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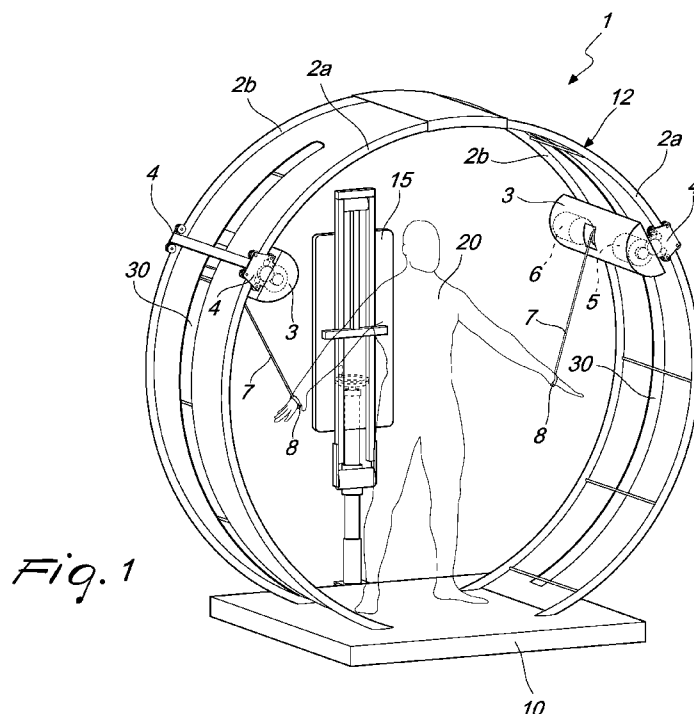
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(54) Title: GYMNASTICS AND REHABILITATION APPARATUS



(57) Abstract: A gymnastics apparatus, the particularity of which resides in that it comprises an at least semicircular arc structure (2; 12) which is adapted to define a pair of rails (2a, 2b) along which at least one body (3; 25) can move on which at least one cable (7) can be unwound and wound, in contrast with a resistance, said cable being adapted to be gripped by a user who positions himself or herself proximate to the at least semicircular arc structure (2; 12).

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GYMNASTICS AND REHABILITATION APPARATUS

The present invention relates to a gymnastics and rehabilitation apparatus. More particularly, the invention relates to a gymnastics and rehabilitation apparatus based on isoinertial exercise, so as to make it possible to train both the concentric phase and the eccentric phase of a muscle contraction.

As is known, many apparatuses are known commercially which are provided with weights that allow a user to exert a muscular action against the force of gravity which acts on a weight pack. In this manner, the effort that the user applies is correlated to the quantity of weight selected.

However, the use of machines with weight pack of the traditional type involves possible problems for the user, which are due for example to jerking motions that can be transferred by the cable connecting the weight pack to the user, or to a training of the muscles that is not strictly targeted at the muscle group of interest, but can be spread, with activation of collateral muscles, at the expense of the muscle that it is desired to train with that particular apparatus.

Moreover, apparatuses of the known type do not provide for the possibility to graduate, for example by increasing it, the effort that the user performs during the muscle elongation movement, i.e. during the eccentric phase, that usually follows the concentric phase of muscle contraction.

Moreover, apparatuses of the known type are normally used one for each muscle group, thus requiring a plurality of apparatuses in order to be able to train multiple muscles of the body. This obviously translates to an expenditure of costs, as well as of spaces occupied by a multitude of apparatuses.

The aim of the present invention is to provide a gymnastics and rehabilitation apparatus that makes it possible to train both the concentric phase and the eccentric phase of a muscle contraction, with reduced encumbrances.

Within this aim, an object of the present invention is to provide a gymnastics and rehabilitation apparatus that allows the user to train substantially all of the body in a reduced space.

Another object of the invention is to provide a gymnastics and rehabilitation apparatus that allows the user to adjust, including for example
5 by increasing it, the eccentric effort applied by the user during the elongation phase of the muscle involved.

Another object of the present invention is to provide a gymnastics and rehabilitation apparatus that makes it possible to obtain great benefits with
10 shorter training times than apparatuses of the known type.

Another object of the present invention is to provide a gymnastics and rehabilitation apparatus that is highly reliable, relatively easy to provide and at competitive costs.

This aim and these and other objects which will become better
15 apparent hereinafter are achieved by a gymnastics and rehabilitation apparatus, characterized in that it comprises an at least semicircular arc structure which is adapted to define a pair of rails along which at least one body can move from which at least one cable can be unwound and wound, in contrast with a resistance, said cable being adapted to be gripped by a
20 user who positions himself or herself proximate to said at least semicircular arc structure.

Further characteristics and advantages of the invention will become better apparent from the description of preferred but not exclusive embodiments of the gymnastics apparatus according to the invention,
25 illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a first embodiment of the gymnastics and rehabilitation apparatus according to the present invention;

Figure 2 is a perspective view of the gymnastics and rehabilitation
30 apparatus according to the invention in a different configuration for use;

Figure 3 is a front elevation view of the gymnastics and rehabilitation apparatus of Figures 1 and 2;

Figure 4 is a perspective view of a second embodiment of the gymnastics and rehabilitation apparatus according to the present invention;

5 Figure 5 is a front elevation view of the gymnastics and rehabilitation apparatus of Figure 4;

Figure 6 is a perspective view of a third embodiment of the gymnastics and rehabilitation apparatus according to the present invention; and

10 Figure 7 is a perspective view of a fourth embodiment of the gymnastics and rehabilitation apparatus according to the present invention.

With reference to the figures, the gymnastics and rehabilitation apparatus according to the present invention, generally designated by the reference numeral 1, comprises an at least semicircular arc structure 2 which
15 is adapted to define a pair of rails 2A, 2B, on which a body 3 can freely slide which is provided with trucks 4 which are motorized by way of a motor 5 and which allow the body 3 to slide along the rails 2a, 2b of the semicircular arc structure 2.

The body 3 is provided with an additional motor 6, to which a cable 7
20 is attached which is provided with at least one handle 8. The motor 6 is capable of applying an adjustable force on the traction of the cable 7 so that the user can perform a traction exercise on the cable 7 by gripping the handle 8, according to a specific preset program.

The structure 2 is conveniently provided with a footing 10 for resting
25 on the ground.

The gymnastics and rehabilitation apparatus according to the invention can, in a second embodiment, comprise a full circular arc structure as shown in Figures 1 to 5 instead of a semicircular arc structure.

The expression semicircular arc or full circular arc naturally does not
30 mean an exact semicircular arc or circular arc, but a structure that can be

shaped like a partial arc or like a full arc, although the arcs of interest extend beyond an exact semicircular arc or for less than a full circular arc.

In this embodiment (full circular arc), there are two bodies 3 which are arranged at the opposite sides of the full circular arc structure, which is
5 designated in this case by the reference numeral 12.

In the various figures, identical elements are designated by identical reference numerals. Therefore, in the embodiments that are different from the one previously described, all the corresponding elements will have an identical reference numeral.

10 The bodies 3 arranged mutually opposite allow the simultaneous training of two limbs by a user 20 who is positioned inside the full circular arc structure 12, with the feet resting on the footing 10.

Conveniently, inside the full circular arc structure 12, it is possible to arrange a flat, inclined or reclining bench 15, which allows the user to
15 perform further exercises, again by using the cables 7 with the corresponding grip handles 8.

The bench 15 can also be used in the semicircular arc structure 2.

The bench 15 can conveniently be moved from a vertical position, in which the bench is in the condition in Figures 1 and 3-5, thus leaving
20 completely free the space inside the semicircular arc structure or full circular arc structure 12, to an operational position, as shown in Figure 2.

The adjustment of the position of the body 3 along the semicircular arc structure or full circular arc structure 2, 12 makes it possible to train the muscle of interest according to different angles, while at the same time
25 being able to graduate the effort applied by the user to the cable 7, both in the muscle contraction phase (concentric phase) and in the muscle elongation phase (eccentric phase).

The apparatus further makes it possible to train resistance force and static force and also to adjust the speed for the return work, i.e. the muscle
30 elongation work, without any risk of injuries.

Moreover, the semicircular arc structure or full circular arc structure 12 is provided with a slit 20 which is arranged along the extension portion of the structure that constitutes the useful stroke of each body 3. The slit 20 makes it possible to perform exercises outside the structure 12 as well, by
5 guiding the cable 7 through the slit 20, so as to allow two users to use the apparatus at the same time, one positioned inside the structure 12 and one positioned outside it.

In an additional embodiment, shown in Figures 4, 5, and 6, the full circular arc structure of Figures 4 and 5 or the semicircular arc structure of
10 Figure 6 can be provided, instead of with a motor to graduate the effort applied to the cable 7, again with a body, in this case designated by the reference numeral 13, which can move along the circular arc structure or semicircular arc structure to which a cable 25 connected to a weight pack 26 is attached.

15 In this case, the body 13 can always be arranged as desired along the circular arc structure or semicircular arc structure, and its position determines the working angle that the muscle will be able to perform, the only difference being that a weight pack is present instead of the motor 6.

In the embodiment of Figures 4, 5, and 7, the body 13 is constituted
20 by a pulley about which the cable 25 that connects the weight pack 26 winds and unwinds.

The body 13, therefore the pulley, can be arranged, as mentioned, along the semicircular arc structure and full circular arc structure 2, 12.

The gymnastics and rehabilitation apparatus according to the
25 invention is thus provided, in its more general concept, with at least one semicircular arc structure, which is provided with at least one body which can move along such semicircular arc structure, and the body can be provided with a motor for the controlled unwinding of a cable provided with a handle, or with a weight pack again connected to a cable with a handle.

30 The gymnastics and rehabilitation apparatus according to the

invention therefore makes it possible to train both the concentric phase (muscle contraction phase) and the eccentric phase (muscle elongation phase), moreover stimulating irisin, a hormone which in addition to transforming fats enables the production of bone tissue, combating
5 osteoporosis.

The gymnastics and rehabilitation apparatus allows a greater injury prevention effect and is an excellent instrument for recovery and rehabilitation with respect to the apparatuses of the known type.

Moreover, it is possible to increase the load in the eccentric phase of
10 the exercise, thus improving coordination, strength and functionality.

The apparatus further makes it possible to train in a very specific way the muscles of interest, while at the same time avoiding jerking motions and possible injuries during exercise.

Furthermore, the possibility to vary the angle of exercise, by way of
15 moving the body 3 along the semicircular arc structure or full circular arc structure, makes it possible to attack the muscle from multiple angles and thus perform a much more complete training than the apparatuses of the known type in which the angle of attack of the muscle is constant.

The body 3 can also be mounted on the rails 2a, 2b so as to slide on
20 them, arranging itself outside the semicircular arc structure or full circular arc structure.

In practice it has been found that the gymnastics and rehabilitation apparatus according to the invention fully achieves the intended aim and objects, since it makes it possible to provide a complete training for the
25 body in total safety.

The apparatus thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims.

All the details may furthermore be replaced with other technically
30 equivalent elements. In practice, the materials used, as well as the

contingent shapes and dimensions, may be any according to the requirements and the state of the art.

The disclosures in Italian Patent Application no. 102018000008951, from which this application claims priority, are incorporated by reference.

- 5 Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

CLAIMS

1. A gymnastics and rehabilitation apparatus, characterized in that it comprises an at least semicircular arc structure (2; 12) which is adapted to define a pair of rails (2a, 2b) along which at least one body (3) can move
5 from which at least one cable (7; 25) can be unwound and wound, in contrast with a resistance, said cable being adapted to be gripped by a user who positions himself or herself proximate to said at least semicircular arc structure (2; 12).

2. The gymnastics and rehabilitation apparatus according to claim 1,
10 characterized in that said at least semicircular arc structure (2; 12) is a full circular arc structure (12) and comprises a pair of said bodies (3) which can move on said pair of rails (2a, 2b) which are defined by said full circular arc structure (12) so as to move along said arc structure.

3. The gymnastics and rehabilitation apparatus according to claim 1
15 or 2, characterized in that said at least one body (3) is provided with a motor (5) which is adapted to allow the movement of said body (3) along said rails (2a, 2b) which are defined by said at least semicircular arc structure (2; 12), and a motor (6) which is adapted to make it possible to apply resistance against traction and release on said at least one cable (7) which is being
20 unwound and wound by said user.

4. The gymnastics and rehabilitation apparatus according to one or more of the preceding claims, characterized in that said full circular arc structure (12) comprises a pair of bodies (3) which can move inside said structure along said rails (2a, 2b).

25 5. The apparatus according to one or more of the preceding claims, characterized in that said at least semicircular arc structure (2; 12) comprises a footing (10) for resting on the ground.

6. The apparatus according to one or more of the preceding claims, characterized in that said body (3) which can move along said rails (2a, 2b)
30 comprises a pulley (13) and said cable (25) is connected at one end to a

weight pack (26) and at the other end to a handle (8) which is adapted to be gripped by said user.

7. The apparatus according to one or more of the preceding claims, characterized in that said body (3) which can move along said rails (2a, 2b) which are defined by said at least semicircular arc structure comprises trucks (4), which are motorized and actuated by said motor (5) and are adapted to allow said body (3) to move along said rails (2a, 2b).

8. The apparatus according to one or more of the preceding claims, characterized in that it comprises a flat and/or reclining bench (15) which is adapted to be arranged in a position that is adjacent to said at least semicircular arc structure (2; 12).

9. The apparatus according to one or more of the preceding claims, characterized in that said bench (15) can move from a vertical position, in which said bench is outside said structure, to a horizontal operational position.

10. The apparatus according to one or more of the preceding claims, characterized in that said structure (2; 12) comprises a slit (20) which is adapted to allow the guiding of said at least one cable (7) outside said structure (2; 12).

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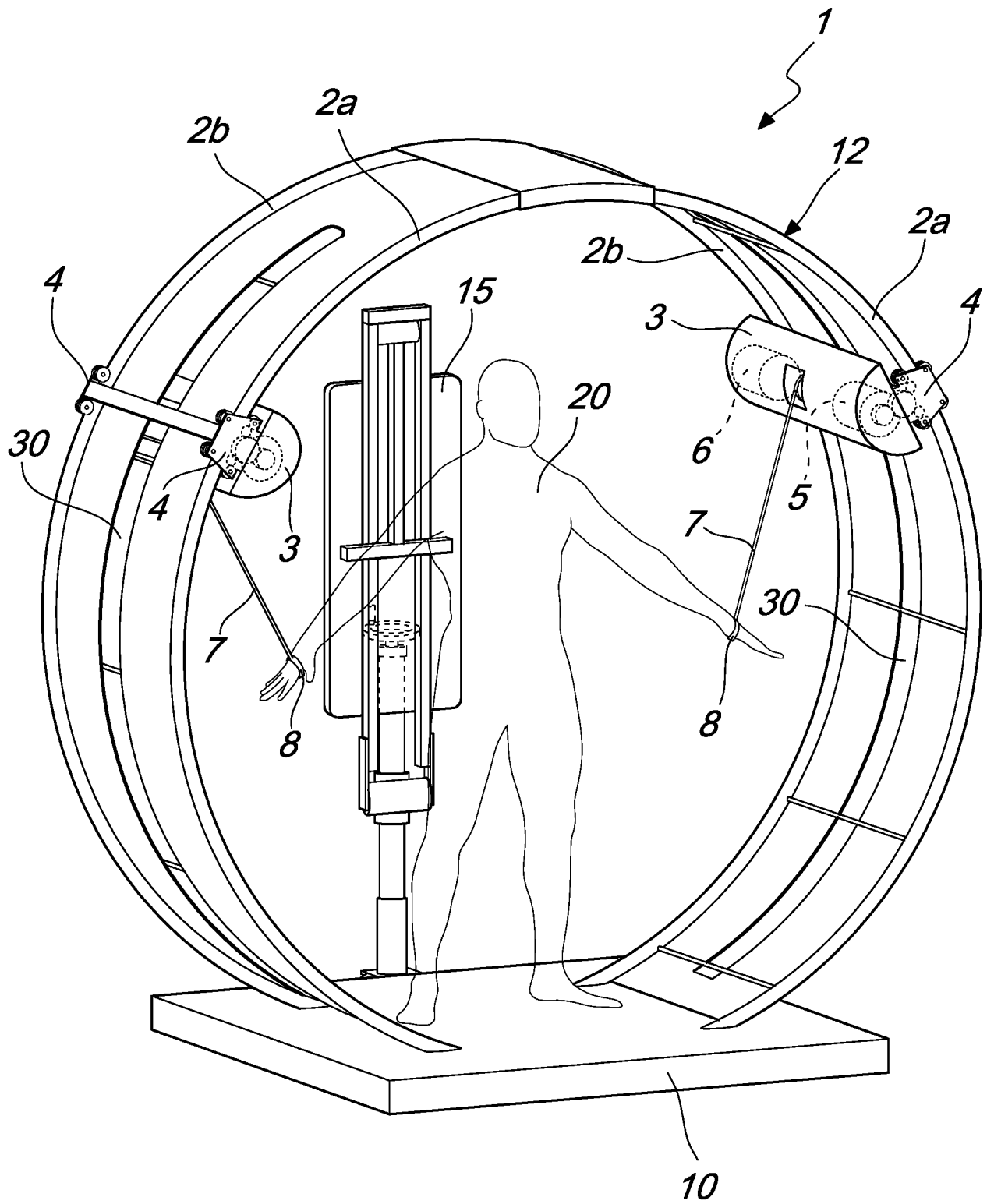
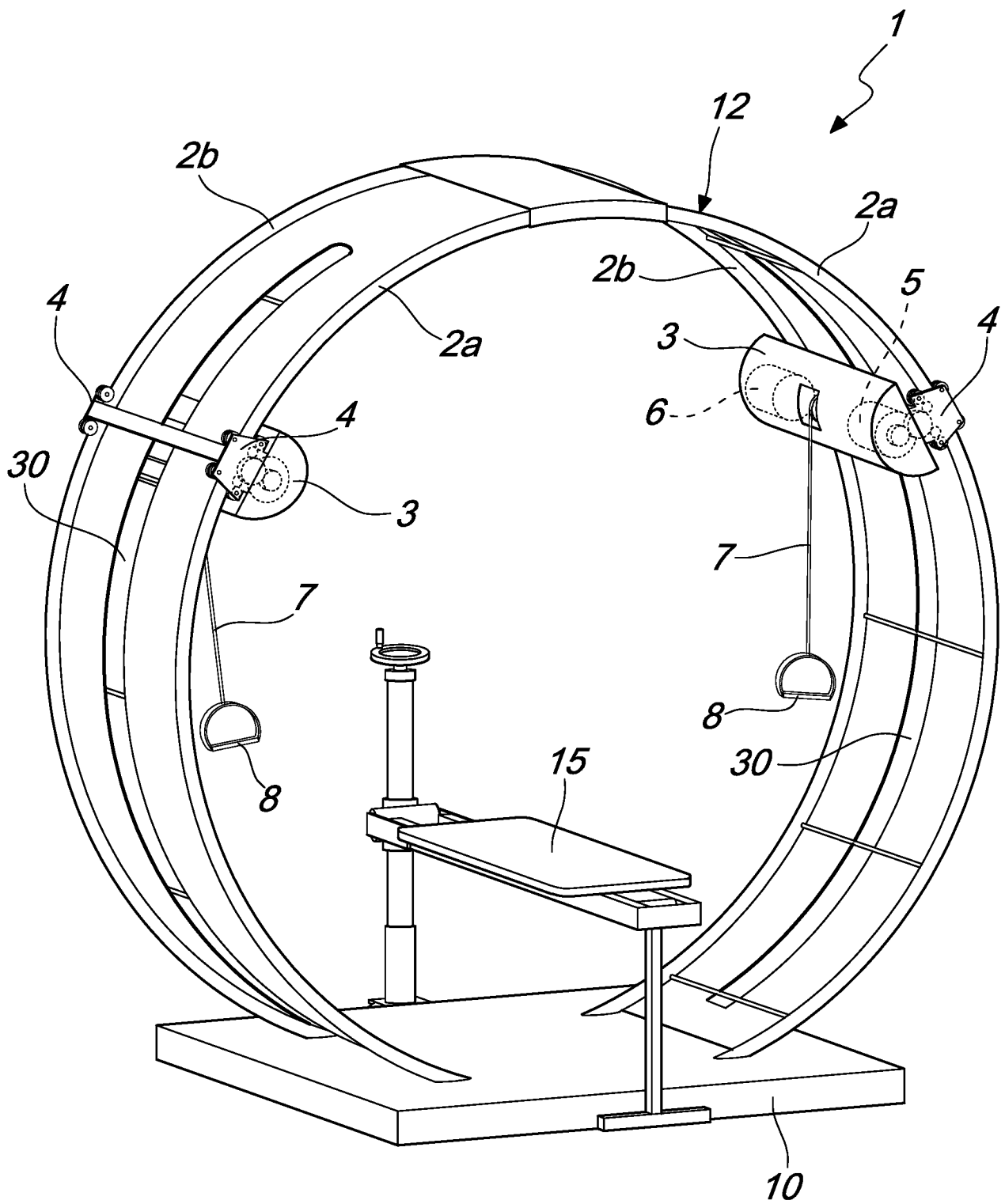
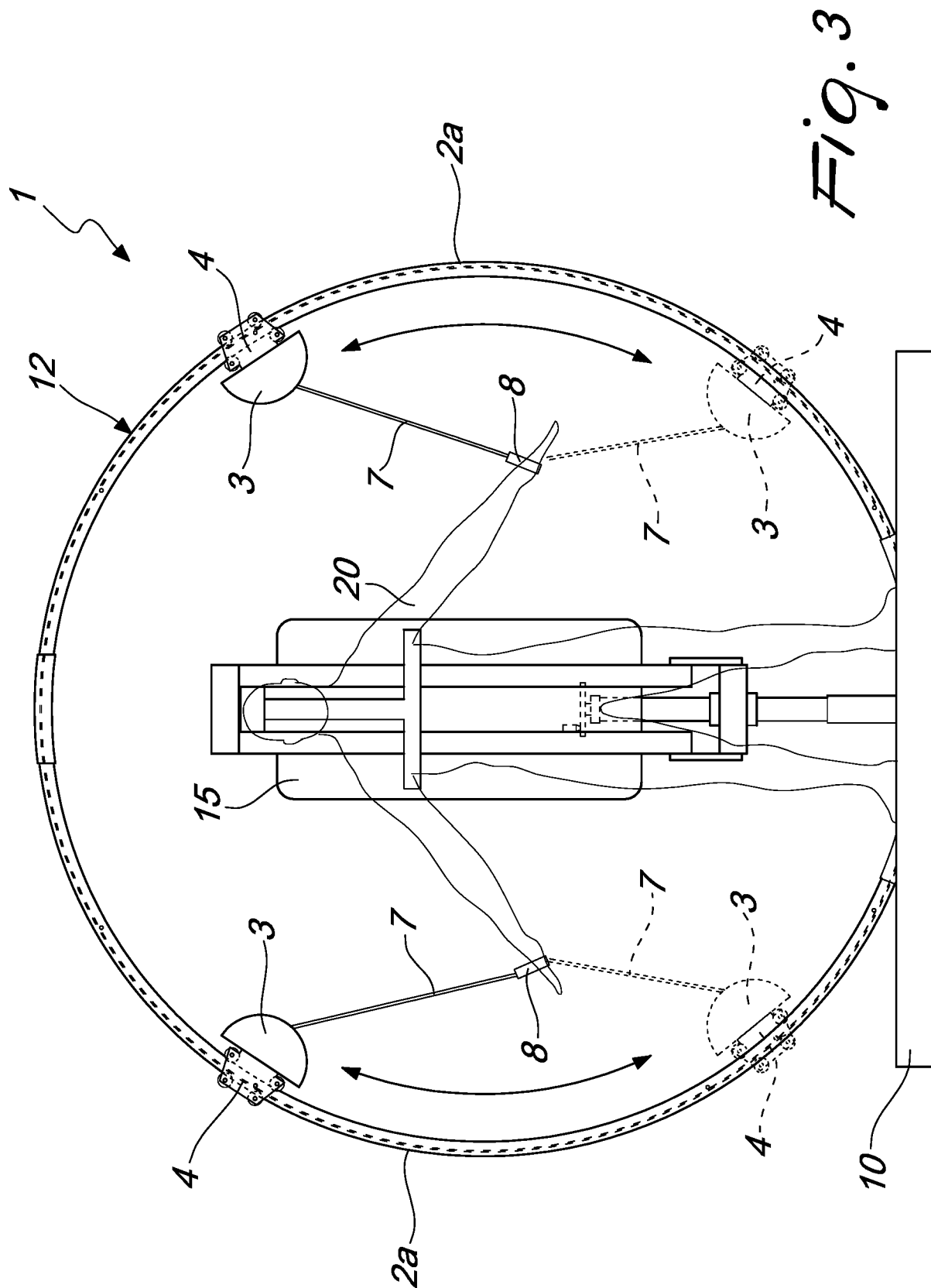


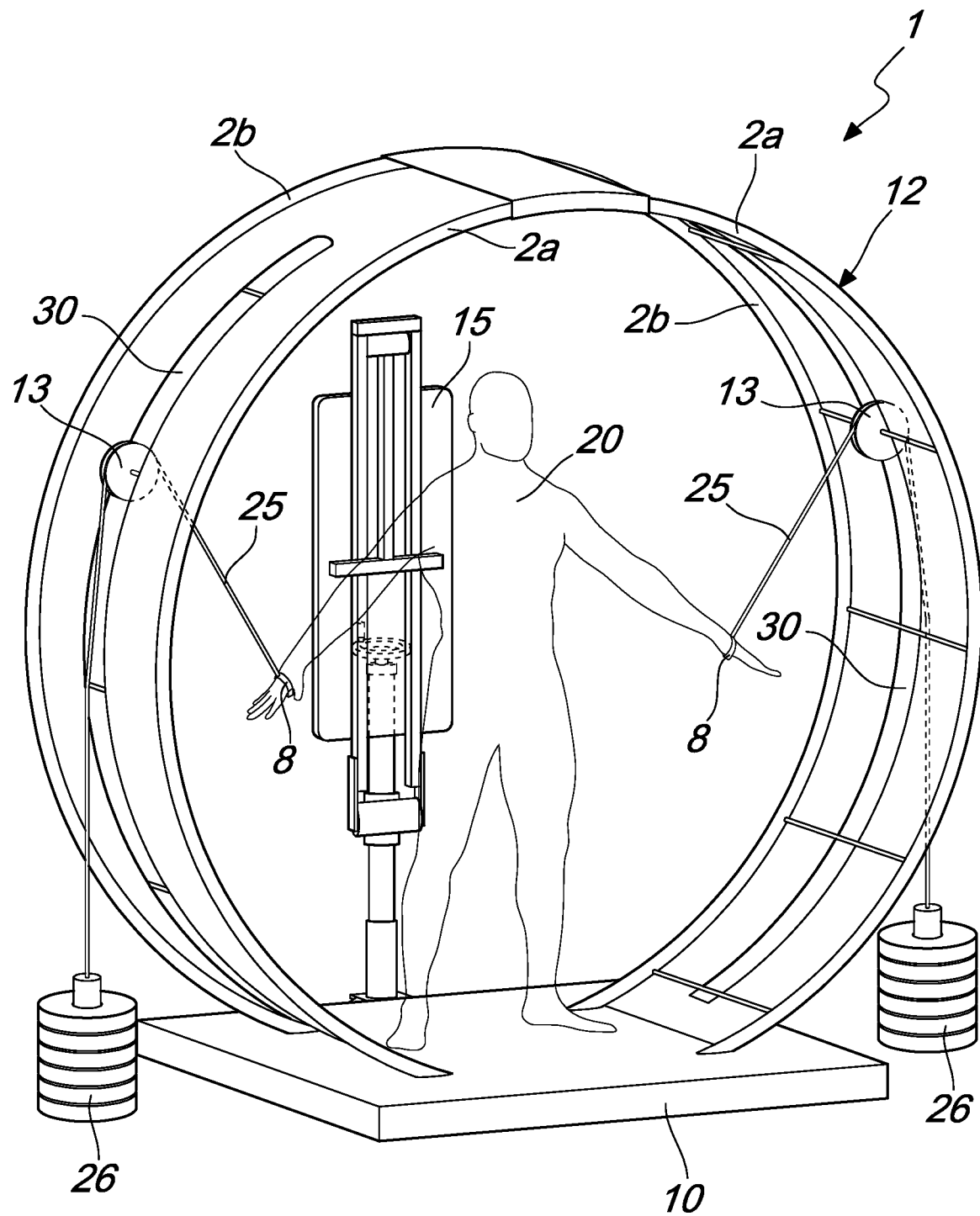
Fig. 1

2/7

*Fig. 2*



4/7

*Fig. 4*

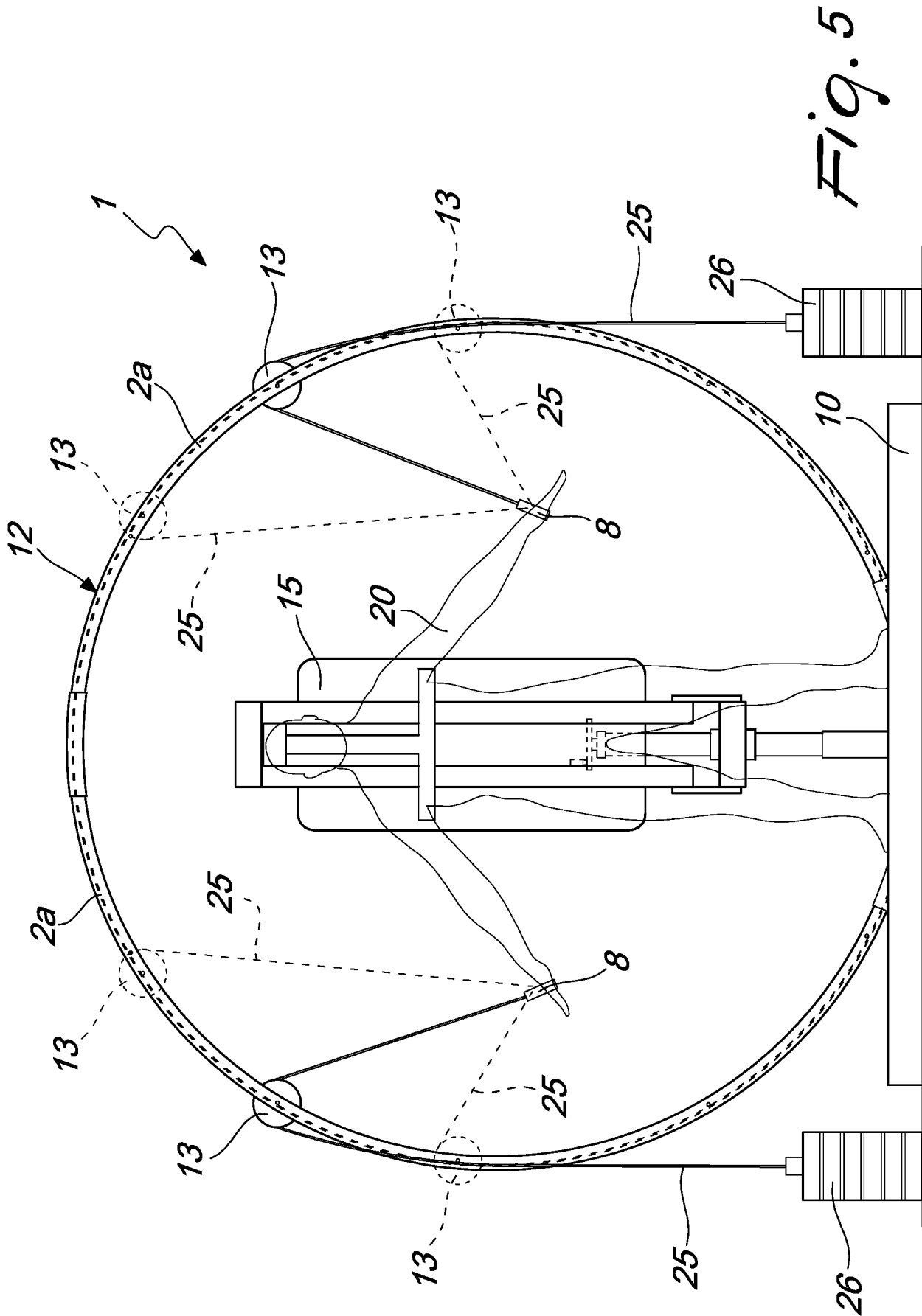
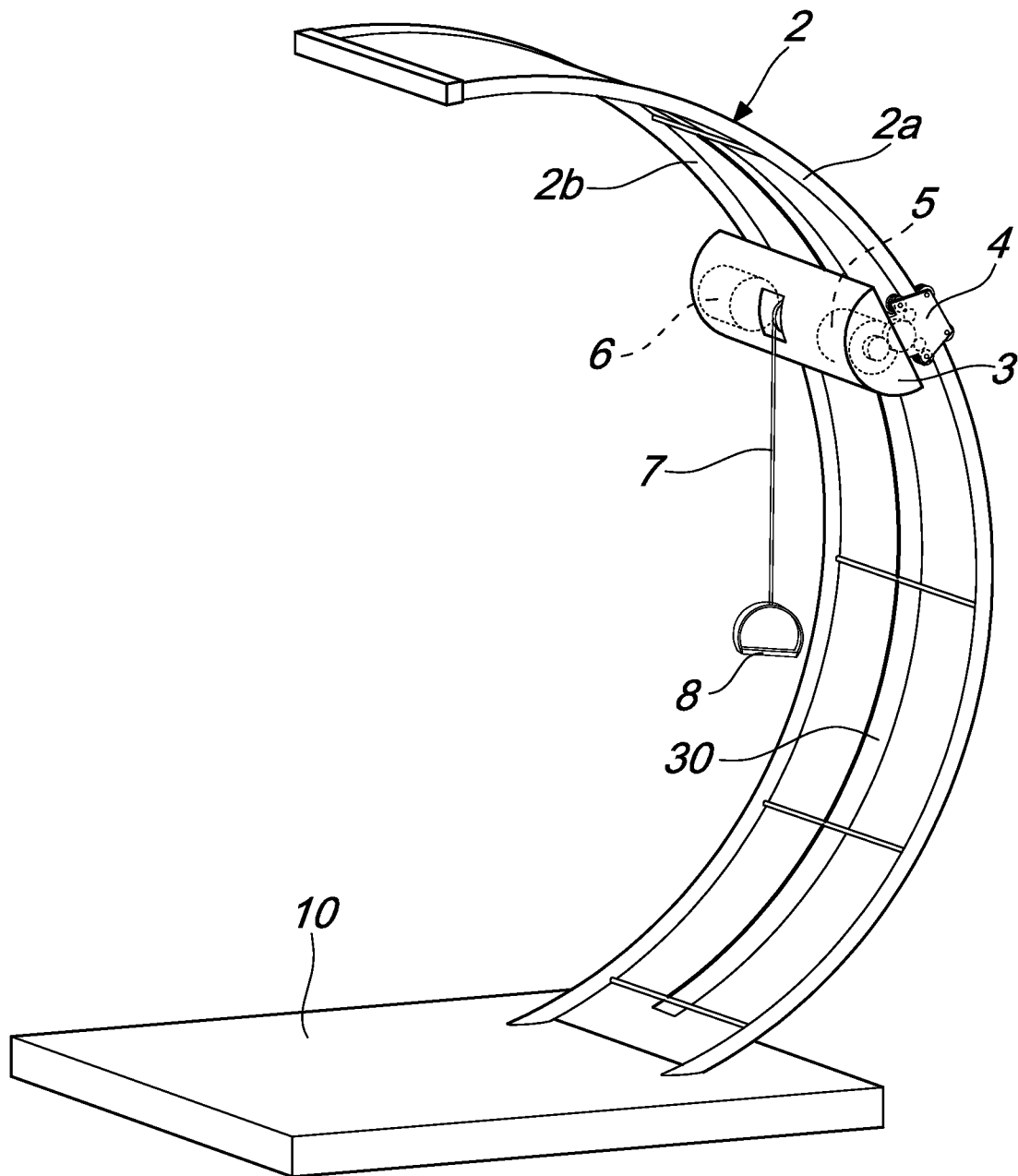
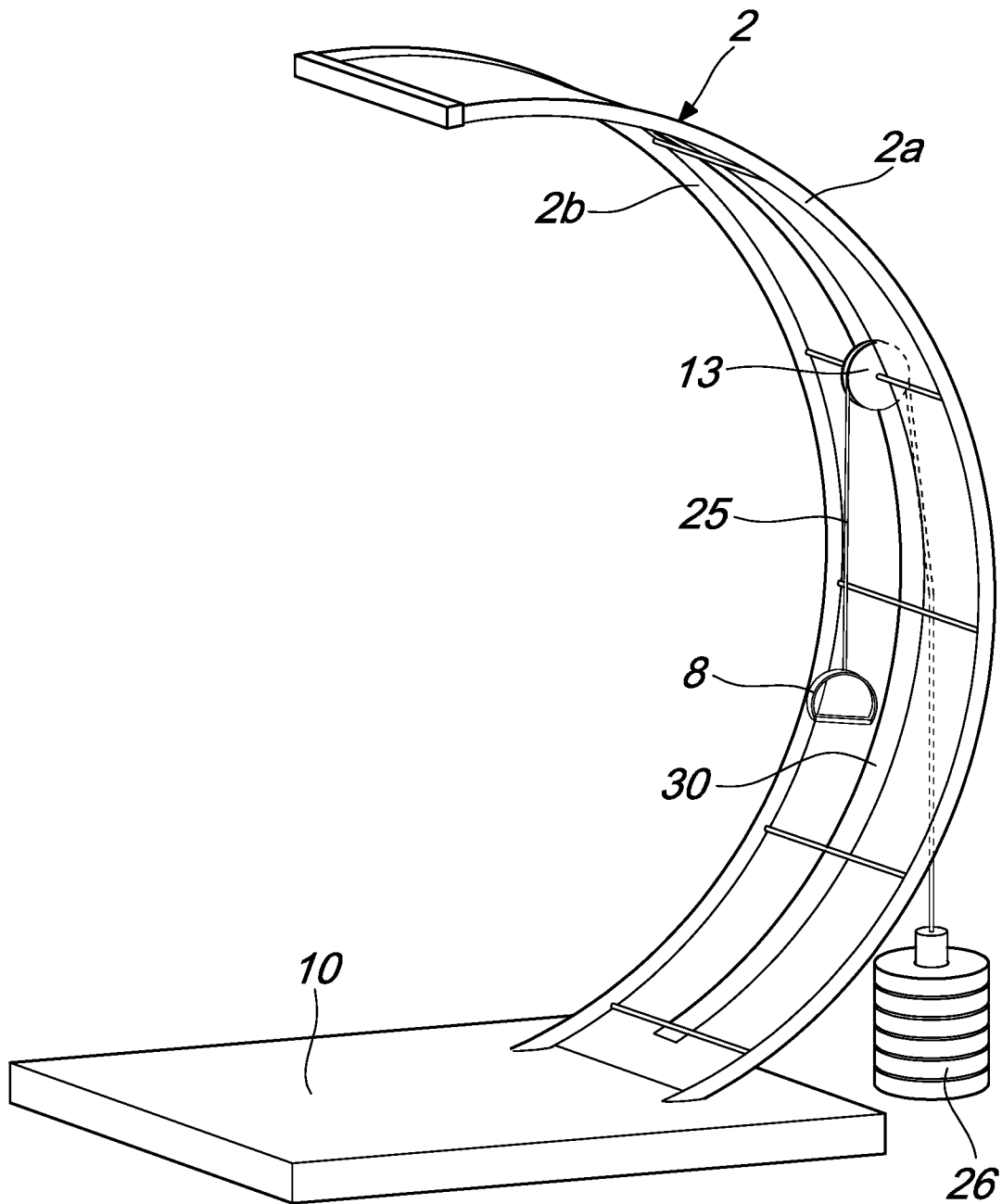


Fig. 5

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*Fig. 6*

7/7

*Fig. 7*

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/058217

A. CLASSIFICATION OF SUBJECT MATTER

INV. A63B21/00 A63B21/062 A63B21/005 A63B23/035 A63B23/12
ADD.

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)
A63B

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

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	paragraphs [0340] - [0341], [0354] - [0365], [0363] - [0365], [0467] - [0470]; figures 2, 17-19 -----	8-10
X	US 6 685 600 B1 (ULLMAN STUART G [US]) 3 February 2004 (2004-02-03)	1,2,4-6, 8,9
A	columns 5-7; figures -----	10
X	US 2006/240956 A1 (PIANE ROBERT A JR [US]) 26 October 2006 (2006-10-26)	1,2,4-6, 8,9
A	paragraphs [0029] - [0047]; figures -----	10
X	WO 2009/143808 A1 (QUATTROMANI ENGINEERING GMBH [DE]; MAYR MARKUS [DE]) 3 December 2009 (2009-12-03)	1,3-5,7, 8
A	pages 6-7; figures -----	9,10
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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