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(72) Inventors:

• **DELGADO ACARRETA, Raúl**

50197 Zaragoza (ES)

• **LANGARITA ADIEGO, Rafael**

50197 Zaragoza (ES)

• **LUNA GARCÍA, Alberto**

50197 Zaragoza (ES)

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(71) Applicant: **Rade Tecnologías, S. L.**

50197 Zaragoza (ES)

(74) Representative: **Pons Ariño, Angel**

Pons Patentes y Marcas Internacional, S.L.

Glorieta Rubén Darío 4

28010 Madrid (ES)

(54) **STRETCHER**

(57) It has a resting surface (2) with an opening (3) in correspondence with the area intended to support the user's trunk, in which there is a support element which has a contact surface (6, 60). It also has a height adjustment device (5, 50) of the contact surface (6, 60) and pressure sensors (7) located at different points on the contact surface (6, 60), intended to detect the pressure

exerted by the support element on different points on the user's trunk, and a control unit (8) which receives signals from the pressure sensors (7) and, depending on them, acts on the height adjustment device (5, 50), modifying the height of the contact surface (6, 60) to the shape of the user's trunk.

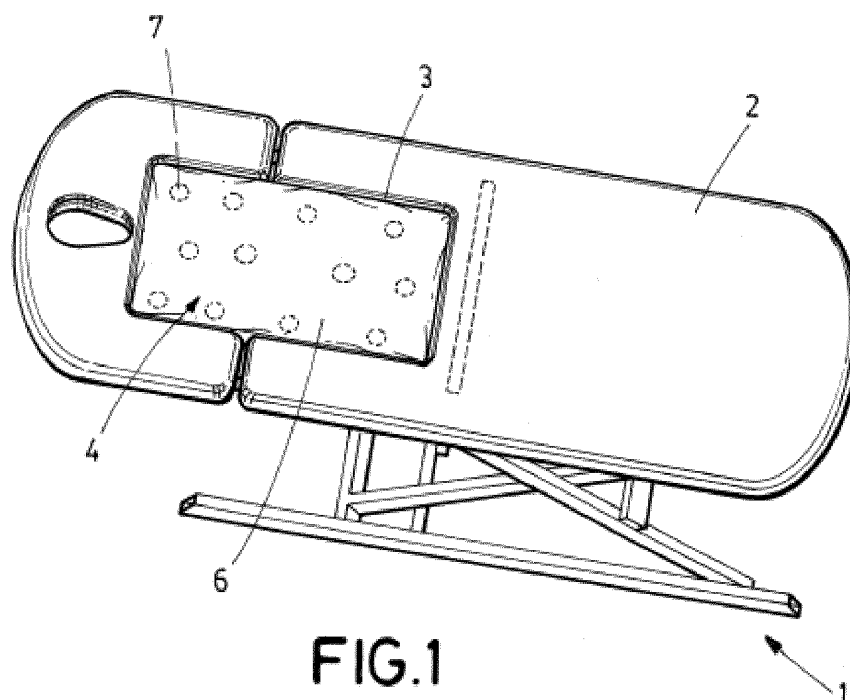


FIG.1

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Description

OBJECT OF INVENTION

[0001] The present invention relates to a stretcher for people with different trunk shapes, making it ideal for pregnant women or obese people, although it is applicable to all kinds of people.

[0002] The stretcher is designed to have a support element whose contact surface is adaptable in height to the shape of the user's trunk in a satisfactory way depending on the contact pressure of the user on the support element of the stretcher.

BACKGROUND OF THE INVENTION

[0003] Therapeutic treatment for obese people, pregnant women or people with special needs on a stretcher is a difficulty when placed in prone decubitus position since the situation is uncomfortable for the patient and sometimes means the impossibility of carrying out any action on the patient. This situation determines the need for the patient to adopt another position which is not the most suitable for the treatment being carried out on the patient.

[0004] Faced with this problem there is therefore a need to develop a stretcher that facilitates the adjustment in the proper position of part of the patient's volume, as for example the size of the abdomen or middle section of the obese patient, pregnant person or with special needs, or the breasts.

[0005] Document US7636967 shows for example a massage table that includes a pair of openings configured to receive the breasts of a person face down on the table.

[0006] Document US20130283526 shows a treatment table capable of being used to massage or provide chiropractic, medical, therapeutic treatment or other treatment to a patient, which includes an upper torso support cushion that has a plurality of breast recesses configured to accommodate the breasts; and an abdominal support cushion that has a recess configured to accommodate a middle section of an obese person or pregnant woman.

[0007] Other solutions include the possibility of adapting the shape and size of the cushion to the shape of the patient's trunk, as in the case of the mattress described in document US5819348, which consists of an adjustable and modular maternity mattress designed to accommodate a pregnant woman, which incorporates an inflatable abdominal cushion composed of a series of independently inflatable cells, whose overall lengths increase as they ascend, and in which each cell has an inflator inlet and a deflator outlet.

[0008] Document ES2288329 describes a device that incorporates a balloon or pillow that is adaptable for a process of filling water, air or other non-polluting elements, remotely controlled by an electronic system according to the prescription of the service requested in the

areas described such as facial, abdominal and back in supine decubitus and prone decubitus.

[0009] On the other hand, document US3988793 shows an inflation ring instead of an inflation cushion which is filled at an air pressure that provides a body support that compensates for the heaviest weight around the middle section of the patient.

DESCRIPTION OF THE INVENTION

[0010] The stretcher that constitutes the object of the present invention is destined to patients who are located in prone decubitus position on it, and it stands out fundamentally because it incorporates a support element that has a contact surface which is adaptable in height to the shape of the patient's trunk. For this purpose, the support element incorporates one or more pressure sensor/s that control the exerted pressure on the patient by the support element, in order to optimally regulate the shape and height that the contact surface will adopt in function of the patient's trunk shape.

[0011] The pressure sensor/s will preferably be located in contact with the contact surface of the support element, without ruling out other positions.

[0012] In that way, depending on the pressure values obtained, the stretcher is adapted to the different trunk shapes of the different users of the stretcher, resulting therefore of special application for obese people, pregnant women during their different stages of gestation and for people with special needs.

[0013] The stretcher incorporates a frame and a resting surface in which is defined an opening in correspondence with the area intended to support the patient's trunk, the support element being arranged in that opening.

[0014] The support element may consist of an inflatable cushion with an upper surface that constitutes the contact surface. The cushion is preferably pneumatic, configured to be inflated with air, but it can also be inflated by another fluid, such as water. Alternatively, the support element can consist of cushions of different diameters and concentric to each other, of tubular annular configuration that can be elliptical or circular for example, which have an upper face, inner and outer lateral faces and bottom face, which are equipped with relative vertical displacement between them, and where the contact surface of the support element is the upper face of the cushions.

[0015] Associated with these support elements, the stretcher also comprises a height adjustment device of the contact surface of the support element.

[0016] The stretcher also comprises a height adjustment device of the contact surface of the support element.

[0017] In the first case, for the embodiment of the pneumatic cushion, the height adjustment device of the contact surface of the support element comprises a filling valve and a drain valve connected to the pneumatic cushion and to a compressor.

[0018] In this case, the height of the contact surface of

the pneumatic cushion is adjusted by regulating the air flow (flow rate) in the cushion. Both inflation and deflation are controlled. Depending on the pressure determined by the pressure sensors, the compressor acts by introducing or extracting air, thus regulating the inflation of the cushion.

[0019] For this purpose, the stretcher incorporates a control unit that receives signals from the pressure sensors and, depending on them, acts on the height adjustment device of the contact surface, in this case on the compressor and on the valves. Depending on the pressure determined by the pressure sensors, it sends an order to open or close the valves depending on whether you want to inflate, deflate or keep the air in the pneumatic cushion, for example:

- Inflate: the filling valve is opened and the compressor is turned on. The drain valve is closed.
- Hold the air: the compressor is stopped and the filling valve is closed. The drain valve is closed.
- Deflate: the compressor is stopped and the drain valve is opened. The filling valve is closed.

[0020] Data from pressure sensors can be displayed on a display device that can be integrated in the stretcher or can be external, such as a mobile phone. Moreover, the connection of the sensors to the control unit can be wired or wireless.

[0021] The cushion can incorporate one or several air chambers for a greater adaptation of the cushion to the trunk of the stretcher's user. Specifically, it is envisaged that it could have a single air chamber and a single pressure sensor, or a single air chamber and several sensors, or several air chambers and at least one sensor for each air chamber.

[0022] For the second embodiment, in which the support element consists of different diameters cushions and concentric to each other, the height adjustment device of the contact surface comprises:

- a pusher intended to push the concentric cushions from their bottom face,
- a lifting and lowering mechanism which acts on the pusher by modifying its height,
- retention elements, which can be tapes, that associate the concentric cushions with each other and facilitate the retention between the concentric cushions in their relative downward movement, and that are linked to the resting surface preventing the fall of the concentric cushions.

[0023] Preferably the pusher is linked to the concentric cushion of the smallest diameter, and comprises two arms arranged in a cross shape of sufficient length to contact the bottom face of all the concentric cushions, in such a way that during the pusher's upward movement, the pusher pushes the smallest diameter cushion and as it ascends, the pusher also pushes the rest of the cush-

ions upwards.

[0024] On the other hand, in a possible embodiment it is envisaged that the lifting and lowering mechanism incorporates two lateral linear actuators and scissor structures that join the actuators with the pusher, in which the scissor structures transform the horizontal linear movement of the actuators into a vertical movement of the pusher.

[0025] The stretcher can operate in two modes in order to control the vertical position or height of the trunk area of the stretcher, it can be performed in "manual" or "automatic" mode:

- Manual: the user of the stretcher or the masseur have two pushbuttons to raise or lower the height of the trunk area of the stretcher. In this way, the user of the stretcher or the masseur determine the height of the trunk area of the stretcher according to their needs or comfort. In the same way, it could be done with an additional controller or included in the controller of raising or lowering of the whole stretcher.
- Automatic: through the control unit the vertical position of the trunk area of the stretcher is regulated until the pressure exerted on the stretcher user is considered adequate. Once an automatic regulation has been carried out, it is possible to carry out a manual regulation for the comfort of the stretcher user or the masseur.

[0026] Thus, the stretcher object of the present invention presents a series of advantages among which stand out:

- It improves the ergonomics of both, the masseur and the stretcher user. The user of the stretcher will rest on his hips and shoulders, but the delicate areas are supported without effort.
- It is possible to avoid the overpressure to which people are subjected when they receive massages in prone decubitus position, not compromising the health of the user of the stretcher, nor of the fetus in case the user of the stretcher is a pregnant woman.
- Adaptability to the different forms of trunk and different stages of gestation, in case the user of the stretcher is a pregnant woman.

DESCRIPTION OF THE DRAWINGS

[0027] In order to complement the description that is being made and in order to help a better understanding of the characteristics of the invention, according to a preferred example of practical embodiment of the same, a set of drawings is accompanied as integral part of this description, in which with an illustrative and non-limiting character, the following has been represented:

Figure 1.- It shows a perspective view of the first embodiment of the stretcher that incorporates a

pneumatic cushion.

Figure 2.- It shows a perspective view of the second embodiment of the stretcher with extended concentric cushions.

Figure 3.- It shows a schematic view of the height adjustment device associated with the pneumatic cushion of the first embodiment.

Figure 4.- It shows a perspective view of the second embodiment of the stretcher with the concentric cushions in upper position retracted.

Figure 5.- It shows a detailed perspective view of the second embodiment in which is observed the pusher linked to the smallest diameter cushion.

Figure 6.- It shows an inferior view of detail of the second embodiment in which the extended cushions are appreciated.

PREFERRED EMBODIMENT OF THE INVENTION

[0028] In view of the figures, two modes of preferred embodiment of the stretcher that constitutes the object of this invention are described below.

[0029] In general, it can be seen from figure 1 or figure 2 that the stretcher comprises, for any of the two embodiments represented, a frame (1) supporting a resting surface (2) with an opening (3) in correspondence with the area intended to support the user's trunk, in which there is a support element which has a contact surface (6, 60) adaptable in height to the shape of the user's trunk.

[0030] The figures also show that the stretcher has pressure sensors (7) located at different points on the contact surface (6, 60) of the support element, intended to detect the pressure exerted by the support element on different points of the user's trunk.

[0031] On the other hand, the stretcher incorporates a height adjustment device (5, 50) of the contact surface (6, 60) of the support element, showing in figure 3 the height adjustment device (5) for the first embodiment, and in figure 4 the height adjustment device (50) for the second embodiment.

[0032] In both cases, the stretcher incorporates a control unit (8) which receives signals from the pressure sensors (7) and, depending on them, acts on the height adjustment device (5, 50), modifying the height of the contact surface (6, 60) of the support element as a function of the pressure and therefore of the shape of the user's trunk.

[0033] According to the first embodiment shown in figure 1, the support element comprises an inflatable pneumatic cushion (4) with an upper surface that constitutes the contact surface (6), and the height adjustment device (5), shown in figure 3, comprises a filling valve (9), a drain valve (10), both connected to the pneumatic cushion (4), and a compressor (11), to which the filling valve (9) and the drain valve (10) are connected.

[0034] In accordance with the second embodiment represented in figures 2 and 4, the support element comprises concentric cushions (40) of different diameters,

with a tubular annular configuration with an upper face, inner and outer lateral faces and bottom face, which are equipped with relative vertical displacement between them, and where the contact surface (60) of the support element is the upper face of the concentric cushions (40).

[0035] For this second embodiment of the stretcher, the height adjustment device (50), partly represented in figure 4, comprises a pusher (12), shown in figure 5, intended to push the concentric cushions (40) from their bottom face, a lifting and lowering mechanism (13) which acts on the pusher (12) by modifying its height, and retention elements, consisting of tapes (16), shown in figure 5 or 6, that associate the concentric cushions (40) and facilitate the retention of the concentric cushions (40) with each other during their relative downward movement and their connection with the resting surface (2) to limit their descent in height and to avoid their fall.

[0036] Figure 5 shows that the pusher (12) is linked to the smallest diameter concentric cushion and comprises two arms arranged in a cross shape of sufficient length to contact the bottom face of all the concentric cushions (40).

[0037] On the other hand, the lifting and lowering mechanism (13) incorporates two lateral linear actuators (14) and scissor structures (15) that join the actuators (14) with the pusher (12), through beams (17), shown in figure 6, in which the scissor structures (15) transform the horizontal linear movement of the actuators (14) into a vertical movement of the pusher (12).

Claims

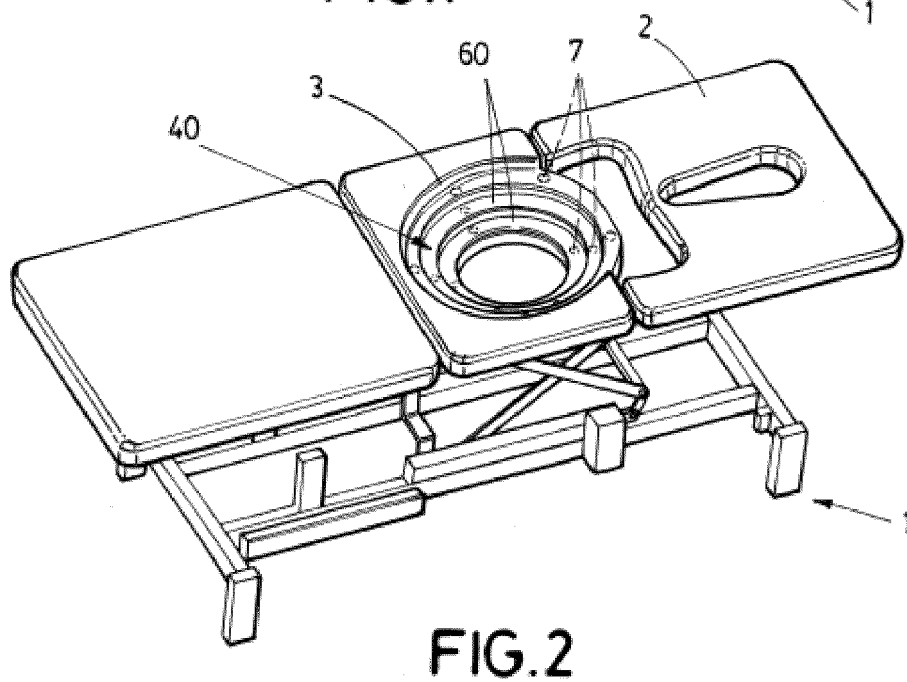
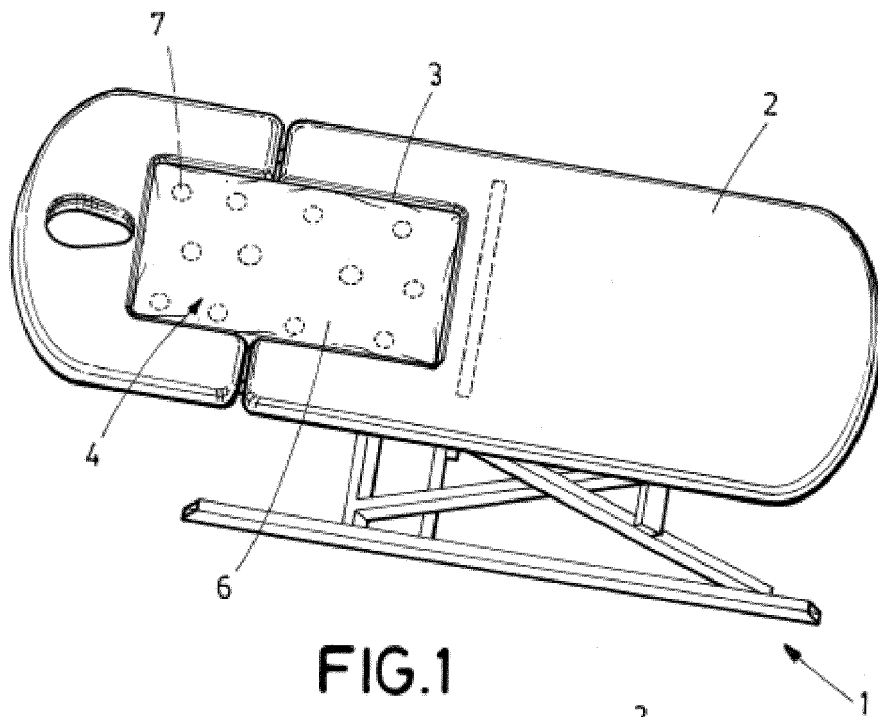
1. Stretcher comprising:

- a frame (1),
- a resting surface (2) supported on the frame (1) with an opening (3) in correspondence with the area intended to support the user's trunk,

characterized in that additionally comprises:

- a support element arranged in the opening (3) which has a contact surface (6, 60) adaptable in height to the shape of the user's trunk,
- a height adjustment device (5, 50) of the contact surface (6, 60) of the support element,
- one or more pressure sensor/s (7) located in the support element, intended to detect the pressure exerted by the support element on the user's trunk, and
- a control unit (8) which receives signals from the pressure sensors (7) and, depending on them, acts on the height adjustment device (5, 50) of the contact surface (6, 60) of the support element as a function of the pressure and therefore of the shape of the user's trunk.

2. Stretcher according to claim 1, **characterized in that** the pressure sensor/s (7) is/are located on the contact surface (6, 60) of the support element.
3. Stretcher according to any of the previous claims, **characterized in that** the support element comprises an inflatable cushion with an upper surface that constitutes the contact surface (6). 5
4. Stretcher according to claim 3, **characterized in that** the inflatable cushion is a pneumatic cushion (4). 10
5. Stretcher according to claim 4, **characterized in that** the height adjustment device (5) comprises a filling valve (9), a drain valve (10), both connected to the pneumatic cushion (4), and a compressor (11), to which the filling valve (9) and the drain valve (10) are connected. 15
6. Stretcher according to claim 4, **characterized in that** the pneumatic cushion (4) comprises a single air chamber and at least one pressure sensor (7). 20
7. Stretcher according to claim 4, **characterized in that** the pneumatic cushion (4) comprises several air chambers and at least one pressure sensor (7) for each air chamber. 25
8. Stretcher according to claim 1, **characterized in that** the support element comprises concentric cushions (40) of different diameters, with a tubular annular configuration with an upper face, inner and outer lateral faces and bottom face, which are equipped with relative vertical displacement between them, and where the contact surface (60) of the support element is the upper face of the concentric cushions (40). 30 35
9. Stretcher according to claim 8, **characterized in that** each concentric cushion (40) has an elliptical configuration. 40
10. Stretcher according to claim 8, **characterized in that** each concentric cushion (40) has a circular configuration. 45
11. Stretcher according to claim 8, **characterized in that** the height adjustment device (50) comprises:
 - a pusher (12) intended to push the concentric cushions (40) from their bottom face, 50
 - a lifting and lowering mechanism (13) which acts on the pusher (12) by modifying its height, and
 - retention elements that associate the concentric cushions (40) and facilitate the retention of the concentric cushions (40) with each other during their relative downward movement and that 55
12. Stretcher according to claim 11, **characterized in that** the pusher (12) is linked to the concentric cushion of the smallest diameter.
13. Stretcher according to claim 11, **characterized in that** the lifting and lowering mechanism (13) comprises two lateral linear actuators (14) and scissor structures (15) that join the actuators (14) with the pusher (12) through beams (17), in which the scissor structures (15) transform the horizontal linear movement of the actuators (14) into a vertical movement of the pusher (12).
14. Stretcher according to claim 11, **characterized in that** the retention elements are tapes (16).
15. Stretcher according to claim 11 or 12, **characterized in that** the pusher (12) comprises two arms arranged in a cross shape of sufficient length to contact the bottom face of all the concentric cushions (40).



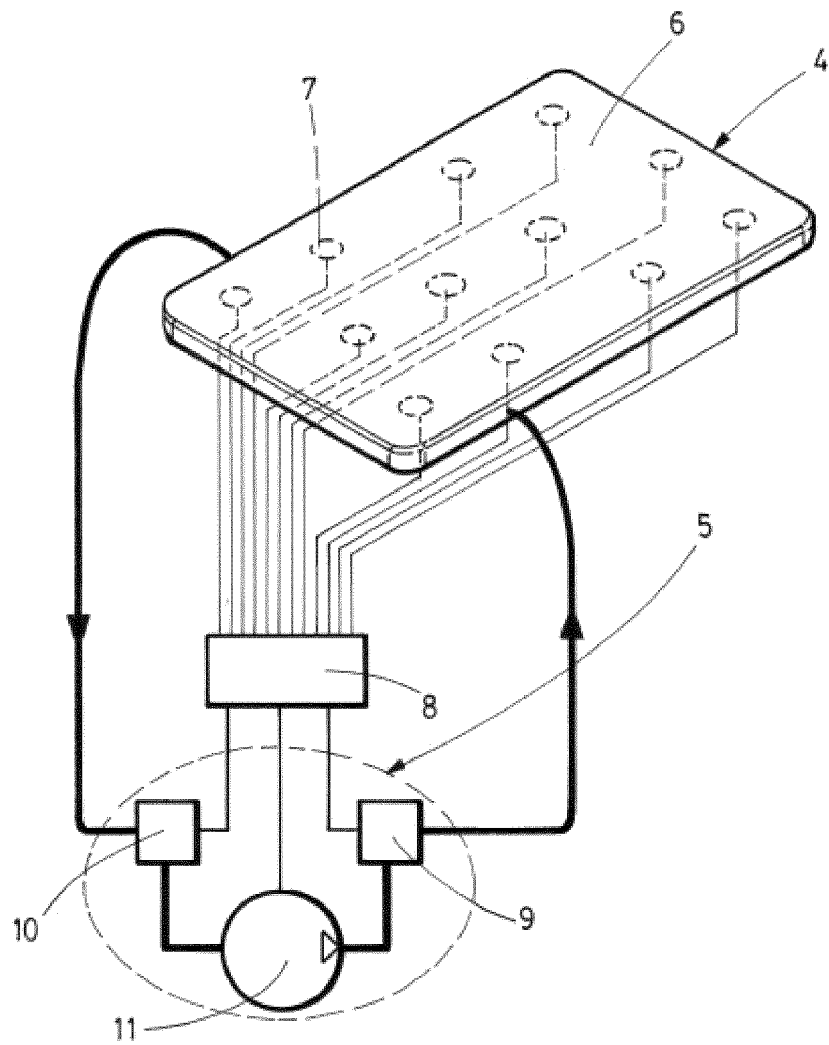


FIG.3

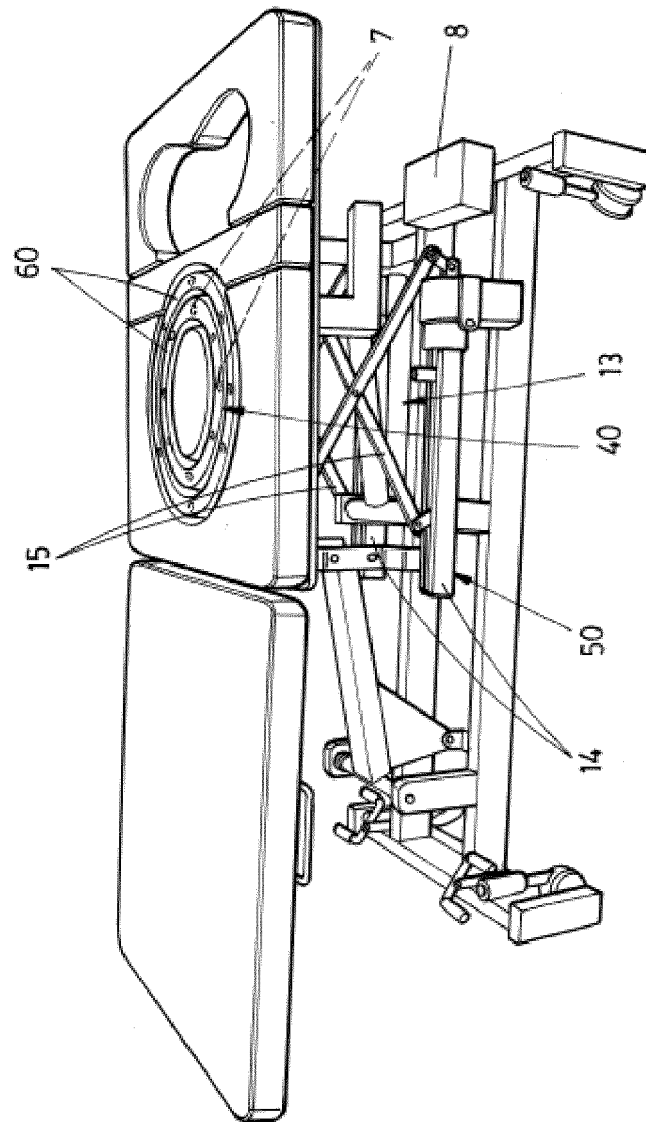


FIG.4

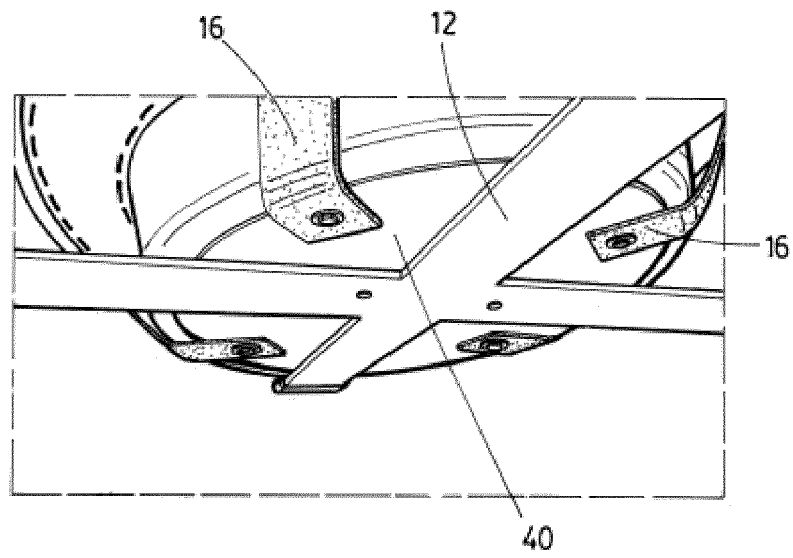


FIG. 5

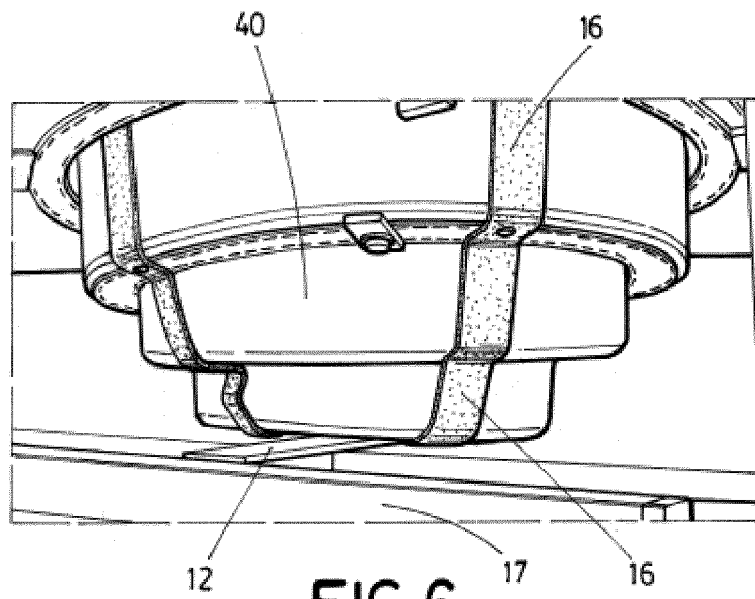


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		3 October 2019	Edlauer, Martin
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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