

(19)



(11)

EP 2 572 692 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

27.03.2013 Bulletin 2013/13

(51) Int Cl.:

A61G 1/04 (2006.01)

A61G 1/044 (2006.01)

A61G 1/013 (2006.01)

A61G 1/048 (2006.01)

(21) Application number: **11382298.5**

(22) Date of filing: **20.09.2011**

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

BA ME

(72) Inventors:

- **Maya, Luis Alberto**
1900 La Plata (AR)
- **Altuna Insausti, Luis María**
20120 Lazkano (ES)

(71) Applicant: **Soluciones MeeoTEK, S.L.**
20240 Ordizia (ES)

(74) Representative: **Igartua, Ismael et al**
Galbaian S.Coop.

Polo de Innovación Garaia
Goiru Kalea 1 - P.O. Box 213

20500 Arrasate-Mondragón (Gipuzkoa) (ES)

(54) Immobilization device for immobilizing a patient

(57) Immobilization device (1) comprising a first and a second immobilization unit (2, 3). The first immobilization unit (2) comprises a base on which is disposed a first locking unit (4) to immobilize the skull-cervical area and a second locking unit (5) to immobilize the thoracic-abdominal area. The second immobilization unit (3) is suitable for receiving and fixing the first immobilization unit (2), which comprises a third locking unit (6) to immobilize

the patient from the waist down. The second locking unit (5) also comprises two rigid or semi-rigid flaps (9), preferably arched, fitted on each side of the base in a pivoting and/or detachable manner, said flaps (9) being suitable for surrounding and immobilizing the abdomen and/or thorax area. To keep the patient in the immobilized position the immobilization device (1) comprises a plurality of fixing means (7).

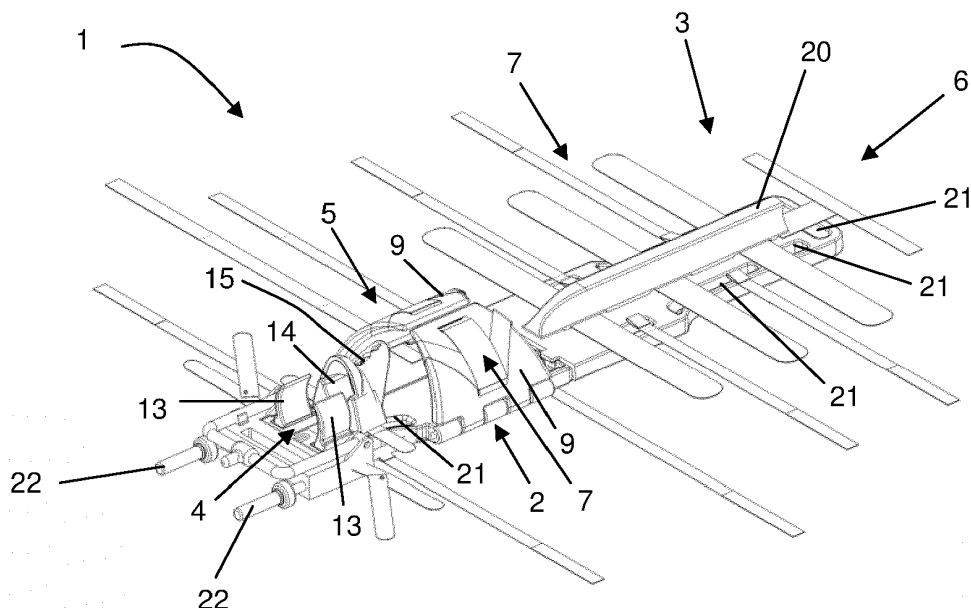


FIG. 1

Description

TECHNICAL FIELD

[0001] This invention relates to devices suitable for immobilizing and transporting a patient during a rescue operation.

PRIOR ART

[0002] There are known immobilization units used in rescue situations that comprise a fixed part and a detachable part. The detachable immobilization part is used, for example, to immobilize a patient inside a vehicle that has suffered a crash. In this stage the skull-cervical and thoracic-abdominal areas of the patient are immobilized. This operation is very delicate and complicated as it must be performed in a small space and without exact knowledge of the injuries suffered by the accident victim. To prevent more serious injuries it is important that the patient is kept in the correct posture and is prevented from making undesirable movements. To keep the patient immobilized the use of a plurality of straps or belts is known. Once the patient has been extricated from the vehicle, the detachable immobilization part is attached to the fixed immobilization part to immobilize the rest of the patient's body.

[0003] In this respect US7082632 B2 discloses a device for immobilizing a patient or an accident victim in a rescue situation. The device comprises three units, the first one to immobilize the skull-cervical areas, the thorax and the abdomen of the patient and the second one to immobilize the rest of the body. The third unit is optionally used as an annex for tall patients. These three units are attached to each other. The first unit is used to immobilize the patient, for example, inside a vehicle that has suffered a crash where the straps that are used to tie and to immobilize the patient on the immobilization device are flexible straps that are rested on the body of the patient.

DISCLOSURE OF THE INVENTION

[0004] It is an object of this invention to provide a device for immobilizing a patient so that he can be transported or transferred in a safe manner, as described in the claims.

[0005] The immobilization device of the invention comprises a first immobilization unit and a second immobilization unit. The first immobilization unit comprises a base on which is disposed a first locking unit to immobilize the skull-cervical anatomical area and a second locking unit to immobilize the thoracic-abdominal area of the patient. The second immobilization unit is suitable for receiving and fixing the first immobilization unit and comprises a third locking unit that immobilizes the pelvis and the patient's lower limbs. The immobilization device also comprises a plurality of fixing means which enable the patient to be kept in the immobilized position.

[0006] To optimise the immobilization of the patient, and thereby reducing the risk of causing more injuries or even aggravating the injuries already suffered, the second locking unit of the first immobilization unit comprises two rigid or semi-rigid flaps, preferably arched, fitted on each side of the base in a pivoting and/or detachable manner. Said flaps surround and immobilize (through the use of the corresponding fixing means) the thorax and the abdomen area of the patient. As a result, the patient and the first immobilization unit are moved together as one as if they were a single body. This is especially advantageous, for example, in the rescue of a patient with a multiple polytrauma, who is trapped inside a vehicle, whose extrication and transporting is vital so as not to aggravate the injuries suffered by the patient.

[0007] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0008]

Figure 1 shows a first view in perspective of an embodiment of the immobilization device according to the invention.

Figure 2 shows a second view in perspective of the immobilization device of Figure 1 without the first immobilization unit.

Figure 3 shows a third view in perspective of the immobilization device of Figure 1 with the first immobilization unit inclined and without the side flaps.

Figure 4 shows a detail according to the IV-IV line of the immobilization device of Figure 1 without the coupling means and with the first immobilization unit not inclined.

Figure 5 A shows a first view of the first immobilization unit of Figure 3.

Figure 5B shows a second view of the first immobilization unit of Figure 5A.

Figure 6 shows a view of a patient immobilized in the immobilization device of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

[0009] The immobilization device 1 of the invention, as shown in Figure 1, comprises a first immobilization unit 2 and a second immobilization unit 3. The first immobilization unit 2 comprises a base 10, as shown in Figure 5A, on which is disposed a first locking unit 4 to immobilize the skull-cervical anatomical area and a second locking unit 5 to immobilize the thoracic-abdominal area of the

patient. The second immobilization unit 3, shown in more detail in Figure 2, is suitable for receiving and fixing the first immobilization unit 2 and comprises a third locking unit 6 that immobilizes the pelvis and the patient's lower limbs. The immobilization device 1 also comprises a plurality of fixing means 7, which enable the patient to be kept in the immobilize position.

[0010] To optimise the immobilization of the patient, and thereby reducing the risk of causing more injuries or even aggravating the injuries already suffered, the second locking unit 5 of the first immobilization unit 2 comprises two rigid or semi-rigid flaps 9, preferably arched, to follow the patient's outline, fitted to each side of the base 10 in a pivoting and/or detachable manner, as shown in Figures 5A and 5B. Said flaps 9 surround and immobilize (through the use of the corresponding fixing means 7) the thorax and the abdomen of the patient, as shown in Figure 6. As a result, the patient and the first immobilization unit 2 are moved together as one as if they were a single body. This is especially advantageous, for example, in the rescue of a patient with a multiple polytrauma, who is trapped inside a vehicle, whose extrication and transporting is vital so as not to aggravate the injuries suffered by the patient.

[0011] In a first embodiment of the invention, the base 10 of the first immobilization unit 2 comprises two parts, as shown in Figure 5B, which are joined laterally, as shown in Figure 5A. The two parts have substantially the same width. This feature is really advantageous, especially for immobilizing the patient in areas of reduced accessibility, such as the inside of a vehicle that has suffered an accident. Each part of the first immobilization unit 2 is approached from each side of the patient, joining both parts in a simple manner behind the back of the patient and being fixed by means of a safety bolt 24. This prevents having to move the patient in order to house and fix the first immobilization unit 2 in the second immobilization unit 3. In emergency situations it is difficult to assess the internal injuries suffered by the patient, which means that the patient must be moved as little as possible so as not to aggravate the injuries and even cause new ones during the immobilization.

[0012] Once the immobilization device 2 has been placed behind the patient's back, the flaps 9 are approached, each one pivoting on its axis situated on the edge of the base 10, in order to surround the patient's abdomen and/or thorax. The skull-cervical area of the patient is then immobilized, as will be detailed hereinafter, and the patient is then immobilized from the waist or pelvis upwards through the use of the fixing means 7. Thanks to the fact that the flaps 9 surround the patient, there is no relative movement between the patient and the first immobilization unit 2, so the first immobilization unit 2 and the patient are moved together as one as if they were a single body. This prevents the incorrect movement of the patient, thereby preventing, for example, injuries to the spinal column during the extrication and transporting of the patient. In the first embodiment,

the flaps 9 and the base 10 of the first immobilization unit 2 are made of the same material so that the first immobilization unit 2 is more robust and the patient is more protected. In addition, during the immobilization of the abdominal and thoracic area of the patient, the patient's ribs are prevented, for example, from suffering injury during the fixing or fastening of the fixing means 7 due to an excessive force exerted directly on the patient's body. However, the flaps 9 and the base 10 may optionally be made of different material in order to find different performs of the same.

[0013] In the first embodiment of the invention, the flaps 9 of the first immobilization unit 2 are pivoting and detachable. This feature is especially useful in making the rescue operation of the rescue team members easier. The flaps 9 may be detached before starting rescue operation, and once the skull-cervical area of the patient has been immobilized, the flaps 9 may be fitted once again, by the sides of the patient, in order to immobilize the abdomen and/or the thorax areas. The rescue team members thus have greater visibility and control of the situation.

[0014] In a second embodiment, where the base 10 of the first immobilization unit 2 does not comprise two parts, the solution by which the flaps 9 are detachable is very advantageous for positioning the first immobilization unit 2 correctly in relation to the patient without unnecessary obstacles, reducing their movements and offering greater visibility and control of the situation.

[0015] Thanks to the arched shape of the flaps 9, these adapt to all types of bodies, including adults, children and corpulent or thin people and so on, approaching more or less to adapt to the outline of the patient. As a result, if the patient is a strong person the flaps 9 surround the patient, with a medium-sized space being left between both flaps 9. If the patient is a thin person or a child, the flaps 9 surround the patient, with a minimal space being left between them, and if the patient is a corpulent or obese person the space between the flaps 9 is larger.

[0016] To immobilize the skull-cervical area of the patient, as shown in Figure 5A, the first locking unit 4 of the first immobilization unit 2 comprises skull fixing means 13 in the form of pads, preferably made of plastic, which are adjustable so they can adapt to the differing sizes of patients' skulls, and detachable so that they can be easily cleaned, among other functions. The first locking unit 4 also comprises cervical fixing means 14. Said means comprise a second set of adjustable and detachable pads, as shown in Figure 1, and a cervical immobilizer 15, preferably in the form of as a surgical collar, which is connected to the second set of pads by means of connection means, preferably by Velcro. As shown in Figure 5A, the cervical immobilizer 15 of the first embodiment comprises an opening 29 to enable cricoid or airway puncture should it be necessary. If the patient has already been assisted and has had the surgical collar fitted, the first immobilization unit 2 could do without the cervical fixing means, replacing them by the means already pos-

sessed by the patient. Through the use of the fixing means 7 the skull-cervical area of the patient is ultimately fixed to the first immobilization unit 2, as shown in Figure 6.

[0017] The first immobilization unit 2 may comprise on one side storage means for storing auxiliary elements such as monitoring cables, so that the rescue team members always have everything they need to hand. It may also comprise auxiliary guidance means, not shown in the drawings, to guide said auxiliary elements so that they do not bother the patient. They may even guide additional elements such as an oxygen cylinder, which is needed to aid a patient suffering asphyxia.

[0018] Once the patient has been immobilized from the waist or pelvis up, the first immobilization unit 2 is fitted on the second immobilization unit 3 of Figure 2, if the first immobilization unit 2 has been taken out beforehand (for example, to immobilize the patient inside the vehicle that has suffered an accident or to rescue a person in the sea). To enable this, the first immobilization unit 2, as shown in Figure 3, comprises guidance means 12, preferably in the form of grooves, which cooperate with coupling means 16, preferably in the form of rods, comprised in the second immobilization unit 3, the patient thus being laid down in a horizontal position, as shown in Figure 6, thus preventing the patient from having to be moved in order to transfer them to another transfer or transporting unit, such as a stretcher. The coupling means 16 of the second immobilization unit 3 are housed in the guidance means 12 of the first immobilization unit 2, and then the first immobilization unit 2 is moved towards the lower part of the second immobilization unit 3 until fixing protuberances 27 are housed in retaining means 28. The fixing protuberances 27 are preferably in a circular form to enable the first immobilization unit 2 to pivot and are comprised in the lower part of the base 10 of the first immobilization unit 2. The retaining means 28 are preferably in the form of a groove and are comprised in the top part of the third locking unit 6 of the second immobilization unit 3, as shown in detail in Figure 4. Finally, the first immobilization unit 2 is locked, in other words it is fixed and secured, by means of locking means 17, shown in Figures 1 and 2, comprised in the second immobilization unit 3. The locking means 17 are movable, so that said locking means 17 are moved towards the first immobilization unit 2 until retaining means 25 shown in Figure 2, preferably in the form of a groove, fix at least in one protuberance 26, preferably rectangular in shape, comprised in the top part of the base 10 of the first immobilization unit 2. The first embodiment of the invention comprises a protuberance 26 in the top part of each half of the base 10 of the first immobilization unit 2, as shown in Figure 3.

[0019] As shown in Figure 2, the third locking unit 6 of the second immobilization unit 3 comprises an aligner 20, preferably in the form of a pad, which helps keep the patient's pelvis and lower limbs aligned so that they are immobilized in the correct position, through the fixing means 7. In the first embodiment, the aligner 20 is de-

tachable to make cleaning work easier. The aligner 20, as shown in Figure 6, is disposed between the patient's legs.

[0020] The first embodiment of the immobilization device 1 of the invention also comprises, in the lower part, approximately at the level of the feet, additional fixing means 8, which are mainly T-shaped, to immobilize the patient's ankles and feet, replacing the splints known in the prior art.

[0021] Thanks to the immobilization device 1 of the invention the need to use auxiliary elements such as collars, splints, short rigid tables or long rigid tables is reduced, thereby creating more space in the ambulance and making it easier for the members of the rescue team to go about their work.

[0022] The three locking units 4, 5 and 6 of the immobilization device 1 cooperate to keep the patient immobilized in the ideal position.

[0023] Normally the immobilization device 1 is supported on a surface, and in order for the members of the rescue team to handle said device 1, at least the first immobilization unit 2 comprises in its lower part a plurality of support protuberances 11, as shown in Figure 3, that enable a gap between the first immobilization unit 2 and the support surface, a gap sufficiently large for the members of the rescue team to put their hands in. The second immobilization unit 3 may also comprise similar support protuberances.

[0024] The immobilization device 1 is made easier to handle by the fact that it comprises gripping means that comprise a plurality of holes 21 disposed on the perimeter, both in the first immobilization unit 2 and in the second immobilization unit 3, through which the rescue team members may put their hands. The first embodiment of the invention also comprises at least one set of handles 22 disposed on one of the ends of the device 1. Alternatively, the device 1 may also comprise another set of handles 22 on the opposite end. Said handles 22 make it easier to transport the patient as they balance the forces better.

[0025] As an alternative, in a third embodiment, the immobilization device 1 of the invention comprises auxiliary fastening means, not shown in the figures, which may be fixed to hitching means provided, for example, in an helicopter.

[0026] As an additional alternative, in a fourth embodiment, the second immobilization unit 3 comprises sliding means (not shown in the figures), preferably in the form of wheels. The wheels may be pulled out and/or height-adjustable, so that the immobilization device 1 of the invention may replace the stretcher traditionally known in the prior art.

[0027] As shown in Figure 2, and in further detail in Figure 3, the locking means 17 of the second immobilization unit 3 comprise support means 18 that cooperate with the first immobilization unit 2 to keep said first immobilization unit 2 in an inclined position when the immobilization unit 2 pivots according to a transverse axis

19 formed between the connection of the first immobilization unit 2 and the second immobilization unit 3, being positioned approximately at the level of the patient's hips or pelvis. This option is very useful for incorporating the patient. To achieve this, first of all the first immobilization unit 2 is lifted pivoting in relation to the axis 19, and then the support means 18 are rotated upwards until a protuberance 23 comprised in the support means 18 is housed in a housing disposed in the rear part of the base 10 of the first immobilization unit 2. The first immobilization unit 2 may have various housings at different levels to enable different degrees of inclination. This feature is also advantageous for transferring patients in a safe and comfortable manner to a hospital, residence, rehabilitation centre, etc.

[0028] The immobilization device 1 of the invention is manufactured from a light, radio-transparent and floating material. As it is radio-transparent, there is no need to transfer the patient to another unit or stretcher in order to be explored by X-ray or by a magnetic resonance. In extreme cases, the patient may be operated in theatre on the immobilization device 1.

[0029] The immobilization device 1 of the invention avoids the unnecessary movements of the patient until having a complete and definitive diagnosis, thereby reducing the risk of causing further injury or even aggravating the injuries already suffered.

[0030] When the rescue takes place in an area where there is water, the immobilization device 1 of the invention may also be used, as it floats. In such cases, the patient is supported on the immobilization device 1 or only the first immobilization unit 2. As the flaps 9 are hinged, the patient may be immobilized while leaving the abdomen area free in the event that there is a need for the patient to undergo cardiorespiratory or cardiopulmonary resuscitation.

[0031] To make the immobilization device 1 of the invention easier to use, it may comprise colour codes to guide the rescue team members when immobilizing the patient. For example, the fixing means 7 may thus be coloured so that the rescue team members are able to identify which fixing means 7 have to be connected to each other. In addition, the device 1 may optionally comprise bright colours or reflective elements to enable the rapid identification of the device 1.

[0032] "Rescue team members" are defined as any personnel involved in the rescue or transfer of a patient. In other words, the immobilization device 1 of the invention is so intuitive and easy-to-use that it is suitable for use by both qualified health personnel and non-health personnel. The immobilization device 1 is suitable for forming part of first aid equipment and may be located in specific places that are, for example, much frequented, such as shopping centres, airports, sports centres, casinos, schools, colleges, universities, sports clubs and associations etc as well as, evidently, in ambulances and hospitals. It is also an ideal tool for use by lifeguards in swimming pools and on beaches.

[0033] The immobilization device 1 of the invention is detachable, which means that the space required for its storage is considerably reduced. In this respect, in the first embodiment, the second immobilization unit 3 is detachable, so that the locking means 17, the coupling means 16 and the third locking unit 6, along with the first immobilization unit 2, may be stacked for their storage. This feature also makes it easier to clean the immobilization device 1. Alternatively, the second immobilization unit 3 may also be fitted together, with the result that the coupling means 16 slide along some sliding means 30, preferably in the form of holes, until the locking means 17 come up against the third locking unit 6. To assemble the second immobilization unit 3 all that is required is to pull on the locking means 17 until the coupling means 16 reach the end of their path.

Claims

1. Immobilization device for immobilizing a patient, comprising

a first immobilization unit (2) that comprises a base (10) on which is disposed
a first locking unit (4) to immobilize the skull-cervical anatomical area and a second locking unit (5) to immobilize the thoracic-abdominal area of the patient, and
a second immobilization unit (3) suitable for receiving and fixing said first immobilization unit (2), which comprises a third locking unit (6) to immobilize the patient from the waist down,

and said device (1) comprising a plurality of fixing means (7) that enable the patient to be kept in the immobilized position,

characterised in that said second locking unit (5) comprises two rigid or semi-rigid flaps (9), preferably arched, fitted on each side of the base (10) in a pivoting and/or detachable manner, said flaps (9) being suitable for surrounding and immobilizing, through the use of the corresponding fixing means (7), the patient's abdomen and/or thorax area.

2. Device according to claim 1, wherein the base (10) of the first immobilization unit (2) comprises two parts that are joined to each other laterally.

3. Device according to claim 2, wherein the two parts of the base (10) of the first immobilization unit (2) have substantially the same width.

4. Device according to any of the preceding claims, wherein the flaps (9) are made of the same material as the base (10).

5. Device according to any of the preceding claims,

wherein at least the first immobilization unit (2) comprises in its lower part a plurality of support protuberances (11) that enable a gap between the first immobilization unit (2) and the support surface of said unit (2) when the unit (2) is supported on said surface.

6. Device according to any of the preceding claims, wherein the first immobilization unit (2) also comprises guidance means (12), preferably in the form of grooves, which cooperate with coupling means (16), preferably in the form of rods, comprised in the second immobilization unit (3).
7. Device according to claim 6, wherein the second immobilization unit (3) also comprises locking means (17) to fix and secure the first immobilization unit (2) when the guidance means (12) of the first immobilization unit (2) are housed in the coupling means (16).
8. Device according to claim 7, wherein the locking means (17) of the second immobilization unit (3) are movable and comprise retaining means (25), preferably in the form of a groove, that retain or fix at least one protuberance (26), preferably rectangular in shape, comprised in the top part of the base (10) of the first immobilization unit (2).
9. Device according to claims 7 or 8, wherein the locking means (17) comprise support means (18) that cooperate with the first immobilization unit (2) to keep said first immobilization unit (2) in an inclined position when the immobilization unit (2) pivots according to a transverse axis (19), formed between the connection of the first and second immobilization unit (2, 3), being positioned approximately at the level of the patient's hips or pelvis.
10. Device according to any of the preceding claims, wherein the first locking unit (4) of the first immobilization unit (2) comprises adjustable and detachable skull fixing means (13) that comprise a set of pads, preferably made of plastic, , and also comprises adjustable and detachable cervical fixing means (14) that comprise a second set of pads and a cervical immobilizer (15), preferably in the form of a surgical collar, which is connected to the second set of pads by means of connection means.
11. Device according to any of the preceding claims, wherein the third locking unit (6) comprises an aligner (20), preferably in the form of a pad, which helps keep the patient's pelvis and lower limbs aligned so that they are immobilized in the correct position.
12. Device according to any of the preceding claims, which comprises gripping means to be handled by the rescue team, which comprise a plurality of holes

(21) disposed on the perimeter and/or at least a set of handles (22), disposed at least on one of the ends of said device (1).

13. Device according to any of the preceding claims, which comprises, in the lower part, approximately at the level of the patient's feet, additional fixing means (8), preferably T-shaped, to immobilize the feet and/or ankles of the patient.
14. Device according to any of the preceding claims, wherein the second immobilization unit (3) is detachable and/or may be fitted together.
15. Device according to any of the preceding claims, wherein said device is manufactured from a light, radio-transparent and floating material.

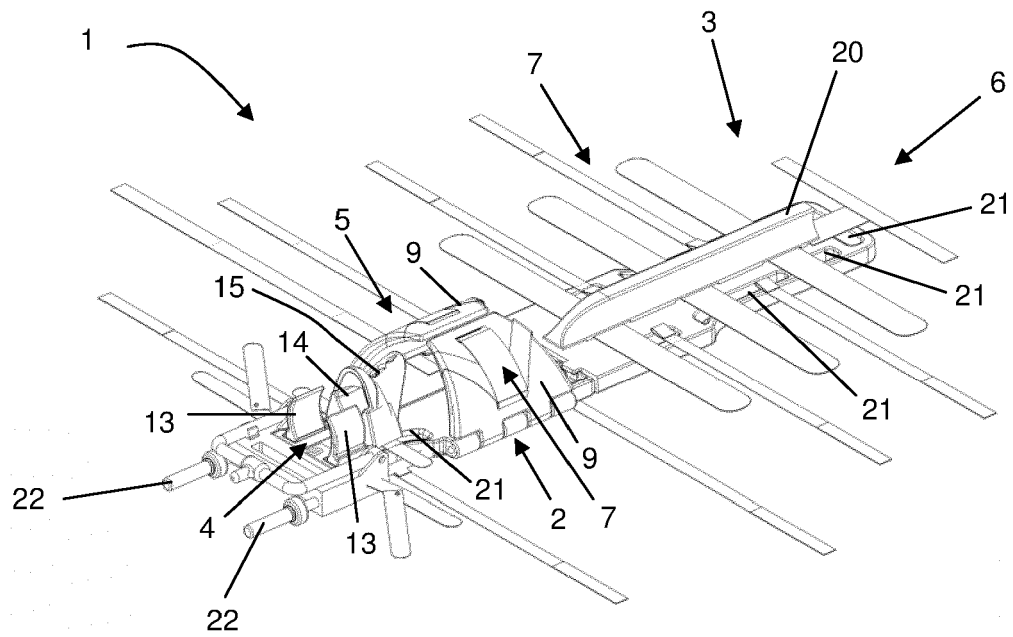


FIG. 1

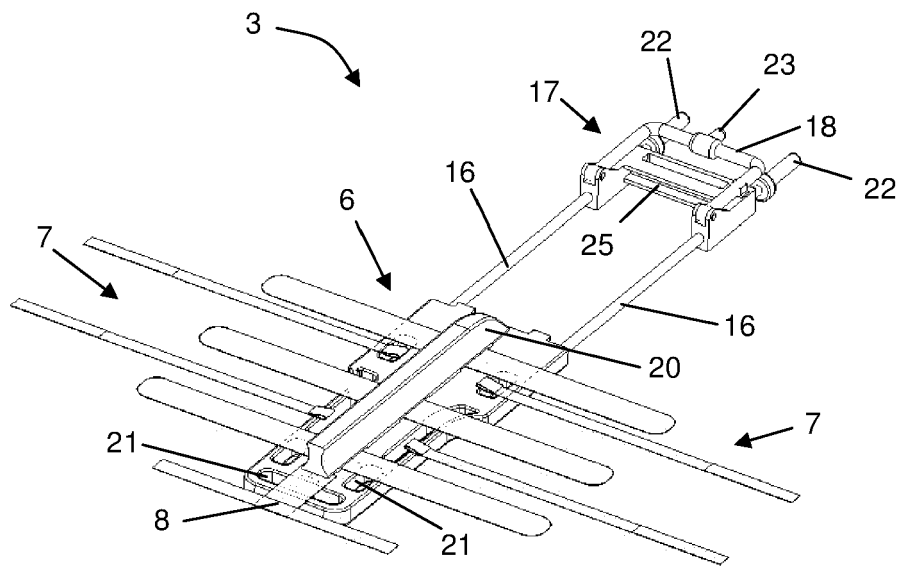


FIG. 2

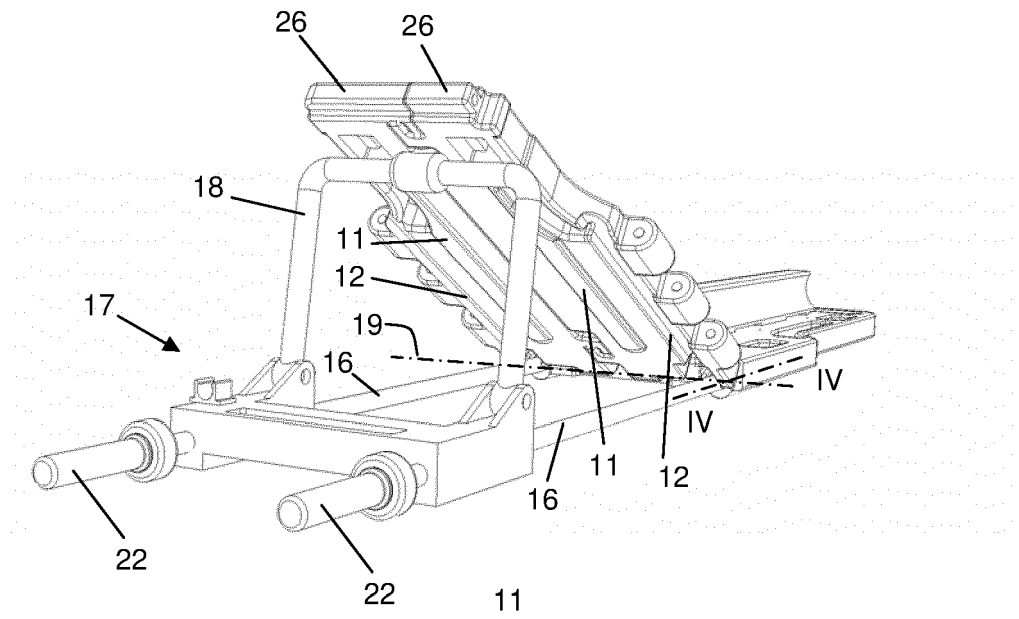


FIG. 3

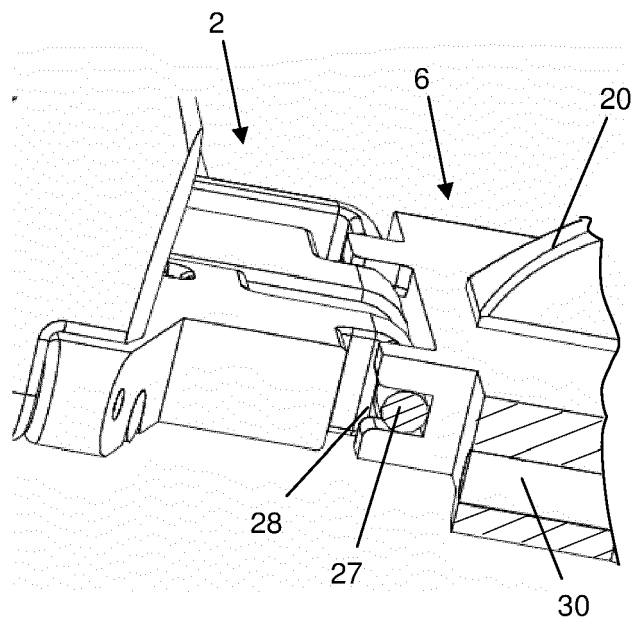


FIG. 4

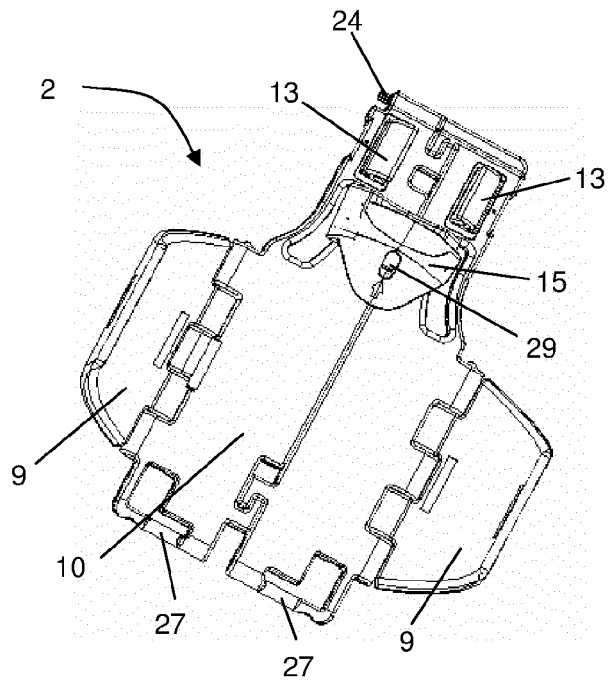


FIG. 5A

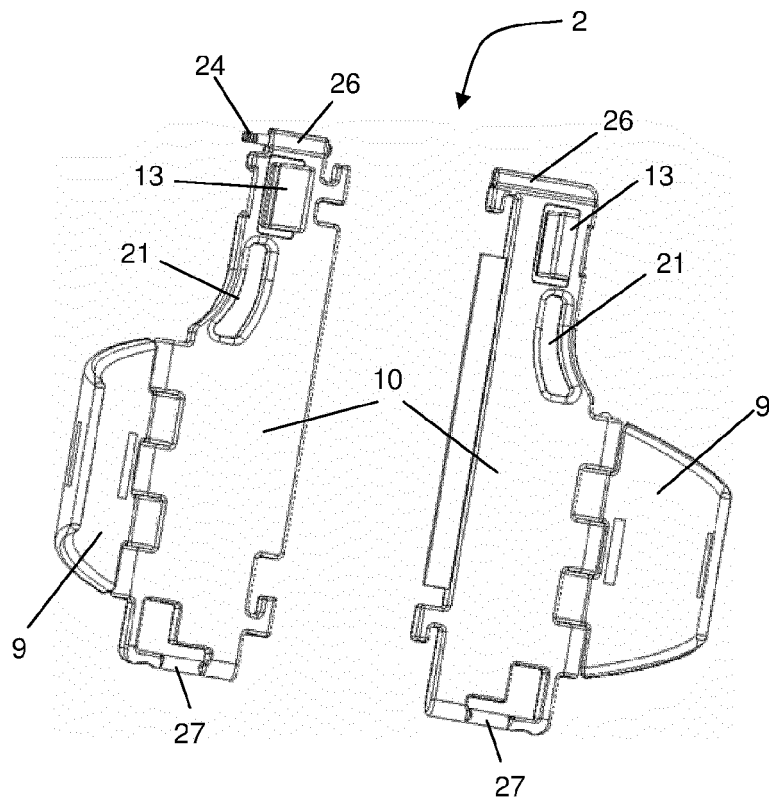


FIG. 5B

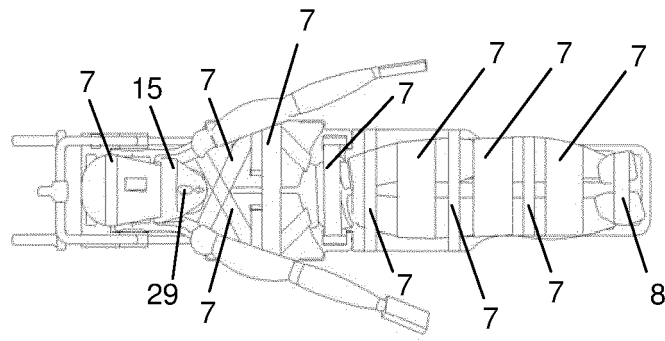


FIG .6



EUROPEAN SEARCH REPORT

Application Number
EP 11 38 2298

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 35 46 526 A1 (STOLLENWERK FABRIK FUER SANITA [DE]) 23 April 1987 (1987-04-23) * column 2, line 22 - line 51 * * column 3, line 10 - column 5, line 57 * * figures 1-4,8-10 * -----	1-15	INV. A61G1/04 A61G1/044 ADD. A61G1/013 A61G1/048
X	US 5 154 186 A (LAURIN FREDERICK J [CA] ET AL) 13 October 1992 (1992-10-13) * column 4, line 64 - column 5, line 65 * * column 7, line 63 - column 10, line 59 * * figures 1-3,10-14 * -----	1,10,11,13	
A	EP 1 214 919 A1 (CANADA MINISTER DEFENCE [CA]) 19 June 2002 (2002-06-19) * figures 1-4,8 * * abstract *	2,3	
A	FR 2 583 977 A1 (THOMSON CSF [FR]) 2 January 1987 (1987-01-02) * page 2, line 20 - page 6, line 14 * * figures 1-4 *	1	
A	US 5 496 092 A (WILLIAMS GARY R [US] ET AL) 5 March 1996 (1996-03-05) * figures 1,2 * * abstract * -----	1	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 February 2012	Examiner Schiffmann, Rudolf
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			

 1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 38 2298

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3546526	A1	23-04-1987	NONE
US 5154186	A	13-10-1992	NONE
EP 1214919	A1	19-06-2002	AT 298549 T 15-07-2005 CA 2359777 A1 14-06-2002 DE 60111710 D1 04-08-2005 DE 60111710 T2 04-05-2006 EP 1214919 A1 19-06-2002 NO 20016085 A 17-06-2002 US 2002077681 A1 20-06-2002
FR 2583977	A1	02-01-1987	NONE
US 5496092	A	05-03-1996	AT 155669 T 15-08-1997 AU 4232993 A 29-11-1993 CA 2133336 A1 11-11-1993 DE 69312495 D1 04-09-1997 DE 69312495 T2 12-03-1998 EP 0645994 A1 05-04-1995 JP 3319757 B2 03-09-2002 JP H07509148 A 12-10-1995 US 5496092 A 05-03-1996 WO 9321871 A1 11-11-1993

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 7082632 B2 [0003]