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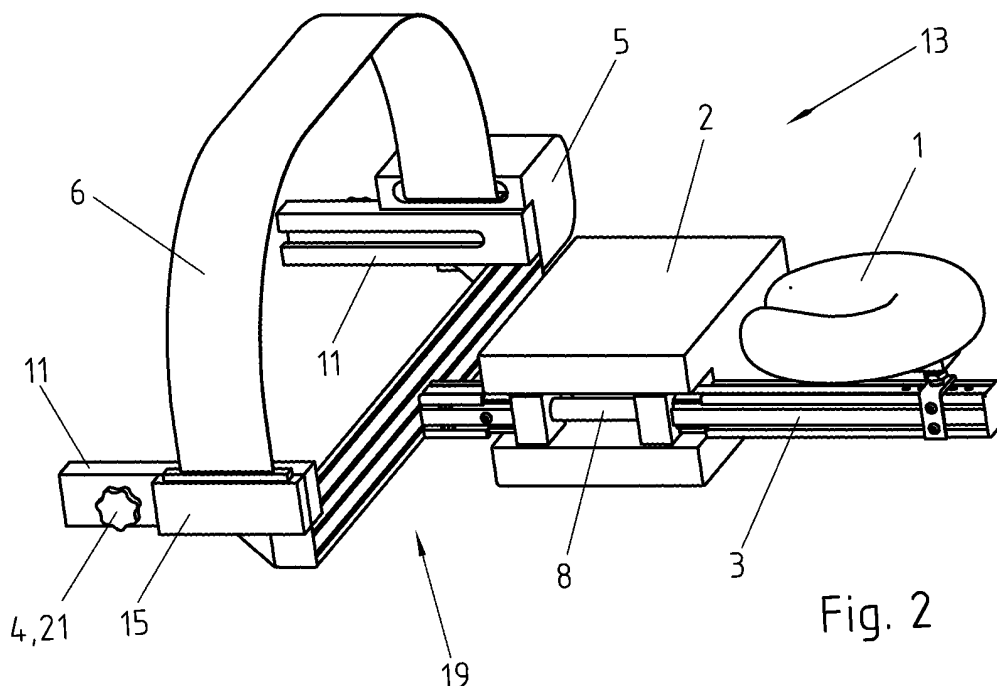
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(54) SHOULDER SURGERY ATTACHMENT FOR A SURGICAL TABLE

(57) The "beach chair positioning" is a commonly used positioning for shoulder arthroplasty and other surgical procedures around the shoulder joint. This "beach chair position" defines that the patient is sitting upright with the back of the table flexed at 70° to 80°, the legs flexed 30°. The present invention relates to a module for "beach chair" patient positioning in shoulder surgery. The module is a reusable device that fits the standard adult population (95th percentiles). The invention is an add-on to the standard operating table. It is a single unit which is composed of three interconnected elements. The first

element being the base which is attached to the side rails of the operating table. Further, this element houses an integrated rolled up safety belt system for securing of the patient onto the module. In the middle is a shoulder support element with a displacement system for left and right shoulders and radiolucent materials around the shoulder. The third element is a head support element which is adjustable in height and size. This patient positioning module achieves a safe and fast patient "beach chair positioning" for shoulder surgeries.

**Fig. 2****EP 4 049 644 A1**

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an addition or "add-on" to the standard surgical operating table. It represents a reusable module which is attached to the upper third of the operating table in order to achieve a fast and secure "beach chair positioning" for shoulder surgeries.

BACKGROUND OF THE INVENTION

[0002] The technical problem to be solved is the "setting of a patient into a "beach chair positioning" for surgical procedures. The "beach chair positioning" is a commonly used positioning for shoulder arthroplasty, arthroscopy and other surgical procedures around the shoulder joint.

[0003] The "beach chair position" is usually achieved by transitioning the operating table according to a "beach chair", which means that the patient is sitting upright with the back of the table flexed at 70° to 80°, the legs flexed at 30°. The shoulder area of the side which is being operated upon is left free without support. In order to liberate the shoulder, one part of the operating table around the shoulder area is taken away, the part for the support of the opposite shoulder is left in place. Further, the parts of the table that support the head are also removed. The head is then secured with an add on head piece which is located on a central rod which is then connected to the operating table. The head is secured with straps onto that head piece, because the piece only offers support of the head from the back.

[0004] This conversion procedure of a standard operating table from a supine position to the beach chair position with free access to the shoulder that is being operated on is not standardized and difficult to perform. It requires many steps to convert the operating table and secure the patient and the shoulder in the required position. This process is complex, it needs trained personnel and is time consuming.

[0005] US 5,275,176 A (MIDMARK CORP [US]) discloses a shoulder arthroscopy attachment for use with a surgical table wherein the attachment may be attached to a seat section of the table in place of an articulated leg section. The attachment includes a lumbar support assembly for supporting the lumbar portion of a patient's back, and a headrest assembly including an upper back support and a headrest. The upper back support is adjustable in a lateral direction whereby either of a patient's shoulders may be exposed for an operation while supporting the opposite shoulder on the upper back support. The headrest is adjustable relative to a frame for the headrest assembly whereby the head of a patient may be accommodated at a variety of positions. This invention relates to an entire surgical operating table particularly adapted for shoulder arthroscopy. It has modular parts that can be removed, which include the shoulder area.

In the shoulder area, the right and left parts can be removed, leaving a free access to the shoulder, however a central part is always remaining. This part does not allow the entire shoulder region to be free. On top of the shoulder part, there is a central part for the head. There is no included support for the patient's head or for the body such as a strap or safety belt.

[0006] US 2001/032364 A1 (HILL ROM SERVICES INC [US]) relates to a surgical table having an articulated leg section with accessory attachment rails on opposite sides thereof. This invention concerns a shoulder surgery attachment for the surgical table which includes a chair back assembly having a base on one end thereof and a cooperating second connector at each of its sides. Each second connector is releasably attachable to its corresponding first connector. A pair of mounting blades are provided on opposite sides of the base. A rail clamp is positionable along the attachment rails to be fastened to each of the attachment rails to provide a first connector at each side of the leg section. Indeed, this represents a chair like add-on for the surgical table with rails. The chair module puts the patient in a sitting position. The module is attached to the side rails with a clamp. The chair module itself has two central rods. Onto the rods a part for the back support is attached, two shoulder support parts and at the top the rod which holds the head holding part. Each shoulder support can be removed separately. There is no included support for the patient onto the module such as a strap or safety belt.

[0007] US 2006/103226 A1 (WONG GEORGE T [US]; LICARI PAUL A [US]; Warburton David [US]) discloses a shoulder chair releasably attachable to a table including rails each mounted to the table via spacers. The shoulder chair has a back portion and side plate assemblies extending from opposing sides of the back portion. Each side plate assembly includes at least an inner side plate with forward and rearward slots which receive the rail spacers of the table therein. It concerns a chair like attachable unit to an operating table including rails each mounted to the table via spacers. This chair is comprised of a back portion and side plate assemblies extending from opposing sides of the back portion. Each side plate assembly is attached to the back plate and can be removed. On the upper part of the back plate there is a rod that holds the head support. However, the head support is rather rigid, in order to allow adapting to all patients and there is no fixation strap for the head. Also, the central back portion is bulky and covers parts of the shoulder blade, even when the side portions are removed.

[0008] US 5,926,876 A (COMPACTA INTERNATIONAL LTD [US]) discloses a device for adapting a surgical operating table such that the upper torso of the patient can be raised in order to place the patient in a seated position, the device further providing the means of exposing or supporting a side of said patient's upper torso and limbs. The device contains a continuously adjustable positioning mechanism, and corresponding actuator for

said mechanism, in a way that a user can rapidly and conveniently put a patient in the desired position, from a supine posture to a fully seated position. Additionally, the device does not render the surgical table permanently modified, as the process of modification is reversible by means of a simple attachment mechanism. The device uses a back support section hingedly connected to a base frame, this base frame providing the attachment support to the surgical table. Side support panels are either moved out of the way on the patient's operative side or left in place to provide support to the unaffected side. Two embodiments are described that differ solely in the way the back support surface is implemented.

[0009] This invention relates to a shoulder surgery attachment for the surgical table which consists of a chair back assembly. It can be used to put the patient into a sitting position up to 80° of flexion. It has a base plate and a rod that allows for the fixation on the operating table. It includes a back part that is also used for positioning of the head, and two side parts. Each side part can be removed. There is no module which secures the head or a safety strap or belt to hold the patient.

[0010] US 2009/307845 A1 (RAO SUDHIR B [US]; HARPER KEITH J [US]) discloses a shoulder surgery attachment for a surgical table having an articulated leg section with accessory attachment rails on opposite sides. An upright chair back assembly is supported at its base or bottom end thereof for attachment to the accessory attachment rails and the chair back assembly includes a headrest assembly positioned above a back support. The headrest assembly includes a removable neck support and a head fixation assembly. The headrest assembly is adjustably moveable up and down the chair back assembly. The neck support is positioned below the head fixation assembly and protrudes from the front of the headrest assembly for engagement with the back of the patient's neck. The head fixation assembly includes a forward protruding U-shaped forehead clamp having two distal rearwardly extending free ends that are adjustably secured to the headrest assembly whereby the head clamp may be adjusted for engaging the forehead of the patient to clamp the patient's head against the headrest assembly.

[0011] This invention concerns an attachment for a surgical table that is like a chair. It can be attached onto the rails of an operating table. It consists of one part for the back and shoulder support which can be moved according to what shoulder should stay free. The patient is held in position with rods and fixation from the side. There is a central rod and on top of that is the headrest assembly. This includes a removable neck support and a head fixation assembly. However, the fact that there is only one part for back and shoulder support does not offer sufficient support for the patient, this fact is compensated by rods around the patient on both sides. Unfortunately, these rods can hinder the access to the operating area.

[0012] EP 2 452 665 A1 (MERIVAARA OY [FI]) relates to a surgical operating table (1), which is intended for

shoulder operations or surgical procedures performed on a similar part of the body. The surgical table comprises a platform (2) for the patient and an adjustment pedestal portion (3) with the platform (2) rested there upon. The platform (2) has preferably a plurality of sections (21, 22, 23), which are connected to each other and capable of being pivoted at least in vertical plane, and upon which the patient is rested while a surgical procedure is performed. These sections include a back support (23), which comprises a basic back section (4), a middle back section (5) protruding therefrom, and two shoulder sections (6; 6a, 6b) disposed on either side of the middle back section (5) and releasably secured to the basic back section (4) by means of attachment elements (7). According to the invention, the attachment elements (7) comprise first and second attachment elements (7a, 7b), such that the shoulder section (6; 6a, 6b) is provided with first attachment elements (7a), which comprise an inclined protrusion (62) and, in engagement therewith, a gutter (63) which is disposed at an end (61) of the shoulder section, and the basic back section (4), particularly sides (40; 40a, 40b) of the basic back section, are provided with second attachment elements (7; 7b) comprising a frame portion (71), a rod (72), and a gap (73) therebetween. In a securing process of the shoulder section (6; 6a, 6b), the inclined protrusion (62) of the first attachment elements (7a) is pushed into the gap (73) while the shoulder section is at an inclined angle relative to the basic back section's plane in such a way that the rod (72) finds the gutter (63) of the protrusion (62) and is supported therein, which is followed by pivoting the shoulder section (6) from the inclined angle to a position coplanar with the basic back section (4) and the middle back section (5) with the rod (72) constituting a pivoting axis, whereby the protrusion (62) is wedged and clamped between the frame portion (71; 711) and the rod (72) and maintains the shoulder panel (6; 6a, 6b) locked to the side (40; 40a, 40b) of the basic back section (4), and wherein, in its releasing process, the shoulder section (6; 6a, 6b) is first pivoted to an inclined angle downward from a plane of the basic back section (4) and the middle back section (5), thus enabling the protrusion (62) to be released from the clamping of the frame portion (71; 711) and the rod (72), after which the shoulder section (6; 6a, 6b) is capable of being pulled out of the gap (73) and removed from the basic back section (4). This invention concerns an entire operating table for shoulder surgery. In the region of the shoulder, both sides of shoulder support can be removed, leaving a central back support. There is no module for the fixation of the head and no device for the fixation of the patient.

[0013] US 5,661,859 A (MIDMARK CORP [US]) discloses a shoulder arthroscopy attachment for use with a surgical table wherein the attachment may be attached to a seat section of the table in place of an articulated leg section. The attachment includes a lumbar support assembly for supporting the lumbar portion of a patient's back, and a headrest assembly including an upper back

support and a headrest. The upper back support is adjustable in a lateral direction whereby either of a patient's shoulders may be exposed for an operation while supporting the opposite shoulder on the upper back support. The headrest is adjustable relative to a frame for the headrest assembly whereby the head of a patient may be accommodated at a variety of positions. However, this attachment consists of many parts that need to be assembled in a modular order. Further, the headrest allows the fixation of the head mainly at the back and additional straps are needed to safely fixate it for surgery.

[0014] US 2012/186017 A1 (RIACH JEFFREY [US] (82); RIACH JEFFREY [US]; OAKWORKS INC [US]) discloses an examination table designed to provide a technician or practitioner easy access to various regions of a patient's body. Specifically, the examination table includes a lower support structure, an upper support structure, and an examination passageway. The upper support structure has a sliding access panel disposed on a side of the upper support structure such that the examination passageway is provided when the sliding access panel is repositioned at various measurements. Thus, it concerns an entire operating table with parts that can be removed. On this table, there is no integrated system to secure the head or the patient.

[0015] Consequently, a module to achieve a fast, safe, stable, and easy to use "beach chair position" for shoulder surgery is still needed.

BRIEF DESCRIPTION OF THE INVENTION

[0016] The present invention relates to a device/module or add-on for fitting to an operation room table to position a patient optimally for left or right shoulder surgery comprising a back portion to be mounted to a standard operation table, the device comprising a shaft on which a pivotable shoulder support is mounted to support either the left or right shoulder and also a head rest.

[0017] One object of the present invention is to provide a reusable shoulder surgery add-on module adapted to be reversibly attached to the upper third of a standard surgical operating table to achieve a beach chair positioning of a patient for left or right shoulder surgery, the module being a single unit comprising 3 interconnected elements, namely a first, a second and a third element:

- the first element being a shaft comprising at its extremity designed to be in contact with the operating table a rod in square shape forming two end caps for the attachment to the side rails of the operating table and at its opposite extremity a tubular rod for supporting the two other elements of the module;
- the second element being a displaceable shoulder support element mounted on the tubular rod which is equipped with a coupling mechanism allowing displacement of said second element relative to said tubular rod to form a displaceable shoulder support element supporting either the left or right shoulder

of the patient, and,

- the third top element being the head support element mounted on the extremity of the tubular rod, said head element comprising means for adjusting the patient's head in height and width and from front to back.

[0018] The present invention provides a fast and safe positioning of the patient for shoulder surgeries.

[0019] Another object of the present invention is to provide an unimpaired possibility to perform X-ray imaging of the shoulder during operating procedures because the shoulder area is free.

[0020] Other objects and advantages of the invention will become apparent to those skilled in the art from a review of the ensuing detailed description, which proceeds with reference to the following illustrative drawings, and the attendant claims.

BRIEF DESCRIPTION OF THE FIGURES

[0021]

Figure 1: shows shows the view from the top of the entire add-on module of the invention in association with the upper third of a standard operating table.

Figure 2: shows the entire shoulder surgery add-on module from the bottom left side with the safety belt rolled out and attached into the locking position.

Figure 3: illustrates the side view from the left of the entire shoulder surgery add-on module with the safety belt rolled out.

Figure 4: shows the side view from the left of the entire shoulder surgery add-on module of the invention with the safety belt inside the cassette.

Figure 5: shows the view from above of the entire shoulder surgery add-on module and the safety belt rolled out to the middle position.

Figure 6: shows the side view from the top and oblique of the entire shoulder surgery add-on module without the safety belt and the cassette.

Figure 7: shows the side view from the right of the entire shoulder surgery add-on module.

Figure 8: shows the clamp system of the invention.

Figure 9: shows the locking bolt for the interlock mechanism.

Figure 10: shows the interlock mechanism.

Figure 11: shows the tubular rod with holes for the

different height positions for the head supporting element.

Figure 12: shows the view from the right side of the entire add-on shoulder surgery module with single representation of all the corresponding parts of the module according to the invention.

Figure 13: shows the entire shoulder surgery add-on module with the helmet head supporting element from the oblique bottom right side.

Figure 14: depicts the entire shoulder surgery add-on module of the invention attached onto a standard operating table with the patient positioned for surgery.

Figure 15: shows a detailed representation of the helmet type head supporting element with the flip-able visor.

Figures 16 to 18: shows a detailed representation of head supporting element or head set with moveable head side supports.

Figures 19 to 20: shows the view from the side of the entire add-on module of the invention with a shoulder element slidable on rails.

DETAILED DESCRIPTION OF THE INVENTION

[0022] Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and materials are described below. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. The publications and applications discussed herein are provided solely for their disclosure prior to the filing date of the present application. Nothing herein is to be construed as an admission that the present invention is not entitled to antedate such publication by virtue of prior invention. In addition, the materials, methods, and examples are illustrative only and are not intended to be limiting.

[0023] In the case of conflict, the present specification, including definitions, will control. Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of skill in art to which the subject matter herein belongs. As used herein, the following definitions are supplied in order to facilitate the understanding of the present invention.

[0024] The term "comprise" is generally used in the sense of include, that is to say permitting the presence of one or more features or components.

[0025] As used in the specification and claims, the singular forms "a", "an" and "the" include plural references

unless the context clearly dictates otherwise.

[0026] As used in the specification and claims, the word "means" (singular or plural) preceded or followed by a function can be replaced by the word "unit" or "module". For instance "adjustable means" can be replaced by "adjustable module" or "adjustable unit".

[0027] An "operating table", sometimes called "operating room table", is the table on which the patient lies during a surgical operation. This surgical equipment is usually found inside the surgery room of a hospital. An operating table system is basically made up of three components: an operating table column, the tabletop and the transporter. Modern operating table systems are available as both stationary and mobile units. There are a wide range of table tops that can be used for both general surgery and for specialist disciplines. Mobile operating tables, however, tend to be equipped with a specific discipline in mind. The base, column and tabletop form a unit.

[0028] Since the table column for a stationary operating table system is firmly anchored to the floor, the additional necessary medical devices can easily be brought to the operating area and positioned. These devices include, for example, x-ray equipment, which can easily be slid under the tabletop. For personnel, the system offers improved leg space since disruptive foot geometry is no longer present.

[0029] Operating tables are fitted with side rails to which positioning equipment is attached. These rails range in size according to their make and origin. In order to achieve stable positioning, the correct sized clamp must be used.

[0030] Additional elements can be adapted to the operating table. This flexibility is very important since it enables the table to be adapted to suit the relevant patient or the surgical discipline. The advantage of the mobile operating table, on the other hand, is that the position of the table can be changed within the operating room. However, the foot of the table limits the leg space available to the surgical team. The individual segments of the tabletop are adjustable and can be easily removed and replaced. They also permit x-rays and conduct electricity. On most general tables, the head section is removable and can have a variety of attachable head rests. In shoulder surgery, the most common surgical position is Sitting: also known as Fowler's position, the patient in this position is sitting at a 90-degree angle. The knees are slightly flexed and the feet are placed against a padded foot board. This position is ideal for neurosurgery, facial operations, and some shoulder surgeries.

[0031] The "beach chair positioning" is a commonly used positioning for shoulder arthroplasty, arthroscopy and other surgical procedures around the shoulder joint. The "beach chair position" is usually achieved by transitioning the operating table according to a "beach chair", which means that the patient is sitting upright with the back of the table flexed at 70° to 80°, the legs flexed at 30°. This "beach chair position" is an intermediate posi-

tion between a sitting and supine position.

[0032] One object of the present invention is to provide a reusable shoulder surgery add-on module (13) adapted to be reversibly attached to the upper third of a standard surgical operating table (7) to achieve a beach chair positioning of a patient for left or right shoulder surgery, the module being a single unit comprising 3 interconnected elements, namely a first, a second and a third element:

- the first element being a shaft (19) comprising at its extremity designed to be in contact with the operating table a rod in square shape (14) forming two end caps (11a, 11b) for the attachment to the side rails of the operating table (7) and at its opposite extremity a tubular rod (3) for supporting the two other elements of the module,
- the second element being a displaceable shoulder support element (2) mounted on the tubular rod (3) which is equipped with a coupling mechanism (8) allowing displacement of said second element (2) relative to said tubular rod (3) to form a displaceable shoulder support element (2) supporting either the left or right shoulder of the patient, and,
- the third top element being the head support element (1) mounted on the extremity of the tubular rod (3), said head element (1) comprising means for adjusting the patient's head in height and width and from front to back.

[0033] According to one embodiment, the first element (19) further comprises a cassette for an integrated safety belt (5) located on one side of one end cap (11) and a locking mechanism for the safety belt (15) located at the opposite side of the other end cap (11). Advantageously, the integrated safety belt (5) and the locking mechanism for the safety belt (15) are mounted at the opposite side of the end caps (11) intended to be in contact with the side rails of the operating table (7).

[0034] According to another embodiment, the head support element (1) comprises a helmet (16) with a flip-pable or pivotable visor type mean (17) to fixate the forehead of the patient.

[0035] Preferably, the helmet (16) is garnished with a cushion material (18).

[0036] Advantageously, the cushion material (18) is a memory foam.

[0037] According to a further embodiment, the helmet (16) is surrounded by an adjustable waist cage comprising adjustable means (not represented). Preferably, the adjustable means for the cage is a knob (not represented) for tightening the helmet.

[0038] Preferably, the cage is like a bicycle helmet cage. The main thing of the head support element (1) is its simplicity and the visor (17) that can be pulled up and down, so it is easy in handling and requires only a few steps and not many people holding the head and adjusting the head support element (1) as it is done now with the standard operating tables.

[0039] According to an embodiment, the head support element (1) comprises a helmet (16) with moveable side supports, in other words patches, for adjusting the patient's head, see figures 16 to 18. Before the patient's head is being placed inside the head support element, the side supports are loose. This allows placing the head inside. Then, the handwheel is turned and consequently the side supports move closer to the head until the head is safely supported. To open it up again, the locking mechanism is released, and the side support elements move aside, then the head can be released and taken out of the head support element.

[0040] According to another embodiment of the invention, at least the second element (2) consists in a radiolucent material. However, according to a preferred embodiment, the tubular rod (3) also consists in a radiolucent material.

[0041] In accordance with the invention, the free bottoms of the two end caps (11a, 11b) also representing the clamp system for the attachment of the first element (19) to the side rails of the operating table (7) comprise a clamp mechanism (21).

[0042] Also encompassed are means for adjusting the patient's head in height and width and from front to back is a locking knob (20) for the head support element (1).

[0043] The shoulder surgery add-on module (13) of the invention is a stable, light weighted product with radiolucent properties for X-ray and a safety belt system (5, 6, 15), said module is compatible for fixation on all standard operating tables (see figures 2, 5, 13 and 14). The shoulder surgery add-on module (3) of the present invention is less complicated in handling because it is one single module, meaning shoulder and head and belt in one piece to be attached onto the side rails of the operating table (7). one of the main advantages is the shoulder supporting element (2) with the displaceable shoulder support element, for instance flippable or pivotable locking mechanism or sliding and locking mechanism. Another advantage is the integrated safety belt for the body as well as the integrated fixation of the head (1) with a visor type strap (17) and helmet (16). The prior art only discloses either a head rest or a complicated assembly with a strap. Also, most of the disclosures of the prior art do not allow the shoulder which is being operated on completely free but there remains a central back support that can interfere with x-rays for example.

[0044] One advantage of the present invention is to provide a single unit, simple, easy to handle module for "beach chair positioning" in shoulder surgery in the form of an add-on to the standard operating table (7). This single unit module can be securely attached to the standard side rails which are located on both sides of the operating table (7). In order to attach the shoulder surgery add-on module (13), the end caps (11) of the first element (19) are slid onto the rails on both sides of the upper third of the operating table (7).

[0045] The current invention is one single unit module which is composed of three main parts or elements. The

first element (19) or bottom element is the base element or shaft with the fixation mechanism for the attachment to the side rails of the operating table (7). The shaft consists in a rod in square shape (14) forming a "fork" or "U" like shape and a tubular rod (3) for supporting the two

[0046] On top on this element there is the second element or middle shoulder support element (2) being a displaceable element for supporting of the shoulder and shoulder blade area, the displacement, preferably from left to right or vice versa, being for instance a flip with rotation around the rod or a slide relative to the rod.

[0047] Advantageously, the shoulder support element (2) can be switched from one side to the other. The shoulder support element (2) is coupled to the tubular rod (3) by a coupling mechanism. The second element can be a pivotable shoulder support element (2) mounted on the tubular rod (3) which is equipped with an interlock mechanism (8) allowing rotation of said second element (2) around said tubular rod (3) to form a flippable shoulder support element (2) supporting either the left or right shoulder of the patient. This shoulder support element can be flipped from the left to the right side and vice versa and interlocked in the desired position.

[0048] In the section where the shoulder part is located, the shaft (19) consists of a tubular rod (3) with a hole for the interlock mechanism (8) (see figures 2, 6, 7, 9, 10 11 and 12). This allows the rotation around the tubular rod (3) and interlocking in the desired position (right or left, for supporting the right or left side of the shoulder so that the other (the one which is being operated on) is free. On this tubular rod (3), the switch mechanism (9) is integrated. The desired position is secured with the locking bolt (10) for the interlock mechanism (8) (see figures 8, 9 and 10).

[0049] Alternatively, the second element can be a slideable shoulder support element (2) mounted on the tubular rod (3) which is equipped with a sliding mechanism (8) allowing sliding of said second element (2) relative to said tubular rod (3) to form a slideable shoulder support element (2) supporting either the left or right shoulder of the patient. The shoulder support element (2) is equipped with linear guide received or sliding in a sliding guide mounted on the tubular rod (3) (see figures 19-20). When the desired position of the shoulder support element (2) is reached, the shoulder support element (2) is locked.

[0050] The displaceable part of the shoulder support element (2), for instance flippable or slideable, and its fixation on one side or other is an important advantage of the present invention. This leaves the shoulder which is being operated on free whereas the shoulder which is not operated is supported by the shoulder support element. This also allows free access for X-ray imaging of the shoulder being operated on.

[0051] Built directly on one end cap (11) of the first element (19) is a case or cassette for the safety belt (5). This safety belt (6) is inserted into a locking mechanism

(15) located on the other end cap (11). This belt (6) secures the patient onto the module (13) and prevents movement of the torso and back. The safety belt (6) is integrated into the end cap (11) of the shaft (first element) then around belt guides and can be rolled up in a cassette (5), on the other side it is fixed in the locking mechanism (15) like in an airplane and then tightened (see figures 1, 2, 3, 5, 12, 13 and 14).

[0052] The top element of the module (13) is the head support element (1). This element is connected to the base element (19) namely on the tubular rod (3) via a locking bolt (20). The head support element (1) is adjustable in height and from front to back (see figures 13, 14 and 15). The head support element (1) is also adjustable in size to fit the head size of the standard population (95th percentiles of men and women).

[0053] The head support or holding element (1) comprises a helmet (6) (i.e. motor bike) with a flippable or pivotable visor type mean (17) that is used to fixate the forehead (see figure 5). Preferably, the pivotable visor can be made of plastic or fake leather and cushioned with foam). More preferably, the cushioning material (18) inside the helmet (16) can be memory foam (see figure 13).

[0054] In particular, the module of the invention is comprised of one piece which is divided into 3 elements or parts. It can be securely attached to the standard railings of an operation room table (7) on each side. The shoulder add-on module (13) is composed of a first element (19) being a shaft. On to this part the safety belt system is attached. On top of this is an element for supporting the shoulder (2) which can be flipped from right to left and interlocked in the desired position so that one shoulder is left free. On top of this is the head support element (1). It is adjustable in height and from front to back.

[0055] The shoulder surgery add-on module (13) for patient positioning in shoulder surgery, consists in one single movable unit with three different elements. The first element (19) is the shaft. This shaft comprises a rod in square shape (14) forming two end caps (11a, 11b) comprising one fixation system on each side which can be attached to the slide rails of the operating table (7) via a clamp mechanism (21) (see figure 1). On the upper side margin of the rod in square shape (14), there is a cassette (5) for a rolled safety belt. The safety belt (6) travels from one side to the opposite side of the end caps (11a and 11b) where it is attached. On top of the rod in square shape (14) there is a tubular rod (13) which in its middle supports at the region of the shoulder one pivotable shoulder support element (2) which can be changed from left to right and blocked at each side with an interlock mechanism.

[0056] On top of the second element (2) also defined as pivotable or flip shoulder element and in the top center of the first element (19), there is the head supporting element (1) (see figures 2, 3, 6). This third top element supporting the head (1) is adjustable in height and from front to back. It comprises a cushioned helmet (16) made

from material which is preferably washable. It is surrounded by an adjustable waist cage (22 not represented) comprising adjustable means (23 not represented). Preferably the adjustable cage (22) is a plastic cage, and the adjustable means (23) is a knob. Ideally, the size of the head support element (1) can be adjusted by changing the size of the cage (22) via the knob (23). On the front of the helmet (16) there is a flippable visor type piece (17) that secures the head from moving in the forward direction (see figures 13, 14 and 15).

[0057] Preferably the shoulder surgery add-on module (13) for patient positioning in shoulder surgery with a safety belt (6), cushioned head support element (1) which is adjustable in size and height and with the flip shoulder support element (2) for left and right shoulders is made out of radiolucent materials around the shoulder.

[0058] Advantageously the shoulder surgery add-on module (13) of the invention is a single, movable, reusable unit. This module serves as an add-on to upper third of the standard operating tables (7). The module (13) is attached directly onto both sides of the side rails of the operating table (7) via clamp mechanisms (21) (see figure 1).

[0059] The shoulder surgery add-on (13) is comprised of three interconnected parts (see figure 2). The first element (19) or lower part is the base or shaft. This base is composed of a fork or square shaped rod system (14) with end caps (11) that provides the fixation mechanism (see figure 4). This first element can be slid onto both side rails of the operating table (7). In particular, the bottom U-part of the rod system or shaft defined herein as the end caps (11) is locked onto both side rails with a clamp mechanism (21) (see figure 1). In the center of the fork shaped rod system is a square shaped rod (14) (see figure 6). The square shape rod (14) is changed into a tubular shape (3) in the middle section, where the pivotable shoulder element (2) is located (figure 6). This tubular shaped rod (3) is necessary for the alternation between the position of the shoulder element on the right and left side, respectively.

[0060] The second element (2) is located around the shoulder and shoulder blade area (figure 13 and 14). Depending on which shoulder is operated on, this shoulder supporting element (2) can be rotated around the central tubular rod (3) (tubular in shape in this section). Then it is locked on the desired side and is in plane with the operating table (7) (figure 14).

[0061] On the upper side margin of the first element (19), on one side of the end cap (11) there is a cassette (5) for a rolled in safety belt (6) (see figure 2). The safety belt (6) travels from one end cap (11a) to the opposite end cap (11b) where it is attached and tightened according to the size of the patient (see figures 5, 13 and 14). This safety belt (6) provides the fixation of the patient's torso onto the module.

[0062] On top of the shoulder supporting element (2), the head supporting element (1) is located. This third element is directly connected to the central tubular rod

(3). The head support element (1) can be moved up and down the square shaped rod (14). This mechanism ensures the adjustable height according to the size of the patient. The fixation of the head support element (1) onto the tubular rod (3) is achieved with central holes and a locking bolt (20) (see figure 12), further the square shape (14) of the shaft (19) acts against the torsion of the head support element (1). The head support element (1) is also adjustable from front to back. The patient's forehead is secured onto the head support element (1) with a flappable visor type piece (17) that secures the head from moving in the forward direction (see figure 15). The head support element (1) is shaped like part of a helmet (6) and cushioned with material (18) which is adjusting to the head sizes of the standard population (95th percentiles) and it is washable (see figure 13).

[0063] Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. It is to be understood that the invention includes all such variations and modifications without departing from the spirit or essential characteristics thereof. The invention also includes all of the steps, features, compositions and compounds referred to or indicated in this specification, individually or collectively, and any and all combinations or any two or more of said steps or features. The present disclosure is therefore to be considered as in all aspects illustrated and not restrictive, the scope of the invention being indicated by the appended Claims, and all changes which come within the meaning and range of equivalency are intended to be embraced therein.

List of reference numbers:

[0064]

- 1) Head support element
- 2) shoulder support element, for instance pivotable or slideable
- 3) tubular rod
- 4) star screw
- 5) cassette for safety belt
- 6) safety belt
- 7) upper third of a standard surgical operating table
- 8) interlock mechanism
- 9) switch mechanism
- 10) locking bolt for the interlock mechanism
- 11) end caps for the attachment of the first element to the side rails of the operating table
- 12) corner piece
- 13) shoulder surgery add-on module
- 14) rod in square shape
- 15) locking mechanism for the safety belt
- 16) helmet
- 17) flippable visor type means
- 18) cushion material
- 19) first element or shaft

- 20) locking knob for the head support element
- 21) clamp mechanism for the side rails
- 22) Upper patch
- 23) Back head support
- 24) Side head support
- 25) Lower patch
- 26) Lower patch inclined
- 27) Backhead cushioning
- 28) Left head support
- 29) Back casing
- 30) Front casing
- 31) Catch housing
- 32) Locking disc
- 33) Handwheel
- 34) Screws M2 x 16
- 35) Gear with pins
- 36) Tooth profile
- 37) Right head support
- 38) Cushioning for the head
- 39) Clamp guide
- 40) Side holders and cushioning for the head
- 41) Stop mechanism
- 42) Carrier plate
- 43) Shoulder cushioning
- 44) Belt guidance
- 45) Railings for attachment on OR table
- 46) Adjustment mechanism
- 47) Central rod
- 48) Linear guide
- 49) Sliding guide
- 50) Belt buckle
- 51) Cross bearer

Claims

1. A shoulder surgery add-on module (13) adapted to be reversibly attached to the upper third of a standard surgical operating table (7) to achieve a beach chair positioning of a patient for left or right shoulder surgery, the module being a single unit comprising 3 interconnected elements, namely a first, a second and a third element:
 - the first element being a shaft (19) comprising at its extremity designed to be in contact with the operating table a rod in square shape (14) forming two end caps (11a, 11b) for the attachment to the side rails of the operating table (7) and at its opposite extremity a tubular rod (3) for supporting the two other elements of the module,
 - the second element being a displaceable shoulder support element (2) mounted on the tubular rod (3) which is equipped with a coupling mechanism (8) allowing displacement of said second element (2) relative to said tubular rod (3) to form a displaceable shoulder support el-

ement (2) supporting either the left or right shoulder of the patient, and,
 - the third top element being the head support element (1) mounted on the extremity of the tubular rod (3), said head element (1) comprising means for adjusting the patient's head in height and width and from front to back.

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2. The shoulder surgery add-on module of claim 1, wherein the first element (19) further comprises a cassette for an integrated safety belt (5) located on one side of one end cap (11) and a locking mechanism for the safety belt (15) located at the opposite side of the other end cap (11), **characterized in that** the integrated safety belt (5) and the locking mechanism for the safety belt (15) are mounted at the opposite side of the end caps (11) intended to be in contact with the side rails of the operating table (7).
3. The shoulder surgery add-on module according to any one of claims 1 to 2, wherein the head support element (1) comprises a helmet (16) with a flippable visor type mean (17) to fixate the forehead of the patient.
4. The shoulder surgery add-on module according to claim 3, wherein the helmet (16) is garnished with a cushion material (18).
5. The shoulder surgery add-on module according to claim 4, wherein the cushion material (18) is a memory foam.
6. The shoulder surgery add-on module according to any of claims 3-4, wherein the helmet (16) is surrounded by an adjustable waist cage comprising adjustable means.
7. The shoulder surgery add-on module according to any of claims 3-4, wherein the adjustable means for the cage is a knob.
8. The shoulder surgery add-on module according to any one of claims 1 to 2, wherein the head support element (1) comprises a helmet (16) with moveable side supports for adjusting the patient's head.
9. The shoulder surgery add-on module according to any of claims 1-8, wherein at least the second element (2) consisting in a radiolucent material.
10. The shoulder surgery add-on module according to claims 9, wherein the tubular rod (3) consisting in a radiolucent material.
11. The shoulder surgery add-on module according to any of claims 1-10, wherein each of the two end caps (11a, 11b) for the attachment of the first element (19)

to the side rails of the operating table (7) comprises a clamp mechanism (21).

12. The shoulder surgery add-on module according to any of claims 1-11, wherein the means for adjusting the patient's head in height and width and from front to back is a locking knob (20) for the head support element (1). 5
13. The shoulder surgery add-on module according to any of claims 1-12, wherein the second element being a pivotable shoulder support element (2) mounted on the tubular rod (3) which is equipped with an interlock mechanism (8) allowing rotation of said second element (2) around said tubular rod (3) to form a flippable shoulder support element (2) supporting either the left or right shoulder of the patient. 10 15
14. The shoulder surgery add-on module according to any of claims 1-12, wherein the second element being a slideable shoulder support element (2) mounted on the tubular rod (3) which is equipped with a sliding mechanism (8) allowing sliding of said second element (2) relative to said tubular rod (3) to form a slideable shoulder support element (2) supporting either the left or right shoulder of the patient. 20 25

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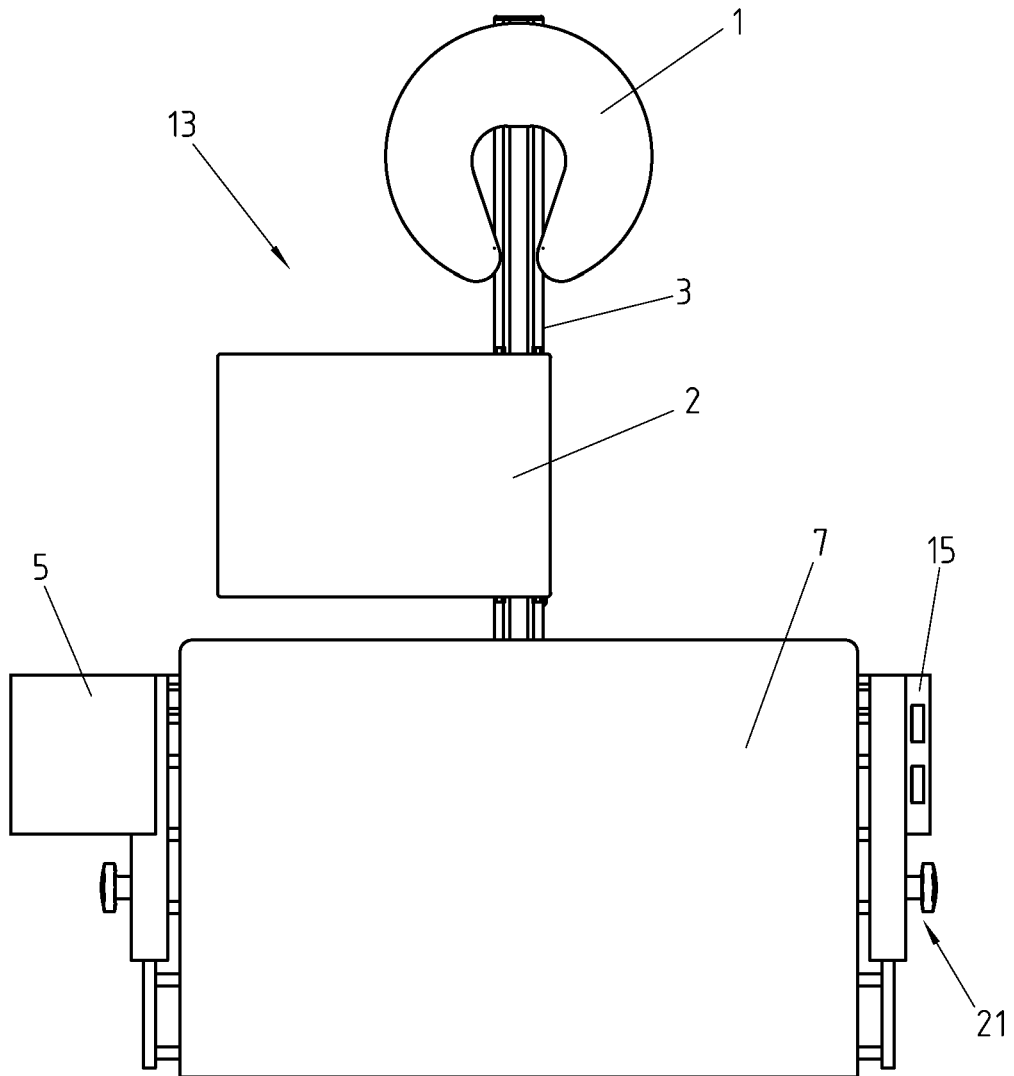
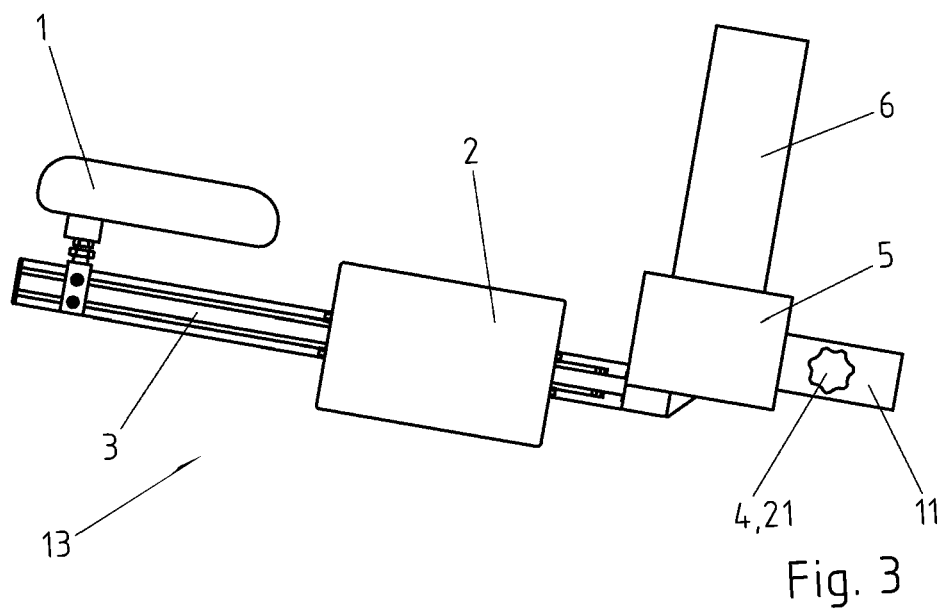
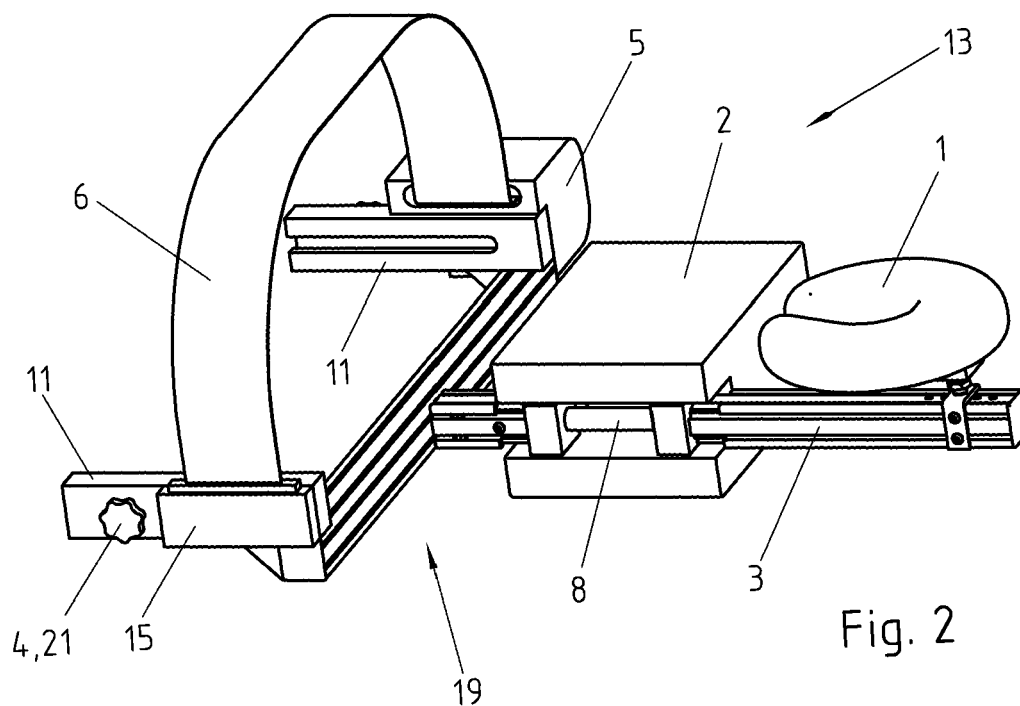


Fig. 1



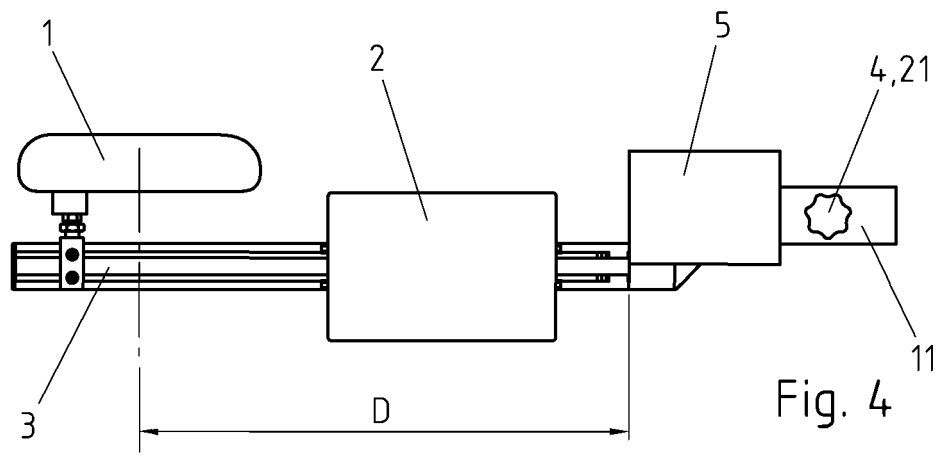


Fig. 4

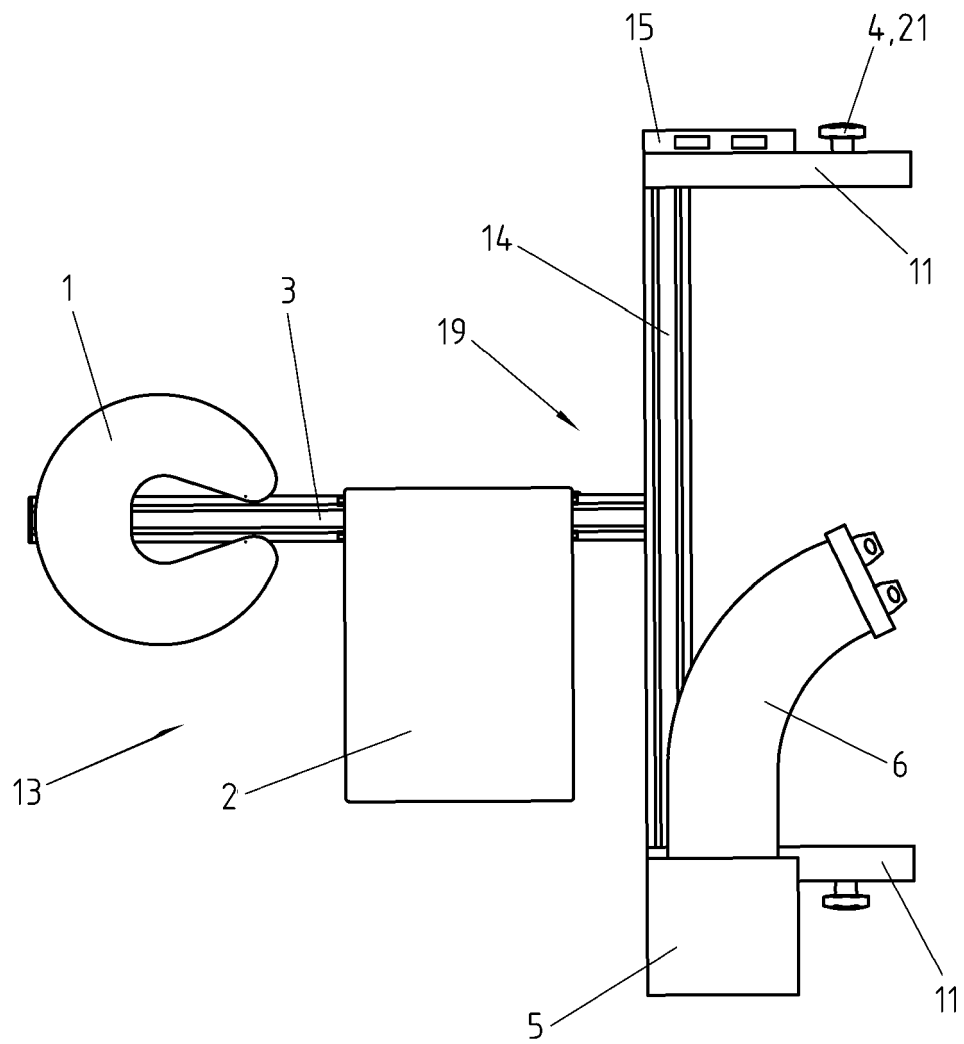


Fig. 5

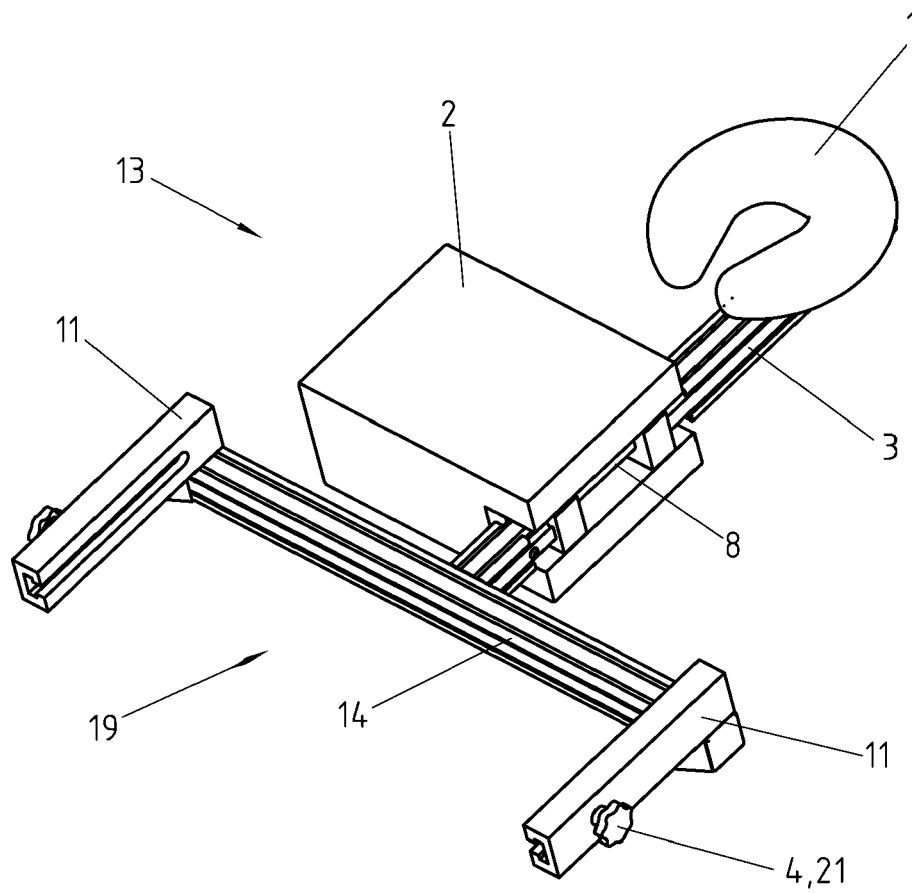


Fig. 6

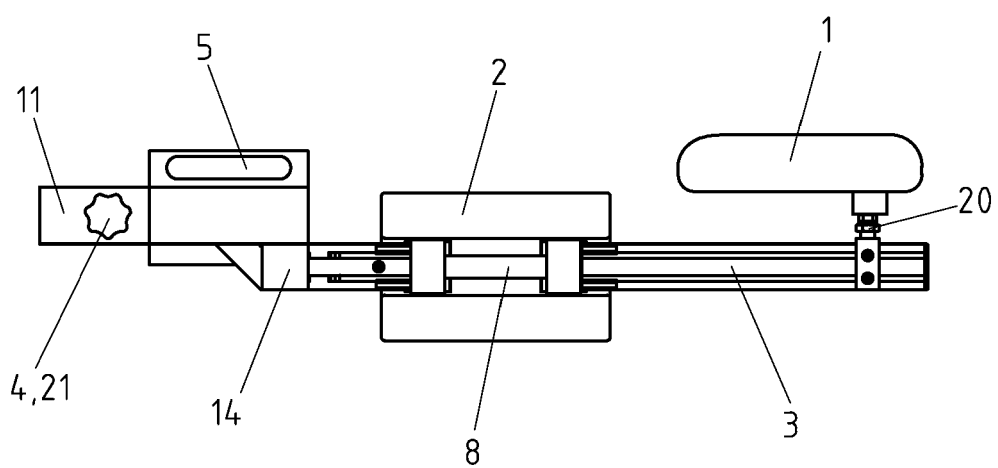


Fig. 7

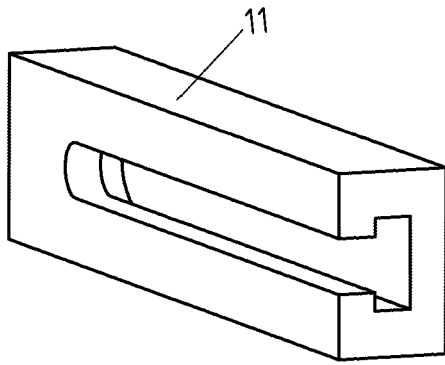


Fig. 8

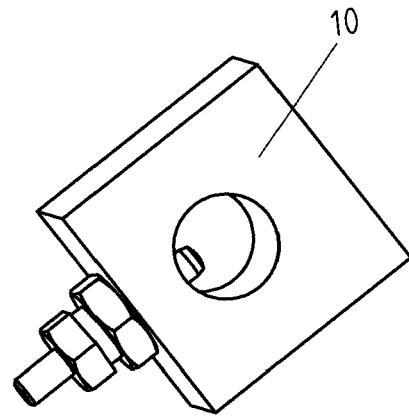


Fig. 9

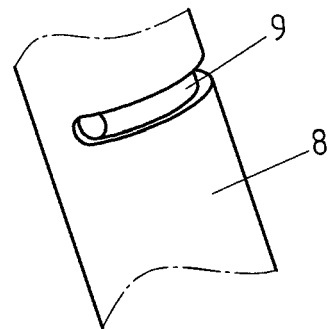


Fig. 10

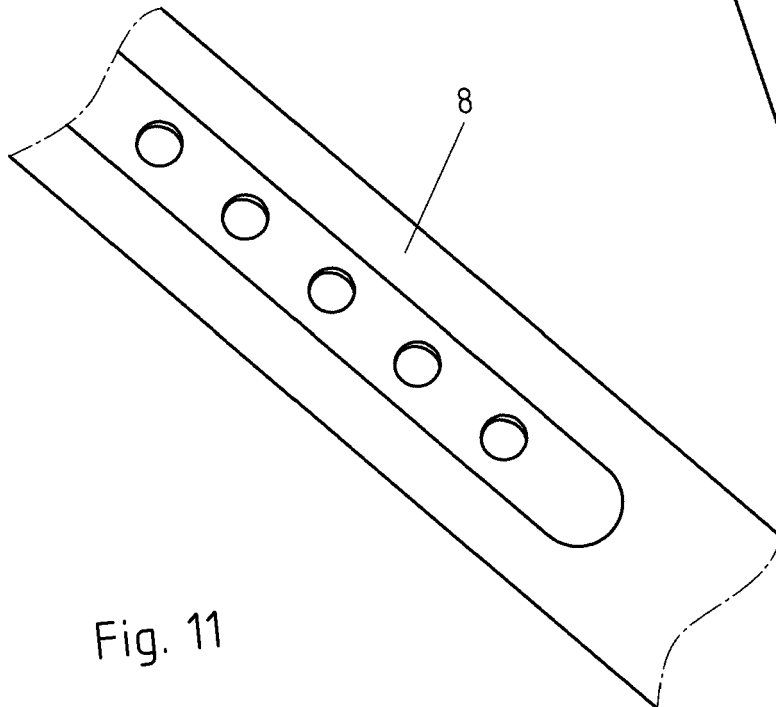


Fig. 11

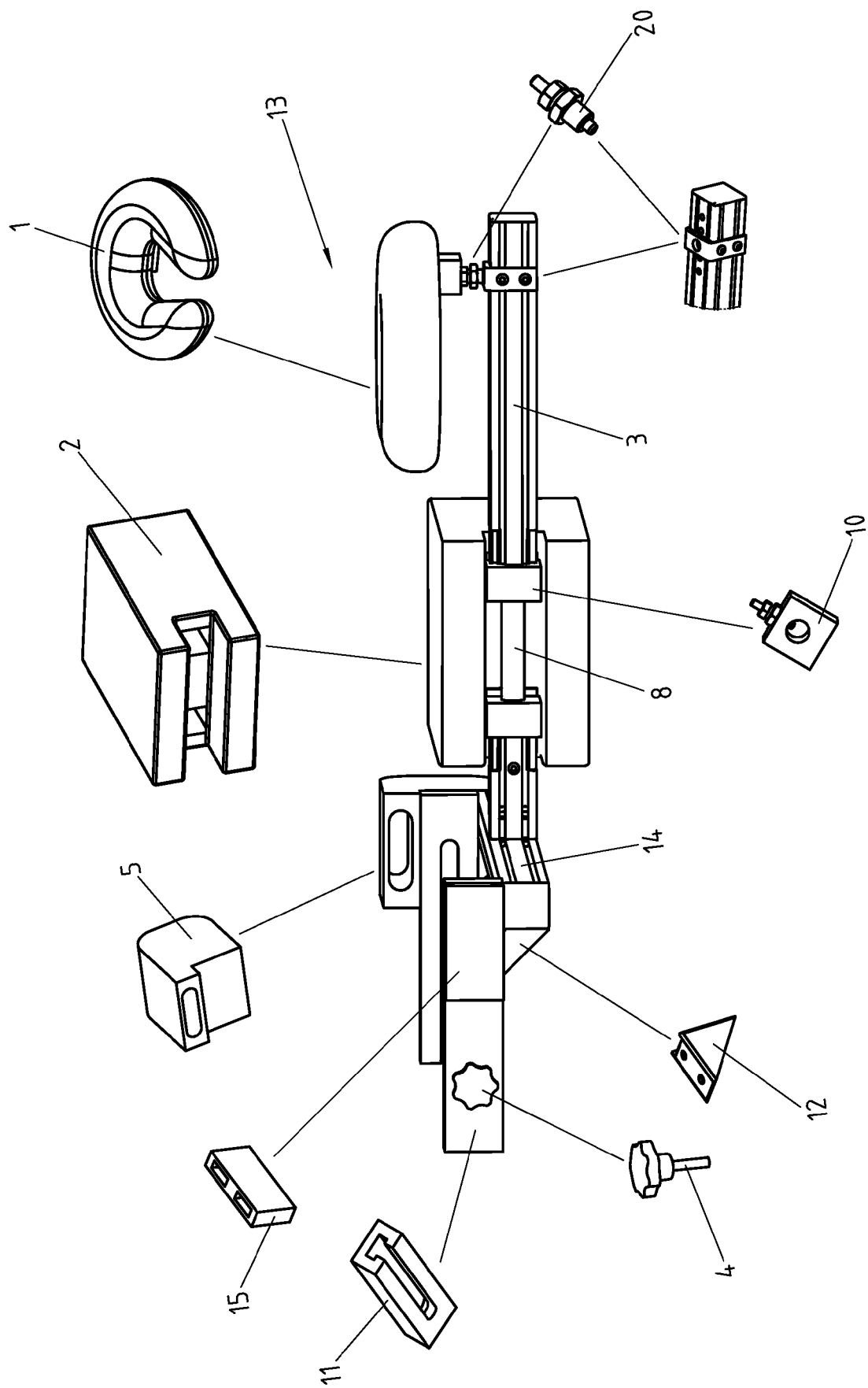


Fig. 12

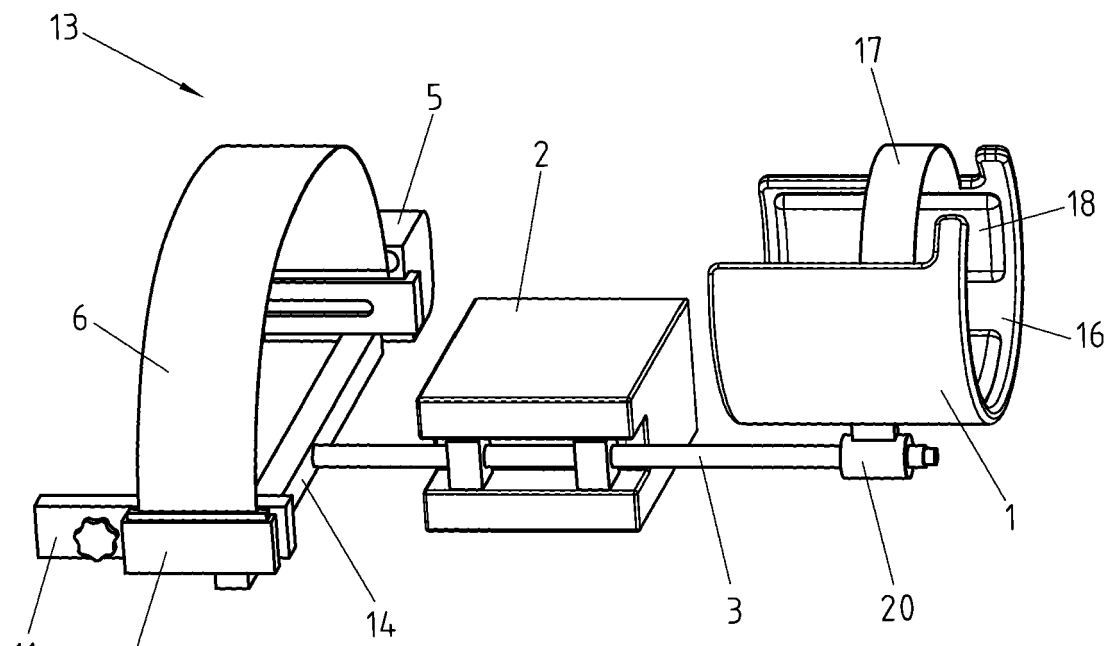


Fig. 13

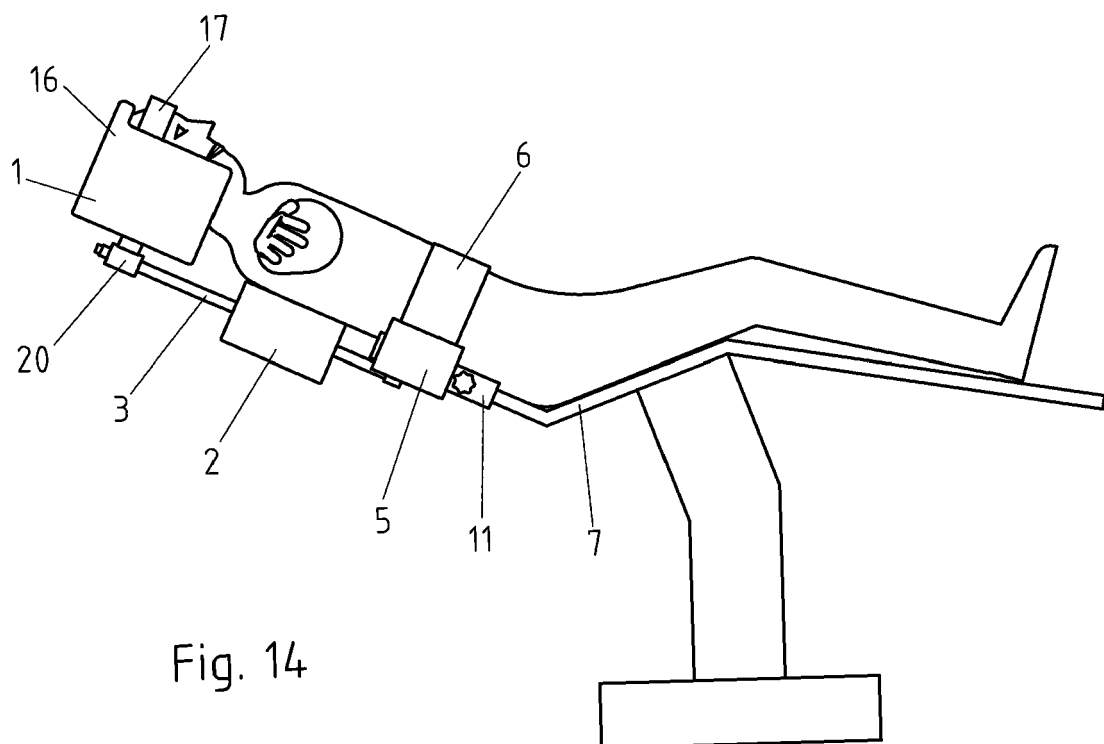


Fig. 14

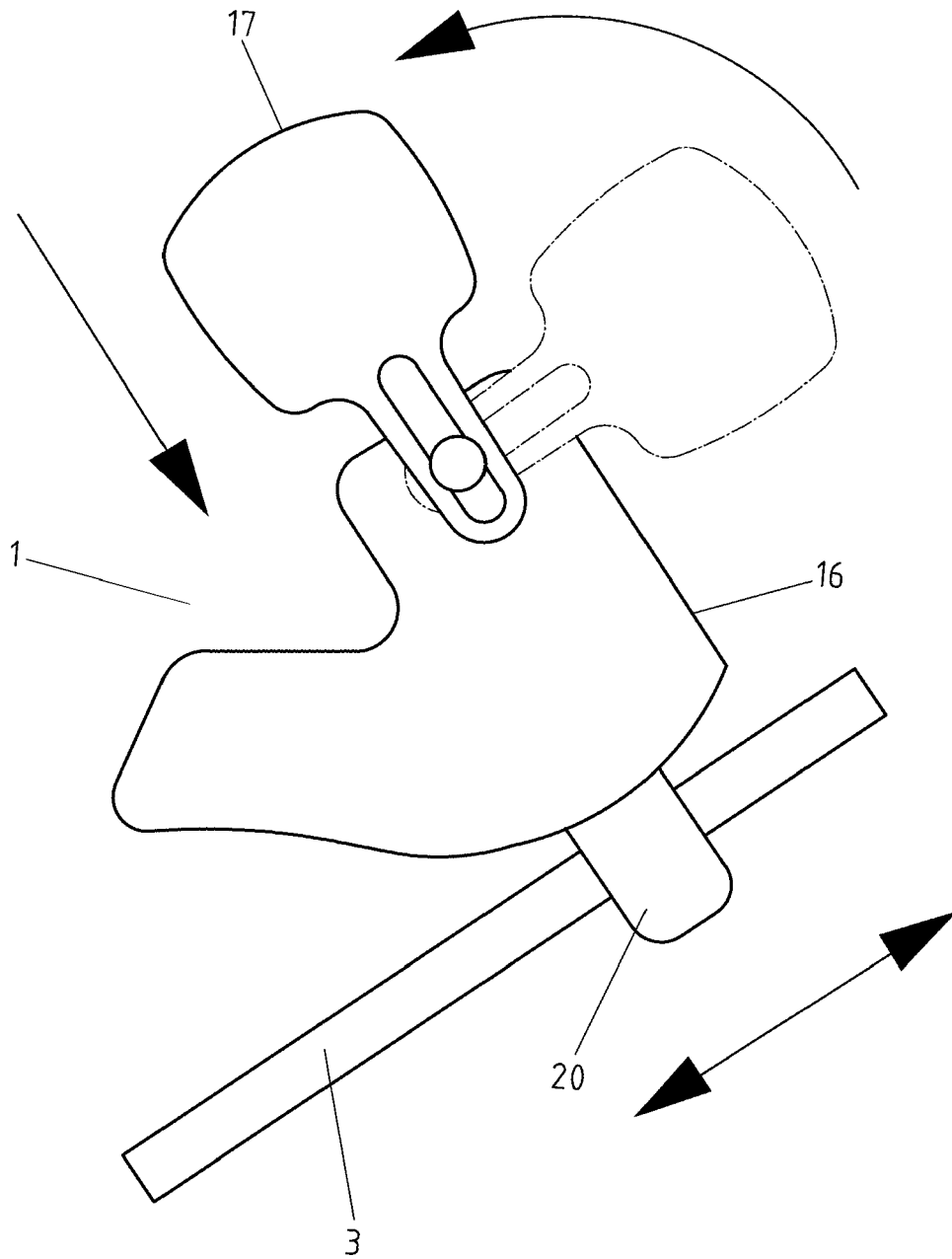


Fig. 15

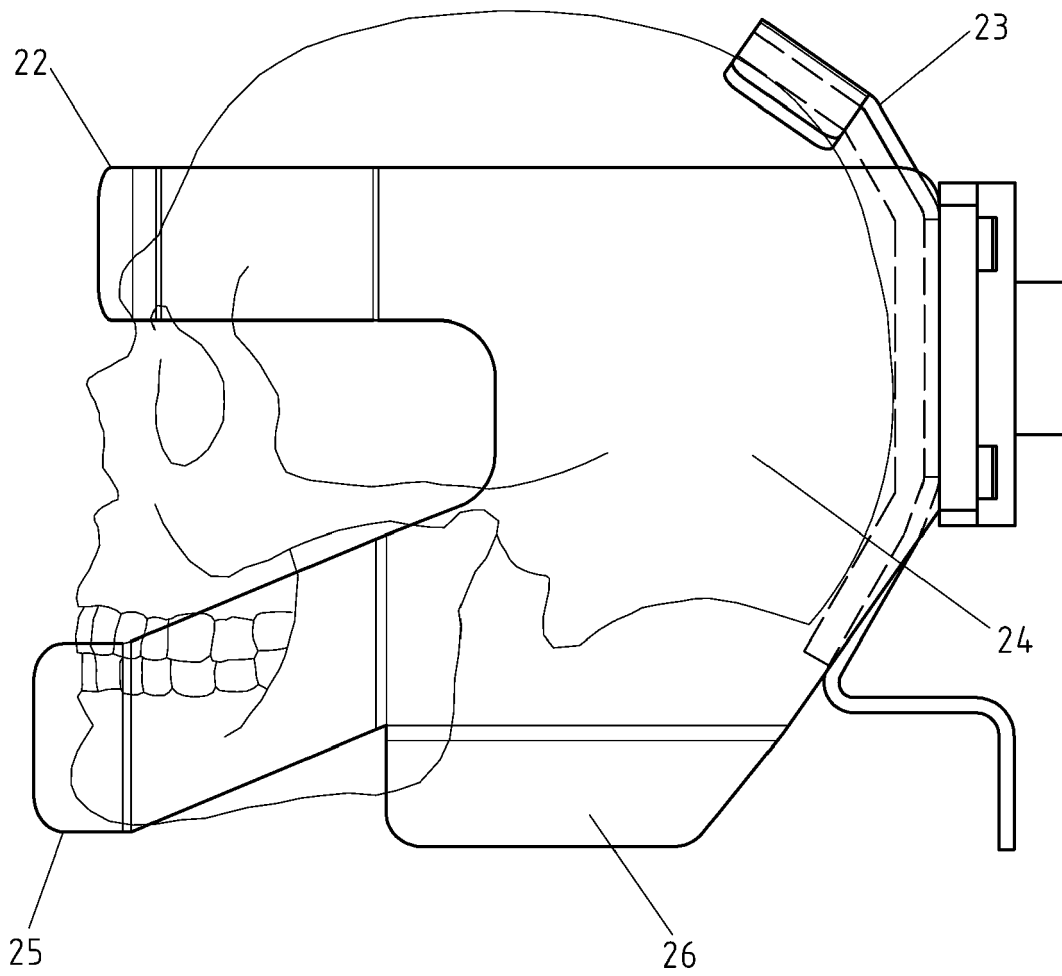


Fig. 16

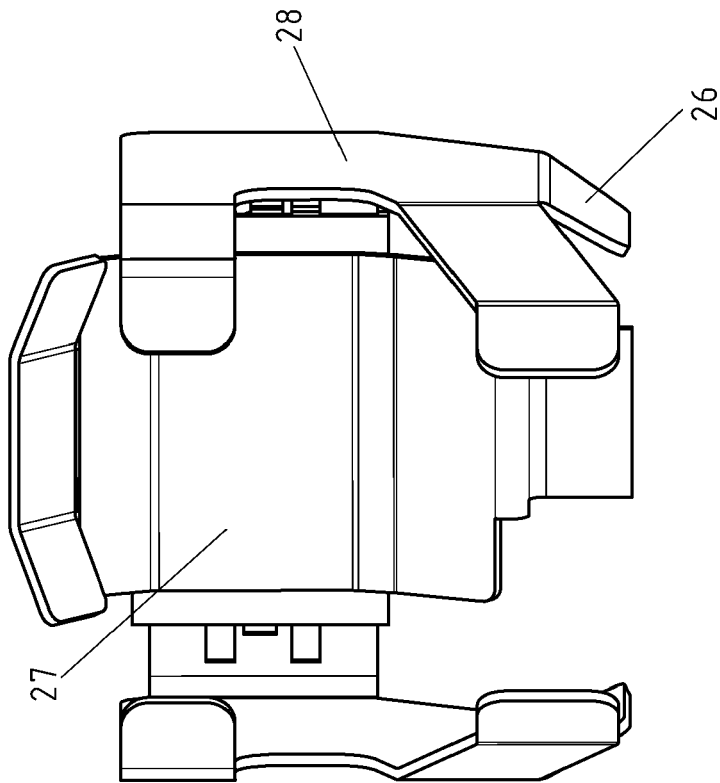


Fig. 17b

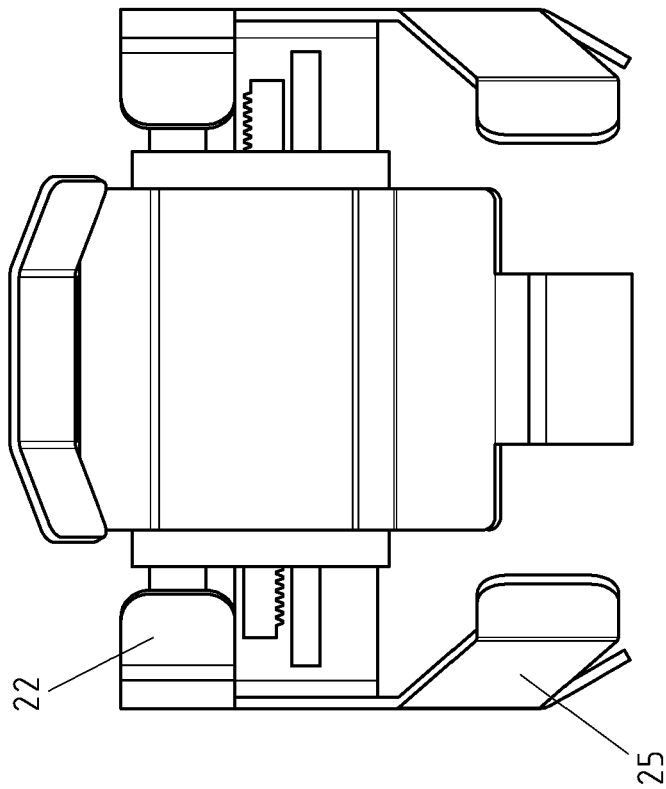


Fig. 17a

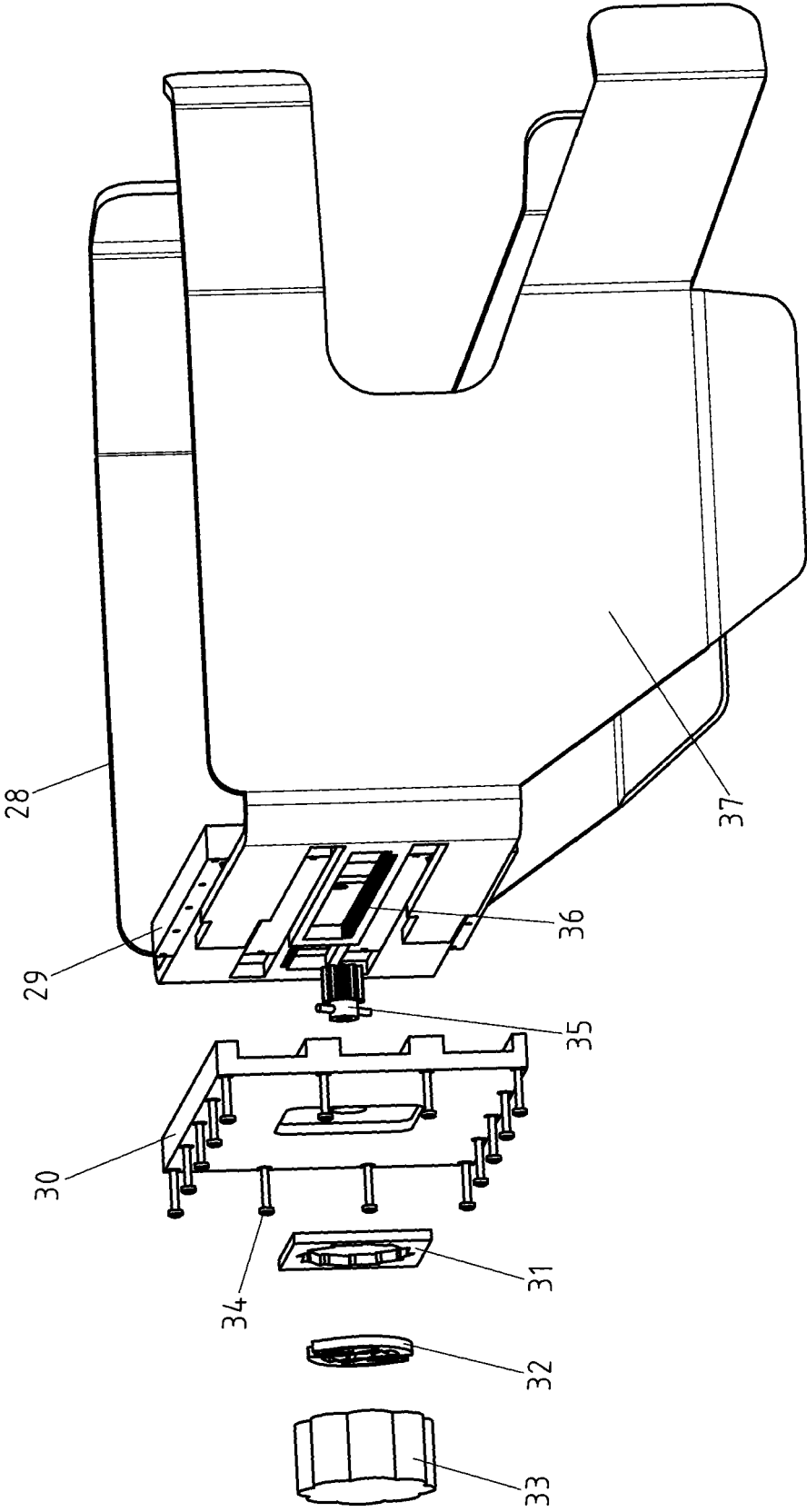


Fig. 18

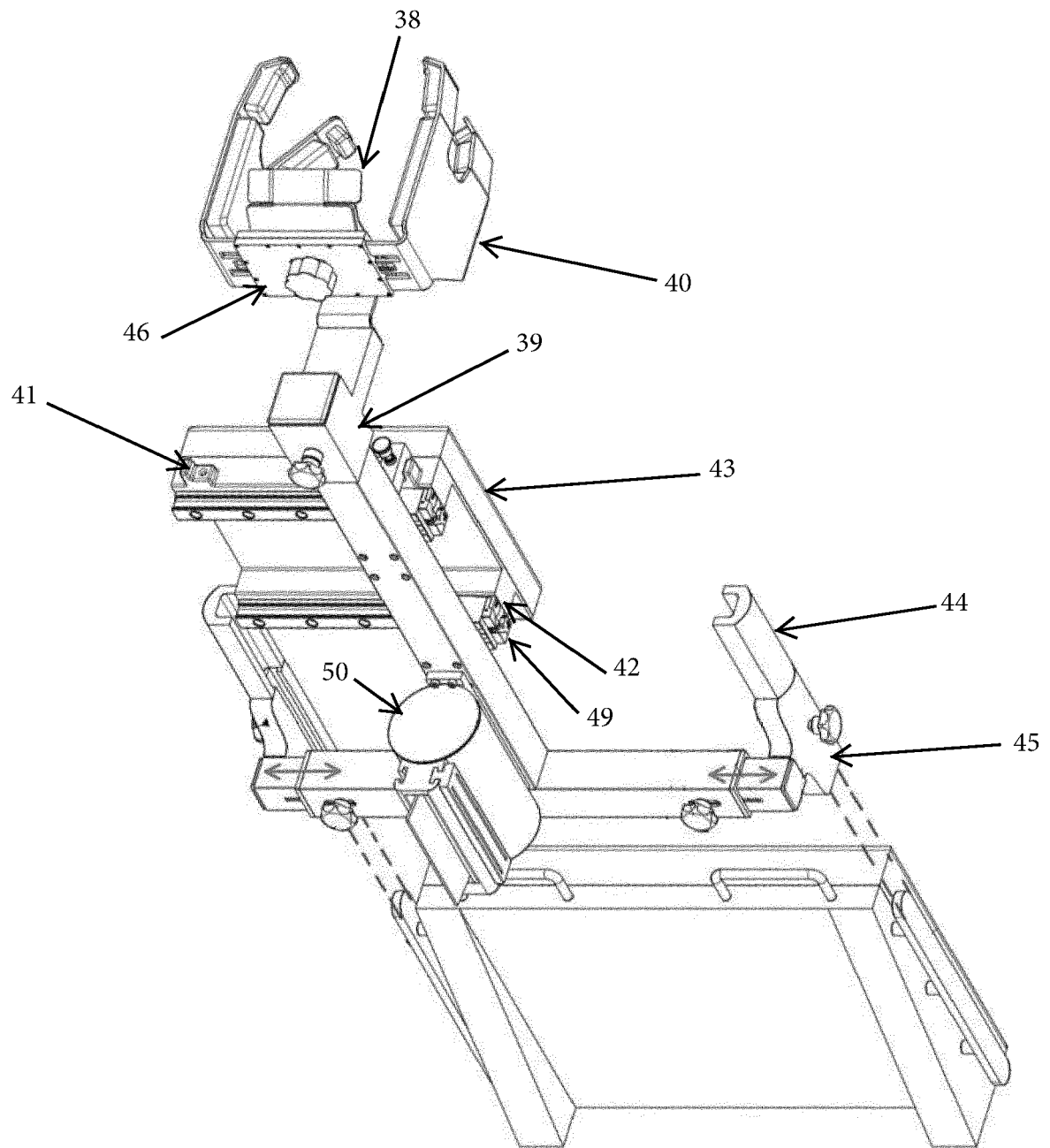


Fig. 19

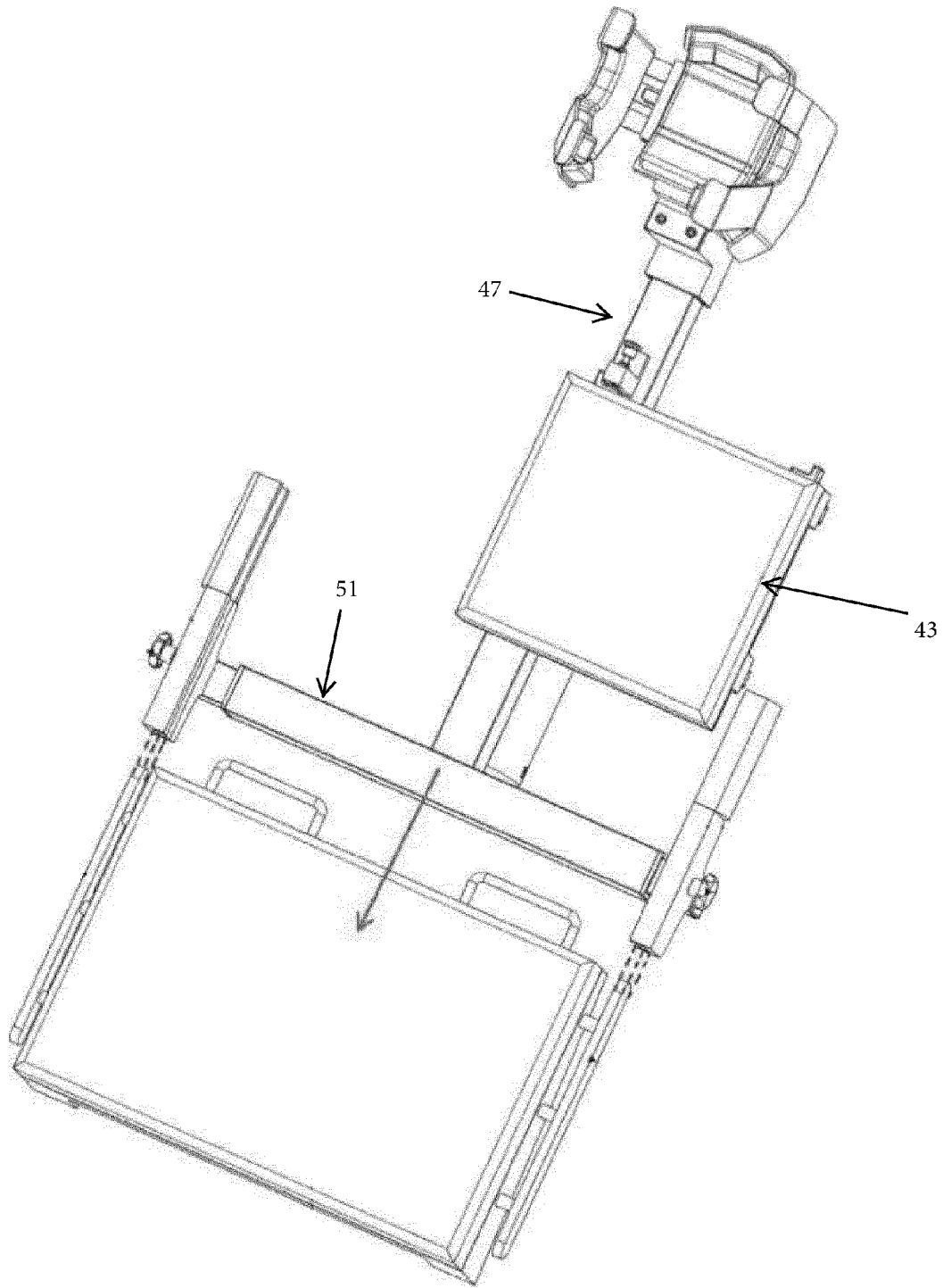


Fig. 20



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Place of search		Date of completion of the search	Examiner
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