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(54) **ARMCHAIR WITH PASSIVE LIMB-EXERCISING ELEMENTS**

(57) The invention relates to an armchair with passive limb-exercising elements, which is formed by a seat base (3) articulated to a back (2) and to a skirt (4) and incorporates at least one passive arm-exercising element (7) and a passive foot-exercising element (17). The armchair also comprises at least one projection (6) solidly joined to the back (2) and articulated to a support (5) that holds the arm-exercising element (7). The support (5) is

solidly joined to an actuator (8) comprising a rod (9) solidly joined to a stud (14) that rotates freely in a hole of the projection (6), the rod being articulated to a thread body (10), and a threaded driveshaft (12) coupled to the thread body (10). The stud (14) rotates freely in a hole of the projection (6) and the rod (9) is articulated to the thread body (10) by means of a screw shaft (18).

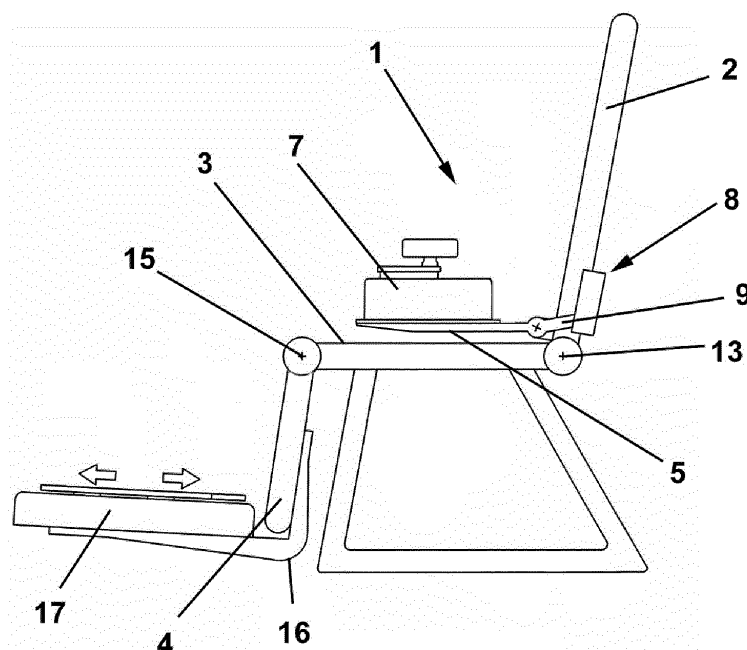


FIG.1

Description

OBJECT OF THE INVENTION

[0001] The following invention relates to an armchair with passive limb-exercising elements, the aim of which is for the user to have means that allow for the passive exercise of the legs by placing the feet on platforms that have a to-and-fro movement, simulating the exercise of walking, and of the arms, affecting the joints of the elbow and of the shoulder by supporting the forearm on a body that has a smooth rotational movement.

FIELD OF APPLICATION

[0002] In this specification, an armchair with passive limb-exercising elements is described, the exercising elements of which can be incorporated in different types of armchairs and thus can be incorporated in massage chairs, used by a very wide range of users regardless of age, or in simple armchairs for the more specific use thereof for the recovery of limbs after surgery and/or injuries.

BACKGROUND OF THE INVENTION

[0003] As is known, there is a wide range of armchairs on the market which have evolved over time with the aim of providing greater comfort to users, shifting from simple armchairs, such as seat elements with fixed components, to armchairs with articulated components that enable different positions to be adopted.

[0004] Thus, over time there has been an increase in the popularity of "relax armchairs" which have means for providing a vibration massage, small electromagnetic discharges, heat, etc. and which, by also being articulated, make it easier to adopt a very wide range of positions, the actuation and control of which is carried out by electric means incorporated in the armchair or even by remote control.

[0005] In these types of armchairs, the armrests usually form part of the chassis of the armchair and are fixed, such that in the lower front part there is usually an articulated skirt that, in the reclined position, is useful for supporting the lower legs, being able to remain in a horizontal position, acting as a bed.

[0006] The document ES 2 178 590 which presents a system for exercising the lower limbs of people who are sitting is found in the state of the art. The system incorporates a platform with supports for the feet that can move in parallel driven by the feet or electrically to simulate walking while the user is sitting actively or passively.

[0007] The document ES 2 499 815 describes an apparatus for exercising the joints of the shoulder and elbow, whether it is activated by means of one's own muscular effort or electrically with passive exercise. The document describes an application of the apparatus in an armchair that also incorporates the system for exercising

the feet, such that a user can exercise any of their limbs simultaneously or independently and actively or passively, based on their abilities.

[0008] This document, however, does not consider the possibility of being used by people with a significant inability to move or those who cannot even get out of bed.

[0009] The present invention resolves this problem by describing an armchair that incorporates elements for passively exercising any of the limbs with the possibility of being used by a user in any position, even being completely horizontal. It provides activation of the very limbs and blood system which was not possible until now if it were not for a person in charge of manually exercising the limbs of the patient.

DESCRIPTION OF THE INVENTION

[0010] The present specification describes an articulated armchair with limb-exercising elements that, in the lower front part thereof, have an articulated skirt which, once extended with a user in the horizontal position, facilitates the support of the lower legs. The armchair comprises a projection in the back, preferably located in the lateral lower part of the back, wherein a support that holds a passive arm-exercising element, connected to an actuator, is articulated, with the function of adjusting the folding position of the support with respect to the back of the armchair, independently of the position of the back, which can also be folded by means of a second actuator.

[0011] Preferably, the armchair has a projection in each side of the back with the corresponding support that holds a passive arm-exercising element, such that a user can exercise their two arms at the same time.

[0012] The armchair wherein the invention is implemented also comprises a bracketed body that, on one flange, is fixed to the skirt and on the other flange has a passive foot-exercising element, which provides the user with means that enable the passive exercising of their feet simulating walking. Both the back and the skirt are motor-driven so they can be folded.

[0013] The actuator responsible for folding the support with the passive arm-exercising element comprises a rod that, at a first end, solidly fixes to the support and, at a second end, joins a nut body in an articulated manner. A motor with a threaded driveshaft is coupled to the nut body. The rod has a coupled screw shaft, with free rotation, by means of which the articulation to the body of the nut is carried out.

[0014] In this way, by actuating the motor with the aim of tilting the corresponding support, the nut body can rotate freely, absorbing the rotation of the rod, joined solidly to the support.

[0015] The rod is joined to the respective support through a stud that rotates freely with respect to the projection of the back.

[0016] Thus, on one hand, the armchair can be used to aid recovery from sports-related injuries or surgery that affect the upper and lower limbs, and on the other hand,

it can be of great use and help all people who, due to physical impairments, cannot actively practise sport, such as older people or those with a severe physical disability.

BRIEF DESCRIPTION OF THE FIGURES

[0017] To complete the invention described herein and for the purpose of aiding to better understand the features of the invention according to a preferred exemplary embodiment thereof, a set of drawings is attached in which the figures described below have been depicted with an illustrative and non-limiting character.

Figure 1. Shows a side view of an armchair that incorporates a pair of passive arm-exercising elements in supports as armrests, a passive leg-exercising element connected to the front skirt in which actuators have been integrated for the folding of the supports.

Figure 2. Shows a plan view of the armchair of Figure 1.

Figure 3. Shows a side view of the armchair of Figure 1 wherein the back and the supports of the arms have been tilted.

Figure 4. Shows a side view of the armchair represented in the preceding figure wherein the supports that hold the arm-exercising elements have been rotated by the corresponding actuators, independently of the back, being able to adopt the position thereof according to the user's criteria.

Figure 5. Shows a side view of the armchair of Figure 1 wherein the back has been reclined to the horizontal position.

Figure 6. Shows a side view of the armchair of Figure 5 wherein the articulated skirt that holds the passive foot-exercising element has been rotated.

Figure 7. Shows a side view of the armchair of Figure 6 wherein the articulated skirt has been tilted to the maximum horizontal position.

Figure 8. Shows a detailed side view of a support, without the arm-exercising element, with the actuator, showing how the motor has a threaded shaft to be coupled to a nut body articulated to an end of a rod that is solidly joined to the support at the other end thereof.

Figure 9. Shows a plan view of a support, without the arm-exercising element, with the actuator, which shows how the rod is joined to the support by means of a stud that rotates freely in a hole of the projection and the thread body is articulated to the rod by means of a screw shaft.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0018] As shown in the aforementioned figures and in accordance with the specified numbering, we can see how, starting with an articulated armchair that incorpo-

rates limb-exercising elements, it aims to integrate in the structure thereof a tilting system that enables users to passively exercise their limbs in any position of the armchair 1, being able to do so from an upright seated position to a horizontal position.

[0019] Thus, the armchair 1 comprises a back 2 articulated to the seat base 3, a skirt 4 articulated in the lower front part to the seat base 3, a pair of articulated supports 5 as armrests, projections 6 in the lateral front lower part of the back 2 on which the supports 5 are articulated. Each support 5, moreover, holds a passive arm-exercising element 7 and is connected to an actuator 8 to regulate the position thereof, independently of the position of the back 2.

[0020] The mentioned actuators 8 comprise a rod 9 that, at a first end, is fixed to a support 5 and, at the second end thereof, is fixed to a nut body 10, whereon the threaded driveshaft 12 of a motor 11 threads, solidly joined to the back 2 of the armchair and with the ability to rotate in both directions. As shown in Figures 8 and 9, the nut body 10 articulated to the second end of the rod 9 by the screw shaft 18 will absorb the rotation of the rod 9 fixed to the support 5 upon actuating the motor 11.

[0021] Thus, starting from the position of Figure 1, the user would be in the upright seated position and the supports 5 in an essentially horizontal position. Upon actuating the actuators 8, i.e. actuating the motor 11, the rotation of the threaded driveshaft 12, coupled to the nut body 10, causes the rod 9 to tilt and with it the support 5, to which it is solidly joined at the first end thereof, upon rotating the stud 14, which acts as a rotation shaft with respect to the projection 6 since it is housed in a hole of the same.

[0022] Thus, on one hand, the back 2 can tilt with respect to the seat base 3 by means of a first motor-driven shaft 13, from an upright seated position to a horizontal position, as shown for example in Figures 3 to 7.

[0023] On the other hand, the skirt 4 is articulated to the lower front part of the seat base 3 by means of a second shaft 15, also motor-driven. A pair of brackets 16 are fixed to the skirt 4 at one of the flanges thereof, such that a passive foot-exercising element 17 is fixed to the other flange thereof.

[0024] The movement of the back 2 and of the skirt 4 belong to the state of the art and it shall not be described in more detail.

[0025] On the other hand, the supports 5 that hold the respective passive arm-exercising elements 7 can tilt independently of the back 2 by means of the actuators 8 mounted on the sides of the armchair 1, according to the needs or preferences of the user such that they can incorporate different folding positions, since they are activated independently.

[0026] Since the armchair is intended for people with a significant inability to move, the mobile elements of the armchair, such as the arm-exercising elements (7), the leg-exercising elements (17), the back (2), the skirt (4) and the support (5), incorporate an electric system for

controlling the movement, which can be incorporated in the device itself or connected to a wired or wireless remote control.

[0027] Finally, it should be considered that the present invention should not be limited to the embodiment described herein, bearing in mind that other embodiments may be carried out by those skilled in the art in view of the present description. Accordingly, the scope of the invention is defined by the following claims.

[0028] The use of the passive arm-exercising elements 7 can be useful for all people who have undergone an operation or experienced injury to the elbow or shoulder, thereby facilitating their recovery.

[0029] Thus, the use of the armchair 1, mainly by impaired people or older people who cannot participate in active physical exercise, and with the activation of the passive foot-exercising elements 17 and object of the Patent of Invention ES 2 178 590 and the activation of the passive arm-exercising elements 7 and object of the Patent of Invention ES 2 499 815, causes the reactivation of the circulation of blood to the heart, stimulating and regenerating the immune system of the organism and generally helping to improve many ailments and illnesses, as well as preventing others from arising.

[0030] Ultimately, with this regeneration of the immune system, the health of the heart and the cardiovascular system improves significantly, having a healthy impact on the entire organism.

[0031] Finally, it is worth noting that the known armrests are installed, coupled and fixed in the seat of all conventional armchairs, and in the object of the present invention the armrests are replaced by two tilting supports, which support two movers or motor-driven activators of the joints of the upper limbs, of the arm, elbow, forearm, shoulder.

[0032] Said supports 5 are connected to the structure of the back 2 of the armchair, tilting independently of each other, as well as with respect to the back.

Claims

1. An armchair with passive limb-exercising elements, comprising a seat base (3) that incorporates at least one passive arm-exercising element (7) and is articulated at the rear part to a foldable back (2) by means of a first hinged shaft (13) and at the front part to a skirt (4) by means of a second hinged shaft (15), the skirt (4) incorporating a passive foot-exercising element (17), wherein the two hinged shafts (13, 15) are motor-driven, the armchair being **characterised in that** it comprises at least one projection (6) that is solidly joined to the back (2) at one end and, at the other end, joined by means of an articulation to a support (5) that holds a passive arm-exercising element (7), the support (5) being solidly joined to an actuator (8) comprising:

- a rod (9) solidly joined to a stud (14) at one end and joined to a thread body (10) in an articulated manner at the other end,
- a motor (11) with a threaded driveshaft (12) coupled to the thread body (10),

wherein:

- the stud (14) rotates freely in a hole of the projection (6),
- the thread body (10) is articulated,
- the rod (9) is articulated to the thread body (10) by means of a screw shaft (18),

such that the rotation of the motor (11) and of the driveshaft (12) causes the movement of the thread body (10) and the corresponding rotation of the rod (9) and of the support (5) around the stud (14), the thread body (10) absorbing this rotation upon rotating around the screw shaft (18).

2. The armchair with passive limb-exercising elements, according to claim 1, **characterised in that** it comprises two projections (6) located in sides of the back (2) in order to incorporate two passive arm-exercising elements (7) in the armchair (1) by means of the corresponding supports (5) and thereby being able to exercise both arms simultaneously.

3. The armchair with passive limb-exercising elements, according to claim 1 or 2, **characterised in that** it comprises a pair of brackets (16) joined to the skirt (4) at one of the flanges thereof, such that a passive foot-exercising element (17) is fixed at the other flange of the brackets (16).

4. The armchair with passive limb-exercising elements, according to any of claims 1 to 3, **characterised in that** it comprises an electric system for controlling the movement of elements to be selected among the arm-exercising elements (7), the leg-exercising elements (17), the back (2), the skirt (4), the supports (5) and a combination thereof.

5. The armchair with passive limb-exercising elements, according to claim 4, **characterised in that** the electric system is activated by means of a wireless remote control.

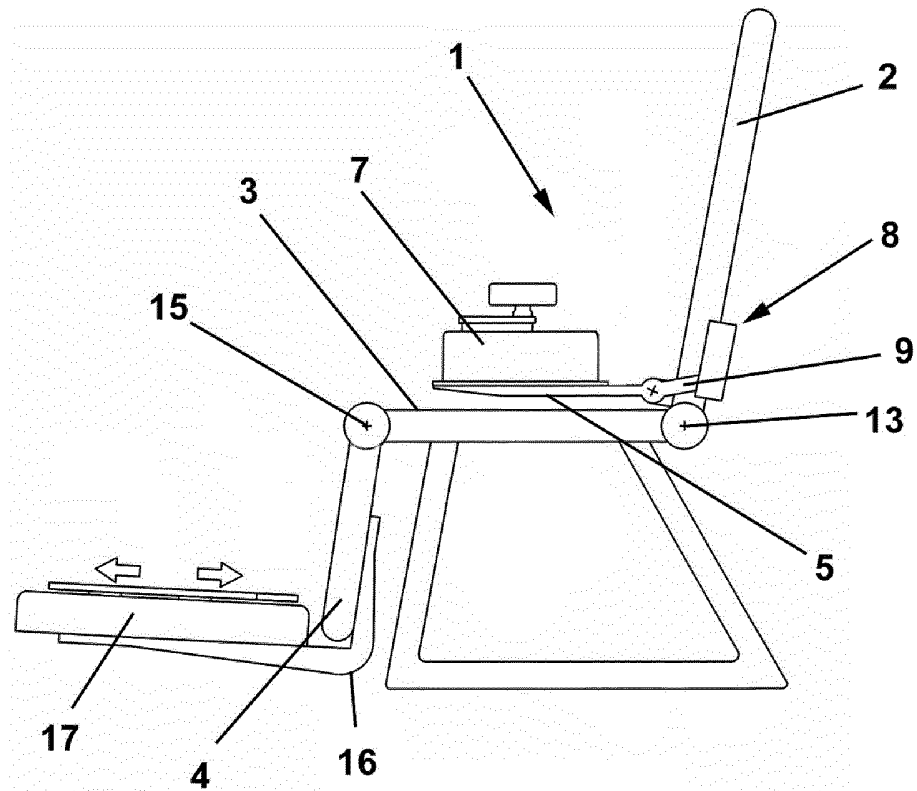


FIG.1

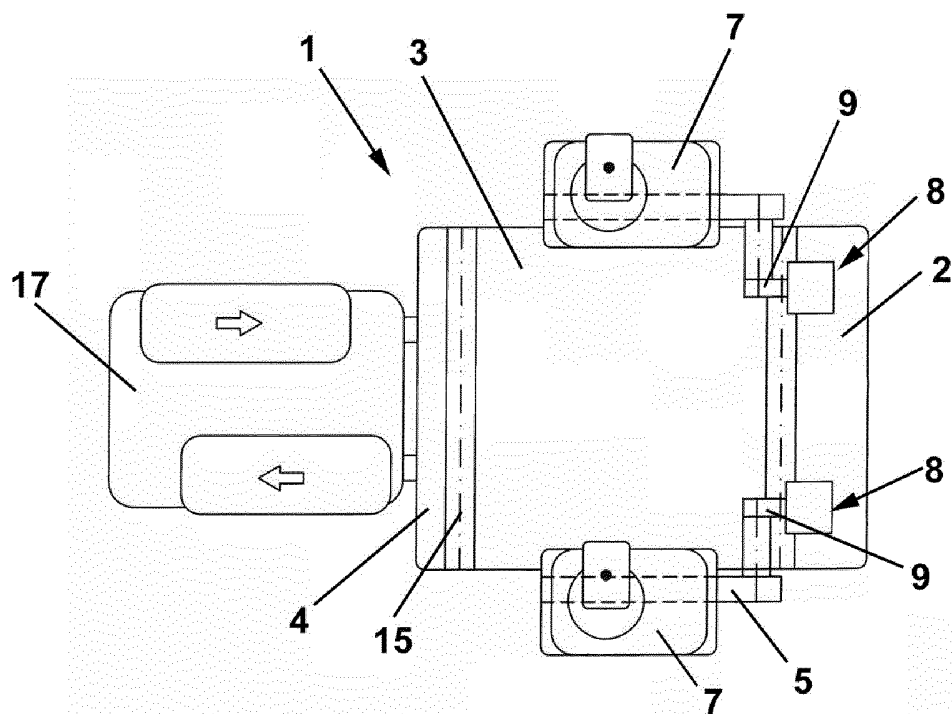


FIG.2

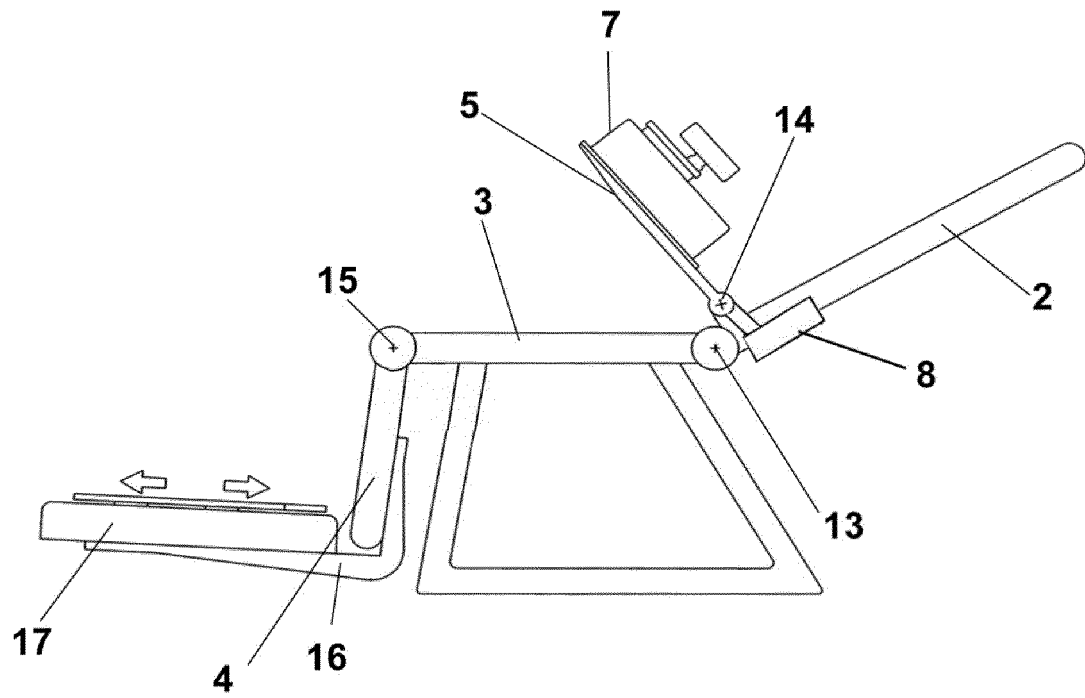


FIG.3

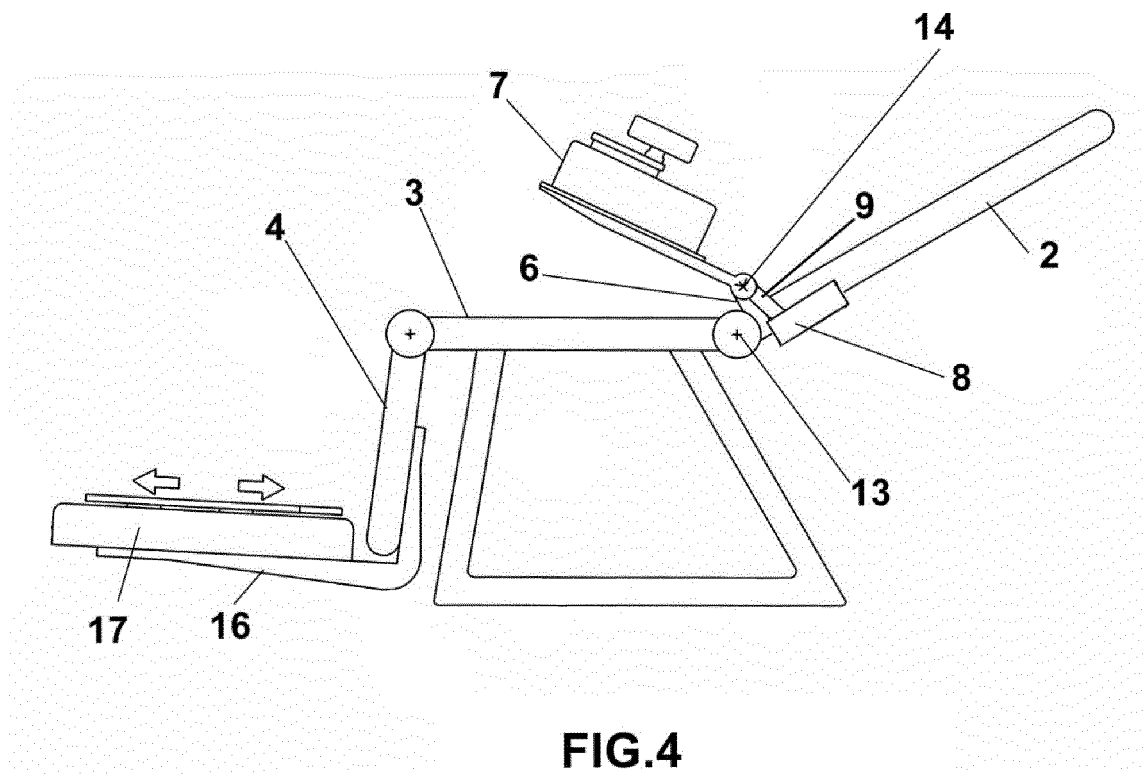


FIG.4

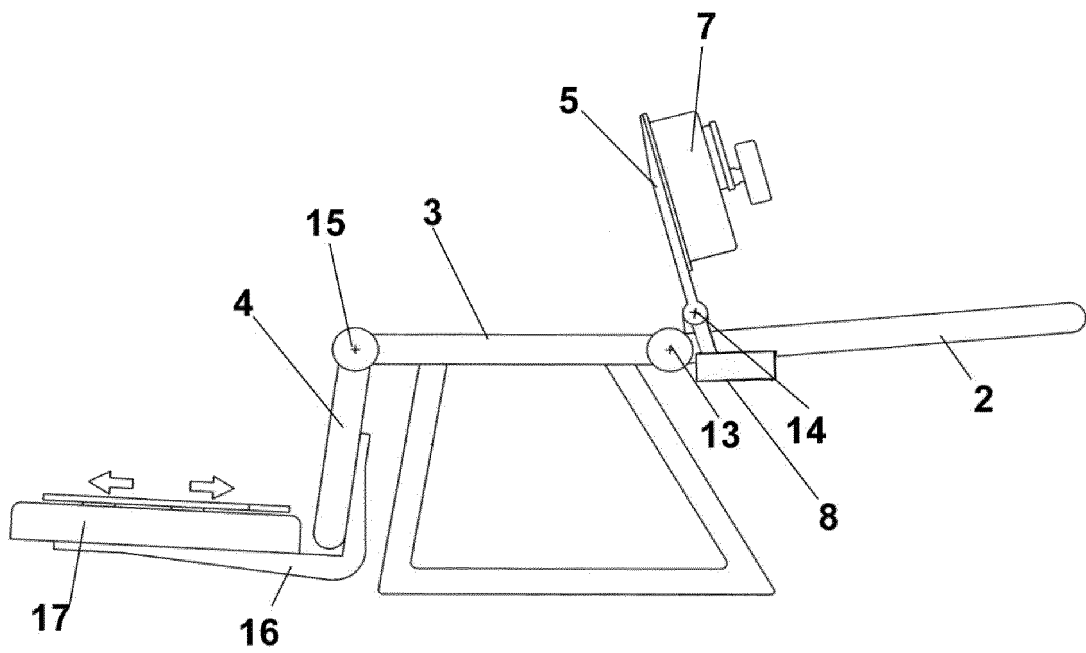


FIG.5

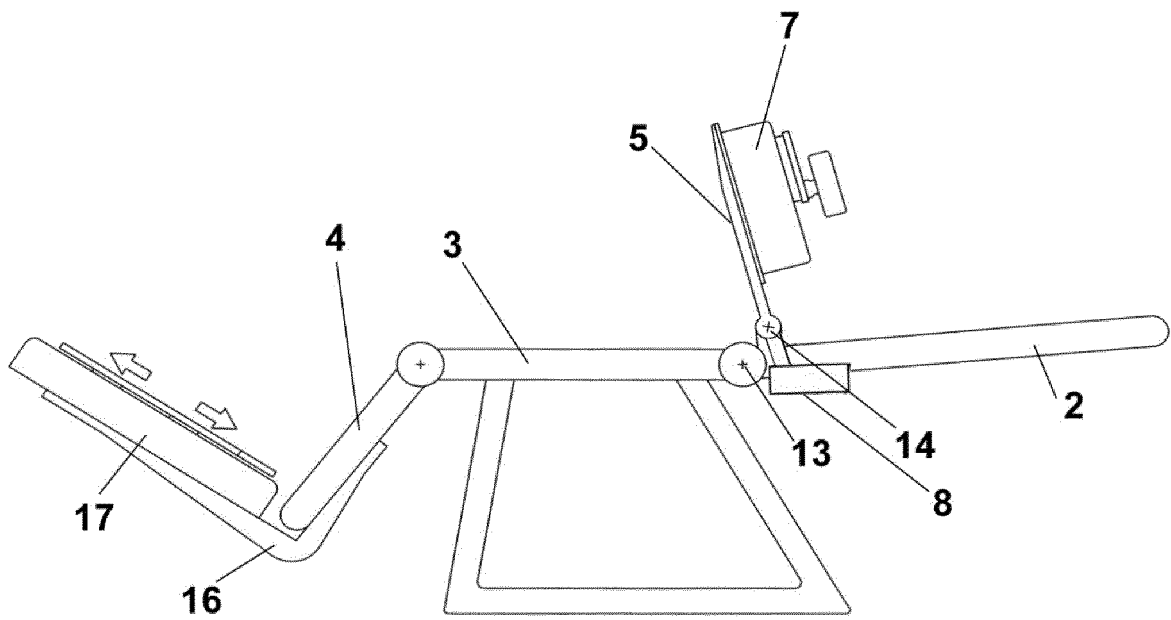
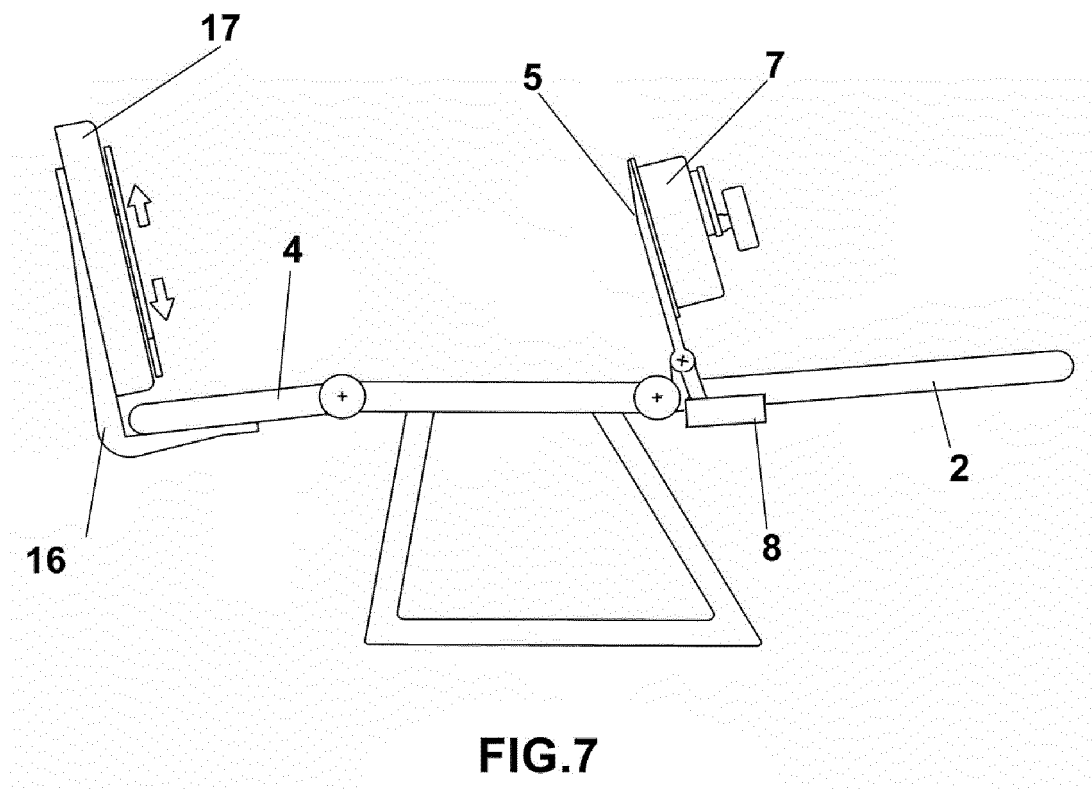


FIG.6



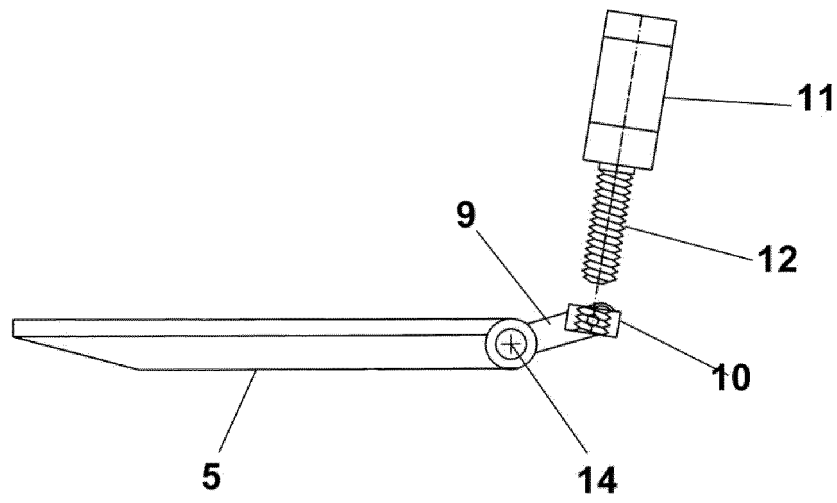


FIG.8

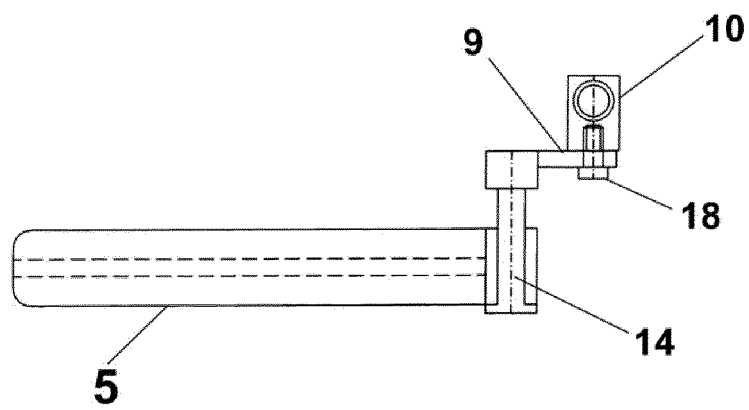


FIG.9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2017/070505

A. CLASSIFICATION OF SUBJECT MATTER

A61H1/02 (2006.01)

A63B23/035 (2006.01)

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61H, A63B

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

Internet

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ES 2499815 A1 (GALVEZ CAMPOS JOSE LUIS) 29/09/2014, the whole document.	1-5
Y	US 2003216231 A1 (REITZ ALAN S ET AL.) 20/11/2003, the whole document.	1-5
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
29/09/2017Date of mailing of the international search report
(04/10/2017)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2017/070505

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
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