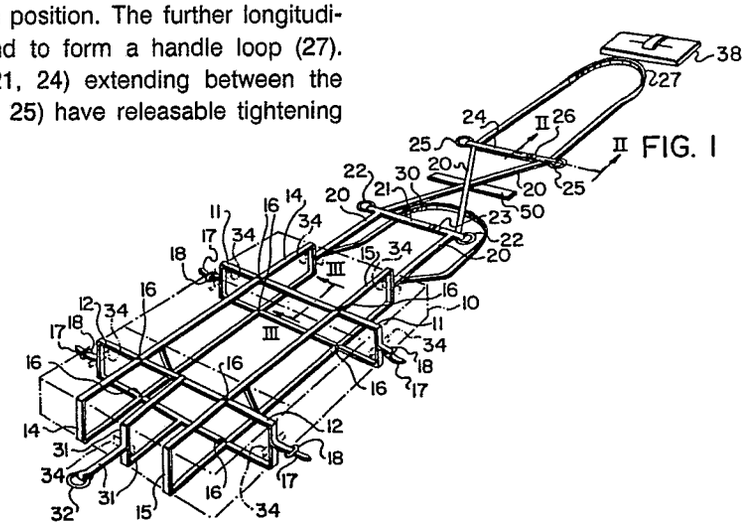

FIG. 1

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EMERGENCY EVACUATION HARNESS

This invention relates to an emergency evacuation harness, and particularly to such a harness for use in hospitals and other establishments having immobile persons, for evacuation of such persons. The invention also relates to a mattress cover embodying the harness and to a mattress incorporating the harness.

It has been proposed, for emergency evacuation of hospital patients who are bedridden, to use straps which extend under a mattress and pass up and over the patient. When the straps are tightened, the mattress is drawn up partly around the patient. A handle is provided at one end, or both ends, for pulling the mattress and patient to a safe place.

In some arrangements, straps are positioned beneath the mattress, extending laterally. A sufficient length must be provided to pass up and over the patient and mattress, the ends often hang down, being inconvenient, and interfering with cleaning. In other arrangements, a sheet of material is positioned below the mattress, with lateral straps being attached to the sheet of material. Again, enough length of strap must be provided to extend up and over the patient and mattress. It has been proposed to provide retaining means at the sides of the mattress to hold the excess lengths of strap, until needed. Where a sheet of material is provided, the straps can be held on the material, in a folded condition. Straps extending over the ends of the mattress are also provided to position the patient longitudinally on the mattress when the straps are in use. Again, provision can be made to hold these straps against hanging down when not in use.

The present invention provides a harness which can be fitted around a mattress, with external longitudinally extending straps which are normally stored at one end, but which, in use, extend over the mattress, and the patient, from one end to the other end. The longitudinal straps are provided with fastening means for engaging with attachment means on the harness at the sides of the mattress. The longitudinal straps extend to the other end of the mattress and form a handle for pulling the mattress along.

Broadly, the invention comprises a harness having a plurality of transverse straps forming transverse loops, at least one longitudinal strap forming a longitudinal loop, the transverse and longitudinal straps forming a grid-like structure, with attachment means on said transverse loops at each side; and further external longitudinal straps extending from one end of the longitudinal loops, the further external longitudinal straps including fastening means engaging with the attachment means when the further, external, longitudinal straps are positioned over a mattress, extending to the other end of said longitudinal loops and forming a handle at said other end.

In a particular embodiment, the harness is attached to the inside of a mattress cover, the mattress cover being open at the end remote from the further external straps, so that a mattress can be pushed into the cover. Conveniently the open end is closed by flaps having hook and loop fastening material, such as is sold under the trade mark "Velcro".

The invention will be readily understood with the following description of certain embodiments, by way of example, in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of one form of harness in accordance with the invention;

Figure 2 is an enlarged section on the line 2-2 of Figure 1;

Figure 3 is an enlarged section on the line 3-3 of Figure 1;

Figure 4 is a perspective view of an alternative embodiment;

Figure 5 is a perspective view showing the system of the present invention in operation for evacuation purposes; and

Figure 6 is a view similar to Figure 5, but showing evacuation using an opposed end of the mattress.

In Figure 1, a mattress is illustrated in dotted outline at 10. A harness, in accordance with the present invention, comprises, in the example illustrated, two transverse straps 11 and 12 which are in the form of transversely extending loops. Also, in the example illustrated, two longitudinal straps 14 and 15 form two longitudinally extending loops. Where the transverse loops and the longitudinal loops cross each other, indicated at 16, they can be connected together, as by stitching or other means.

At each side, extending from each transverse loop, is a short strap 17, having a buckle or some other form of fastener, such as snap-hook fastener 18 at the other end. The short strap 17 can be separate sections of strap or can be formed by folding the transverse straps 11 and 12 back on themselves.

At one end of the mattress extend two further, longitudinally extending straps 20. These straps 20 extend for a short distance parallel to each other, being joined at the ends of the parallel sections by a first lateral loop belt 21 having a ring 22 at each end and a buckle 23 intermediate the ends. The

straps 20 then cross over, and are then connected by a further lateral loop belt 24 having a ring 25 at each end and a buckle 26 intermediate the ends. The straps 20 then continue, being joined at the other ends to form a loop 27 which will serve as a handle. The lateral loop belts 21 and 24 are positioned such that when the straps 20 are brought up and over to overlie the mattress, and a patient on the mattress, the loops 22 align with fasteners 18 on transverse strap 11, and loops 25 align with fasteners 18 on transverse strap 12 and are attached to the fasteners. The belts 21 and 24 can be tightened by means of the buckles 23 and 26. A further looped strap 30 can be provided at this end to act as a handle. At the other end a strap 31 and loop 32 extend and can be used to assist with pulling the mattress, and patient, in cooperation with a handle loop 27, the straps 31 extending to and being connected to the transverse strap 12.

A cross section through the buckle 26 is illustrated in Figure 2. The loop 25 is shown attached to belt 24. Belt 24 extends in three layers, the end 24a being in the center, and extending through the buckle 26, back over as an outer section 24b, through loop 25 and back, as section 24c, across to the other side, where it passes through the other loop 25. The end then returns, passes through and back out of the buckle, the free end being shown at 24d. Pulling on the free end 24d will tighten the belt. A similar structure occurs for belt 21, loops 22, and buckle 24. One of the straps 20 is also shown in Figure 2, the strap 20 and belts 21 and 24 being connected together where they cross, as by stitching.

The harness can be made of a unit which is fitted over a mattress, a mattress cover then being pulled over the mattress and harness. Openings will be required in the mattress cover, sides and ends, for the loop handle 27, strap 30, straps 20, straps 17 and fastener 18, and belts 21, and loops 32, as indicated in dotted outline at 34.

In an alternative arrangement, the harness can be part of the mattress cover, the straps 11, 12, 14, 15 and 31 extending through channels formed on the mattress cover, for example. This is illustrated in Figure 3, where transverse strap 11 is shown in a channel 35 formed by attaching a strip of material 36 to the mattress cover 37. Again, access as by the openings 34, is required for the loop handle 27, strap 30, straps 20, straps 17 and loops 18, and straps 31 and loop 32. A convenient manner of providing such access is by zip fasteners or by some other form of slit which can be readily opened and closed. The straps, and loops, can then be stored inside the mattress cover until required. The straps 20, belts 21, and 24, the loops and buckles, strap 27 and strap 30 can be stored in a case, shown at 38, which can be attached to the end of the mattress cover.

In a further alternative arrangement, the harness is part of the mattress cover, with the harness being attached to the inside surface of the cover by, for example, sewing, at spaced apart positions. As illustrated in Figure 4, in which the same reference numerals are used for items common to Figures 1 and 2, the harness can be attached to the cover at the cross over points 16. As shown in Figure 4, the cover is openable at the end remote from the further longitudinally extending straps 20, being closed by flaps 40, 41, 43 and 47.

To insert a mattress, the loop ends 44 of the longitudinal straps 14 and 15 are moved apart for insertion of the mattress (10). After the mattress (10) is in position, the loop ends 44 are pulled round to extend over the mattress end. The opening is then closed by folding in the flaps (40, 41, 43, 42). The flaps (40, 41, 43, 42) have hook and loop fastening material attached thereto as indicated at 45. By folding in the side flaps 40 and 41, then folding up flap 42 and folding down flap 43, the opening is securely fastened closed, but is readily re-opened.

A further strap and loop, as at 31 and 32 in Figure 1, can be provided, but the strap 31 must be capable of being moved out of the way for insertion of the mattress. A suitable slit would be provided in flap 45.

The number of transverse straps can vary, more than two being provided. The form of the further longitudinally extending strap 20 and lateral loop belts 21 and 24 can also be varied. Only one longitudinal belt might be provided, with a single point of attachment of both ends of straps 20. The objective of the straps 20 and belts 21 and 24 is to safely retain the patient on the mattress while being moved. A single person can pull on the mattress by using the handle loop 27, in combination with loop 32. If the strap 30 is provided, this provides for a further person to assist in controlling movement, as down stairs, for example.

A strip of "Velcro" material 50 can be attached to the straps 20 where they cross over, the strip extending generally laterally. This strip 50 can be wrapped round the wrists or lower arms just above the wrists of a patient to immobilise and thereby protect the arms and hands, if the arms of the patient are outside the bed clothes.

The harness can be applied in various ways. Thus, it can be applied over a mattress, which may be of a synthetic foam or other material safe to use. The harness can be positioned over the mattress and then a removable mattress cover positioned over the harness and mattress. In modifications as mentioned above, the harness can be attached to and be part of the removable mattress cover. Existing mattress covers can often be adapt-

ed, or readily adaptable, to the use of the harness, for example, by the provision of slits through which the various straps can extend. In such an arrangement, the harness is positioned over a mattress with a manual cover used and a further cover applied, with slits or similar openings for the straps.

Instead of a case 38, the straps 20, belts 21 and 24, wrap buckles, strap 30 and strap 27 can be stored inside the end of the mattress cover. Alternatively, the case 38 can be stored inside the mattress cover, holding the belts, etc.

Illustrated in Figures 5 and 6 are methods of securing a patient in a mattress, and, as shown, the position of the patient's head relative to the mattress and harness does not influence the effectiveness of the harness assembly.

The harness is enclosed, and during normal use, the mattress is completely covered, causing no inconvenience and is kept clean. No problem is met when the harness is needed as the straps 17 and fasteners 18 are inside the bed and will not create any problem by having to be threaded back through a bed frame before being fastened.

The straps of the harness can be of various materials, such as a webbing of cotton or synthetic material, rubber, including synthetic rubber, leather, or other material. Use of the mattress fitted with such a harness in a sensitive area, such as in operating rooms, will require the selection of specific materials for the harness to eliminate the possible hazard of static electricity.

Claims

1. An emergency evacuation harness for fitting around a mattress (10) for moving immobile persons, said harness comprising:
a plurality of transverse straps (11, 12), each forming a transversely extending loop;
at least one longitudinal strap (14 or 15) forming a longitudinally extending loop, said longitudinally extending loop and said transversely extending loops forming a gridlike structure;
attachment means (17, 18) on each of said transverse loops, said attachment means (17, 18) positioned at each side;
further longitudinal straps (20) extending from one end, and connected to said longitudinally extending loop at said one end;
fastening means (22, 25) on said further longitudinal straps (20), said fastening means (22, 25) positioned to align with and connect to said attachment means (17, 18) when said further longitudinal straps (20) extend over said transversely extending loops from said one end to the other end.

2. A harness as claimed in Claim 1, characterized in that two longitudinal straps (14, 15) are included, forming two longitudinally extending loops, and a further longitudinal strap (20) extends from and is connected to one end of each longitudinally extending loop.

3. A harness as claimed in Claim 1, characterized in that said further longitudinal straps (20) extend to form a loop (27).

4. A harness as claimed in Claim 1, characterized in that transverse belts (21, 24) are included, which extend laterally between said attachment means (17, 18), with an attachment means (17, 18) at each end of each transverse belt (21, 24).

5. A harness as claimed in Claim 1, characterized in that said attachment means (17, 18) includes a fastener (18) connected to said transverse straps (11, 12) by short straps (17).

6. A harness as claimed in Claim 4, characterized in that said transverse belt (21 or 24) includes releasable tightening means (23 or 26), respectively.

7. A harness as claimed in Claim 1, characterized in that an additional strap (30) is included at said one end, the additional strap (30) forming a handle.

8. A harness as claimed in Claim 1, characterized in that a strap (20) is included, which extends from said other end and is attached to a transverse belt (21 or 24), and a loop (27) at a free end thereof.

9. A harness as claimed in Claim 1, characterized in that said longitudinal straps (14, 15) and transverse straps (11, 12) are connected together at cross over positions (16).

10. A harness as claimed in Claim 1, characterized in that said harness is adapted to fit around a mattress (10) beneath a mattress cover (37).

11. A harness as claimed in Claim 10, characterized in that the straps (11, 12, 14, 15, 31) extend in pocket channels (35) on an inner surface of said mattress cover (37).

12. A harness as claimed in Claim 10, characterized in that access openings (34) are included at sides and ends of said mattress cover (37) for access to said attachment means (17, 18) and said further longitudinal straps (20).

13. A harness as claimed in Claim 12, characterized in that said access openings (34) comprise openable and closable slits in said mattress cover (37).

14. A harness as claimed in Claim 1, including a mattress cover (37), characterized in that transverse straps (11, 12) and longitudinal straps (14, 15) are attached to the mattress cover (37).

15. A harness as claimed in Claim 14, characterized in that said harness is attached to an inner surface of said mattress cover (37), and has an opening (34) at an end remote from said one end, and means (40, 41, 42, 43, 45) for closing said

opening (34).

16. A harness as claimed in Claim 15, characterized in that said opening (34) is rectangular, and has means (40, 41, 42, 43, 44, 45) for closing said opening (34) comprising a plurality of flaps (40, 41, 42, 43), one on each side of said opening (34), and means (45) for releasably holding said flaps (40, 41, 42, 43) in an overlapping closed position.

17. A harness as claimed in Claim 16, characterized in that said means (45) for releasably holding said flaps (40, 41, 42, 43) comprises hook and loop material.

18. A harness as claimed in Claim 1, characterized in that a case (38) is included at said one end, said further longitudinal straps (20) and fastening means (22, 25) are stored in said case (38).

19. A harness as claimed in Claim 4, characterized in that a case (38) is included at said one end, said further longitudinal straps (20), said transverse belts (21, 24) and said fastening means (22, 25) are stored in said case (38).

20. A harness as claimed in Claim 14, characterized in that a mattress (10) is included in said mattress cover (37).

21. The harness of Claim 1, characterized in that said harness is incorporated into a mattress cover (37) adapted to be mounted on a mattress (10).

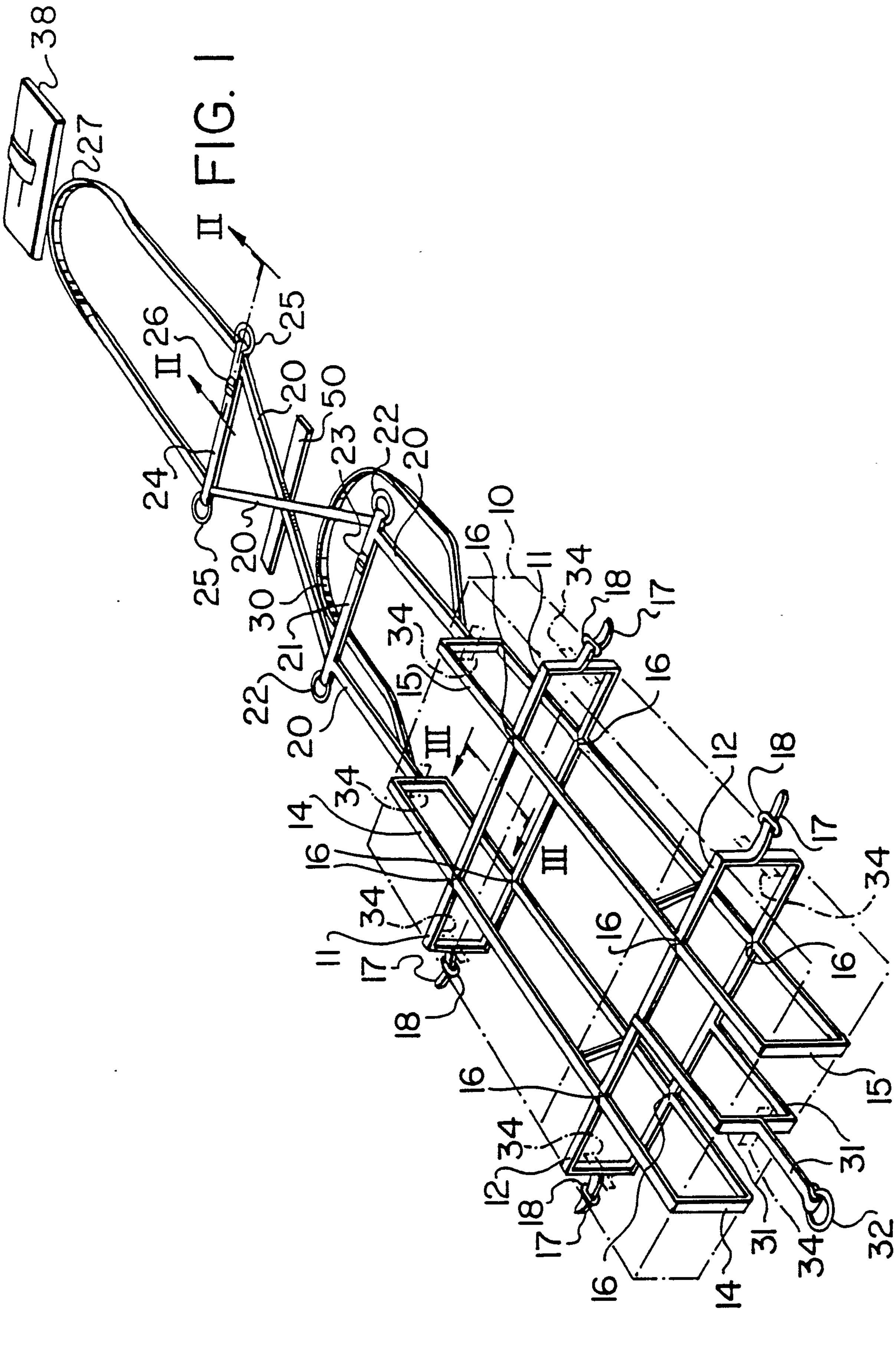


FIG. 1

FIG. 3

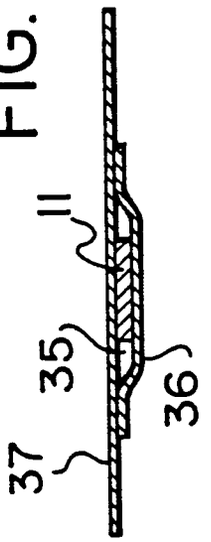
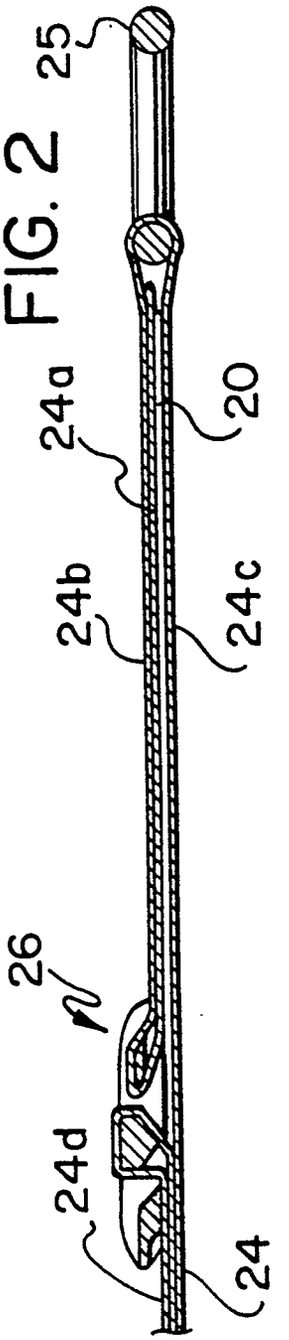


FIG. 2



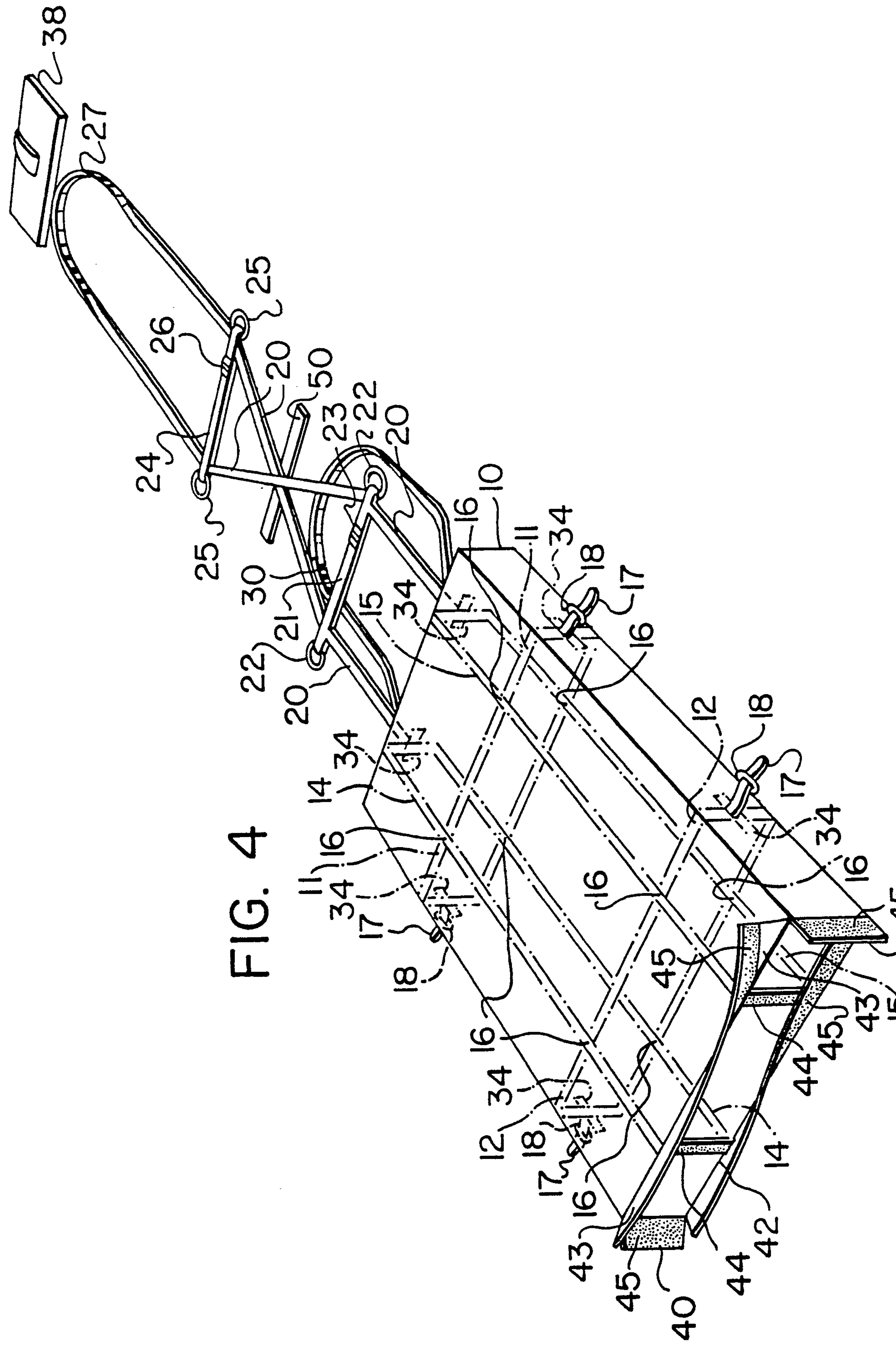


FIG. 4

FIG. 5

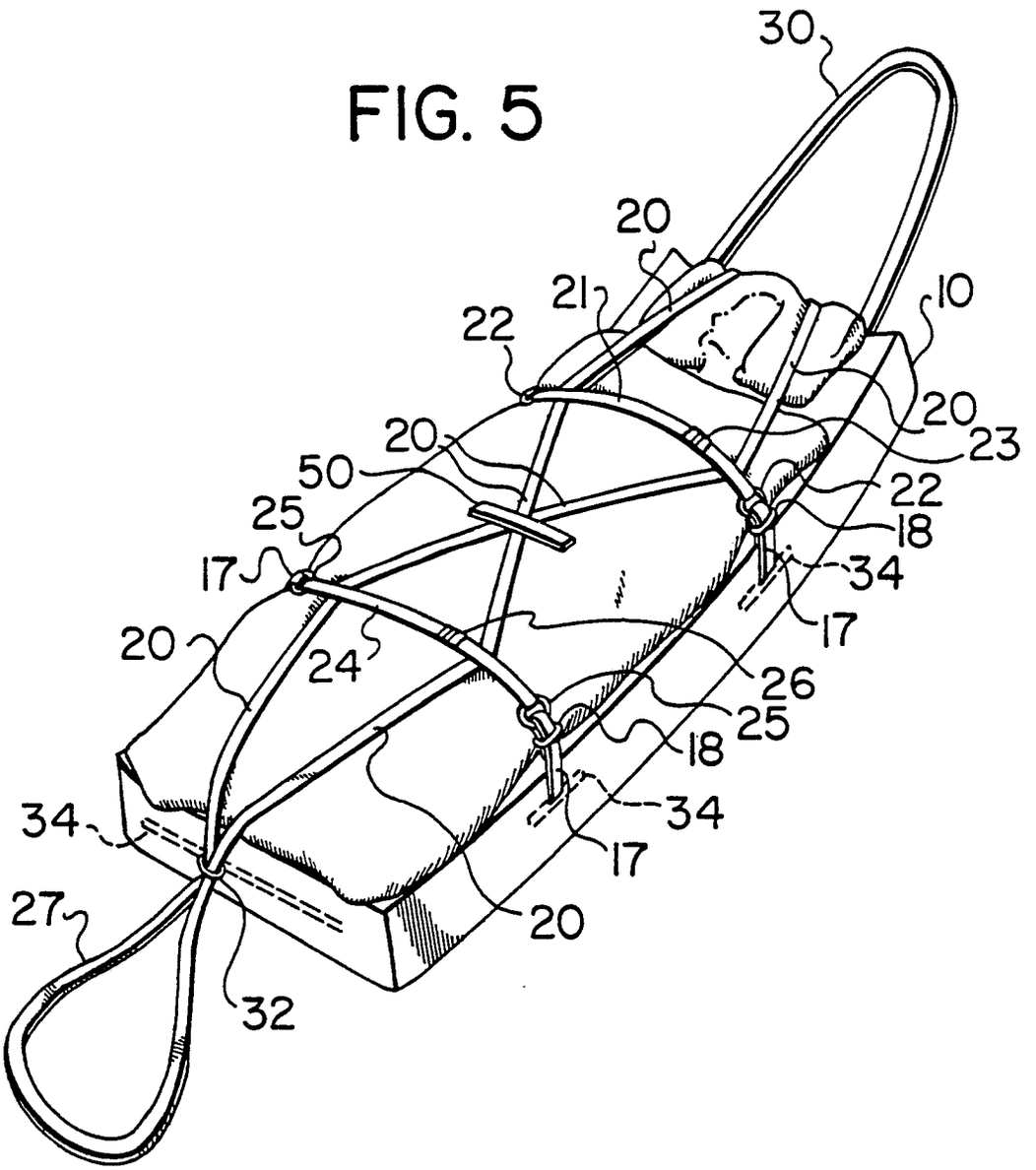

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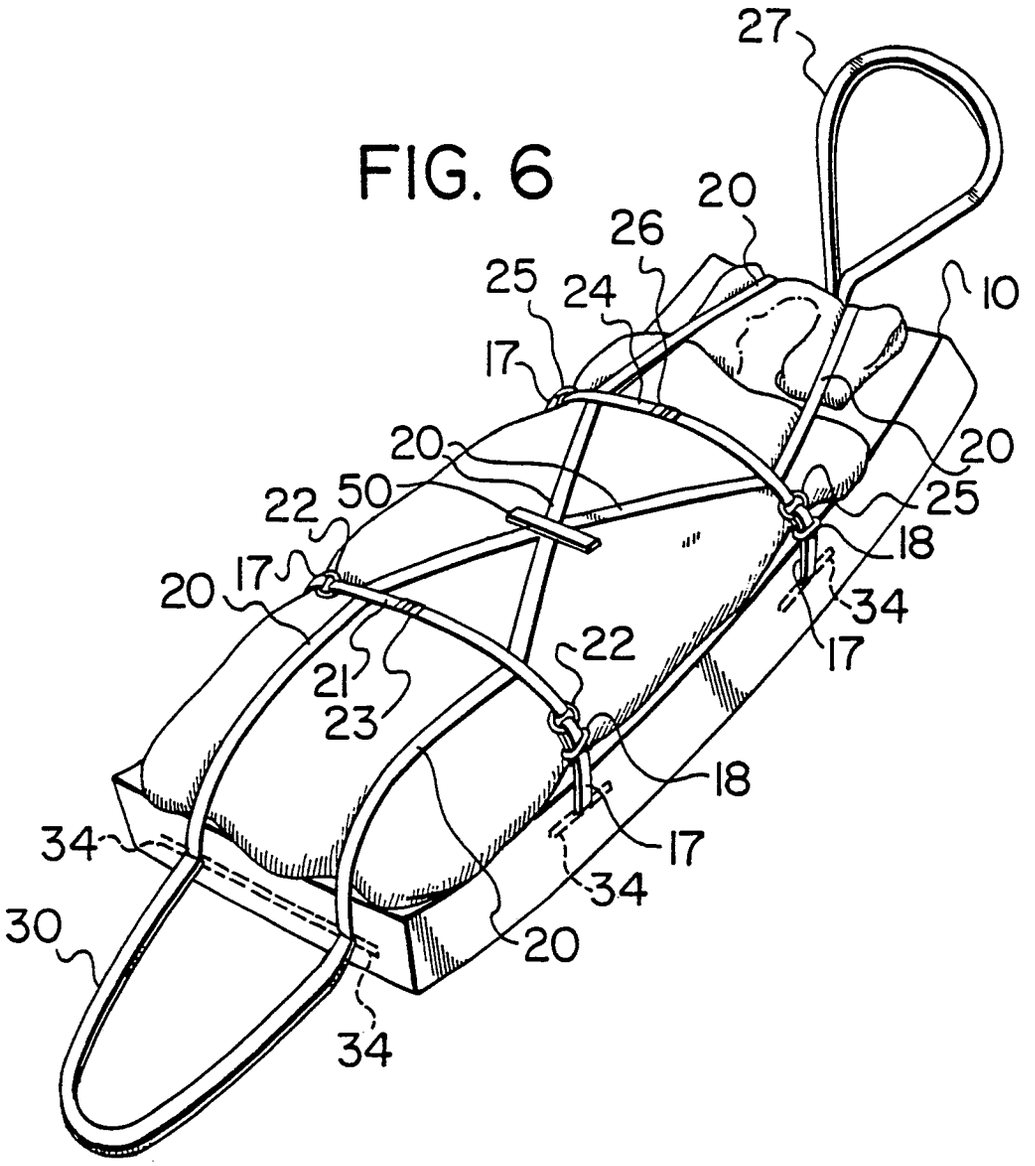
FIG. 6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EUROPEAN SEARCH REPORT

Application Number

EP 89 20 2693

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.5)
A	GB-A-1 584 102 (GABRIEL AND HOPE) * The whole document * ---	1	A 61 G 7/05 A 47 C 31/08 A 62 B 5/00
A	GB-A-1 434 832 (GREEN) * The whole document * ---	1	
A	GB-A-1 503 144 (NAT. RESEARCH DEV. CO.) * The whole document * ---	1	
A	GA-B-2 030 047 (GREEN) * The whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 61 G
A 47 C
A 62 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-01-1990	BAERT F.G.

CATEGORY OF CITED DOCUMENTS

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