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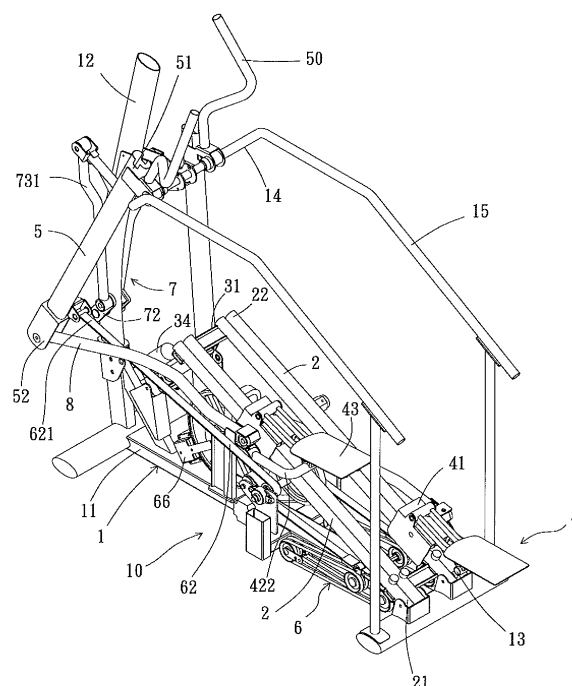
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(54) **Exercise Machine Provided with a Footplate Device**

(57) An exercise machine with a footplate device comprises a support, two lead rails, two footplates sliding to be arranged on the two lead rails, and two swinging arms. First and second shafts are on the support. The first terminal of each lead rail is connected to the first shaft, while the second terminal, an upper end of a supporting part. The upper end of swinging arm is connected to the second shaft, the lower end being combined with a corresponding footplate device through at least one connecting rod, each swinging arm being connected to a blocking device to resist the swinging arm when moving and combined with a crank of a crank mechanism, thus the two footplate device in turn moving forwards and downwards on each corresponding lead rail, the upper end of each swinging arm being connected to a handle knob.



**FIG. 1**

## Description

**[0001]** This invention relates to an exercise machine provided with a footplate device and to a footplate device used for the exercise machine, and particularly to an exercise machine for hands and feet and a footplate for a user to stand and glide.

**[0002]** Although conventional exercise fitness devices are different in their structure, there are many exercise machines for physical trainings of leg muscle and arm muscle. The exercise machine on the whole comprises a pair of lead rails, a footplate device that may straightly glide on the lead rail, a crank mechanism that makes the footplate devices shift in turn forwards and backwards on the lead rail, and a blocking device that provide the pair of footplate devices with a blocking setting during glide. When a user stands on the footplates of the pair of footplate devices by foot and exerts his or her strength to repeatedly glide on the footplate devices or operate two handle knobs with two hands for physical training of leg muscle and/or arm muscle.

**[0003]** The lead rail of the conventional exercise machine provided for physical training of feet and hands incline upwards from a ground surface. If an angle of upward inclination varies, the angle of inclination of the footplate on the lead rail is generally made to vary significantly. Thus, the stability of footplate is poor and the user does not feel good when standing on the footplate that is inclined much more and even gets injured easily. Further, the structure of conventional fitness device for the physical training of feet and arm is complicated.

**[0004]** Consequently, because of the technical defects of described above, the applicant keeps on carving unflaggingly through wholehearted experience and research to develop the present invention, which can effectively improve the defects described above.

**[0005]** This invention is to provide an exercise machine provided with a footplate device, and a footplate device used for the exercise machine. The exercise machine may be provided for a user to exercise for feet and hands and is simple in its structure. Besides, an angle of inclination of the footplate of footplate device of the exercise machine does not significantly vary because an angle of a lead rail vary, and may make a user comfortable when standing to glide and prevent him or her from being injured.

**[0006]** In order to further know the features and technical means of this invention, refer to the detailed description below according to this invention accompanied with drawings; however, the accompanied drawings are provided for reference and illustration only and are not limited to this invention.

Fig. 1 is a 3D view of an exercise machine in an embodiment of this invention;

Fig. 2 is a side view of figure 1, illustrating two hand knobs that may move back and forth and two footplate devices that may in turn glide and shift up and

down.

Fig. 3 is a schematic view illustrating a lead rail, shown in figure 2, of which an angle of inclination is adjusted upwards, and illustrating a status of removal of one lead rail and one footplate device.

Fig. 4 is a side view of the lead rail of figure 2 that is upwards adjusted for an angle of inclination and illustrates the two handle knobs and two footplate devices that in turn move.

Fig. 5 is 3D view of the partial footplate device of figure 1 that is on the lead rail;

Fig. 6 is a cross-sectional view of figure 5; and

Fig. 7 is a longitudinally sectional view of figure 5.

**[0007]** With reference to figures 1 and 2 illustrating an exercise machine 10 in an embodiment of this invention, the exercise machine 10 comprises a support 1, two lead rails 2 separate from each other, a supporting part 3, two footplate devices 4, two arms 5 separate from each other, a blocking device 6, and a crank mechanism 7.

**[0008]** The support 1 comprises a base 11, an upright rod 12 arranged at a front end of the base 11, at least one first shaft 13 arranged at a back end of the base 11, and a second shaft 14 arranged above the base 11. In the embodiment, the two first shafts 13 separate from each other are arranged at the back end of base 11. However, the two first shafts 13 may alternatively be combined into one shaft, the second shaft 14 is connected to a top end of the upright rod 12, and from backsides of the two ends of the second shaft 14, and an armrest 15 stretches separately to support a user.

**[0009]** Each lead rail 2 is provided with a first terminal 21 (at a lower site) and a second terminal 22 (at an upper site), in which the first terminal 21 is connected to the first shaft 13. In the embodiment, the first terminal 21 may turn around to connect to the first shaft 13, and each lead rail 2 may be assembled with two round tubes that are combined together.

**[0010]** The supporting part 3 is arranged on the support 1, and at the top end of the part, a connection portion 31 is provided for the second terminal 22 of each lead rail 2 to connect to so that the two lead rails 2 may be supported and clamped by the supporting part 3 and thus may be inclined upwards from the ground. In the embodiment, the supporting part 3 is a flexible screw tool provided with an outer tube 32 fixed onto the support 1, an inner bar 33 flexible and movable in the outer tube 32, and a motor 34 that may move the inner tube 33 for adjustment of an extension degree. At a top of the inner tube 33, a frame strip is provided allowing the second terminal 22 of the lead rail to connect to, which is used as the connection portion 31. When the inner bar 33 is adjusted corresponding to the extension degree of the outer tube 32, the lead rail 22 turns around the first shaft 13 for adjustment of the angle of inclination upward from the ground, as shown in figure 3.

**[0011]** Each footplate device 4 may be arranged on a corresponding lead rail 2 in a glide state. With reference

to figures 5 through 7, the footplate device 4 comprises a footplate mount 41 combined into the lead rail 2, a footplate supporting mechanism 42 connected to the footplate mount 41, and a footplate 43 on which the user may step. The footplate mount 41 is provided with several pulleys 412 that may slide on the lead rail 2, and a rod 413 passing through the seat plate and being located at a bottom of the lead rail 2 so that each footplate mount 41 may smoothly slide up and down on each corresponding lead rail 2.

**[0012]** The supporting mechanism 42 comprises an upper knighthead 421 and a lower knighthead 422, in which the knighthead 421 is provided with a first terminal 423 pivoted to the footplate mount 41 with an axis pin 420, and a second terminal 424 stretching out of the footplate mount 41. In the embodiment, the footplate 43 is arranged on a top face near the second terminal 424. Further, the second terminal 424 stretching out of the footplate mount 41 is correspondingly inclined from the first terminal 423 at an angle of which a range is defined for the footplate 43 to be approximately horizontal to the ground, allowing the user to step on the footplate 43 by foot. The lower knighthead 422 is provided with an inner end 426 and pivoted to the upper knighthead 421 with an axis pin 427. In the embodiment, the lower knighthead 422 is slightly bent.

**[0013]** Each swinging arm 5 is provided with a picot casing that may round in an upper end 51 and a lower end 52 of the second shaft 14. The lower end of swinging arm 52 is connected to a connecting rod 8 between the axis pin 520 and the corresponding footplate mount 41. At the other end of the connecting rod 8, an end seat 81 is provided and pivoted, with the axis pin 82, at a side of the footplate mount 41 so that the swinging arm 5 that swings and the footplate device 4 that slide on the lead rail 2 may link to work with each other; namely, each swinging arm 5, when swinging around the second shaft 14 as an axis, drives the corresponding footplate device 4 to slide on the lead rail 2. A handle knob 50 is connected to the top end of each swinging arm 5 for the user to swing the swinging arm 5 with a hand exerting his or her strength. A wing rod 83 stretches from the connecting rod near an end mount 81 and is pivoted with the axis pin 84 to an outer terminal 425 of the lower knighthead.

**[0014]** Each blocking device 6 comprises a flywheel 61 provided on the support, and a timing belt driving the flywheel 61 to rotate. The flywheel 61 may resist the swinging arm 5 that is moving and the timing belt 62 is provided with a pair of swinging arms 5 corresponding to each other that are separately connected to a first terminal 621 and a second terminal 622, in which the second terminal 622 rounds a coaxial wheel gear (not shown) of the flywheel 61 and connects to an elastic device 63. In the embodiment, the elastic device 63 is an elastic cordage to provide the swinging arm 5 with a recovery elasticity. The elastic cordage may round to connect its end and fix it to the machine body by using a plurality of idlers. The flywheel 61 connects to a weight wheel by using a

belt 64, and a solenoid brake 66 is provided at a rim of the weight wheel 65 to adjust the resistance against the flywheel 61.

**[0015]** The crank mechanism 7 is provided with a crankshaft 71 that may turn to be arranged on the upright rod 12 of the support 1, two cranks 72 that lies at two sides of the crankshaft 71, and a linkwork 73 connected to each crank. In the embodiment, each linkwork 73 comprises a first connecting rod 731 pivoted to the corresponding crank 72, and a second connecting rod 732 connected to the corresponding swinging arm 5. The two cranks 72 are respectively arranged above and below two sides of the upright rod 12, so the cranks 72 that runs in turn drives the swinging arm 5 to swing and then drives the two footplate devices 4 to slide up and down in turn on each lead rail 2.

**[0016]** The operation of exercise machine 10 according to this invention is describe in figures 2 and 4; when using the machine, the user (not shown) may stand on two feet on the footplates 43 to drive the footplate mount 41 to slide and may operate the two handle knobs 50 with two hands. When exerting his or her strength to overcome the resistance applied by flywheel 61, the user may pull the swinging arm 5 to repeatedly swing and glide the pair of footplate devices 4 forward and downward, thereby driving the devices 4 to move to and fro and up and down. In figure 4, after the positions of the two handle knobs 50 of figure 2 exchange with each other, the footplate device 4 at a right side of figure 2 moves from a lower site to a higher site on the lead rail 2, and the footplate device 4 at a left side of figure 2 move from a higher site to a lower site on the lead rail 2. The footplate device 4 when being gliding may use the elastic device 63 to provide the recovery elasticity for a preferred reciprocating motion rhythm.

**[0017]** With reference to figure 3, an effect given from the footplate device 4 according to this invention is apparent. The supporting part 3 is used to make the angle of inclination of the lead rail 2 vary, and as shown in figure 3, when the lower level of the second terminal 22 of each lead rail 2 that is shown in figure 2 is adjusted to the higher level shown in figure 4, the footplate 43 on the footplate device 4 according to this invention does not significantly vary because the angle of inclination of the lead rail 2 vary; namely, through the upper knighthead 421 and lower knighthead 422 of the supporting mechanism 42 that shifts with the lead rail 2 of which the angle varies, the footplate 43 on the footplate device 4 may keep approximately horizontal to the ground on the lead rail 2 of which the inclination angle varies, thereby being convenient for the user to step and glide.

**[0018]** The structure of exercise machine according to this invention is quite simplified and may be provided for the physical trainings of leg muscle and arm muscle. Further, The angle of inclination of the footplate of footplate device 4 of the exercise machine does not significantly vary because an angle of a lead rail vary, making the user comfortable when standing to glide and preventing

him or her from being injured, thereby the effect given from the expected design of this invention being achieved.

## Claims

1. An exercise machine provided with a footplate device, comprising a support on which a first shaft and a second shaft are provided;  
two lead rails separate from each other, each of which is provided with a first terminal and a second terminal that are connected to the first shaft, the second terminal being connected to an upper end of a supporting part for fixing, making the lead rail to be upward inclined from the ground;  
two footplate devices, each of which is arranged on a corresponding lead rail in a glide state and is provided with a footplate on which a user may step;  
two swinging arms, each of which is provided with an upper end and a lower end that may turn to connect to the second shaft, at least one connecting rod being provided between the lower end of each swinging arm and a corresponding footplate device so that the pair of swinging arms may link with the pair of footplate devices for operation, one handle knob being connected to the upper end of each swinging arm for the user to operate with hands;  
two blocking devices, each of which is connected to a corresponding swinging arm, applying a resistance to the two swinging arms when moving; and  
a crank mechanism provided with a crankshaft arranged on the support and with two cranks at two sides of the crankshaft, each crank being connected to a corresponding swinging arm so that the two footplate devices may in turn move forwards and backwards on each corresponding lead rail.
2. The exercise machine provided with the footplate device according to claim 1, wherein the support comprises a base and an upright rod arranged at a front end of the base, the second shaft is connected to a nearby top end of the upright rod, and from back-sides of the two ends of the second shaft, an armrest stretches separately to support the user.
3. The exercise machine provided with the footplate device according to claim 1, wherein the supporting part is a flexible screw tool and the lead rail may turn around to connect to the first shaft for adjustment of an angle of inclination upward from the ground.
4. The exercise machine provided with the footplate device according to claim 1, wherein the footplate device and the connecting rod are provided with at least 3 movable axial point so that the footplate on the footplate device may still keep preferably horizontal in operation when the angle of inclination of

the footplate device varies with the lead rail, making the user more comfortable when stepping and preventing the user's legs from being injured.

5. The exercise machine provided with the footplate device according to claim 1, wherein the footplate device comprises a footplate mount combined into the lead rail, a footplate supporting mechanism connected to the footplate mount, and a footplate on which the user may step, the supporting mechanism comprising an upper knighthood and a lower knighthood, the knighthood being provided with a first terminal pivoted to the footplate mount with an axis pin and with a second terminal stretching out of the footplate mount, the lower knighthood being provided with an inner terminal pivoted onto the upper knighthood with the axis pin and with an outer terminal pivoted onto the connecting rod with the axis pin, the footplate being arranged on a top face at the second terminal of upper knighthood.
6. The exercise machine provided with the footplate device according to claim 1, wherein one end of the connecting rod is pivoted to the lower end of swinging arm with the axis pin, and the other end of connecting rod is provided with a frame seat pivoted to a side of the footplate mount with the other axis pin so that the connecting rod, the swinging arm, the footplate device may link together.
7. The exercise machine provided with the footplate device according to claim 1, wherein a wing rod stretches from the frame seat of the connecting rod and is pivoted with the axis pin to an outer terminal of the lower knighthood, and with the axis pin, the axis pin pivoting from the upper knighthood to the footplate mount, and the axis pin pivoting from the upper knighthood to the lower knighthood, three movable axial point may be formed together so that the footplate on the upper knighthood may still keep preferably horizontal in operation when the angle of inclination of the footplate mount varies with the lead rail varying, making the user more comfortable when stepping and preventing the user's legs from being injured.
8. The exercise machine provided with the footplate device according to claim 7, wherein the second terminal of upper knighthood that is used to mount the footplate mount is corresponding to the first terminal inclined at an angle of which a range is defined for the footplate to be approximately horizontal to the ground.
9. The exercise machine provided with the footplate device according to claim 1, wherein each blocking device comprises a flywheel provided on the support, and a timing belt driving the flywheel to rotate, and

the timing belt is provided with a first terminal and a second terminal that are corresponding to the swinging arms, the second terminal rounding the flywheel and being connected to an elastic device providing the swinging arm with a recovery elasticity.

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10. The exercise machine provided with the footplate device according to claim 1, wherein the crank of the crank mechanism links with the swinging arm through a connecting rod comprising a first connecting rod pivoted to the crank, and a second connecting rod connected to the swinging arm.

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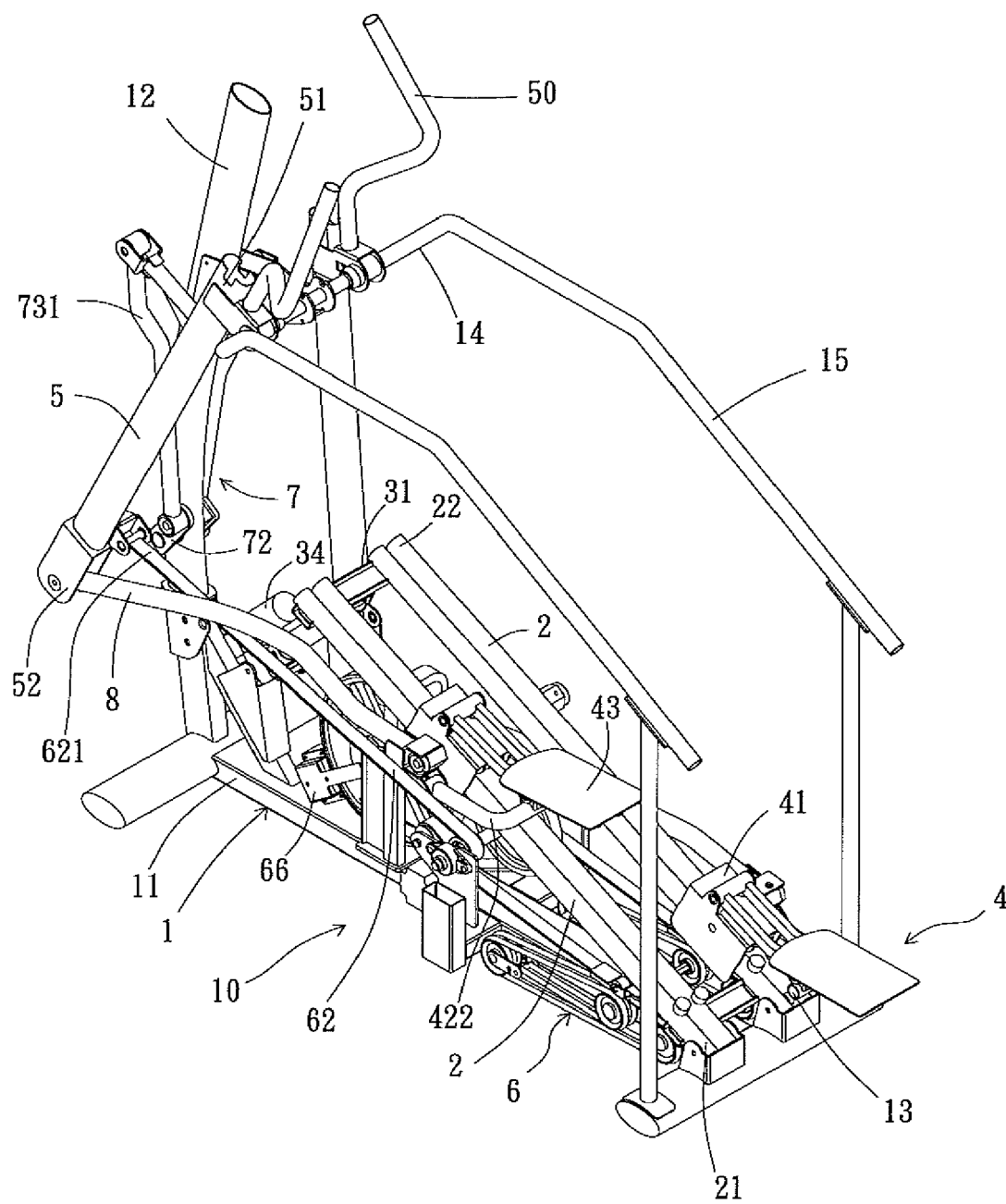


FIG. 1

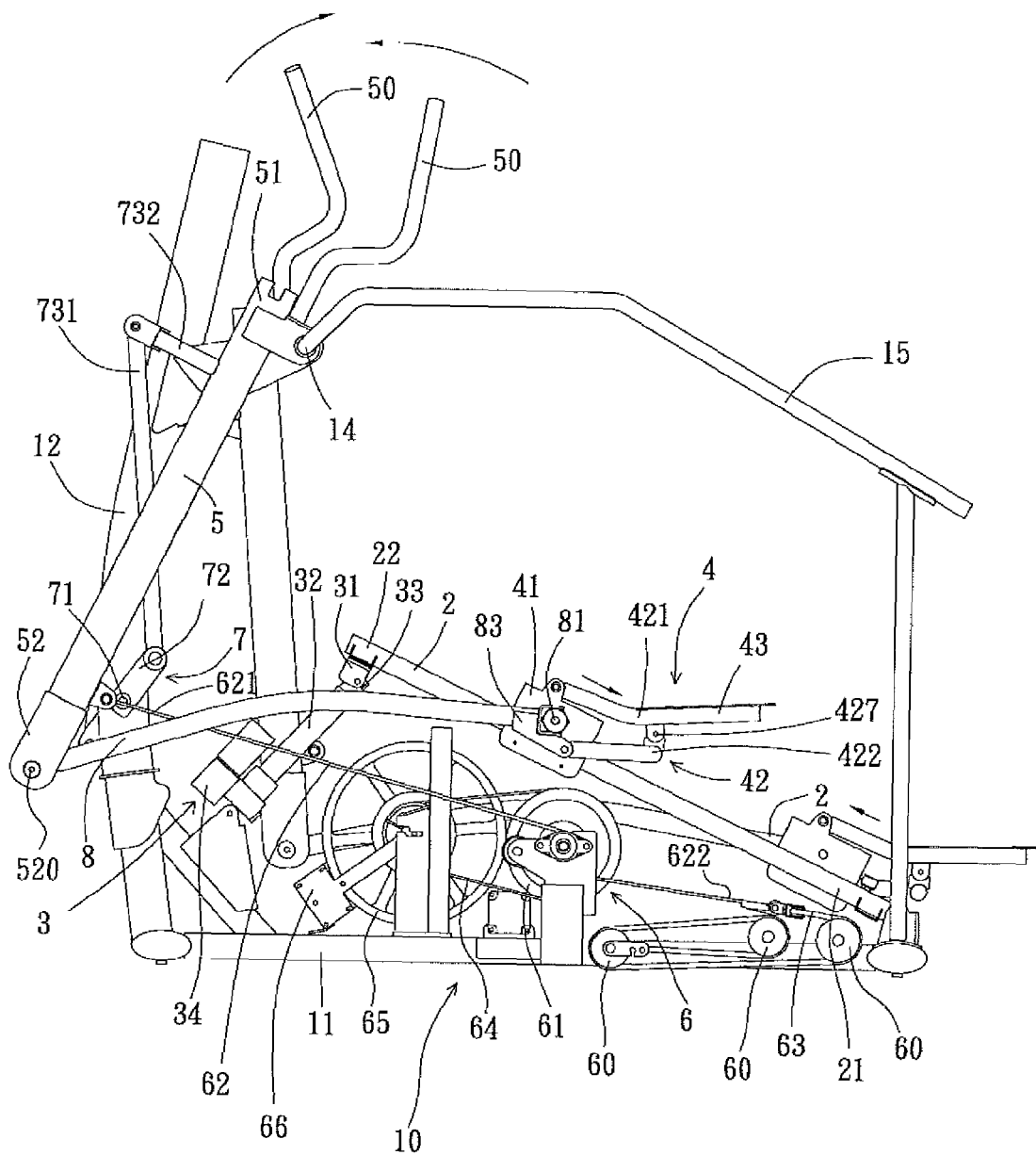
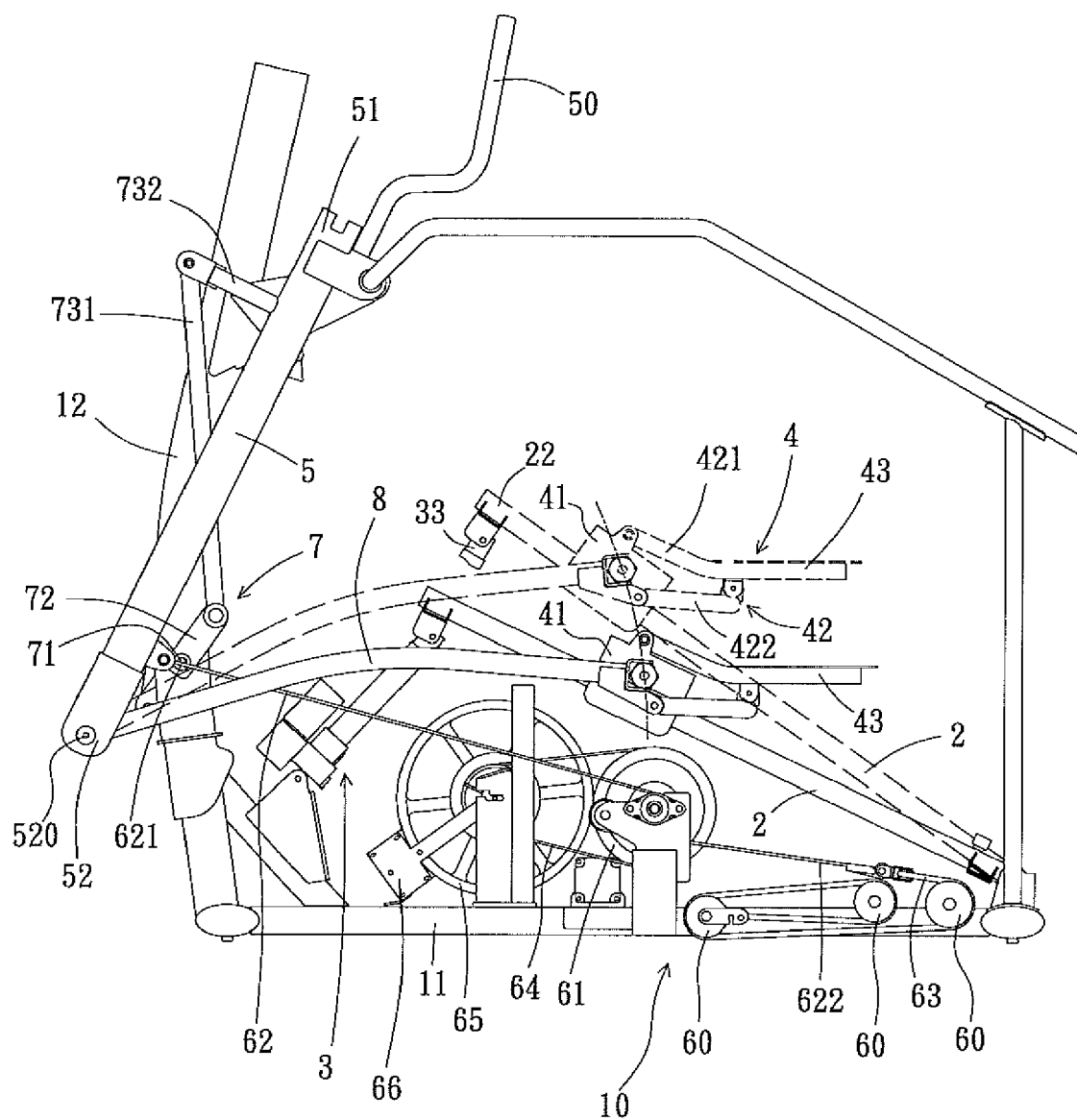
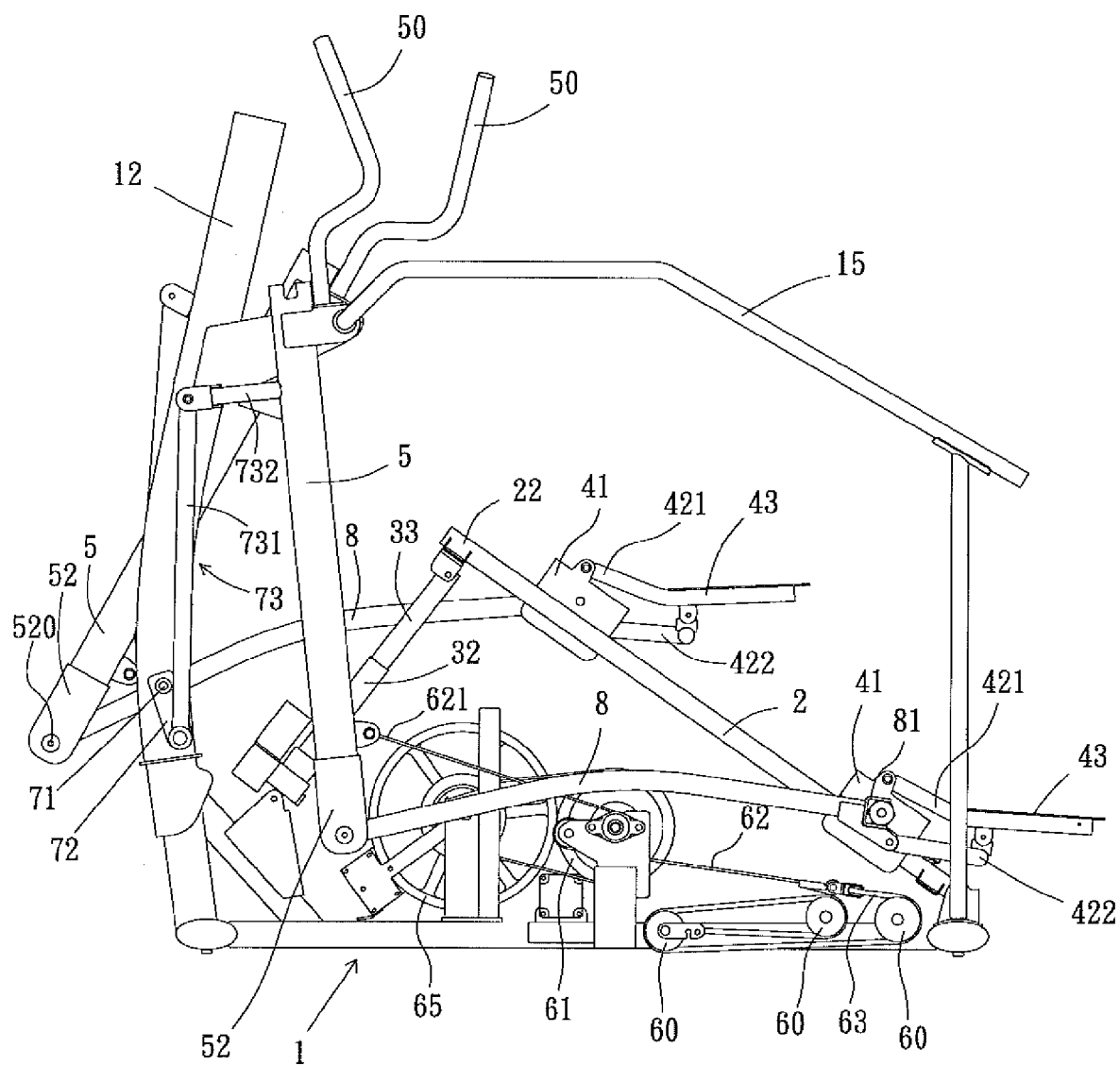


FIG. 2



F I G. 3





F I G. 4

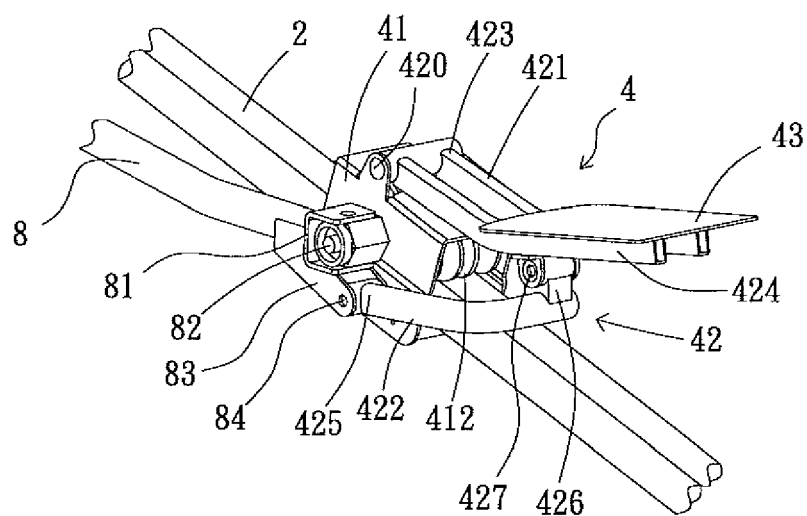


FIG. 5

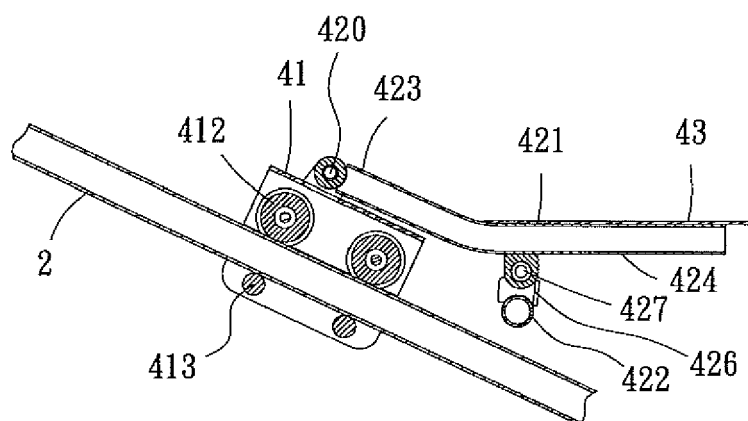
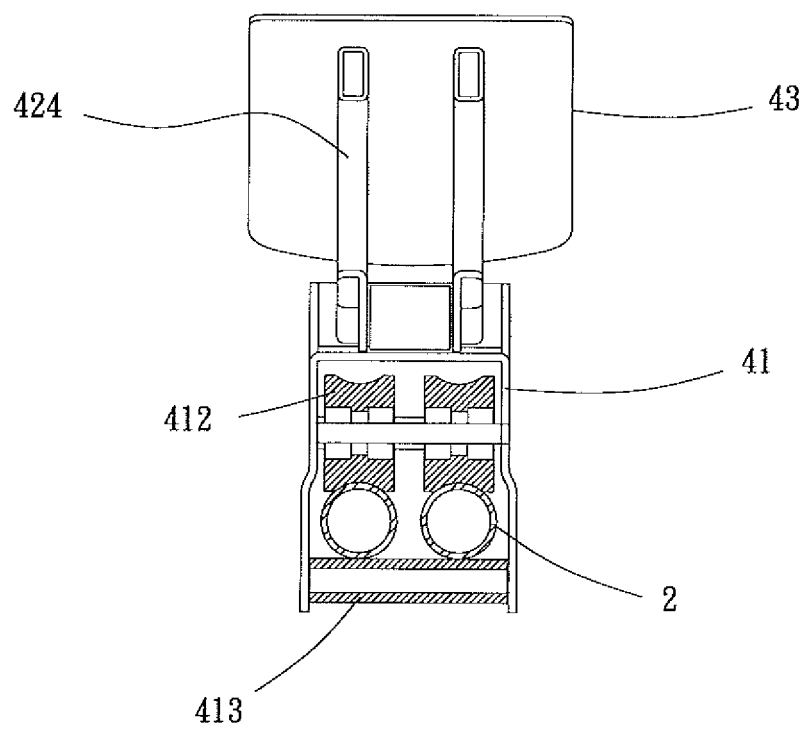


FIG. 6



F I G. 7



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 07 12 2653

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	----- EP 1 834 674 A (BRUNSWICK CORP [US]) 19 September 2007 (2007-09-19) * paragraph [0004] - paragraph [0036]; figures 1-13 *	1,2,6,9	
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 March 2008	Examiner Oelschläger, Holger
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 07 12 2653

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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