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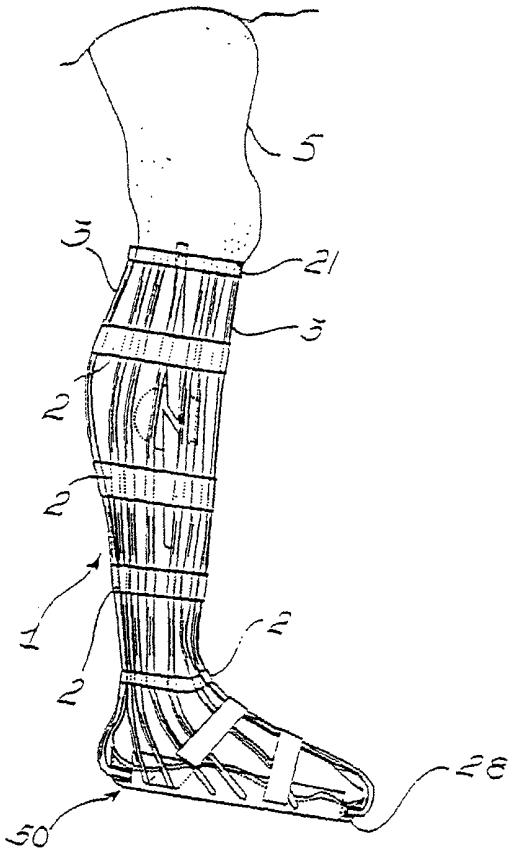
(54) Title: A STIFFENED BANDAGE FOR PROTECTING AND/OR IMMOBILISING INJURED PARTS OF THE BODY



(57) Abstract: A stiffened bandage for protecting and/or immobilising injured parts of the body to aid medication comprises, in mutual co-operation, one or more flexible tie-down tapes (2), and a plurality of elongated stiffening elements (3), plastically deformable, held transversely in mutual adjacent consecutive positions by said tie-down tapes positioned mutually distanced; said tie-down tapes (2) being provided at least at their respective extremities with means for releasable connection (23; 24). The bandage further comprises a support (50; 150), having an upper surface (59) for bearing the sole of a patient's foot and means for removably fastening lower extremities (28) of the elongated stiffening elements (3).

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Description

A Stiffened Bandage for Protecting and/or Immobilising Injured Parts of the Body

Technical Field

The present invention relates to a stiffened bandage for protecting and/or immobilising injured parts of a living body, be it human or animal, as an aid to the necessary medication.

Background Art

Currently, the term "stiffened bandage" means a composite bandage, generally gauze with starch added, sprinkled with gypsum powder. After being moistened, by being immersed in lukewarm water, this composite stiffened bandage, wound about a limb or another part of the body, protects it and immobilise it. However, such immobilisation, which is suitable for closed fractures, is not appropriate to bandage fractured parts with wounds, possibly laceration-contusions, which require immobilisation, but also the frequent monitoring of the wounds. There are many cases in which the current stiffened bandage is not at all suitable, such as traumatic wounds, abrasions, laceration-contusions, localised burns, infected wounds, varicose ulcers, diabetic ulcers. In such cases, which require specific treatments, healing would be aided by bandages that on one hand protect the injured part against contact with external ages, or with the parts of the bandage themselves, and on the other hand allow exposure to air to reach a rapid healing.

Transpiring gauze types are known, prepared to adhere to the skin whilst letting air pass through. However, no means are known which may be suitable to hold a bandage detached from the medication, nor are any means known for stiffening or immobilising the part except for the typical prior art means used for fractures or sprains, in which one proceeds empirically by inserting reinforcing splints in the

gauze to immobilise the affected part.

Description of Invention

The present invention therefore aims at meeting the aforementioned requirements which emerge in various sectors of medicine, in particular in those falling within the scope of first aid, orthopaedics and traumatic or elective neurosurgery, surgery and clinical medicine, sports medicine, as well as veterinary.

The invention, as it is characterised by the claims that follow, solves the problem of providing a stiffened bandage for protecting and/or immobilising injured parts of the body to aid medication, which, from a general viewpoint, is characterised in that it comprises, in mutual co-operation, one or more flexible tie-down tapes and a plurality of plastically deformable elongated stiffening elements, held transversely in mutual consecutive adjacent positions by said one or more tie-down tapes; said tie-down tapes being provided at least at their respective extremities with means for mutual adjustable and releasable connection.

The elongated stiffening elements in the number and in the position required by their particular application, sufficiently held by the tie-down tapes, can serve as stiffeners of the part of the body and at the same time act as spacers, suitably deformed to move away from the precise point of the lesion in the part of the body which must remain exposed to air.

In particular, the bandage further comprises a support, having an upper bearing surface for the sole of the foot of a patient and means for the removable fastening of lower extremities of the elongated stiffening elements. Advantageously, the support is provided with means for holding and adapting the elongated stiffening elements to the patient's foot.

The advantages of a bandage according to the invention are multifold:

- considerable simplicity and speed of application and removal;
- possibility of re-use after washing and sterilisation;
- adaptation of the bandage to the required rigidity through a replacement of the

type and section of the elongated stiffening elements, taking into account their ability to be modelled as needed at the time of use;

- possibility of using the bandage for immobilising limbs and their joints;
- various modes for supplying the components of the bandage, both in kit form and loose;
- ease of fabrication;
- very low cost with respect to the importance and usefulness of the bandage.

Description of the Drawings

Further features and advantages of the invention shall become more readily apparent from the detailed description that follows of a preferred embodiment, illustrated purely by way of non limiting example, in the accompanying drawings, in which:

- Figure 1 shows a schematic plan view of a bandage according to the present invention;
- Figure 2 shows a perspective schematic view of a portion of bandage according to the present invention;
- Figure 3 shows a lateral schematic view of a first application of the bandage according to the present invention to the finger of a hand;
- Figure 4 shows a lateral schematic view of a second application of the bandage according to the present invention to the finger of a hand;
- Figure 5 shows a lateral schematic view of an application of the bandage according to the present invention to an upper limb;
- Figure 6 shows a lateral schematic view of an application of the bandage according to the present invention to a lower limb;
- Figure 7 shows a longitudinal section in enlarged scale of a portion of the bandage of Figure 6;
- Figure 8 shows a perspective schematic view of a support of the bandage of Figure 6.

Description of the Illustrative Embodiment

With reference to Figures 1 and 2, a stiffened bandage for protection and/or immobilisation according to the invention, globally indicated as 1, comprises tie-down tapes 2 and elongated stiffening elements 3.

The tie-down tapes 2 are constituted by strips or the like of flexible, practically inextensible material, fabric, synthetic material or similar suitable material, preferably suited for sterilisation. Said tapes can be in the number of one (Figure 2) of adequate height, in case of application of the bandage to anatomical parts of small dimensions, for instance a finger. Preferably, however, said tapes 2 are at least two, mutually distanced (Figure 1), they have width and length defined by usage requirements, for instance to encompass a limb. Otherwise the tapes 2 can be portions of a continuous belt, able to be cut to measure.

The tie-down tapes 2 are provided at least at their extremities with means for releasable connection. Such means for releasable connection, indicated in Figure 1 with the numbers 23 and 24, mutually connect the opposite extremities of each of the tie-down tapes, or else connect the extremities of the tapes to the living body, about the part affected by the bandage. In the case of mutual connection, the connecting means are constituted by rapid closure devices, for instance formed by mutually engageable hooks and loops, the so-called Velcro closures. Such closures can be distributed uniformly over the entire length of each tape, obviously on opposite faces thereof, to allow their presence at the extremities of the tape, whatever its cut length.

The choice of the type of releasable connection means and their disposition must also allow a certain degree of adjustment of the means to obtain a more or less forced/stretched connection, as needed, about the affected part. This adjustment capability is for instance offered by said Velcro closures.

If the tapes are applied directly to a part of the body, said connecting means can be integrated or replaced by application means, constituted by common adhesive tapes, for instance bi-adhesive, integrated or applied to the tapes (not shown for the sake of simplicity in the drawings). Such connecting means, in this application case,

can in practice also be constituted by elastic bands with annular shape.

It should be understood that both the connecting means and the applying means serve the purpose of correctly positioning and holding with the required pressure the bandage on the affected anatomical part because the treatment thereof is performed by means of medication or other method and by the subsequent bandage.

Co-operation between the tie-down tapes 2 on the elongated stiffening elements 3 is put in practice by means of through slots 20 (Figure 2). The slots are obtained consecutive and mutually adjacent or they can be mutually distanced by a given interval (Fig. 2). Experimentally, an interval ranging between 5 and 10 mm has been found suitable. The elongated stiffening elements 3 are removably received in a through manner in respective slots of at least two tapes positioned at suitable distances depending on the applications to the various affected parts of the body. Obviously, the direction of the slots can be any, but transverse relative to the length of the tapes 2, generally perpendicular relative thereto (Fig. 2). The slots 20 can be blind if the elongated stiffening elements 3 held removably are secured at their extremities. In this case, the slots 20 would serve a protective function against the extremities of the elongated elements 3. This function can be served by elements 21 for covering the extremities of the elements 3. The covering elements 21 can be constituted by stoppers, for instance cylindrical, united in succession in a single piece of flexible plastic material (Figure 1).

Alternatively, each covering element 21 can be constituted by a section made in the shape of a channel (not shown herein), as a single housing for all the extremities of the elongated stiffened elements 3.

Instead of being inserted into through slots of the tapes, the elongated elements 3 can be fastened to the tie-down tapes 2 with generally adhesive fastening means, (not shown herein), for holding rigidly in position the elongated stiffening elements on the opposite surface to the opposite surface to the part of the body to be protected and/or immobilised.

In any case, to hold the elongated elements mutually positioned and to allow

the disposition of the bandage on the part of the body and its application thereto, the tapes must preferably be in a minimum number of two.

The elongated stiffening elements 3 are constituted by rods or bars with polygonal, for instance square, section. Preferably, they are made of a light metallic alloy, for instance semi-rigid aluminium based alloy, plastically deformable also by hand. They can also be made of synthetic material or other suitable material able to be subjected to sterilisation. Their section thickness, or gage, is a function of the final characteristics of rigidity and plasticity required. Thickness or gage can vary, according to the characteristics of the material used; in the case of rods made of light aluminium alloy, an interval ranging between 1 and 3 mm or different, for instance between 2 and 6 mm., has experimentally been observed as suitable, provided the elongated stiffening 3 be plastically deformable by hand.

The stiffened bandage 1 of the present invention can be supplied in the form of tie-down tapes 2 and of elongated stiffening elements 3 as a kit or assembled equipment. At the moment of use, the kit can be cut to measure and adapted to the application requirements through the possible removal of pre-selected elongated stiffening elements 3 and their modelling, providing possible standard length/gage sizes thereof and number and length of the tapes.

Alternatively, the tie-down tapes 2 and the elongated stiffening elements 3 are supplied as separate components, to be cut and assembled according to requirements.

After the preceding, prevalently structural, description, the applications of the present invention shall now be reviewed.

With reference to Figures 3 and 4, a finger 4 which has received wounds indicated as 40 and 41 is partially shown. The wounds 40 and 41 duly medicated are then protected with a stiffened bandage according to the present invention, comprising a tape 2, a terminal tape 22, destined to withhold the elongated elements 3 and to cover their extremities with blind slots, alternatively to the succession of stoppers 21.

As shown in Figures 3 and 4, some elongated elements 3 have been removed,

others have been deformed to be distanced from the part of the body to be protected in the points affected by the wounds 40 and 41. The deformation was effected manually. Any bandage (not shown) will therefore not come in contact with those points. In both applications, use is made of elongated elements 3 in different numbers positioned at different mutual distances, according to the physician's choice.

With reference to Figure 5, a stiffened bandage according to the invention is applied to an upper limb 6. It comprises elongated stiffening elements 3 deformed manually according to the conformation of the limb 6, held by tie-down tapes 2. The extremities of the elements 3 are covered with successions of stoppers 21. Some of the elongated elements (32) extend in correspondence with the palm of the hand with support function.

With reference to Figure 6, a stiffened bandage according to the invention is applied to a lower limb 5. It comprises elongated stiffening elements 3 deformed manually according to the conformation of the limb 5, held by tie-down tapes 2. The extremities of the elements 3 are covered with successions of stoppers 21.

As shown in the drawings, in the bandage according to the invention generally the tie-down tapes 2 are destined to surround the part of the body to be protected and/or immobilised and the elongated stiffening elements 3 are positioned in the longitudinal direction of the same part.

With reference to Figures 3 through 6, which represent only examples of application of the invention, the versatility of the bandage according to invention, destined in general to be covered with a bandage, is highlighted.

The distance between the tapes and their number, as well as the number of the elongated elements, their gage and the space between them, are chosen based on the part of the body whereto the bandage is to be applied. In the application to the finger (Figures 3 and 4), the number of tapes is two or at most three and their distance is very small; the elongated elements an be removed from the parts affected by the wounds, and the gage of the elements is the smallest available. In the case of the

upper limb (Figure 5) in which a more complete immobilisation is required, the number of tie-down tapes and of stiffening elements is greater. In the illustrated embodiment, elongated stiffening elements 3 with lesser gage and possibly more widely distanced can be placed in the upper part of the limb, whilst in the lower part it is appropriate to provide elongated stiffening elements 3 of greater gage, more rigid, positioned closer to each other and having greater length, the number of tapes and the distance between them is suited to the type of holding to the part of the body, which is affected by a pathology in a very limited area. The elongated elements are modelled to conform.

In the case of the lower limb (Figure 6), the lower extremities 28 of the stiffening elements 3 are connected with a support 50 made in a single piece and suitably shaped in its upper surface 59 to receive the sole of a patient's sole. The support 50 is made of a suitable material, for instance multi-layer, and it is preferably rigid in its upper surface and flexible on the opposite surface in contact with the ground, to favour ambulation.

The lower extremities 28 of the stiffening elements 3 are received in housing 51 obtained in the outer lateral surface of a support 50. Advantageously, in an embodiment shown in Figure 8, a support 150 is constituted by two halves 56, 57, joined by means of a conventional rear hinge 53. The hinge 53 shown is of the cylindrical type, but it could be different. The two halves 56, 57 have mutually opposite coupling portions, preferably of the male-female type 60, 61. Anteriorly, the support 150 has an attachment for instance of the type shown schematically in the two parts 54, 55, but it could be of another conventional type.

The support 50, 150 further comprises means for holding and adapting the elongated stiffening elements 3 to the foot of a patient in the form, for instance of a pair of opposite faces 24, 25 fastened to the outer lateral surface of the support.

The connection of the elongated stiffening element 3 with the support 50, 150 can take place as shown in detail in Figure 7. As shown therein, the lower extremities 28 of each stiffening element 3 are inserted in related housing compartments 51

obtained in the outer lateral surface of the support 50 and held there by means of a dowel 52 screwed in a corresponding threaded hole obtained on the upper surface 59 of the support 50, 150 in such a way that it will match the related housing 51.

The connection of the elongated stiffening elements with the support can also take place in different manners. For instance, the position of the dowel and of the lower extremity of the elongated element can be inverted. Moreover, the connection of the lower extremities of the stiffening elements with the support can be obtained by pressure and associated to fastening means that prevent its release.

Naturally, the invention thus conceived can be subject to numerous modifications and variations, without thereby departing from the scope of the same inventive concept that characterises it as claimed below.

Claims

1. A stiffened bandage for protecting and/or immobilising injured parts of the body to aid medication, characterised in that it comprises, in mutual co-operation, one or more flexible tie-down tapes (2) and a plurality of elongated stiffening elements (3), plastically deformable, held transversely in mutual adjacent consecutive positions by said one or more tie-down tapes; said tie-down tapes (2) being provided at least at their respective extremities with means for mutual adjustable and releasable connection (23; 24).

2. A bandage as claimed in claim 1, characterised in that said tie-down tapes (2) are destined to surround the part of the body to be protected and/or immobilised and said elongated stiffening elements (3) are positioned in the longitudinal direction of the same part.

3. A bandage as claimed in claim 1, characterised in that the tie-down tapes (2) have through slots (20), adjacent and mutually distanced by a determined interval, for elongated stiffening elements (3) removably held therein.

4. A bandage as claimed in claim 3, characterised in that said slots (20) are obtained mutually distanced by an interval ranging between 5 and 10 mm.

5. A bandage as claimed in claim 1, characterised in that said tie-down tapes (2) have blind slots (22) for said elongated stiffening elements (3) held removably in correspondence with their respective extremities.

6. A bandage as claimed in claim 1, characterised in that it further comprises a support (50; 150), having an upper bearing surface (59) for the sole of a patient's foot and means for removably fastening lower extremities (28) of the elongated

stiffening elements (3); said support being provided with means for holding and adapting the elongated stiffening elements (3) to a patient's foot.

7. A bandage as claimed in claim 6, characterised in that said support (150) is constituted by two halves (56, 57).

8. A bandage as claimed in claim 6, characterised in that said two halves (56, 57) are mutually pivoted at one of their extremities with a hinge (53) and able to be mutually coupled at the other extremity by a locking means (54, 55); said two halves (56, 57) of the support being provided with mutually opposite coupling portions (60, 61).

9. A bandage as claimed in claim 6, characterised in that said means for removably fastening the free lower extremities of the elongated elements are constituted by housing compartments obtained on the outer periphery of the support (50; 150).

10. A bandage as claimed in claim 6, characterised in that said means for holding to the foot of a patient are constituted by at least a pair of bands (25, 26) fastened to the support and provided with means for releasable and adjustable coupling means.

11. A bandage as claimed in claim 1, characterised in that said elongated stiffening elements (3) are metallic and made of a light alloy.

12. A bandage as claimed in claim 1, characterised in that said elongated stiffening elements (3) are made of a plastic material.

13. A bandage as claimed in claimed in claim 1, characterised in that each of said elongated stiffening elements (3) has circular cross section.

14. A bandage as claimed in claim 1, characterised in that each of said elongated stiffening elements (3) has polygonal cross section.

15. A bandage as claimed in claim 1, characterised in that it comprises covering elements (21) of the extremities of the elongated stiffening elements, having cylindrical stoppers joined in succession and able to be removably connected to said elongated stiffening elements (3).

16. A bandage as claimed in claim 1, characterised in that said tie-down tapes (2) and said elongated stiffening elements (3) are supplied as an assembled kit able to be cut to measure, and adaptable to the application requirements by the possible removal of pre-selected elongated stiffening elements and their modelling.

17. A bandage as claimed in claim 1, characterised in that said tie-down tapes (2) and said elongated stiffening elements (3) are supplied as separate components, to be cut and assembled according to requirements.

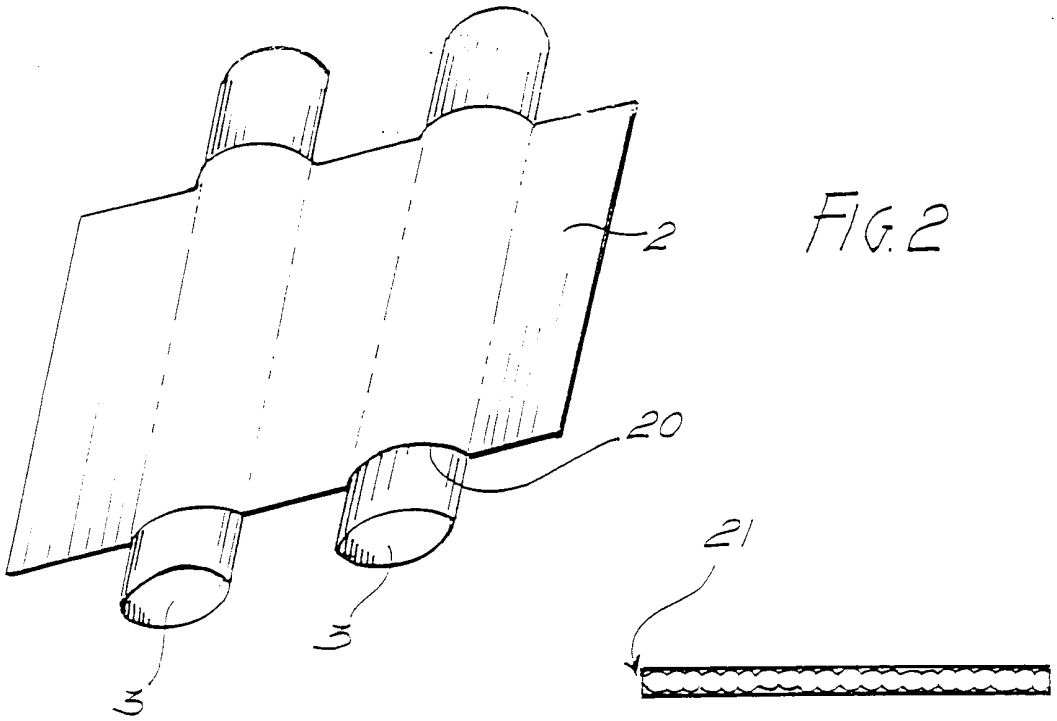


FIG. 2

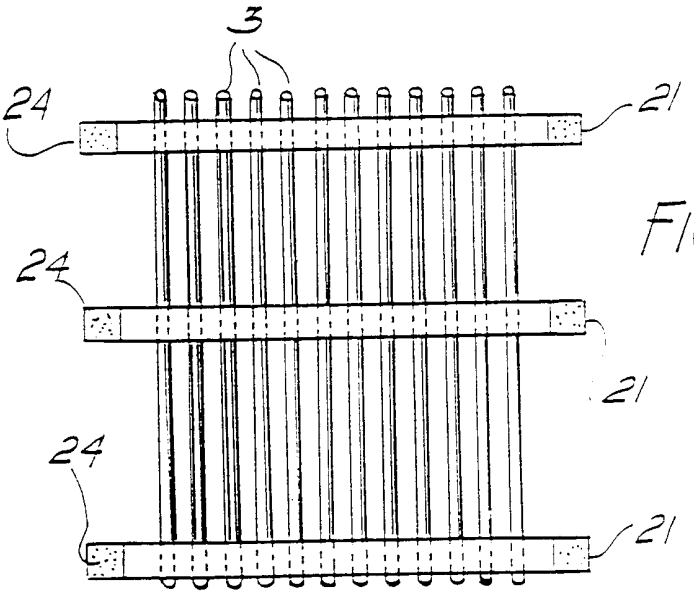


FIG. 1

FIG. 3

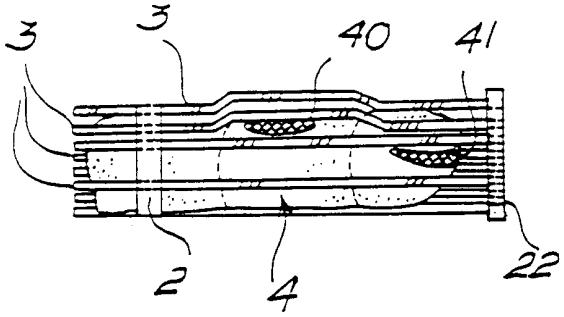


FIG. 4

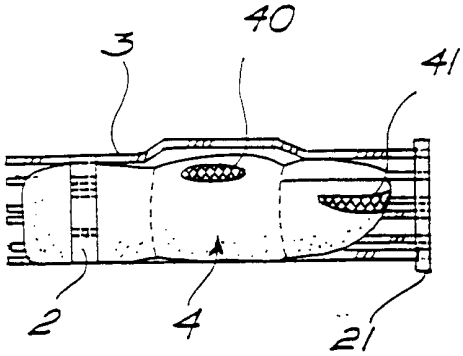


FIG. 6

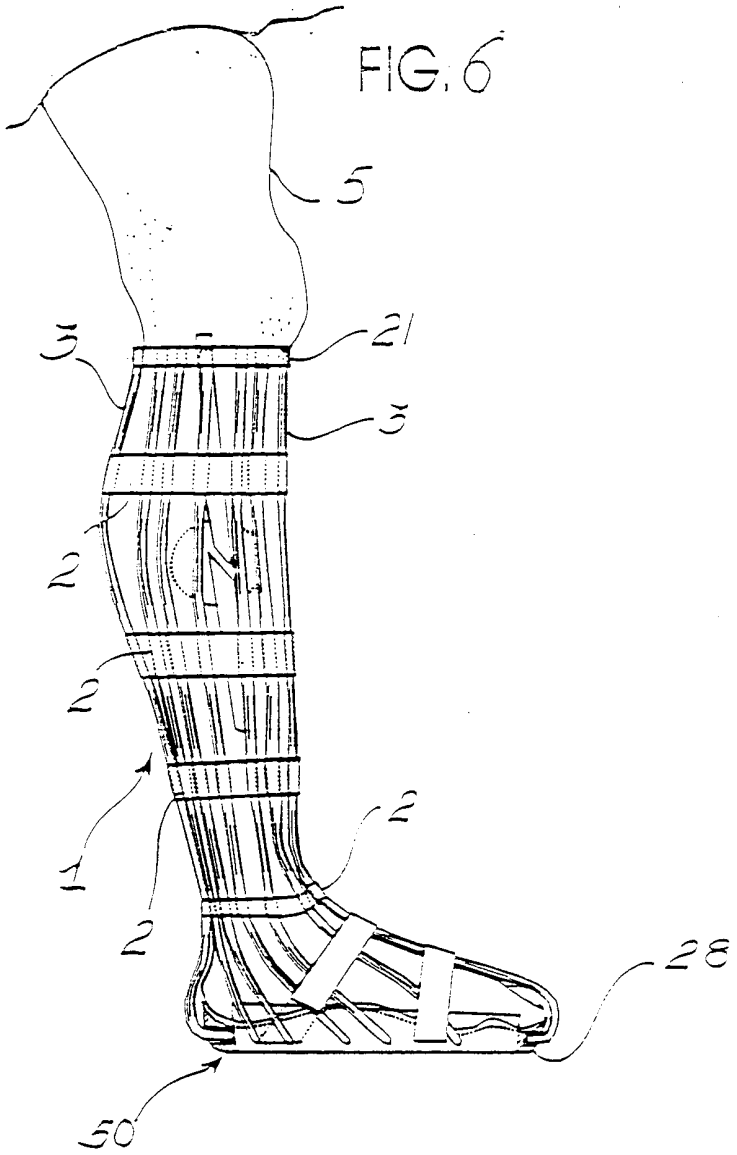
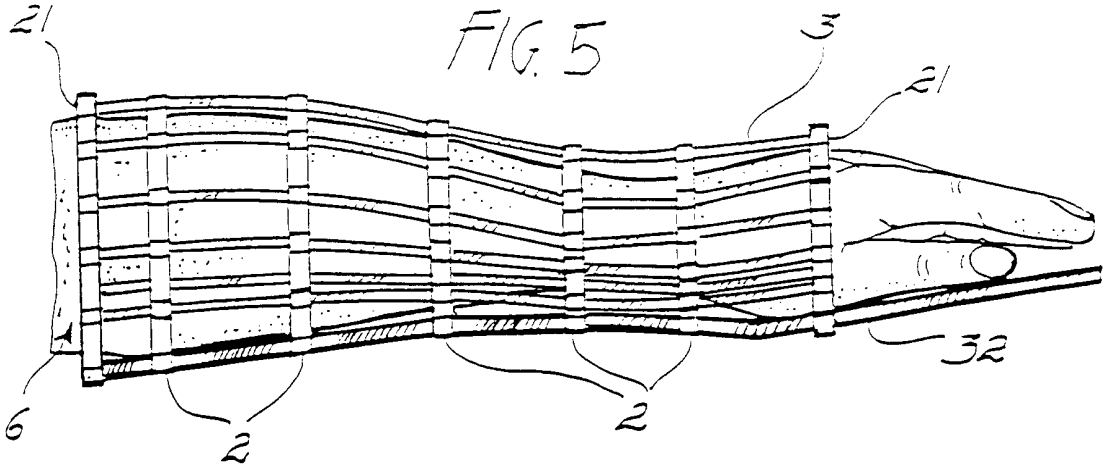


FIG. 5



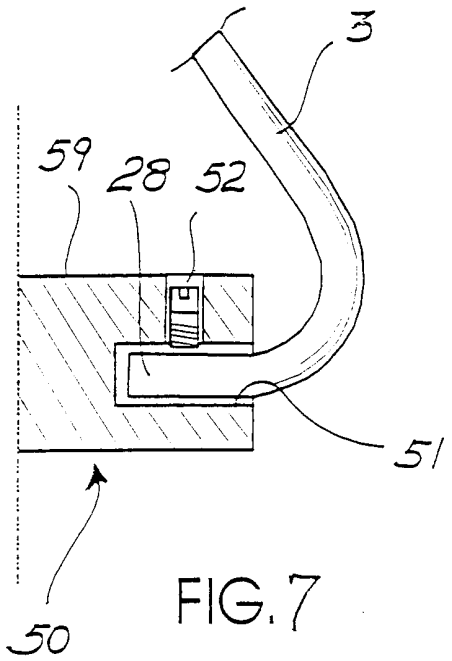


FIG. 7

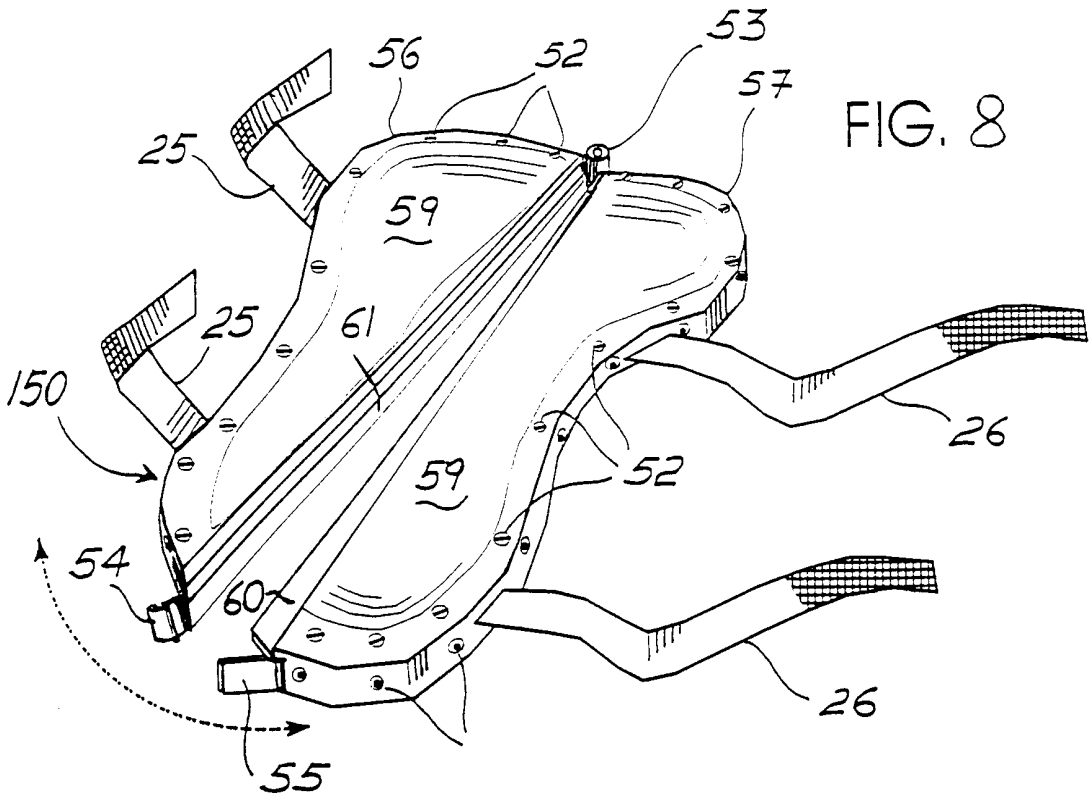


FIG. 8

INTERNATIONAL SEARCH REPORT

Intern. al Application No
PCT/IT 00/00272

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61F13/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61F A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 4 715 362 A (HENRY SCOTT) 29 December 1987 (1987-12-29) column 2, line 33 -column 3, line 43; figures ---	1-5, 11-13, 15-17
X	US 5 058 576 A (GRIM, GAMBLE) 22 October 1991 (1991-10-22) column 5, line 33-39 abstract; figures 1,2,5 --- -/--	1,2,11, 12,14

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 September 2000	09/10/2000

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/IT 00/00272

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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