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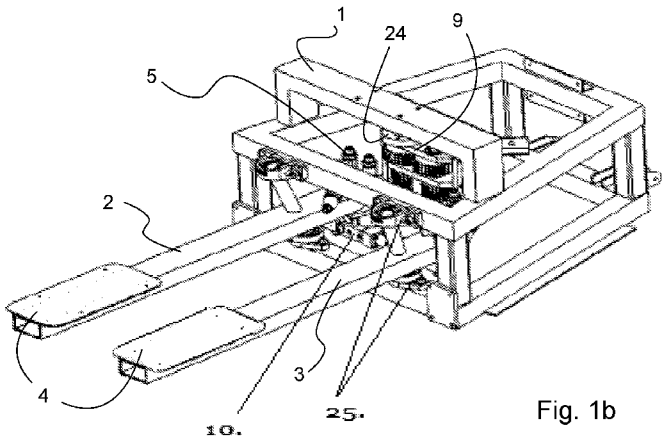

Fig. 1b

(57) Abstract: The invention relates to a training device for simulating a skiing motion, which device comprises a frame. The training device is provided with a substantially elongated left-hand pedal element and a substantially elongated right-hand pedal element disposed substantially parallel thereto. A rear part of the left-hand pedal element and the right-hand pedal element, respectively, is provided with a footrest on which a user can place his or her left foot and right foot, respectively. A front part of each of the left-hand pedal element and the right-hand pedal element is provided with a left-hand pedal shaft and a right-hand pedal shaft, respectively, extending both at an upper side and at a bottom side of the left-hand pedal element and the right-hand pedal element, respectively. The left-hand pedal shaft and the right-hand pedal shaft are each pivotally connected to the frame both at the upper side and at the bottom side. Seen in the direction from the bottom side to the upper side, the left-hand pedal shaft and the right-hand pedal shaft extend toward the rear part of the left-hand pedal element and the right-hand pedal element, respectively. Seen in the direction from the bottom side to the upper side, the left-hand pedal shaft also extends in a direction away from the right-hand pedal element. Seen in the direction from the bottom side to the upper side, the right-hand pedal shaft also extends in a direction away from the left-hand pedal element.

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Training device for simulating a skiing motion and use thereof

DESCRIPTION

The present invention relates to a training device for simulating a skiing motion, said device comprising a frame and being provided with a substantially elongated left-hand pedal element and a substantially elongated right-hand pedal element disposed substantially parallel thereto, wherein a rear part of the left-hand pedal element and the right-hand pedal element, respectively, is provided with a footrest on which a user can place his or her left foot and right foot, respectively, and wherein a front part of the left-hand pedal element is provided with a left-hand pedal shaft extending both at an upper side and at a bottom side of the left-hand pedal element, and wherein a front part of the right-hand pedal element is provided with a right-hand pedal shaft extending both at an upper side and at a bottom side of the right-hand pedal element, which left-hand pedal shaft and which right-hand pedal shaft are each pivotally connected to the frame both at the upper side and at the bottom side.

Such a training device is known, for example from DE 20 2006 015 337 U1. The ski trainer known from said document comprises two supports provided with footrests, on which a user can place his or her feet. The user can move the supports with the footrests from side to side in a skiing motion. Said motion furthermore causes a flywheel to rotate. The rotating flywheel increases the amount of force that is required for carrying out the side-to-side movement so as to thus enhance the training effect for the user.

A drawback of the known training device is that it cannot simulate a skiing motion in a correct and/or realistic manner.

It is an object of the present invention to provide a relatively simple training device by means of which a good and realistic skiing motion can be simulated in an improved manner.

In order to accomplish that object, the invention provides a training device for simulating a skiing motion as defined in claim 1. The training device comprises two elongated pedal elements which are disposed substantially parallel to each other, at least in a position of rest. In the position of rest the footrests, and the footrest surfaces, also extend parallel to each other. Thus a natural and realistic

skiing position is obtained in the position of rest. The pedal elements are provided with a pedal shaft extend at an upper side and at a bottom side thereof, by means of which pedal shaft the pedal elements are pivotally connected to the frame. The skiing motion can be simulated by pivoting the pedal elements. With the training device according to the present invention, the left-hand pedal shaft and the right-hand pedal shaft extend in a direction toward the rear part of the left-hand pedal element and the right-hand pedal element, respectively, seen in the direction from the bottom side to the upper side. In other words, the upper side of the pedal shaft is inclined in rearward direction relative to the pedal element. Seen in the direction from the bottom side to the upper side, the left-hand pedal shaft also extends in a direction away from the right-hand pedal element, whilst, seen in the direction from the bottom side to the upper side, the right-hand pedal shaft also extends in a direction away from the left-hand pedal element. In other words, the upper side of the pedal shaft tilts outwards relative to the pedal element, also called pedal crank.

The arrangement of the left-hand pedal shaft and the right-hand pedal shaft as described above provides an improved simulation of the skiing motion. Starting from the position of rest (the pedal elements are in a central position), the two pedal elements extend parallel to each other. As soon as the pedal elements are simultaneously pushed to the same side, the outer pedal will move downward during said movement, due to the manner in which the pedal shafts are disposed. The inner pedal element will simultaneously move proportionally upward. Since the inner pedal element is at that point positioned higher than the outer pedal element, a descent on a ski slope is thus simulated. The fact is that in a practical situation the leg being supported on the lower ski (outer pedal element) is also positioned lower than the leg being supported on the upper ski (inner pedal element). Surprisingly, the manner in which the pedal shafts are disposed leads to a better and more realistic simulation of the skiing motion, which so far has not been possible with known, relatively simple training devices of the kind referred to in the introduction.

Further advantageous embodiments of the present invention form the subject matter of the dependent claims. A few of said embodiments, and their advantages, will be explained in more detail hereinafter.

It is to be preferred if the left-hand pedal element and the right-hand pedal element are connected to a flywheel via a transmission mechanism. The

flywheel is driven, via the transmission mechanism, by the sideways movement of the pedal elements. The flywheel offers resistance to said sideways movement.

The transmission mechanism preferably comprises a gearbox which is designed to drive the flywheel in one direction of rotation, independently of the direction of pivoting of the pedal elements. Preferably, the flywheel is driven both during the outward stroke and during the inward stroke of the pedal elements, so that the flywheel must be driven, thus offering a certain amount of resistance, during both strokes. It is possible in that connection for the flywheel to be connected to a resistance unit for offering resistance to the movement of the pedal elements.

The flywheel is preferably connected to an electromagnetic generator. The electromagnetic generator provides the device with a controlled counter resistance. The electromagnetic generator may be adjustable so as to offer a controlled and adjustable counter resistance. This enables the user to choose between different intensity levels. Using the adjustable counter resistance, it is possible to simulate different kinds of ski slopes exhibiting different degrees of difficulty. The generator can also serve to generate power. In one embodiment, the generator is connected to a display unit connected to the training device, such that a user can view and follow information regarding his or her training and, for example, the resistance level that has been set.

In an advantageous embodiment, the training device comprises a toothed belt connected to the left-hand pedal element and to the right-hand pedal element, which toothed belt is passed through the gearbox for driving at least one gear of the gearbox during use of the training device. Said at least one gear is connected to a flywheel shaft of the flywheel by means of a freewheel clutch. To be assured of a safe and sound training session, the user must be able to stop the pedals at any desired point in time. The gearbox with the freewheel clutch enables the user to stop the pedals without the flywheel attempting to steer the pedals the other way. In addition, the driving mechanism of, for example, the electromagnetic generator can continue to run when the pedal elements do not move (any more).

In one embodiment, the left-hand pedal element and the right-hand pedal element are each provided with a belt tensioning device, comprising a clamping unit for clamping down the toothed belt therein, which clamping unit is connected to a spring element for keeping the tension on the toothed belt. The belt tensioning device ensures that the toothed belt is reliably attached to the pedal

elements. Thus, a reliable transmission between the pedal elements and the flywheels, via the toothed belt and the gear of the gearbox, is obtained.

The spring element may additionally be designed to provide a progressive spring action when the pedal elements are pushed to the most outward position. Upon reaching said most outward position, the spring force of the compression springs causes the pedal elements to be urged toward the centre. In this way a smooth movement for the user is realised. Because of the action of the compression springs, the impact on the user's joints during the extreme, most sideways pedal positions will be low, because the compression springs function to even out any sudden stops in the movement. As a result, the user will not experience an impact moment.

The spring element extends substantially in a direction parallel to a clamping surface formed by the clamping unit. The spring element thus extends substantially in a longitudinal direction of the toothed belt. As a result, the spring element is easily capable of absorbing the forces being exerted.

Preferably, a tension of the spring element is adjustable, for example by means of an adjustment bolt. This makes it possible to adjust the tension of the toothed belt when said tension is too low (for example due to wear, such as elongation of the toothed belt) or too high.

The clamping unit comprises two parts which can be placed one on top of the other, at least one of which parts is provided with recesses corresponding to teeth of the toothed belt. This leads to an increased reliability of the clamping engagement and of the attachment of the toothed belt to the pedal elements.

To keep the two pedal elements substantially parallel to each other during use, the left-hand pedal element and the right-hand pedal element are connected by means of a connecting device.

The connecting device is designed to manage the difference in height that occurs between the pedal elements. In one embodiment, the connecting device comprises a central core element having two ends, wherein a first end is connected to a left-hand connecting unit which is rotatable about three axes and which is also connected to the left-hand pedal element, and wherein a second end opposite said first end is connected to a right-hand connecting unit which is rotatable about three axes and which is also connected to the right-hand pedal element. The two connecting units, which are each rotatable about three axes, make it possible to

manage the differences in height that occur but also the relative movement in longitudinal direction of the pedal elements, with the pedal elements being kept substantially parallel to each other.

A very realistic simulation of the skiing motion is obtained if a rearward angle between a longitudinal axis of the pedal element and the pedal shaft ranges between 60 and 80 degrees, preferably between 65 and 75 degrees. In one embodiment, said angle is 70.1 degrees, for example.

A very realistic simulation of the skiing motion is also obtained if a lateral angle between a line perpendicular to the surface formed by the upper side of the footrests and the pedal shaft ranges between 5 and 10 degrees, preferably between 7 and 8°. In one embodiment, the angle is 7.7 degrees, for example.

In one embodiment, the angle between the longitudinal axis of the pedal element and the pedal shaft in rearward direction is 70.1 degrees, and the angle between a line perpendicular to the surface formed by the upper side of the footrests and the pedal shaft in lateral direction is 7.7°.

One aspect the invention relates to the use of a training device according to the present invention. Using the training device according to the present invention, it is possible to practice a realistic skiing motion, as already described above. As a result, those muscle groups that are relevant to a skier are trained.

The invention will now be explained in more detail by means of a description of an embodiment thereof, in which reference is made to the figures. In the figures:

Figure 1a is a perspective view, seen from the front side, of a training device according to the present invention;

Figure 1b is a perspective view, seen from the rear side, of the training device of figure 1a;

Figure 1c is a partially cross-sectional top plan view of a training device shown in figure 1a and figure 1b;

Figure 2a is a top plan view of the left-hand and the right-hand pedal element of the training device;

Figure 2b is a side view of a pedal element;

Figure 2c is a perspective view of the left-hand pedal element;

Figures 3a and 3b are perspective views of a connecting device for

connecting the left-hand pedal element to the right-hand pedal element;

Figure 4a is a perspective view of a belt tensioning device;

Figure 4b is a partially cross-sectional view of the belt tensioning device of figure 4a;

Figure 5a is a perspective view of a gearbox;

Figure 5b is a side view of the gearbox of figure 5a;

Figures 6a and 6b are schematic views of the directions of rotation of the various years of the gearbox during the outward and inward movement of the pedal elements.

Figures 1a and 1b are perspective views, from a front side and a rear side, respectively, of an embodiment of the training device according to the present invention. The training device comprises a frame 1. Mounted to the frame are two pedal elements 2, 3, each provided with a footrest 4. The pedal elements 2, 3 are provided with pedal shafts 26, 36. At an upper side and at bottom side of the pedal shafts, said pedal shafts are mounted in block bearings 25 connected to the frame 1. Because of this arrangement, the pedal elements 2, 3 can pivot outward and inward.

Figure 1c shows the device in more detail. The two pedal elements 2, 3 are connected by means of a connecting device 10 extending between the two pedal elements, such that the two longitudinal axes of the pedal elements will remain substantially parallel to each other during the outward and inward movement of said pedal elements. The training device further comprises a gearbox 9, which is connected to belt tensioning devices 5, 6 provided on the pedal elements 2, 3. The gearbox is further connected to a flywheel 24 (see figure 1a and figure 1b). Said flywheel may furthermore be connected to an electromagnetic generator (not shown). Said connection may be effected by means of poly V belt, for example.

Figures 2a and 2b show the pedal elements 2, 3 in more detail. Figure 2c is a perspective view of the left-hand pedal element 2. As shown, the pedal elements 2, 3 each comprise a substantially elongated beam or elongated section. Mounted on a rear end thereof are footrests 4. At a front side, pedal shafts 26, 36 are provided. Said pedal shafts extend in upward and in downward direction relative to the pedal elements 2, 3. An upper end part 27, 37 is provided at an upper side and a lower end part 28, 38 is provided at a bottom side. Via said end parts 27,

28, 37, 38, the pedal shafts are accommodated in the aforesaid block bearings. Those skilled in the art will appreciate that any other means of attachment may be used for connecting the pedal elements 2, 3 to the frame 1. Figure 2a further shows attachment openings 42, 43 for the connecting device 10. Furthermore, means of attachment 45, 46 are provided, on which the belt tensioning devices 5, 6 can be placed.

As figure 2a shows, the pedal shafts are disposed at a lateral angle β. The pedal shafts thus do not extend perpendicularly upward, but outward at an angle β. Said angle β is relatively small, it ranges between 5 and 10 degrees, for example. Preferably, the angle ranges between 5 and 8 degrees, for example 7.7 degrees.

As figure 2b shows, the pedal shafts are also disposed at a rearward angle α. The pedal shafts thus do not extend perpendicularly upward, but at an angle α toward the rear, in the direction of the footrests 4. Said angle α may range between 60 and 80 degrees, preferably between 65 and 75 degrees, for example 70.1 degrees.

The placement of the pedal elements at the aforesaid angles leads to a natural simulation of the skiing motion, because the upper ski (inner pedal element) is disposed higher than the lower ski (outer pedal element) each time the taking of a bend is being simulated.

Figures 3a and 3b are perspective views of the connecting device by means of which the right-hand pedal element 3 is connected to the left-hand pedal element 2. The connecting device 10 comprises a central core element 101 which has two ends. Said ends are mounted in bearings in mounting blocks 13, in such a manner that movement of the central core element 101 about the longitudinal axis is possible. The mounting blocks 13 are connected to bearing holders 11, which are in turn connected to bearing housings 12, being pivotable in a direction perpendicular to the longitudinal axis of the central core element 101. The bearing housing comprises a bearing-mounted shaft 121, which is rotatable about a longitudinal axis of the shaft. The bearing-mounted shaft 121 is used for connecting the connecting device 10 to the left-hand pedal element 2 or to the right-hand pedal element 3. The assembly of mounting block 13, bearing housing 12, and bearing holder 11 forms a connecting unit 11, 12, 13, which is rotatable about three axes. In this way the connecting device can keep the two pedal elements substantially

parallel to each other, also during the difference in height that occurs between the pedal elements and the shift in longitudinal direction of the pedal elements.

Figures 4a and 4b are a perspective view and a sectional view, respectively, of the above-described belt tensioning device 5 for the left-hand pedal element. The belt tensioning device 6 for the right-hand pedal element 3 is identical thereto, albeit in mirror image thereof. The belt tensioning device comprises a base part 5. A hole is provided in said base part, through which a cylinder 8 movably extends. At a first end, the cylinder is connected to a clamping unit 7, 701. At another end, the cylinder 8 is connected to a compression spring 15. The clamping unit comprises a first block 7 and a second block 701 positioned some distance away therefrom. A clamping surface is formed between the blocks 7, 701, which can hold the toothed belt. As the figure furthermore shows, the block 701 is provided with recesses corresponding to teeth of the toothed belt. Because of this configuration, the toothed belt can be reliably clamped down in the belt tensioning device 5. Furthermore, two guide bushes 702, 703 are disposed on the base part 5. Said guide bushes are rotatable about their longitudinal axes. The toothed belt abuts the shell of the guide bushes. The compression spring pushes the cylinder 8 to the left-hand side, seen in figures 4a and 4b. As a result, the clamping unit 7, 701 is moved in that direction as well, so that the toothed belt can be tensioned. Said tension is adjustable, because the clamping device 5 is provided with an adjustment element, such as an adjustment bolt.

As already described above, the toothed belt is attached to the left-hand belt tensioning device 5 and to the right-hand belt tensioning device 6. The toothed belt is further passed through the gearbox 9 shown in figure 5. The toothed belt extends from the left-hand belt tensioning device 5 into the gearbox 9 between a central guide rollers 17 of the gearbox 9 and a left-hand connecting element 18. The toothed belt is in contact with the toothed side of the left-hand connecting element 18 via its toothed side and exits the gearbox 9 again via the central guide roller 17, between the right-hand toothed connecting element 19 and the central guide roller 17, from where it moves to the right-hand belt tensioning device 6.

The connecting elements 18, 19 comprise a so-called freewheel bearing. The left-hand connecting element 18 is mounted on a long shaft 22 and the right-hand connecting element 19 is mounted on a short shaft 23. Mounted on the upper side of the long shaft 22 is the attachment for the flywheel 24, also called

pulley wheel. The configuration of the connecting elements 18, 19 with the aforesaid freewheel bearings is such that reciprocating movement of the pedal elements will lead to rotation in one direction of the flywheel. The gear to that end comprises two further gears 20, 21. One gear 20 is mounted on the long shaft 22, whilst the other gear is mounted on the short shaft 23. Said gears 20, 21 mesh together.

The operation of the gearbox 9 shown in figure 5 will now be explained in more detail with reference to figures 6a and 6b. Said figures schematically show the directions of rotation of the various parts of the gearbox upon movement to the left (figure 6a) and upon movement to the right (figure 6b). When the pedal elements 2, 3 are moved, the toothed belt 120 will set the connecting elements 18, 19 moving. The connection is such that a movement to the left will lead to a positive rotation (clockwise rotation, indicated by a + sign in the figure) of the left-hand connecting element 18 and the right-hand connecting element 19. A movement to the right of the toothed belt 120 will lead to a negative rotation (anti-clockwise rotation, indicated by a - sign in the figure).

Upon positive rotation of the left-hand connecting element 19, said connecting element will engage the long shaft, as a result of which also the flywheel 24 is directly driven. Upon positive rotation of the right-hand connecting element 19, the freewheel bearing will come into operation. As a result, the right-hand connecting element 18 cannot engage the short shaft.

Upon negative rotation of the left-hand connecting element 19 (figure 6b), the freewheel bearing will come into operation and the connecting element 19 can no longer engage the long shaft. Upon negative rotation of the right-hand connecting element 18, on the other hand, said connecting element will actually engage the short shaft and drive the gear 20 mounted on the short shaft. Said gear will rotate in negative direction. The gear 20 engages the gear 21 on the long shaft. As a result, said gear will rotate in a positive direction. Since the long shaft rotates in positive direction, the flywheel 24 will also rotate in positive direction.

Because of the above-described arrangement, the flywheel 24 will be driven in the same direction at all times. Furthermore, the above-described arrangement enables the user to stop the pedal elements at any desired moment. In this way a safe and sound training session can be realised.

In the appended figures and the above description the present invention has been explained merely with reference to a few embodiments. It will be

understood, however, that many variants, which may or may not be obvious to those skilled in the art, are conceivable within the scope of the present invention, which is determined by the appended claims.

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CLAIMS

1. A training device for simulating a skiing motion, which device comprises a frame (1) and which is provided with a substantially elongated left-hand pedal element (2) and a substantially elongated right-hand pedal element (3) disposed substantially parallel thereto, wherein a rear part of the left-hand pedal element (2) and the right-hand pedal element (3), respectively, is provided with a footrest (4) on which a user can place his or her left foot and right foot, respectively, and wherein a front part of the left-hand pedal element (2) is provided with a left-hand pedal shaft (26) extending both at an upper side and at a bottom side of the left-hand pedal element (2), and wherein a front part of the right-hand pedal element (3) is provided with a right-hand pedal shaft (36) extending both at an upper side and at a bottom side of the right-hand pedal element (3), which left-hand pedal shaft (26) and which right-hand pedal shaft (36) are each pivotally connected to the frame (1) both at the upper side and at the bottom side, wherein, seen in the direction from the bottom side to the upper side, the left-hand pedal shaft (26) and the right-hand pedal shaft (36) extend toward the rear part of the left-hand pedal element (2) and the right-hand pedal element (3), respectively, wherein, seen in the direction from the bottom side to the upper side, the left-hand pedal shaft (26) also extends in a direction away from the right-hand pedal element (3), and wherein, seen in the direction from the bottom side to the upper side, the right-hand pedal shaft (36) also extends in a direction away from the left-hand pedal element (2).

2. A training device according to claim 1, wherein the left-hand pedal element (2) and the right-hand pedal element (3) are connected to a flywheel (24) via a transmission mechanism (9).

3. A training device according to claim 2, wherein the transmission mechanism (9) comprises a gearbox which is designed to drive the flywheel (24) (24) in one direction of rotation, independently of the direction of pivoting of the pedal elements.

4. A training device according to claim 3, wherein the training device comprises a toothed belt (120) connected to the left-hand pedal element (2) and to the right-hand pedal element (3), which toothed belt is passed through the gearbox (9) for driving at least one gear (18) of the gearbox during use of the training device.

5. A training device according to claim 4, wherein said at least one

gear (18) is connected to a flywheel shaft of the flywheel (24) by means of a freewheel clutch.

6. A training device according to claim 4 or 5, wherein the left-hand pedal element (2) and the right-hand pedal element are each provided with a belt tensioning device (5, 6) comprising a clamping unit (7, 701) for clamping down the toothed belt therein, which clamping unit (7, 701) is connected to a spring element (15) for keeping the tension on the toothed belt.

7. A training device according to claim 6, wherein the spring element (15) extends substantially in a direction parallel to a clamping surface formed by the clamping unit (7, 701).

8. A training device according to claim 6 or 7, wherein a tension of the spring element (15) can be adjusted by means of an adjustment element such as an adjustment bolt (16), for example.

9. A training device according to one or more of the preceding claims 6-8, wherein the clamping unit (7, 701) comprises two parts (7, 701) which can be placed one on top of the other, at least one of which parts is provided with recesses corresponding to teeth of the toothed belt (120).

10. A training device according to one or more of the preceding claims 2-9, wherein the flywheel (24) is connected to an electromagnetic generator.

11. A training device according to one or more of the preceding claims, wherein the left-hand pedal element (2) and the right-hand pedal element are connected by means of a connecting device (10) that is designed to keep the left-hand pedal element (2) and the right-hand pedal element (3) substantially parallel to each other during use of the training device.

12. A training device according to claim 11, wherein the connecting device (10) comprises a central core element (101) having two ends, wherein a first end is connected to a left-hand connecting unit (11, 12, 13) which is rotatable about three axes and which is also connected to the left-hand pedal element (2), and wherein a second end opposite said first end is connected to a right-hand connecting unit (11, 12, 13) which is rotatable about three axes and which is also connected to the right-hand pedal element.

13. A training device according to one or more of the preceding claims, wherein a rearward angle (α) between a longitudinal axis of the pedal element and the pedal shaft ranges between 60 and 80 degrees, preferably between 65 and 75

degrees.

14. A training device according to one or more of the preceding claims, wherein a lateral angle (β) between a line perpendicular to the surface formed by the upper side of the footrests (4) and the pedal shaft ranges between 5 and 10 degrees, preferably between 7 and 8°.

15. Use of a training device according to one or more of the preceding claims.

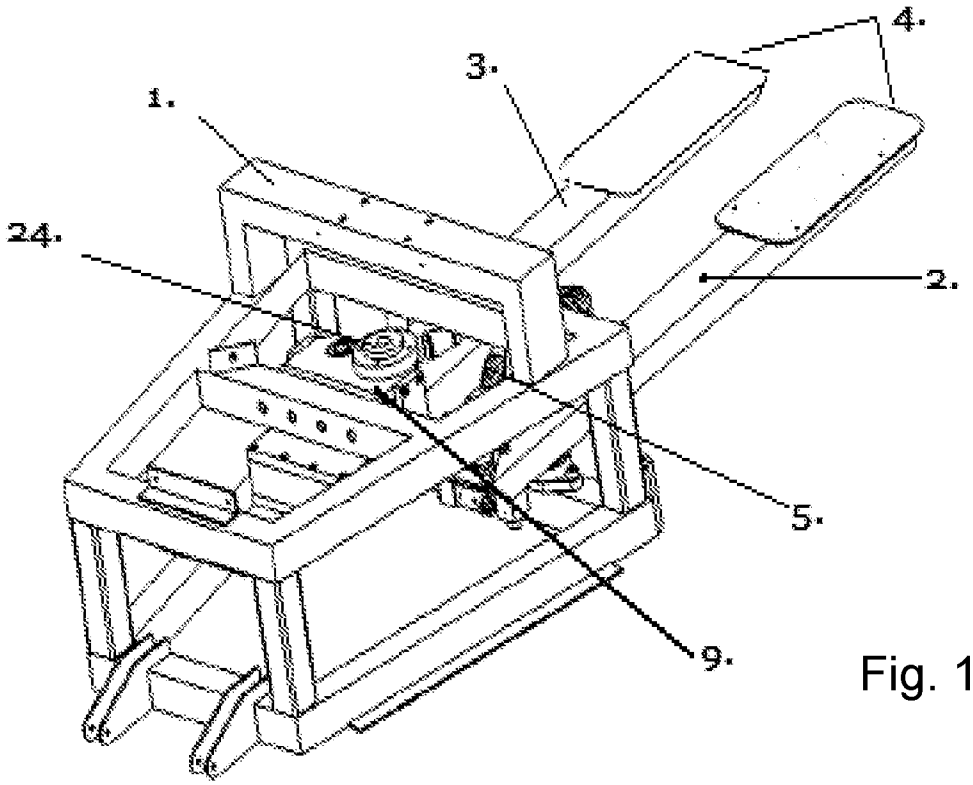

Fig. 1a

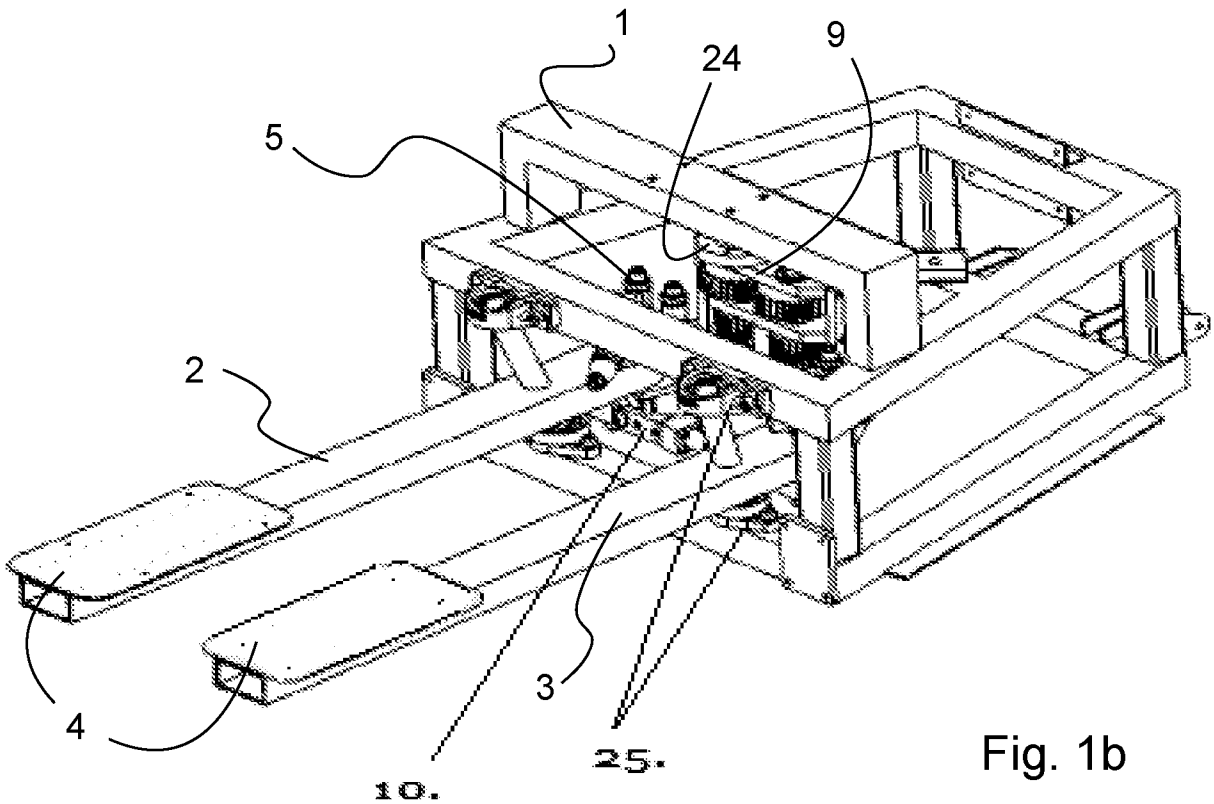

Fig. 1b

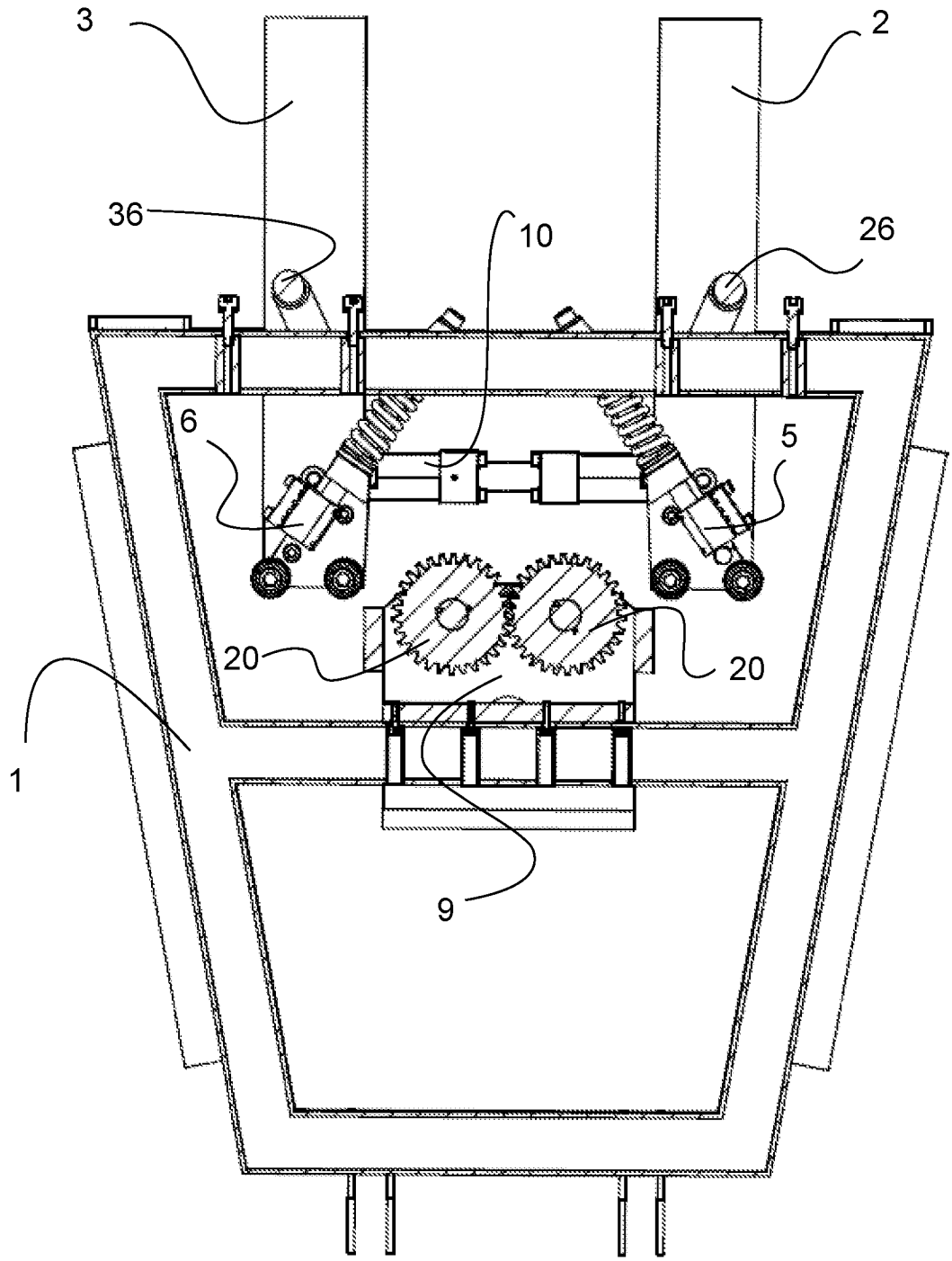

Fig. 1c

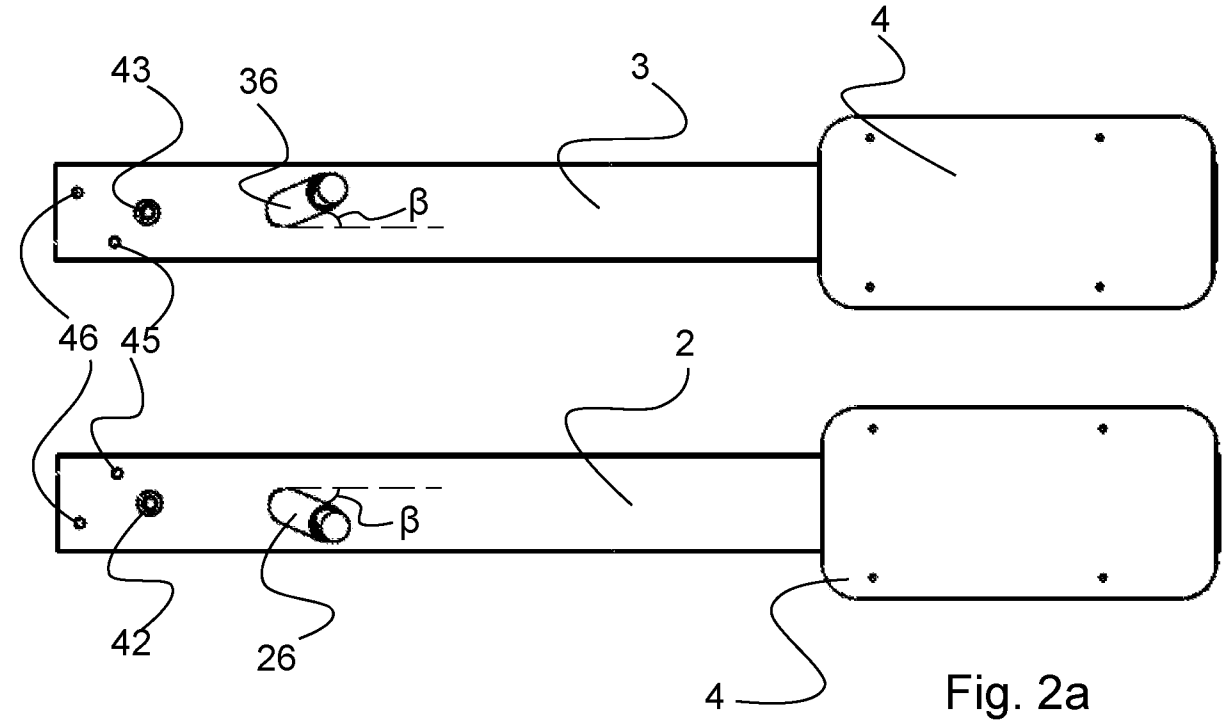

Fig. 2a

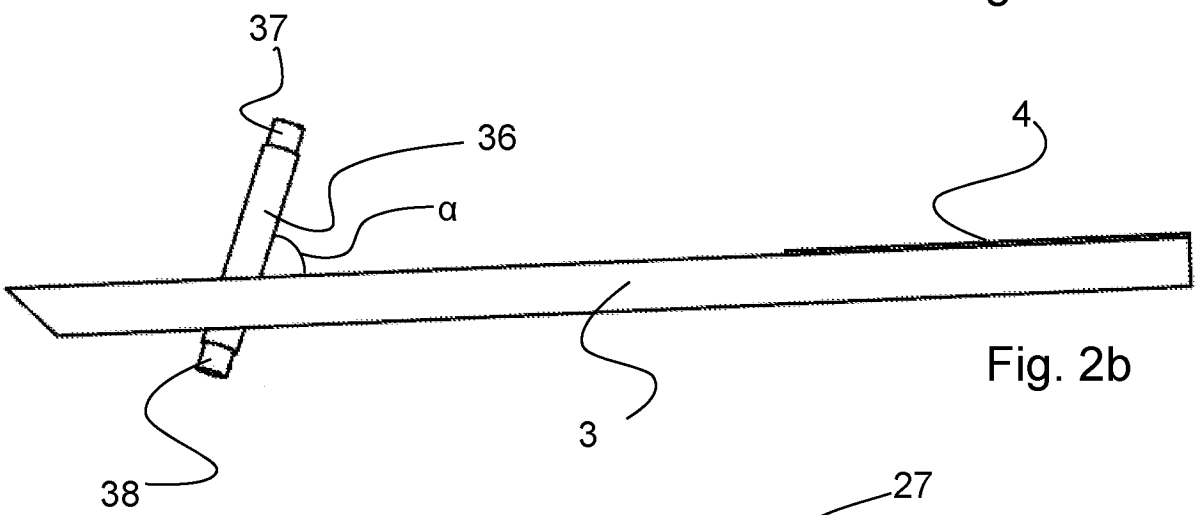

Fig. 2b

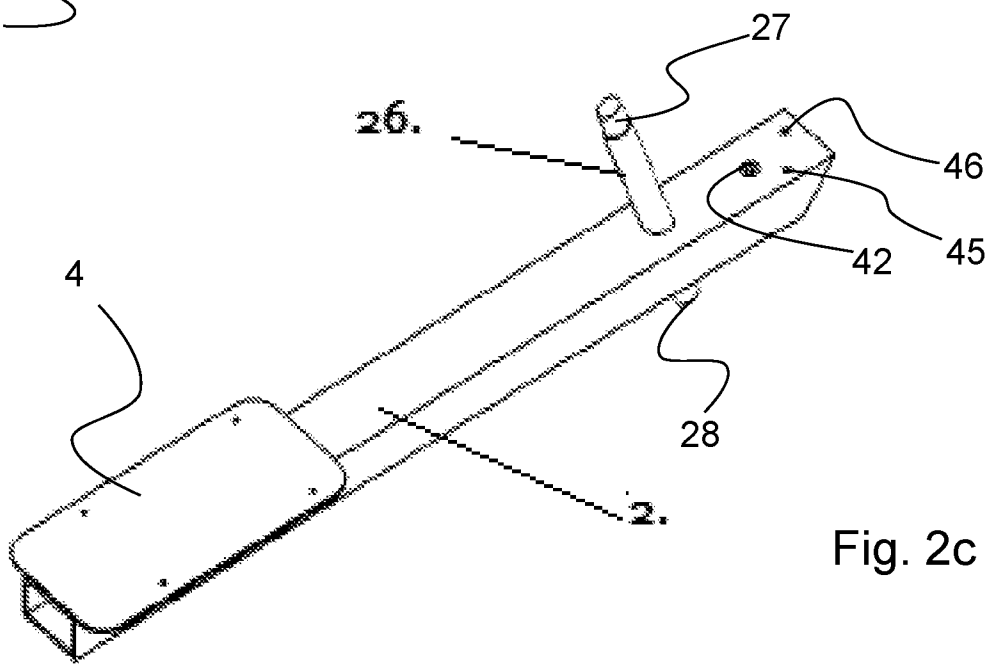

Fig. 2c

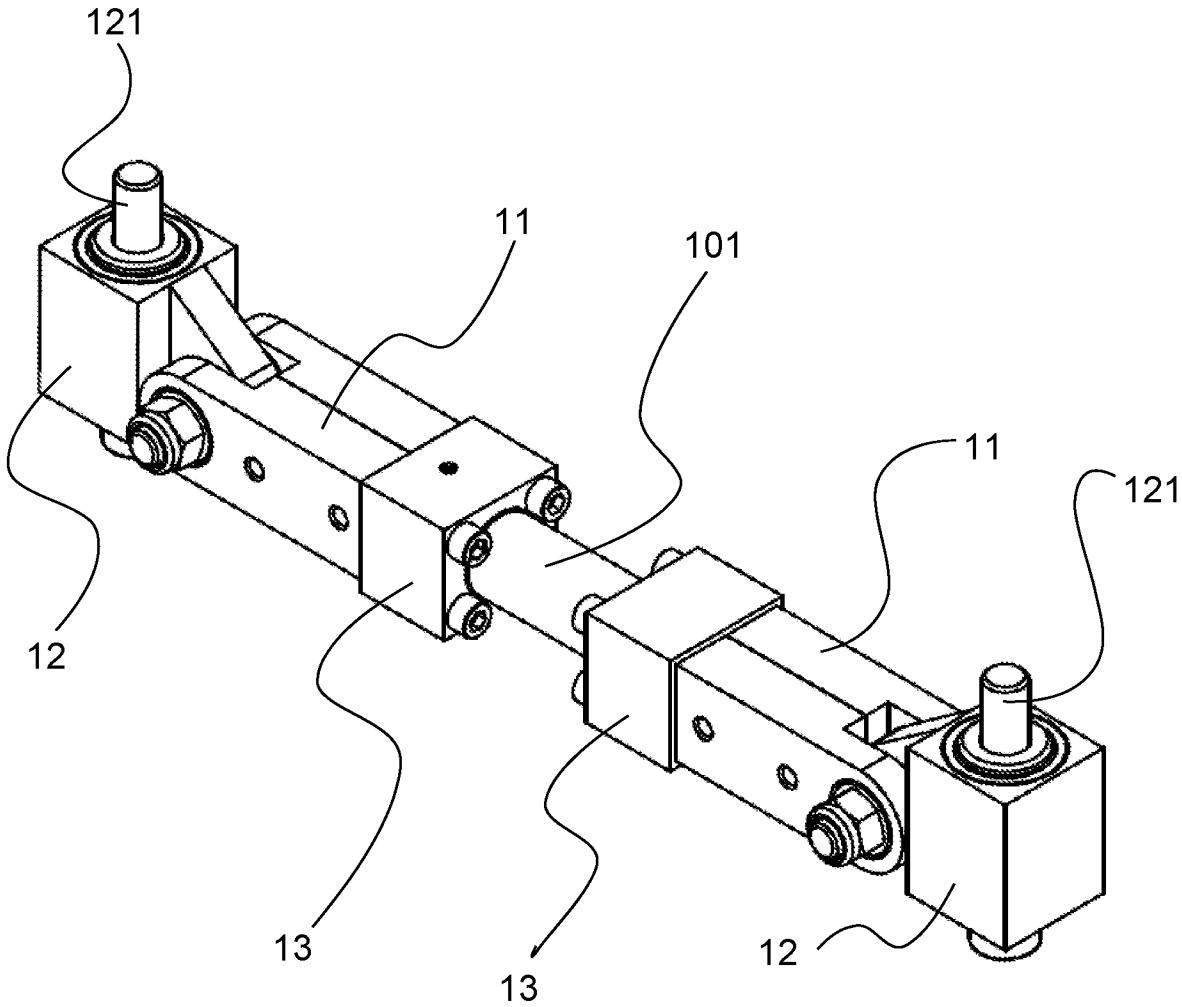

Fig. 3a

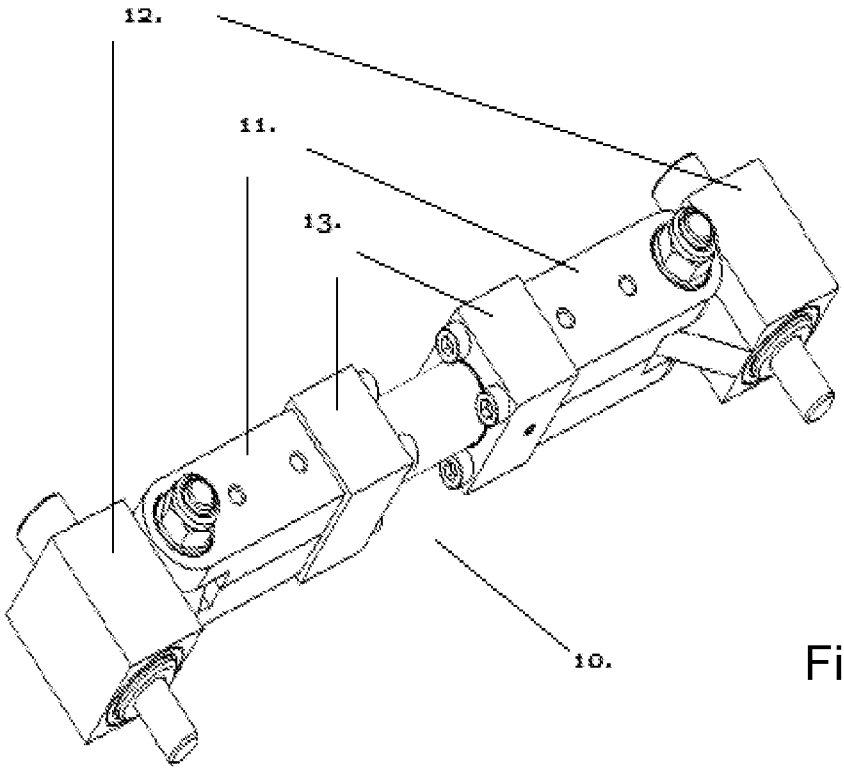

Fig. 3b

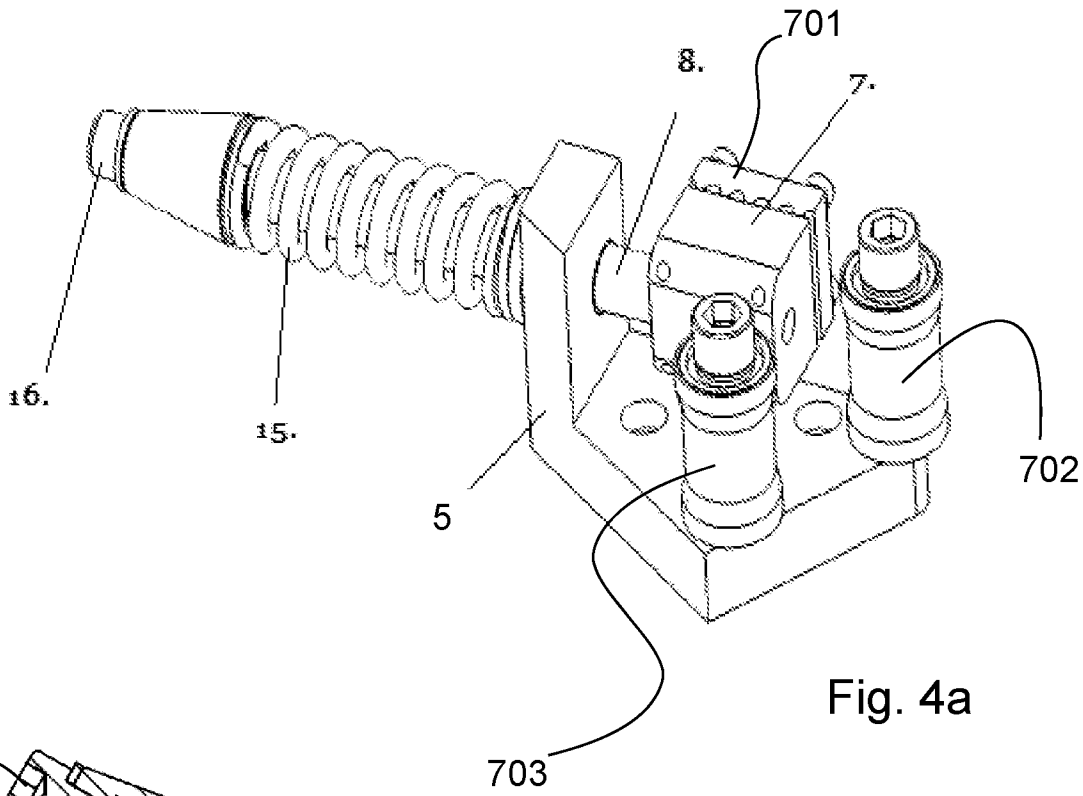

Fig. 4a

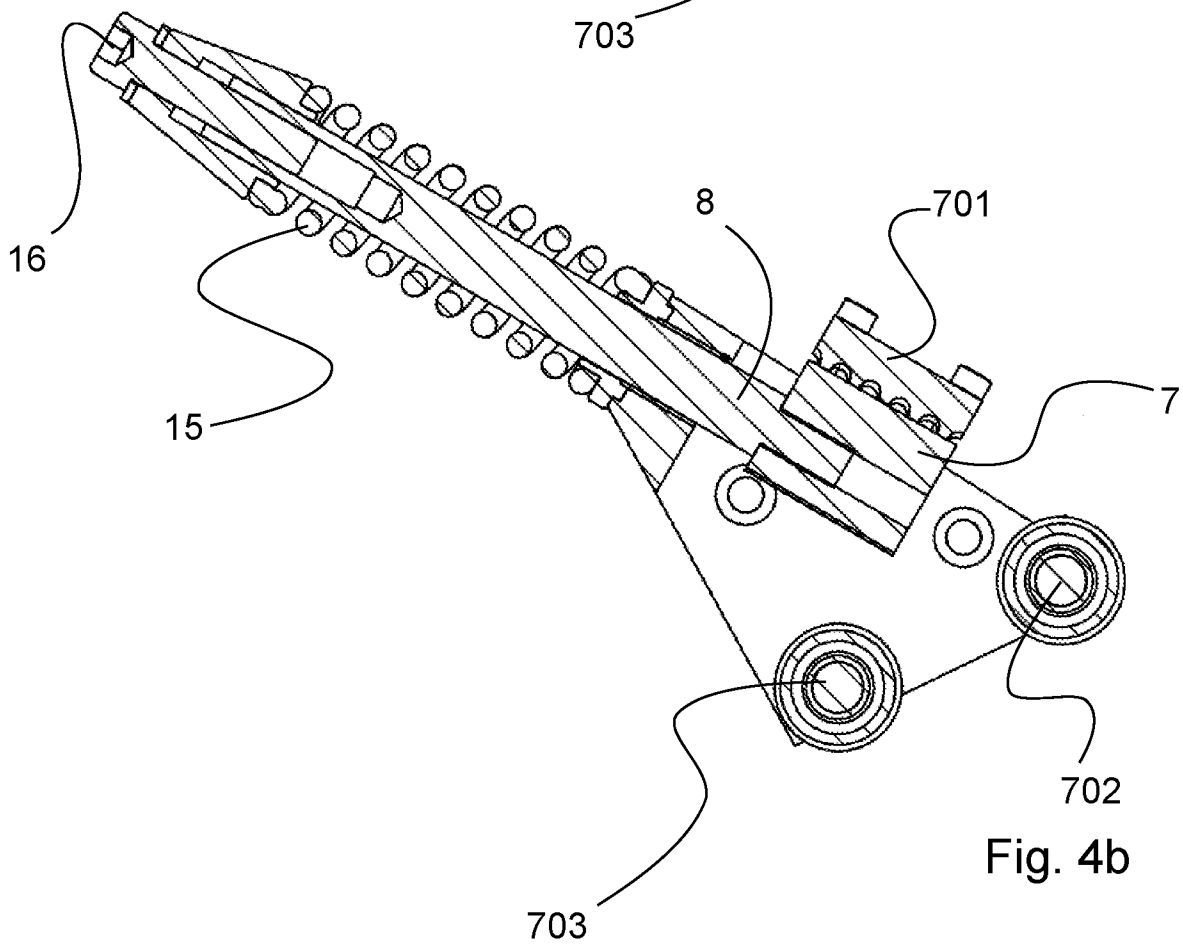

Fig. 4b

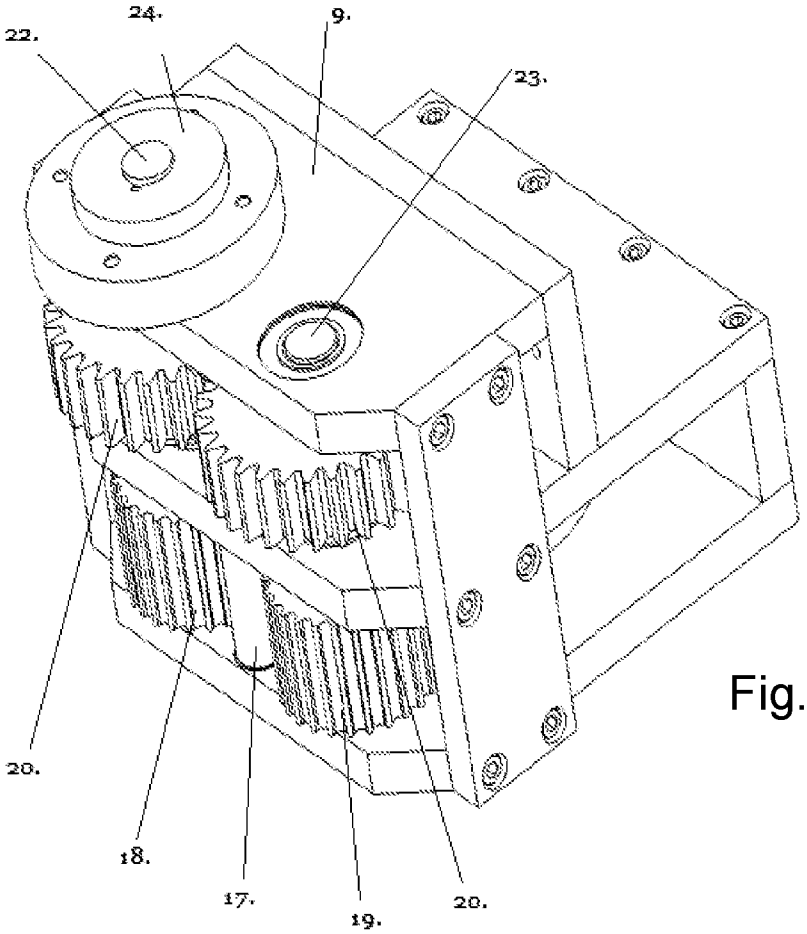

Fig. 5a

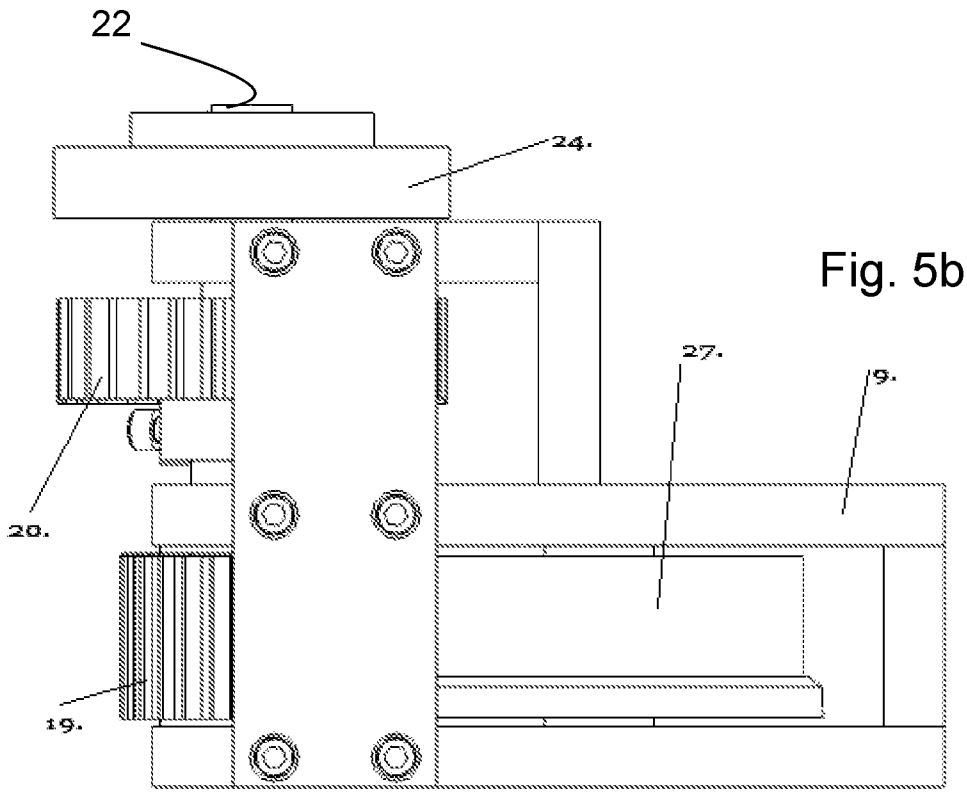

Fig. 5b

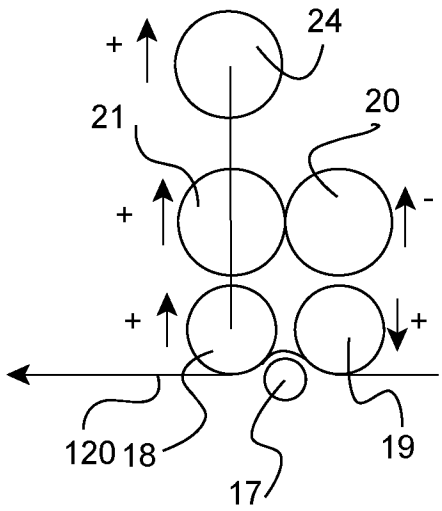

Fig. 6a

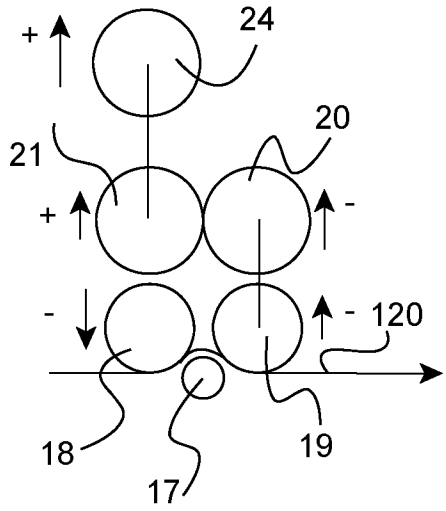

Fig. 6b

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2010/050829

A. CLASSIFICATION OF SUBJECT MATTER
INV. A63B69/18 A63B21/005 A63B23/04 A63B22/00
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 practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 20 2006 015337 U1 (HSIUNG BOB [TW]) 7 December 2006 (2006-12-07) cited in the application abstract; figures 3-16	1-15
A	DE 102 05 483 A1 (PONSTEIN JOACHIM [DE]) 16 October 2003 (2003-10-16) paragraph [0002] - paragraph [0003] paragraph [0024]; figures 1-5	1-5
A	US 3 912 260 A (RICE WALTON M) 14 October 1975 (1975-10-14) column 1, line 50 - column 2, line 17; figures 1,2,4,5,16-22	1-15
A	US 5 284 460 A (MILLER KENNETH [US] ET AL) 8 February 1994 (1994-02-08) column 1, line 43 - line 53; figures 1-2a	1-5

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
1 April 2011	13/04/2011

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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