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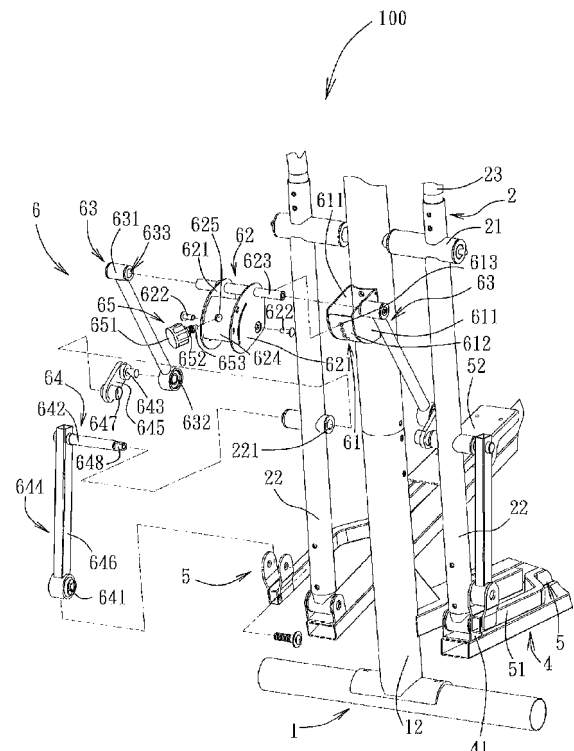
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10785 Berlin (DE)**(54) **Elliptical exercise machine with adjustable stride**

(57) An elliptical exercise machine (100) includes two swing rods (2) connected pivotally to a base (1), a flywheel (3), two supporting rods (4) connected pivotally between the flywheel (3) and the swing rods (2), two pedal rods (5) slidable respectively on the supporting rods (4), and a motion transmitting device (6). The device (6) includes a fixed member (61) fixed on the base (1), a rotatable member (62) locked releaseably on the fixed member (61) at a selected angular position, two cranks (63) connected pivotally to the rotatable member (62), and two links (64) each having a first pivot portion (641) connected pivotally to the corresponding pedal rod (5), a second pivot portion (642) connected pivotally to the corresponding swing rod (2), and a third pivot portion (643) connected pivotally to the corresponding crank (63). The links (64) are driven by the cranks (63) to move the pedal rods (5) forwardly and rearwardly on the supporting rods (4), respectively.

**FIG. 3****EP 2 431 077 A2**

Description

[0001] This invention relates to an exercise apparatus, and more particularly to an elliptical exercise machine with adjustable stride.

[0002] Various stride adjustable elliptical exerciser machines have been proposed to meet the consumer's needs. For example, Taiwanese patent Number M286688 discloses an elliptical exerciser machine including a threaded rod and a threaded sleeve that engages the threaded rod. Relative rotation between the threaded rod and the threaded sleeve results in a change in a maximum distance between two pedals. Such a stride-adjusting arrangement, however, is complicated in structure, and is difficult to adjust.

[0003] The object of this invention is to provide a stride adjustable elliptical exercise machine that has a simple structure and that is easy to adjust.

[0004] Accordingly, an elliptical exercise machine of this invention includes two swing rods connected pivotally to a base, a flywheel, two supporting rods connected pivotally between the flywheel and the swing rods, two pedal rods slidable respectively on the supporting rods, and a motion transmitting device. The device includes a fixed member fixed on the base, a rotatable member locked releaseably on the fixed member at a selected angular position, two cranks connected pivotally to the rotatable member, and two links each having a first pivot portion connected pivotally to the corresponding pedal rod, a second pivot portion connected pivotally to the corresponding swing rod, and a third pivot portion connected pivotally to the corresponding crank. The links are driven by the cranks to move the pedal rods forwardly and rearwardly on the supporting rods, respectively.

[0005] These and other features and advantages of this invention will become apparent in the following detailed description of a preferred embodiment of this invention, with reference to the accompanying drawings, in which:

Fig. 1 is a front perspective view of the preferred embodiment of a stride adjustable elliptical exercise machine according to this invention;

Fig. 2 is a rear perspective view of the preferred embodiment;

Fig. 3 is a partly exploded perspective view of the preferred embodiment;

Fig. 4 is a fragmentary schematic view of a link of the preferred embodiment;

Fig. 5 is a schematic side view of a fixed member, a rotatable member, and a locking member of the preferred embodiment, illustrating that the rotatable member is disposed at a first angular position;

Figs. 6 and 7 are side views of the preferred embodiment, illustrating respectively maximum and minimum distances between centers of a sliding wheel and a flywheel when the rotatable member is disposed at the first angular position;

Fig. 8 is a schematic side view of the fixed member, the rotatable member, and the locking member of the preferred embodiment, illustrating that the rotatable member is disposed at a second angular position; and

Figs. 9 and 10 are side views of the preferred embodiment, illustrating respectively maximum and minimum distances between centers of a sliding wheel and a flywheel when the rotatable member is disposed at the second angular position.

[0006] Referring to Figs. 1 and 2, the preferred embodiment of a stride adjustable elliptical exercise machine 100 according to this invention includes a base 1, two swing rods 2, a flywheel 3, two supporting rods 4, two pedal rods 5, and a motion transmitting device 6.

[0007] With further reference to Fig. 3, the base 1 is disposed on a supporting surface, such as the ground surface, and includes a main body 11, and two posts 12 disposed fixedly on a front end of the main body 11. The swing rods 2 are connected pivotally to the base 11, and are spaced apart from each other in a left-to-right direction. Each of the swing rods 2 includes a horizontal pivot rod portion 21 connected rotatably on the post 12, an upright rod portion 22 extending perpendicularly from and disposed under the horizontal pivot rod portion 21, and a grip portion 23 extending from and disposed above the horizontal pivot rod portion 21 and aligned with the upright rod portion 22. As such, the grip portions 23 can be operated to pivot the upright rod portions 22 forwardly and rearwardly about the horizontal pivot rod portions 21.

[0008] The flywheel 3 is disposed rotatably on a rear end portion of the base 11. Each of the supporting rods 4 is straight, and has a front end 41 connected pivotally to a bottom end of the upright rod portion 22 of the corresponding swing rod 2, and a rear end 42 is slightly higher than the front end 41 and connected pivotally to the flywheel 3. The rear ends 42 of the two supporting rods 4 are connected respectively and pivotally to two opposite sides of the flywheel 3. The pedal rods 5 are disposed respectively on top surfaces of the supporting rods 4 for permitting the feet of the user to step thereon such that, when the flywheel 3 is rotated, each of the feet is moved in an elliptical path of motion simulating natural walking or running foot movement.

[0009] The motion transmitting device 6 includes a fixed member 61 and a rotatable member 62. The fixed member 61 is disposed fixedly on and in front of the post 12, and includes two vertical sidewalls 611 spaced apart from each other in a left-to-right direction. The rotatable member 62 includes two vertical pivot walls 621 respectively adjacent to outer side surfaces of the sidewalls 611. The pivot walls 621 are connected respectively and pivotally to the sidewalls 611 by a pivot pin unit including two pivot pins 622. In this embodiment, each of the pivot pins 622 is a rivet. As such, the rotatable member 62 is rotatable relative to the fixed member 61 about the pivot pins 622. The motion transmitting device 6 further in-

cludes two cranks 63 and two links 64. The two cranks 63 have upper ends 631 connected respectively and pivotally to left and right sides of the rotatable member 61, and lower ends 632. In this embodiment, the upper end 631 of each of the cranks 63 is formed with a pivot hole 633. The rotatable member 62 includes a pivot rod 623 extending through the pivot walls 621 and into the pivot holes 633 in the cranks 63, respectively. As such, the cranks 63 are rotatable relative to the rotatable member 62 about the pivot rod 623, and the position of the pivot rod 623 relative to the fixed member 61 can be changed by rotating the rotatable member 62 relative to the fixed member 61.

[0010] Each of the links 64 has a first pivot portion 641 connected pivotally to the corresponding pedal rod 5, a second pivot portion 642 disposed above the first pivot portion 641 and connected pivotally to the upright rod portion 22 of the corresponding swing rod 2, and a third pivot portion 643 spaced apart from the second pivot portion 642 and connected pivotally to the lower end 632 of the corresponding crank 63. Each of the pedal rods 5 has a pivot rod portion 51 connected pivotally to the first pivot portion 641 of the corresponding link 64 at a front end thereof, and a pedal portion 52 disposed behind and connected to the pivot rod portion 51 and having a bottom end provided with a sliding wheel 53 slidable forwardly and rearwardly on the top surface of the corresponding supporting rod 4, such that the corresponding pedal rod 5 rotates about a central axis of the sliding wheel 53. As such, when the rotatable member 62 is rotated relative to the fixed member 61, the links 64 are driven respectively by the cranks 63 to pivot forwardly or rearwardly to change travel of the pedal portions 52 of the pedal rods 5, thereby adjusting the user's stride.

[0011] With further reference to Fig. 4, in this embodiment, each of the links 64 includes an inverted L-shaped first rod member 644 and a second rod member 645. Each of the first rod members 644 includes a lower rod body 646 having the first pivot portion 641 at a bottom end thereof, and an upper rod body constituting the second pivot portion 642 and extending perpendicularly from a top end portion of the lower rod body 646. The upright rod portion 22 of each of the swing rods 2 is formed with a horizontal pivot hole 221 permitting the second pivot portion 642 of the corresponding link 64 to extend there-through, so that the corresponding link 64 can rotate relative to the corresponding upright rod portion 22. The second rod member 645 of each of the links 64 has the third pivot portion 643 at an upper end thereof, and a non-circular horizontal engaging hole 647 at a bottom end thereof. An engaging block 648 is disposed fixedly on an end of each of the second pivot portions 642, has a non-circular cross-section, and is received fittingly within the engaging hole 647 in the corresponding second rod member 645, so that the corresponding second pivot portion 642 is connected fixedly to the bottom end of the corresponding second rod member 645. As such, when the second rod members 645 are activated by the cranks

53, the first rod members 644 co-rotate with the second rod members 645. In this embodiment, the first and second rod members 644, 645 of each of the links 64 form an angle θ therebetween. The angle θ is an obtuse angle.

[0012] With further reference to Fig. 5, the fixed member 61 further includes a curved wall 612 interconnecting the sidewalls 611, and the rotatable member 62 further includes a curved wall 624 interconnecting the pivot walls 621. A positioning unit is disposed for maintaining the rotatable member 62 at a desired position relative to the fixed member 61. The positioning unit includes a plurality of curvedly arranged positioning holes 613, a through hole 625, and a locking member 65. The positioning holes 613 are formed through the curved wall 612, are vertically spaced apart from each other, and are spaced apart from a common axis of the pivot pins 622 by the same distance (i.e., the positioning holes 613 are arranged in a circumferential direction with respect to the common axis of the pivot pins 622). The through hole 625 is formed in the curved wall 624 of the rotatable member 62. The locking member 65 extends through the through hole 625 in the rotatable member 62 to engage a selected one of the positioning holes 613 in the fixed member 61, thereby locking the rotatable member 62 releaseably on the fixed member 61 at a selected one of a plurality of angular positions.

[0013] In this embodiment, the through hole 625 in the rotatable member 62 is a threaded hole. The locking member 65 has a rotary knob portion 651 exposed outwardly of the rotatable member 62 for manual operation, a threaded rod portion 652 engaging the through hole 625 in the rotatable member 62 and having an end connected to the rotary knob portion 651, and an engaging rod portion 653 connected to an opposite end of the threaded rod portion 652 and engaging the selected positioning hole 613 in the fixed member 61 to lock the rotatable member 62 on the fixed member 61. The rotary knob portion 651 can be operated to remove the engaging rod portion 653 from the selected positioning hole 613 to thereby release the rotatable member 62 from the fixed member 61.

[0014] One of the swing rods 2, one of the supporting rods 4, one of the pedal rods 5, one of the cranks 63, and one of the links 64 at the same side will be described in the succeeding paragraphs.

[0015] With particular reference to Figs. 5, 6, and 7, when the locking member 65 is inserted into the third (counted from the top) positioning hole 613 so that the rotatable member 62 is disposed at a first angular position, as shown in Fig. 5, each of the pedal rods 5 is movable between a front limit position whereat the centers of the sliding wheel 53 the flywheel 3 are spaced apart from each other by a maximum distance (D1) (see Fig. 6), and a rear limit position shown in Fig. 7 whereat the centers of the sliding wheel 53 and the flywheel 3 are spaced apart from each other by a minimum distance (D2) (see Fig. 7). When the rotatable member 62 is disposed at the first angular position, D1 is 578 mm, and

D2 is 163 mm. As a consequence, the travel of the pedal portion 52 is $D1 - D2 = 578 \text{ mm} - 163 \text{ mm} = 415 \text{ mm}$ (approximate to 16 inches).

[0016] With particular reference to Figs. 8, 9, and 10, when it is desired to slightly increase the travel of the pedal rod 5, the locking member 65 is first operated to separate from the third positioning hole 613. Next, the rotatable member 62 is rotated relative to the fixed member 61 in a counterclockwise direction (I) (see Fig. 8) to align the locking member 65 with the fourth (counted from the top) positioning hole 613. Afterwards, the rotary knob portion 651 is operated to engage the fourth positioning hole 613 to thereby lock the rotatable member 62 on the fixed member 61 at a second angular position. During counterclockwise rotation of the rotatable member 62, the third pivot portion 643 is pivoted downwardly about the second pivot portion 642 to thereby rotate the first rod member 644 in a direction (II), thus moving the pedal rod 5 forwardly on the corresponding supporting rod 4. Hence, an angle formed between the link 64 and the upright rod portion 22 of the swing rod 2 and, thus, the travel of the pedal rod 5 are increased. In this embodiment, when the rotatable member 62 is disposed at the second angular position, the travel of the pedal rod 5 is about 17 inches. To reduce the travel of the pedal rod 5, the locking member 65 can be operated to engage the first or second (counted from the top) positioning hole 613.

[0017] In this embodiment, when the locking member 65 engages the first positioning hole 613, the travel of the pedal portion 52 is about 14 inches; when the locking member 65 engages the second positioning hole 613, the travel of the pedal portion 52 is about 15 inches; when the locking member 65 engages the fifth positioning hole 613, the travel of the pedal portion 52 is about 18 inches; when the locking member 65 engages the sixth positioning hole 613, the travel of the pedal portion 52 is about 19 inches; and when the locking member 65 engages the seven positioning hole 613, the travel of the pedal portion 52 is about 20 inches.

[0018] Alternatively, the number and positions of the positioning holes 613 may be changed. In addition, the positioning holes 613 may be replaced with a plurality of positioning grooves. If this occurs, the rotatable member 62 may be provided with a spring-biased engaging member or ball that is engageable within a selected one of the positioning grooves.

[0019] In view of the above, the elliptical exercise machine 100 of this invention has a simple structure, and is easy and convenient to adjust the stride. Thus, the object of this invention is achieved.

Claims

1. An elliptical exercise machine (100) **characterized by:**

a base (1);

two swing rods (2) connected pivotally to said base (1) and spaced apart from each other in a left-to-right direction;
a flywheel (3) disposed rotatably on said base (1);
two supporting rods (4) connected respectively and pivotally to bottom ends of said swing rods (2) and connected to said flywheel (3);
two pedal rods (5) disposed respectively, pivotally, and movably on said supporting rods (4); and
a motion transmitting device (6) including a fixed member (61) disposed fixedly on said base (1),
a rotatable member (62) disposed rotatably on said fixed member (61) and locked releaseably on said fixed member (61) at a selected one of a plurality of angular positions,
two cranks (63) having upper ends (631) connected respectively and pivotally to left and right sides of said rotatable member (62), and lower ends (632) opposite to said upper ends (631), and
two links (64) each having a first pivot portion (641) connected pivotally to a respective one of said pedal rods (5), a second pivot portion (642) disposed above said first pivot portion (641) and connected pivotally to a respective one of said swing rods (2), and a third pivot portion (643) spaced apart from said second pivot portion (642) and connected pivotally to said lower end of a respective one of said cranks (63), said links (64) being driven by said cranks (63) to move said pedal rods (5) forwardly and rearwardly on said supporting rods (4), respectively.

2. The elliptical exercise machine (100) as claimed in Claim 1, **characterized in that:**

said fixed member (61) has a plurality of curvedly arranged positioning holes (613) vertically spaced apart from each other;
said rotatable member (62) has a through hole (625);
and
said motion transmitting device (6) further includes a locking member (65) extending through said through hole (625) in said rotatable member (62) to engage a selected one of said positioning holes (613) in said fixed member (61), thereby locking said rotatable member (62) at the selected one of the angular positions.

3. The elliptical exercise machine (100) as claimed in Claim 1, **characterized in that** each of said links (64) includes an inverted L-shaped first rod member (644) and having said first and second pivot portions (641, 642), and a second rod member (645) having

the third pivot portion (643) at an upper end thereof and connected fixedly to said first rod member (644).

4. The elliptical exercise machine (100) as claimed in Claim 3, further **characterized in that** each of said 5
swing rods (2) has a pivot hole (221) such that said
second pivot portion (642) of said first rod member
(644) of a corresponding one of said links (64) ex-
tends through said pivot hole (221) to connect with 10
a lower end of a corresponding one of said second
rod members (645) of said links (64).
5. The elliptical exercise machine (100) as claimed in
Claim 2, further **characterized in that** said motion 15
transmitting device (6) further includes a pivot pin
unit extending into said rotatable member (62) and
said fixed member (61) for connecting said rotatable
member (62) pivotally to said fixed member (61), and
said fixed member (61) further includes a curved wall 20
(612), said positioning holes (613) being formed
through said curved wall (612) and being spaced
apart from said pivot pin unit by the same distance.
6. The elliptical exercise machine (100) as claimed in
Claim 1, **characterized in that** said through hole 25
(625) in said rotatable member (62) is a threaded
hole, said locking member (65) having a rotary knob
portion (651) exposed outwardly of said rotatable
member (62) for manual operation, a threaded rod 30
portion (652) engaging said through hole (625) and
having an end connected to said rotary knob portion
(651), and an engaging rod portion (653) connected
to an opposite end of said threaded rod portion (652)
and engaging the selected one of said positioning 35
holes (613) in said fixed member (61).

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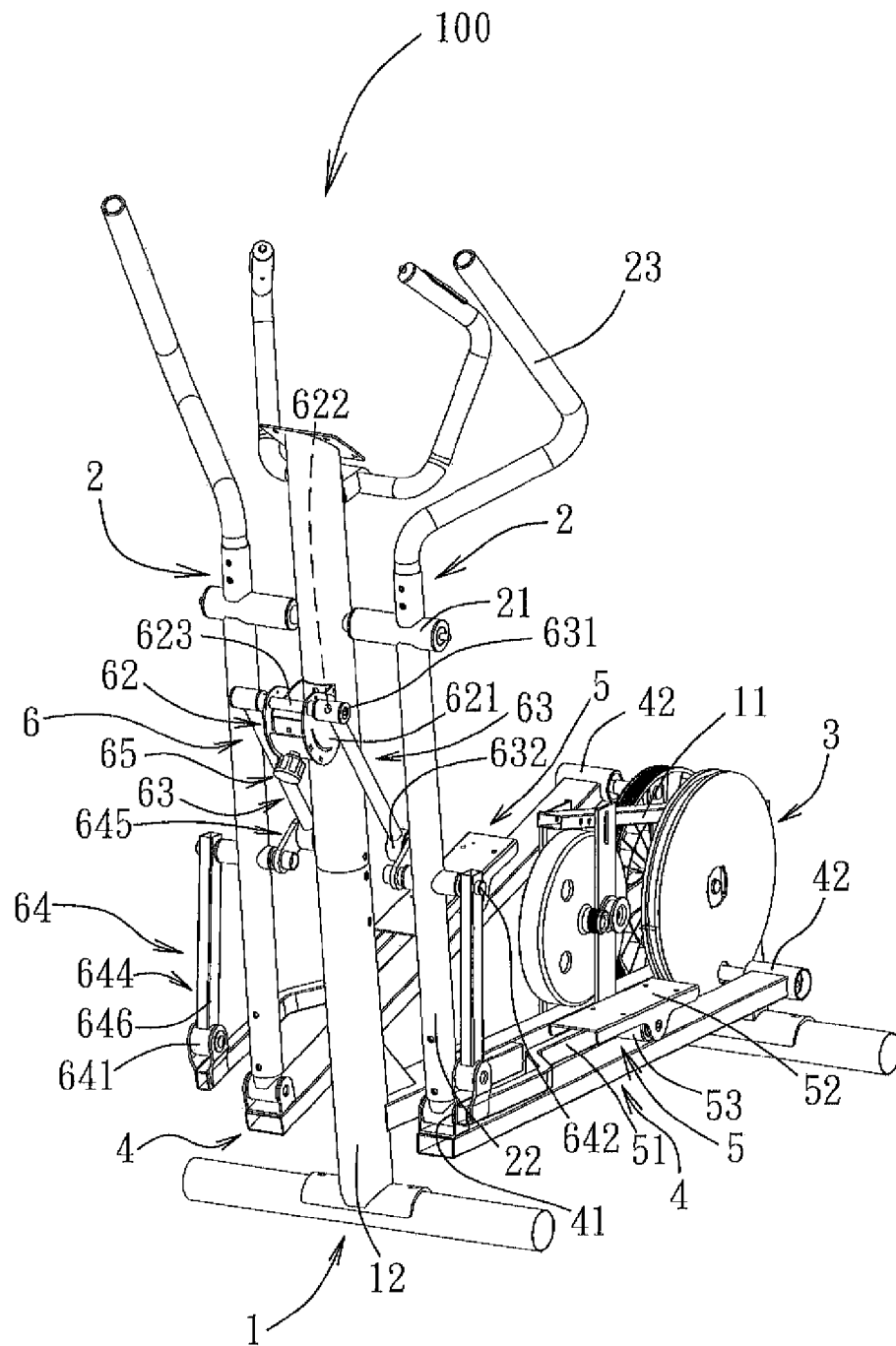
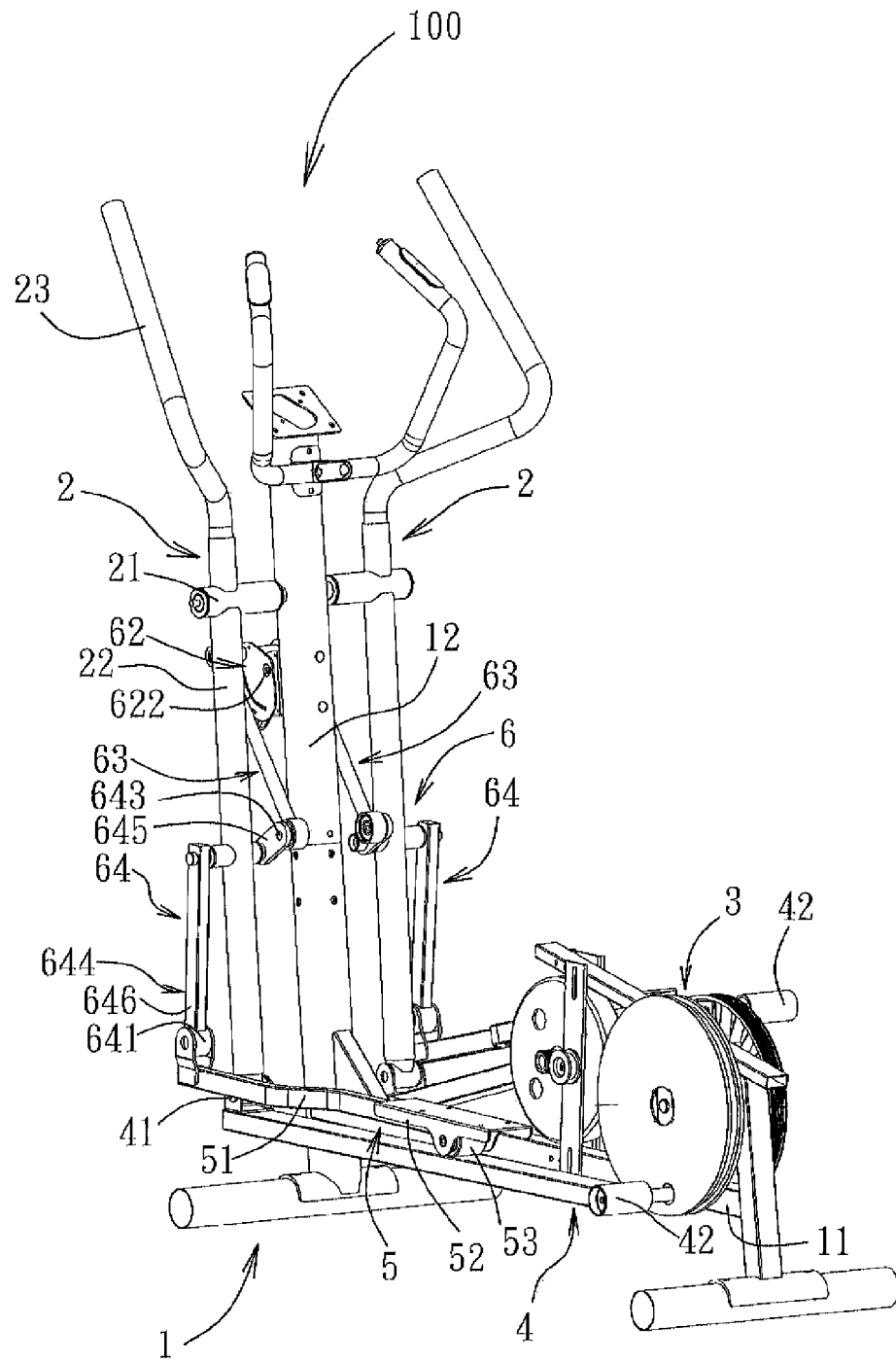
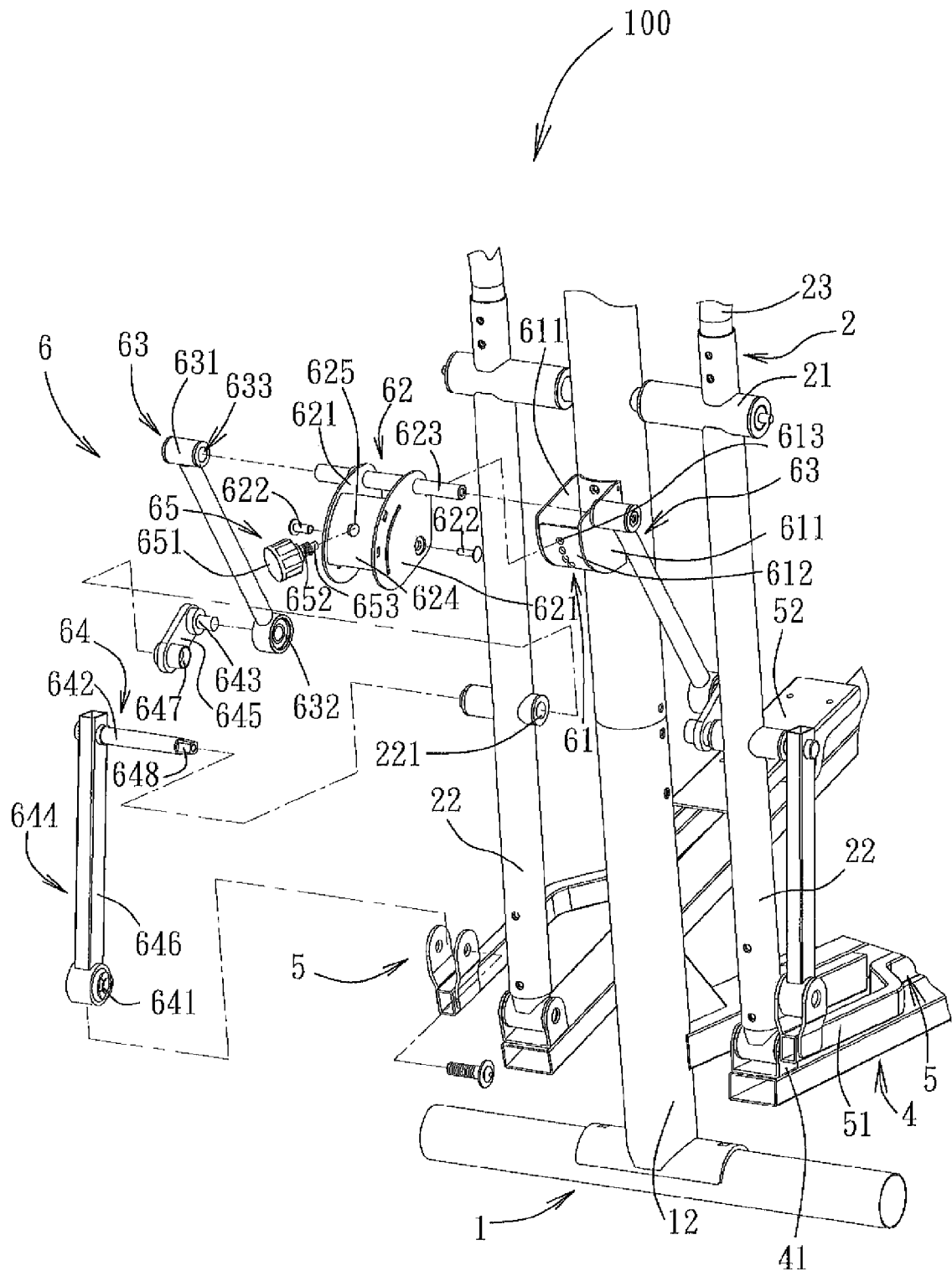


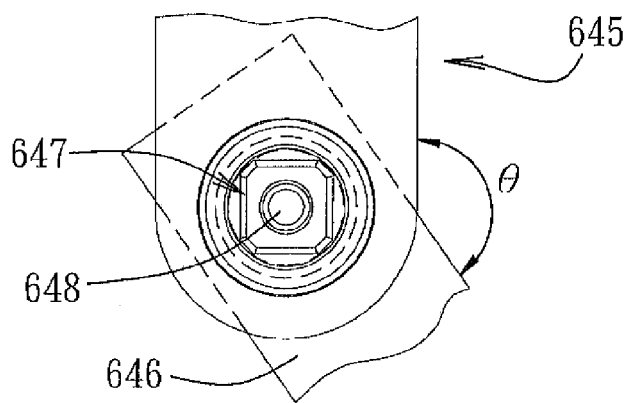
FIG. 1



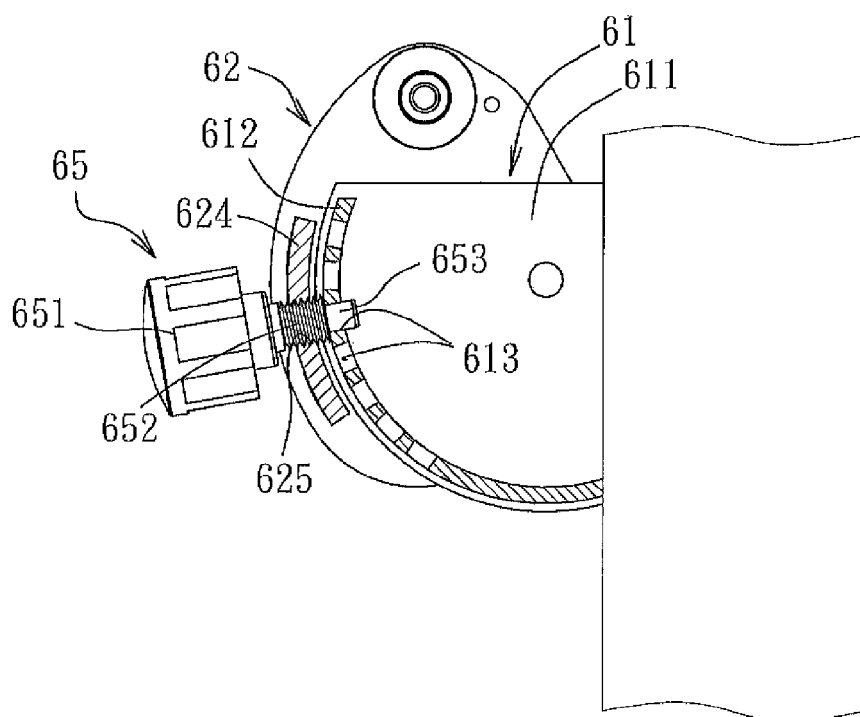
F I G. 2



F I G. 3



F I G. 4



F I G. 5

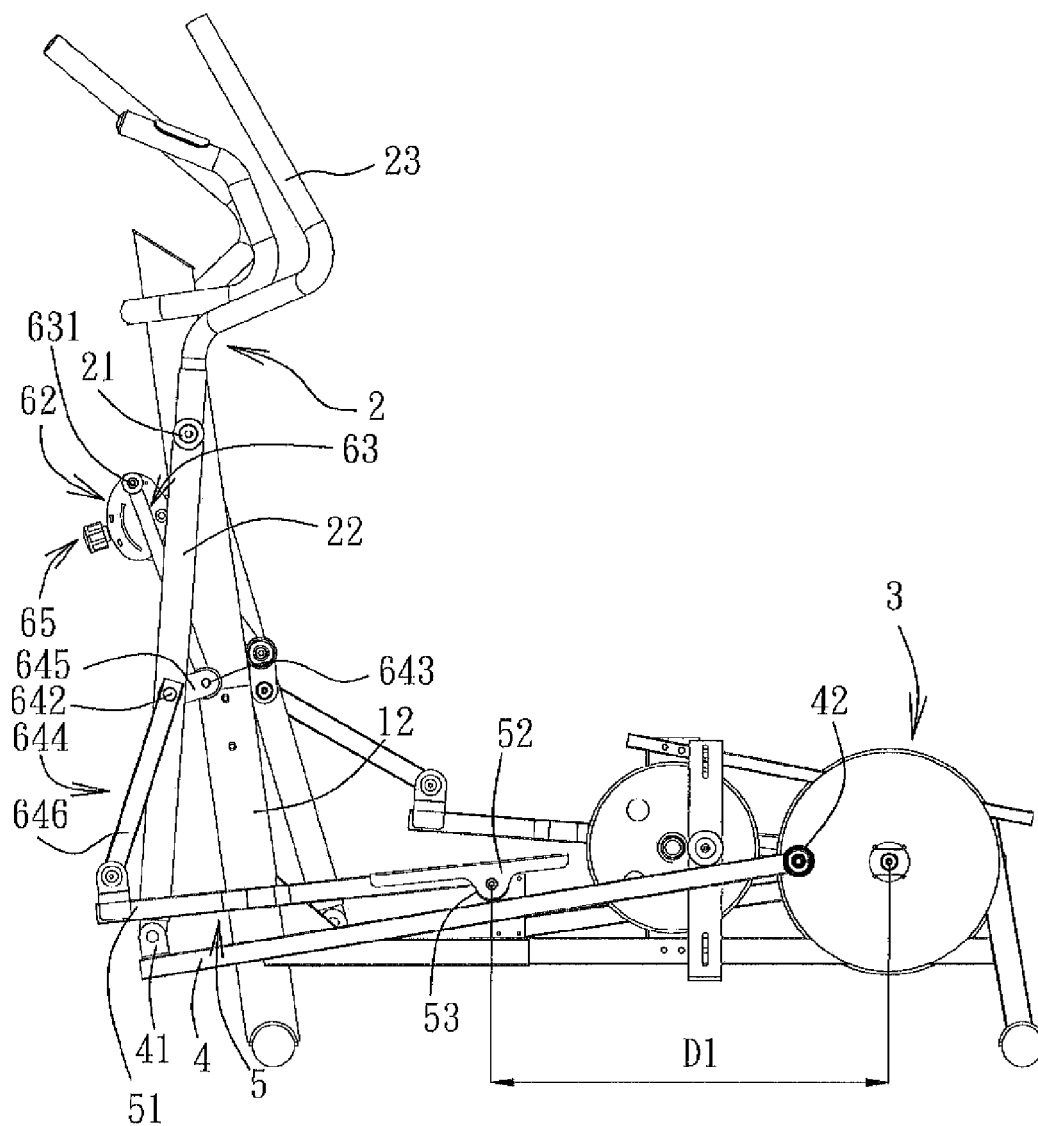
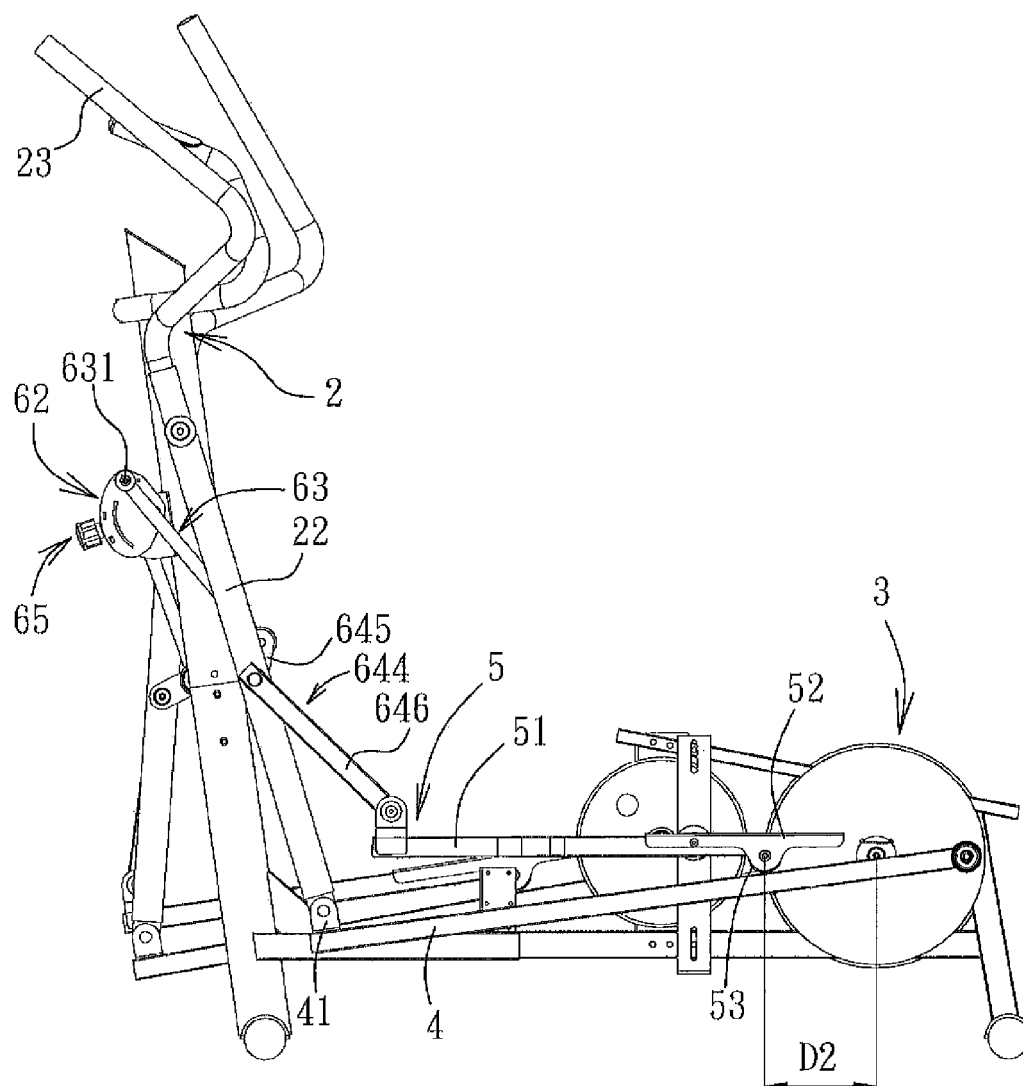


FIG. 6



F I G. 7

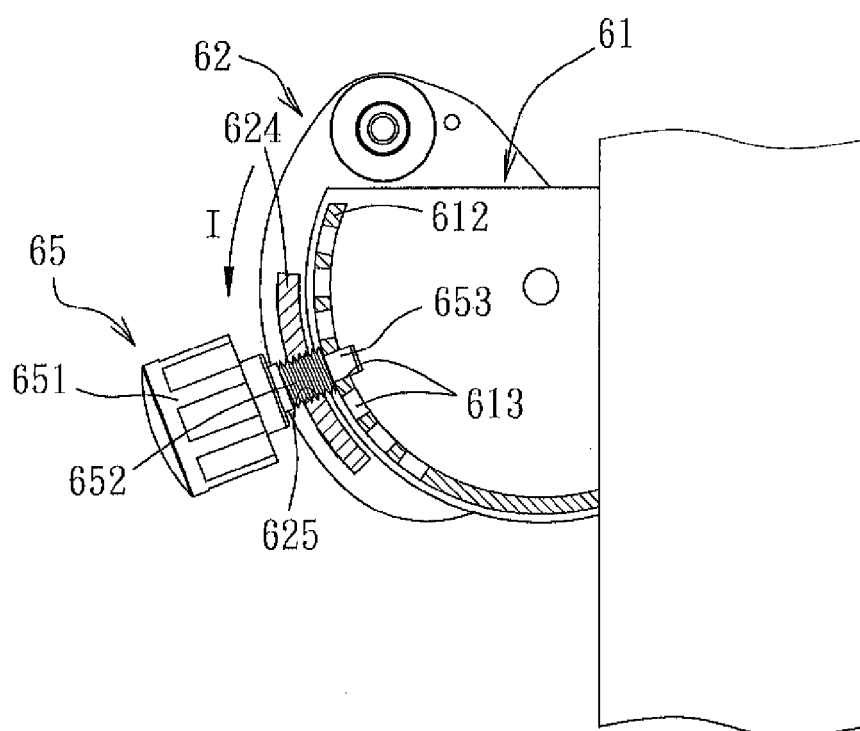
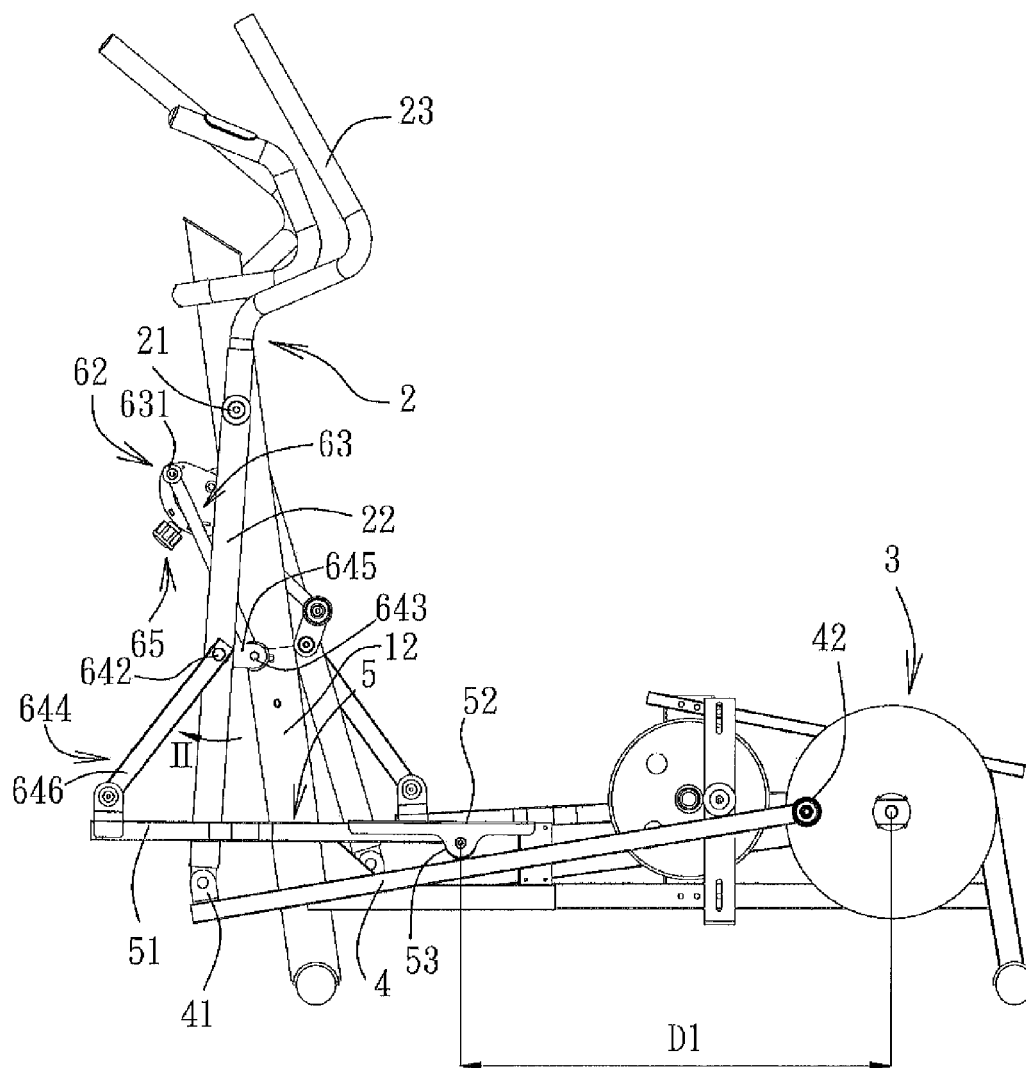
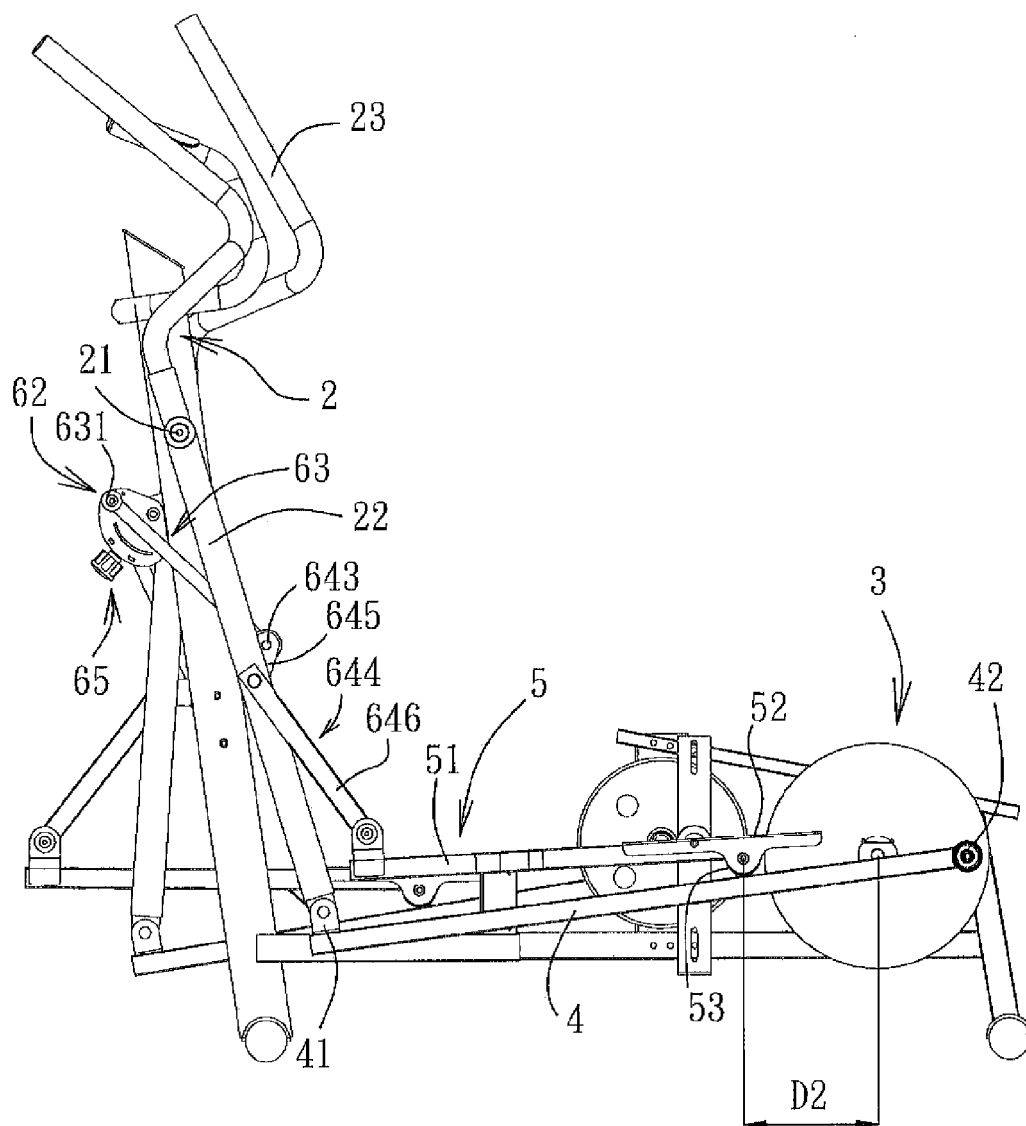


FIG. 8



F I G. 9



F I G. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- TW M286688 [0002]