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(71) Applicant: **Spencer Italia S.R.L.**
43044 Collecchio (PR) (IT)

(72) Inventor: **Pizzi Spadoni, Luigi Cesare**
43044, Collecchio (Parma) (IT)

(74) Representative: **Leone, Mario et al**
Ing. Dallaglio Srl
Viale Mentana 92/C
43100 Parma (IT)

(54) Backboard with integrated head immobilizer

(57) A backboard (1) with an integrated head immobilizer (3, 4) adapted to operate from a rest position in which it is concealably received in the thickness of the backboard (1) to an operating position in which it projects out of it by being rotated and lifted therefrom, characterized in that said rotation of the head immobilizer (3, 4) is performed about an axis (A1, A2) of rotation that is located above the area over which the patient's head passes or is positioned (S1).

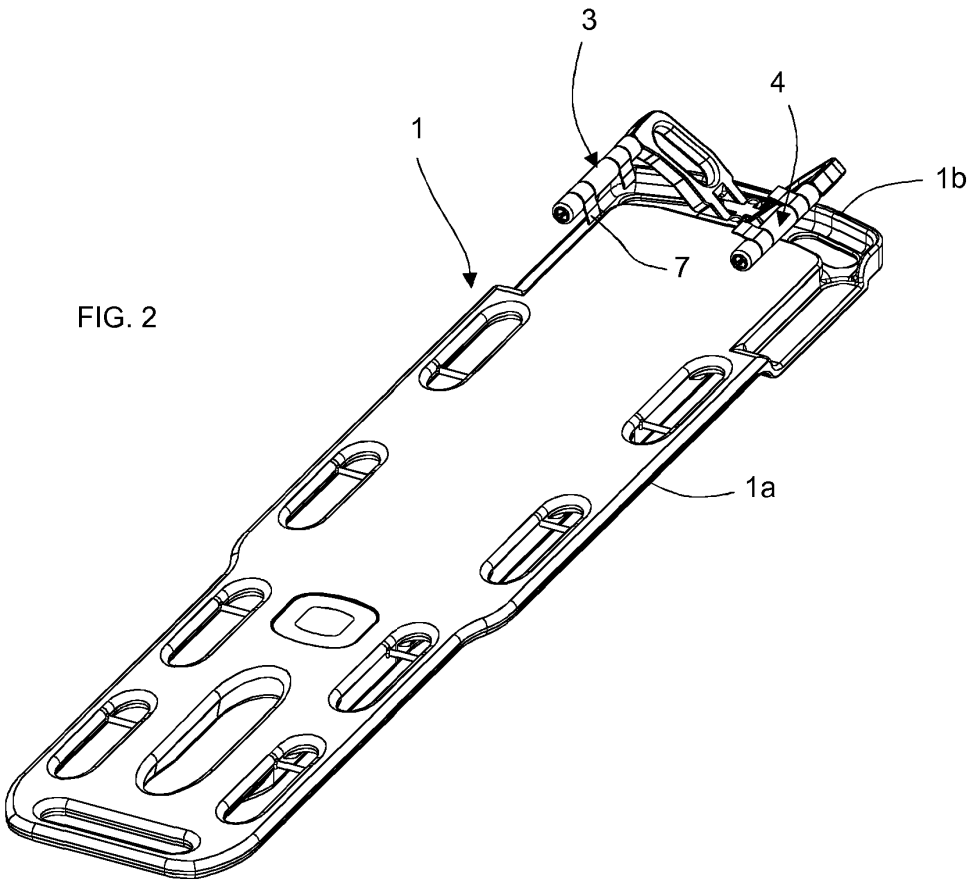

FIG. 2

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Description

[0001] The present invention relates to a backboard with an integrated head immobilizer, to be used for rescuing and transporting patients with suspected spine and/or cranial-cervical injuries, requiring full-body immobilization with head restraint.

[0002] Usually, the patient's head is immobilized by laterally fixing two semi-rigid blocks that are held against the base of the board by Velcro systems (trade name and registered trademark); then, the head is locked in position with the help of straps introduced through special slots formed within the board.

[0003] A number of different solutions have been further proposed, which are of little use due to the drawbacks that will be described below.

[0004] Certain patent documents disclose the use of a pair of movable partitions that are designed to be lifted from the base of the board and are arranged substantially orthogonal thereto for head restraint: examples from the art are those disclosed in patents such as US 6,327,723, US2003/0159216, US5154186, WO2005077315.

[0005] Substantially all the above documents include, as mentioned hereinbefore, an immobilization system with lateral partitions adapted to move from a rest position - in which they are concealably received in the board - to an operating position in which they project out of the board to lock the kinetic components of the head: the concealed position of these head immobilizers allows the support surface of the associated backboard to have a seamless nature.

[0006] The drawbacks of prior art substantially concern the system for positioning the head immobilizer namely the system that is used for rotating it up into its operating condition, because this system always coincides with the line along which the head passes, sometimes even near or under the head position.

[0007] In US 5,154,186, the system for rotating the partitions (designated by numerals 188) is close to the head, like in the other prior art.

[0008] In US 6,327,723, which discloses a kind of pyramidal partitions, the walls fit below and close to the head of the patient.

[0009] Therefore, a first problem is found when lifting the head immobilizer once the head has been positioned, whereby such position of the rotation hinges requires the utmost care to be used by the operating personnel not to inadvertently hit the injured person, and a second problem concerns exact positioning of the head restraining walls, which is very complex and inconvenient because it has to be either established beforehand or adapted to the head of the lying patient, thereby causing difficult handling as well as some risk.

[0010] A third problem is found when the patient is submitted to X-ray examinations while he/she lies on the backboard, whereby the mechanisms under the patient's head or the cervical region cause problems in reading the X-ray plate.

[0011] The object of the present invention is to obviate the above drawbacks by providing a backboard with an integrated head immobilizer, wherein the head immobilizer has a lifting arm with a center of rotation located outside, namely above the area over which the patient's head passes.

[0012] Also, the head immobilizer has such a shape as to allow convenient handling beyond such area and convenient adaptation to the patient's head; it shall be noted that the backboard has the head immobilizer integrated therein and level therewith, allowing the patient to be easily laid thereon, and that the head immobilizer is lifted into its operating condition and easily adjusted.

[0013] One of the advantages is that the patient will not be hit by the hands of the operator when the latter measures the distance of the head immobilizers and stabilizes his/her head.

[0014] Another advantage of the invention is that the head immobilizer also holds the head restraining straps, such straps being coilable.

[0015] Yet another advantage of the invention is that reduced contact with the parietal regions of the head enhances examination efficacy and particularly affords improved otorrhagia detection.

[0016] These objects and advantages are fulfilled by the backboard with integrated head immobilizer according to the present invention, which is characterized by the annexed claims.

[0017] This and other features will be more apparent upon reading of the following description of a few preferred embodiments, which are shown by way of example and without limitation in the accompanying drawings, in which:

- Figure 1 is a three-dimensional view of a backboard with an integrated head immobilizer according to the present invention,
- Figure 2 shows the backboard of Figure 1 with the head immobilizer lifted into its operating position,
- Figure 3 is a top view of the head support area with the device in the rest position,
- Figure 4 is a top view of the head support area with the device in the operating position,
- Figure 5 is a side view of the backboard of Figure 1 with the head immobilizer lifted into its operating position,
- Figure 6 is a side view of the backboard of Figure 1 with the head immobilizer lifted into its rest position.

[0018] Referring to Figures 1, 2, 3, 4, 5 and 6, numeral 1 generally designates the backboard with integrated head immobilizer according to the invention.

[0019] Two head immobilizers 3 and 4 can be seen at the top of the board, above the area that supports the head of the injured person.

[0020] Nonetheless, the head of the patient, although the latter may lie at the center of the board 1, is known to interfere with a large area of the board as it is laid

thereon, which area is indicated by the hatched area designated by S1.

[0021] By suitably forming the head immobilizers 3 and 4 with an L-shape, each head immobilizer 3 and 4 may be rotated from a position coplanar with the plane of the board 1 to a lifted operating position, adapted to form an angle α with the other head immobilizer, for holding and immobilizing the patient's head.

[0022] Therefore, each head immobilizer 3 and 4 is defined by:

- an arm or handlebar 3b or 4b oriented substantially transverse to the board 1, i.e. along its short side 1b for easy grasp and handling by the operator,
- a stop arm 3a or 4a, oriented parallel to the board, namely along its sides 1a, which will be moved against the head of the patient upon rotation of the handlebar, and then lifted out of the board 1.

[0023] Each free end of the handlebar 3b and 4b is attached to the backboard 1, namely by means of hinges F1, F2, to define an axis of rotation A1 and A2, substantially parallel to the longer longitudinal axis of the board 1.

[0024] It will be understood from the above that, as the head immobilizers 3 and 4 are lifted by being rotated about the hinge or fulcrum points F1 and F2, they will move towards each other to immobilize the head of the injured person that has been laid on the board 1.

[0025] By positioning the handlebars 3b and 4b for lifting the head immobilizers above the area S1 over which the head passes and is stabilized, an operational advantage is achieved, in that:

- operation in the area S1 is much easier, because the stop arms 3a and 4a will be hidden in the thickness of the board 1, below the surface plane P1,
- the head immobilizers may be much more easily adjusted from an area remote from, here above, the area S1 and the handlebars 3b, 4b may be more easily handled to place the respective arms 3a, 4a towards the center of the board 1 and the head.

[0026] The board 1 with the integrated head immobilizer also has a pair of straps 7 coiled on both head immobilizers 3 and 4, for restraining the patient's head.

[0027] The straps 7 may be automatically or manually coilable around said arms 3a and 4a of the respective head immobilizers.

[0028] While reference is made in this example to arms 3a and 4a of circular section, any other section may be obviously provided.

Claims

1. A backboard (1) with an integrated head immobilizer (3, 4) adapted to operate from a rest position in which it is concealably received in the thickness of the backboard (1) to an operating position in which it projects out of it by being rotated and lifted therefrom, **characterized in that** said rotation of the head immobilizer (3, 4) is performed about an axis (A1, A2) of rotation that is located above the area over which the patient's head passes or is positioned (S1).

2. A backboard (1) as claimed in claim 1, **characterized in that** said axes of rotation (A1, A2) are defined by corresponding hinges (F1, F2) formed at the free end of each handlebar (3b, 4b) of the head immobilizer (3, 4); said free end being attached to the backboard (1).

3. A backboard (1) as claimed in claim 1, **characterized in that** said axes (A1, A2) are substantially parallel to the longer longitudinal axis of the board (1).

4. A backboard (1) as claimed in claims 1 and 2, **characterized in that** head immobilizing arms (3a, 3b) extend substantially orthogonal from said handlebars (3b, 4b) and parallel to the sides (1a) of the board (1), towards the area over which the head passes and is positioned (S1), said arms (3a, 4a) being adapted to be received in the thickness of the board (1) below its surface plane (P1).

5. A backboard (1) as claimed in claim 1, **characterized in that** as each head immobilizer (3, 4) is lifted by being rotated about the hinge or fulcrum points (F1) and (F2), it moves towards the other to immobilize the head of the injured person that has been laid on the board (1).

6. A backboard (1) as claimed in claim 1, **characterized in that** each head immobilizer (3, 4) has head restraint straps (7) coiled around the stop arms (3a, 4a).

7. A backboard (1) as claimed in claim 6, **characterized in that** said straps (7) may be automatically or manually coiled around said arms (3a) and (4a) of the respective head immobilizers.

FIG. 1

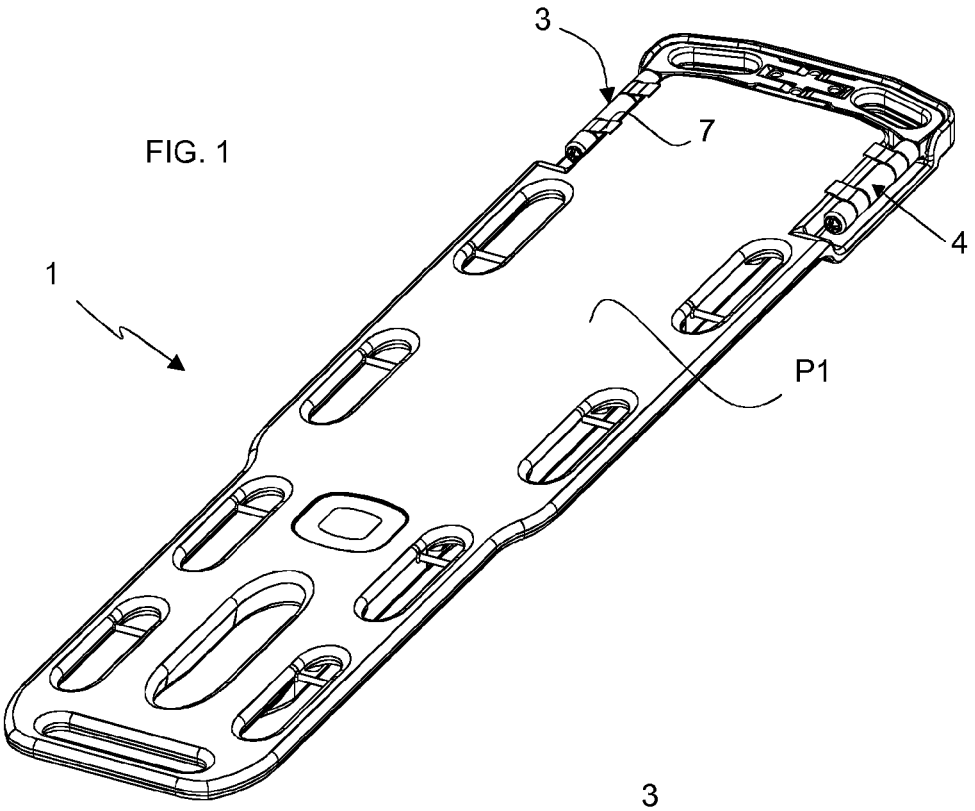


FIG. 2

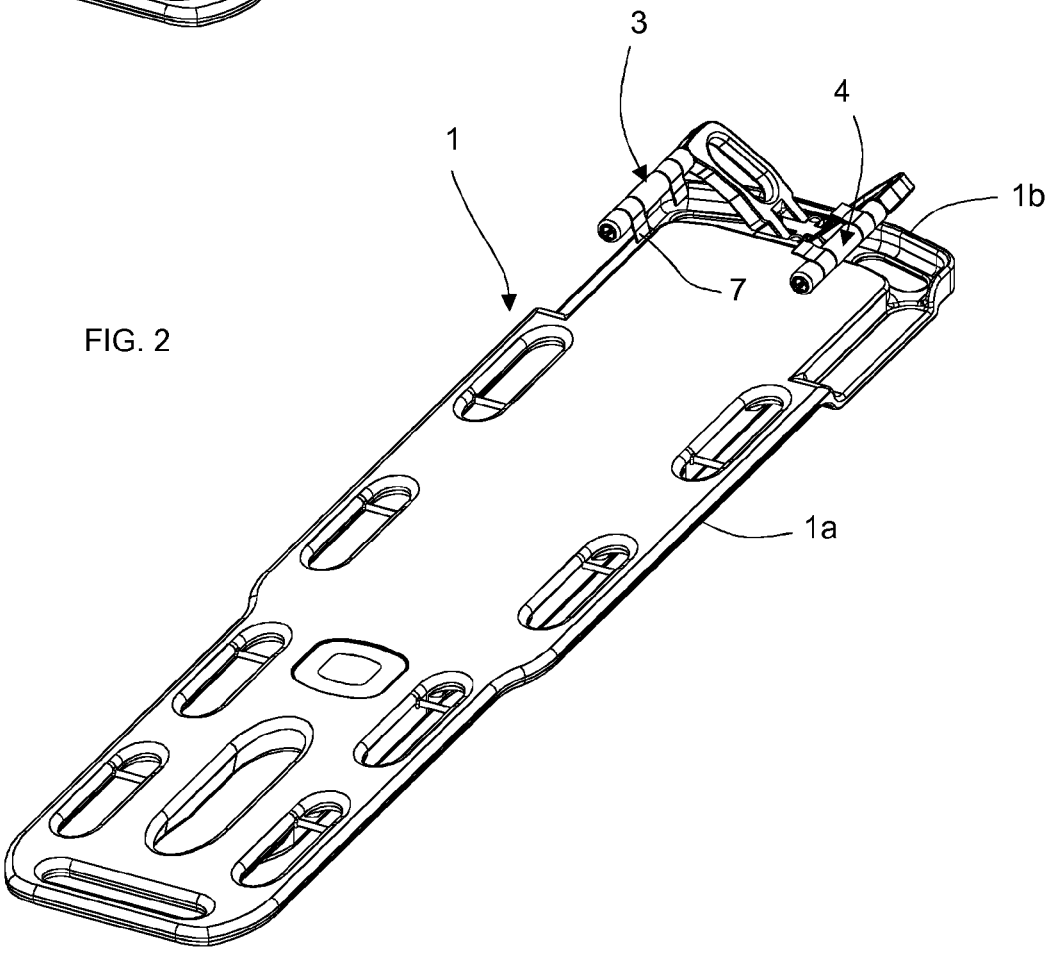


FIG. 3

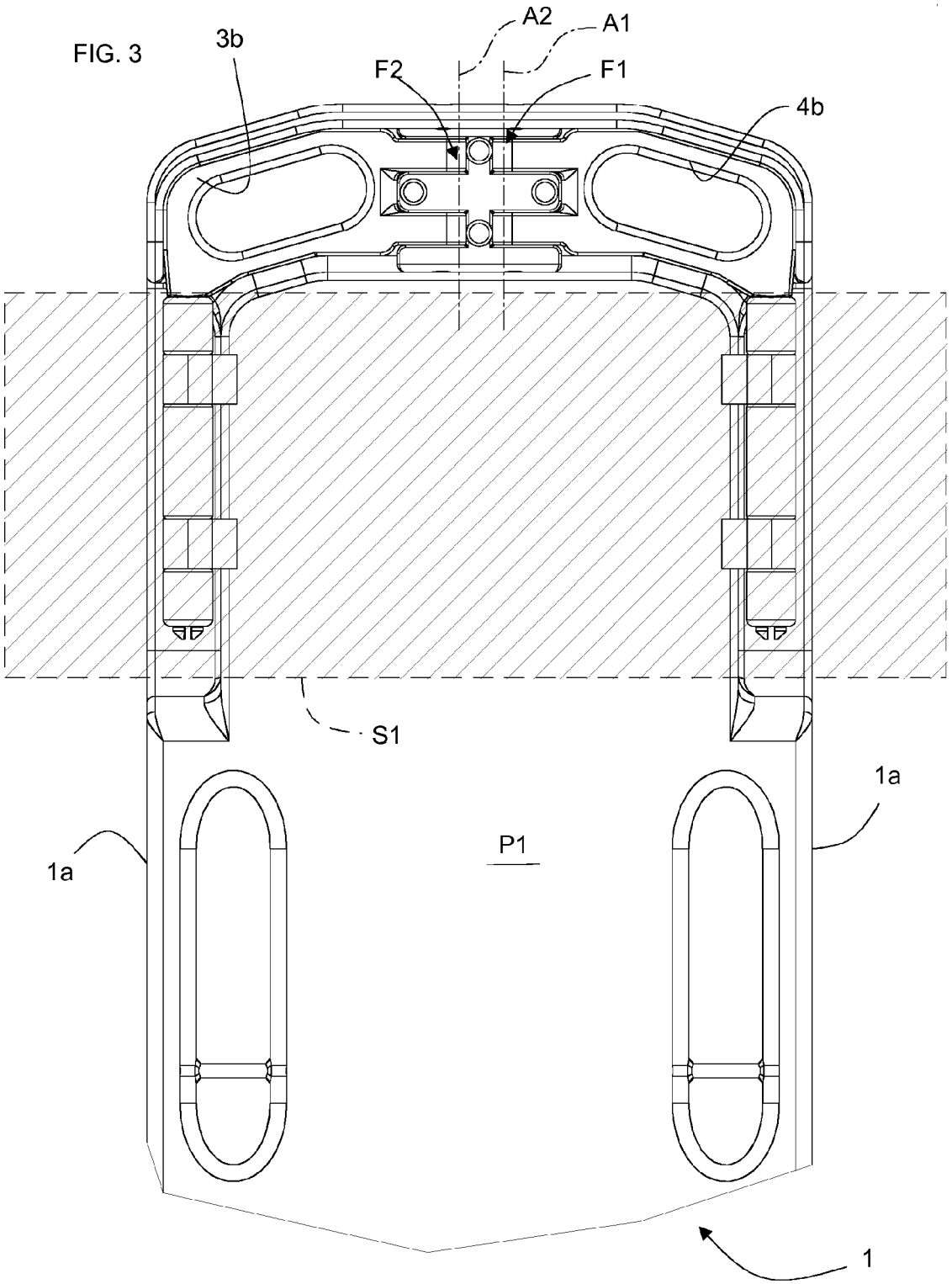
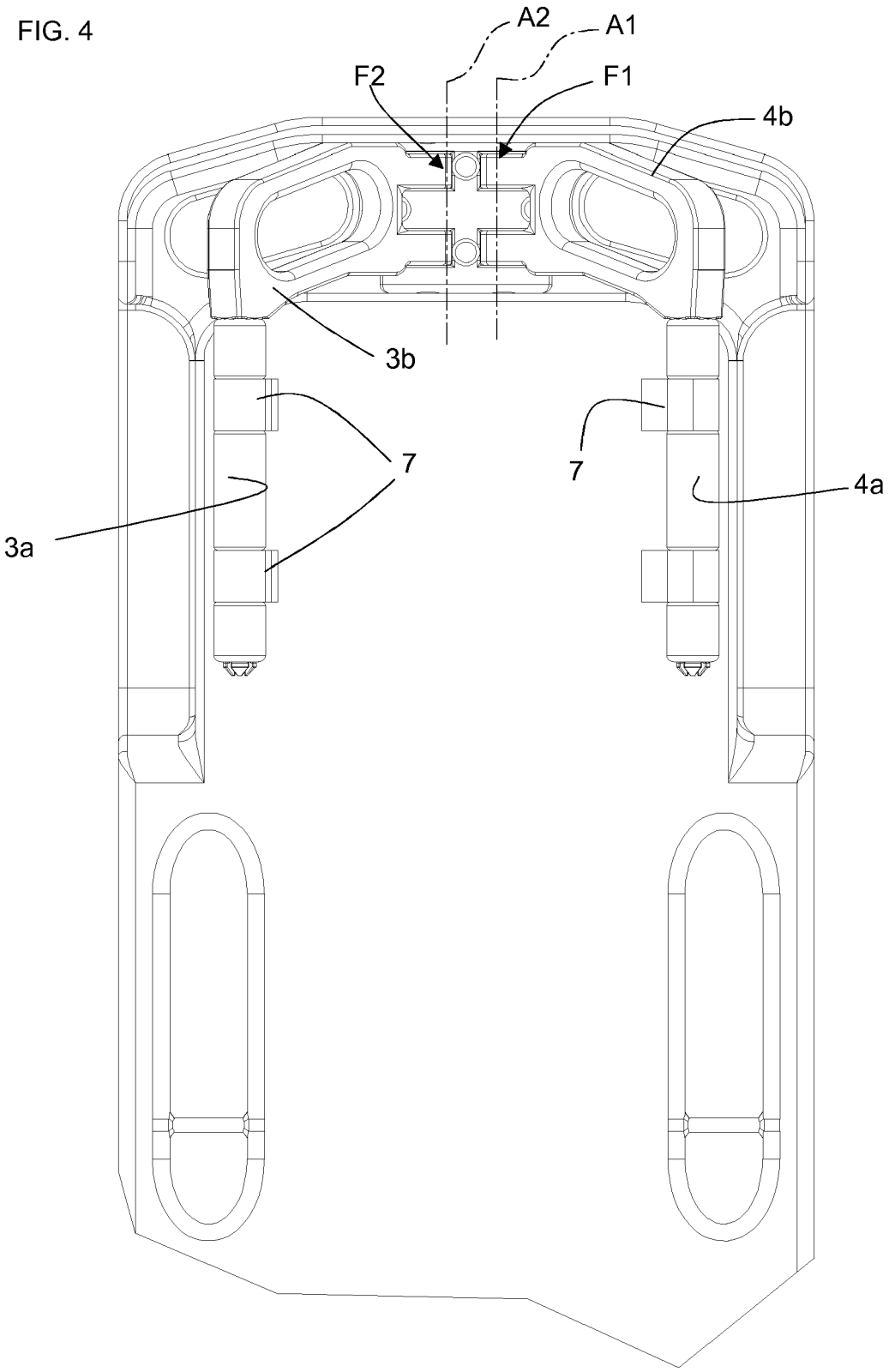


FIG. 4



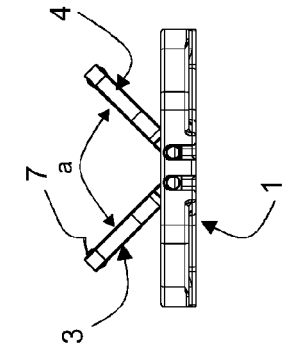
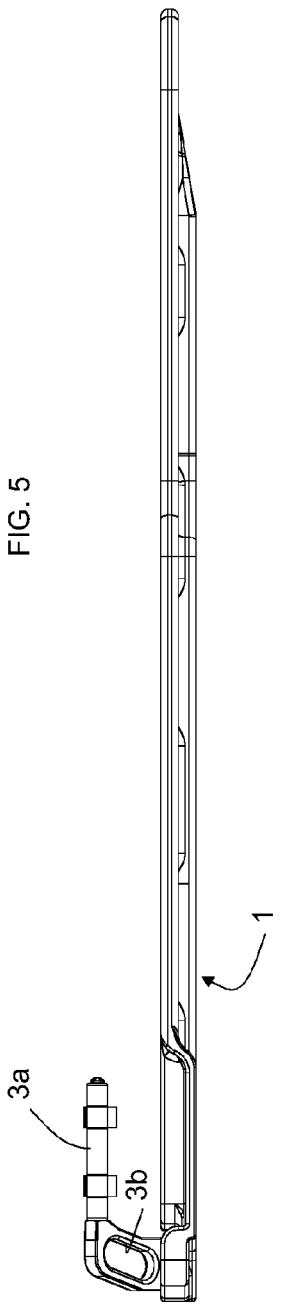


FIG. 5



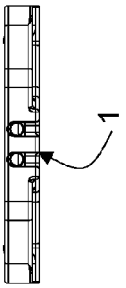
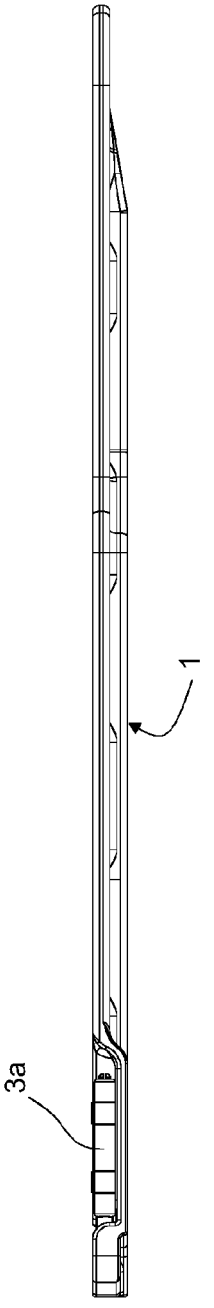


FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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