



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
24.01.2018 Bulletin 2018/04

(51) Int Cl.:
A63B 21/00 (2006.01) A63B 23/12 (2006.01)

(21) Application number: **16834442.2**

(86) International application number:
PCT/CN2016/080323

(22) Date of filing: **27.04.2016**

(87) International publication number:
WO 2017/024817 (16.02.2017 Gazette 2017/07)

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Xiamen Aolro Technology Co., Ltd**
Xiamen City, Fujian 361101 (CN)

(72) Inventor: **HOU, Yanwei**
Xiamen, Fujian 361101 (CN)

(74) Representative: **Verscht, Thomas Kurt Albert**
Josephsburgstrasse 88 A
81673 München (DE)

(30) Priority: **07.08.2015 CN 201510481405**
07.08.2015 CN 201520591969 U

(54) **NOVEL ROWING EXERCISE MACHINE**

(57) A rowing exercise machine, comprising: a base (1), a seat (2), a rotation disc (3), oar units (4), a damping mechanism (6) and a transmission mechanism (7). The base (1) has a stand (11) and a sliding rail (12) obliquely disposed. The seat (2) is slidably fitted on the sliding rail (12). The rotation disc (3) is rotatably mounted on the stand (11) through a fixed rotation shaft (31). Two oar units (4) are connected to two ends of the rotation shaft

(31) respectively through one-way bearings (51) to drive the rotation disc (3) to rotate in one direction when the oar units (4) are rowed. The damping mechanism (6) is mounted on the stand (11). The transmission mechanism (7) is mounted on the stand (11) and connected between the rotation disc (3) and the damping mechanism (6), to drive a damping wheel (61) of the damping mechanism (6) to rotate when the rotation disc (3) is rotating.

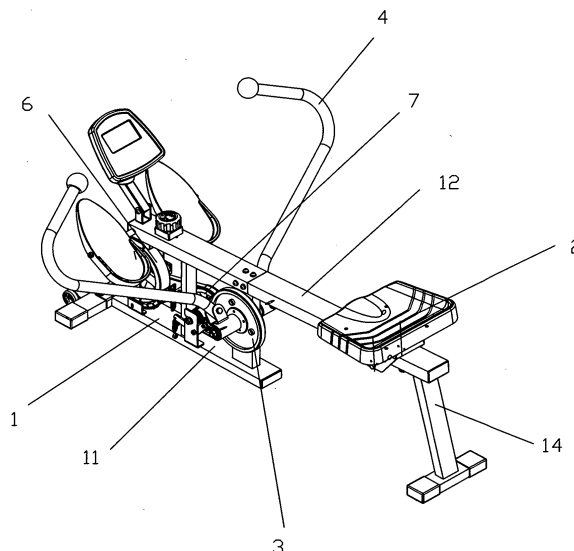


FIG. 1

Description

Field of the invention

[0001] The present invention relates to fitness equipment, particularly to a rowing machine.

Background of the invention

[0002] Rowing machine is also called boating machine which is a kind of fitness equipment simulating boating. The traditional rowing machine mainly adopts with a left and right handles and an oil cylinder mechanism. The left and right handles are respectively connected to the oil cylinder mechanism, and the damping effect of the left and right handles in the shaking process is realized by using the oil cylinder mechanism. This kind of rowing machine with oil cylinder mechanism has disadvantages of high producing cost, easy leakage problem of the oil cylinder and pollution of environment. The rowing machine in current technology (as disclosed in the Chinese patent database with publishing number CN203425451U) has the handle connected to a webbing, the webbing is connected to a pulley, and the pulley drives the damping wheel. When the user pulls the webbing through the handle, the webbing drives the pulley to rotate, and also causes the damping wheel to rotate. The damping wheel produces a damping effect when the user pulls the handle. During the process of pulling and returning, cooperating with the sliding of the bottom seat, the user can achieve a simulation of rowing. This kind of rowing machine has disadvantages as follows: 1. the webbing is easily broken, which results in increasing of use costs. 2. the user can only pull and return through the handle, but can not achieve a simulation of rowing with both hands; 3. the handle is connected to the damping wheel by the webbing, so both hands need to work at the same time, one hand of rowing can not be achieved; 4 The returning is achieved by the action of elastic element, resulting in unnatural phenomenon of the user's hands when returning.

Summary of the invention

[0003] The present invention is provided with a new rowing machine to overcome the disadvantages of the existing known technology, this new structure application can not only adjust the damping strength to adapt to different intensity of training, but also achieve simulation of single hand/double hands rowing. No resistance exists during the user returns hand/hands back, making the machine with well simulation effect, simple structure and low producing cost.

[0004] The technical proposal of the present invention is that: a rowing machine, comprising:

- a base with a rack and a slope rail;
- a seat cushion slidably coupled to the rail;

a rotating plate with a fixing rotating shaft rotatably assembled to the rack through the rotating shaft; two oar components respectively connected to the two ends of the rotating shaft by unilateral bearings in universal joining way to unilaterally drive the rotating plate to rotate when swinging; a rotation damping mechanism with strength adjustable and assembled to the rack; and an acceleration type transition transmission mechanism assembled between the rotating plate and the damping mechanism to drive a damping wheel of the damping mechanism when the rotating plate rotates.

[0005] In another preferred embodiment, the acceleration type transition transmission mechanism is a belt pulley component, which comprises a rotating belt pulley and a belt; the rotating belt pulley comprises a large and a small belt pulleys coaxially connected, the rotating belt pulley is assembled to the rack, the small belt pulley is linked to the rotating plate by a first belt, the large belt pulley is linked to the damping wheel by a second belt.

[0006] In another preferred embodiment, the acceleration type transition transmission mechanism further comprises two tensioning pulleys assembled to the rack respectively to couple to the first and the second belts.

[0007] In another preferred embodiment, the acceleration type transition transmission mechanism is a gear component with at least one stage.

[0008] In another preferred embodiment, the acceleration type transition transmission mechanism is a chain component comprising a rotating chain plate and a chain; the rotating chain plate comprises a large and a small chain plates coaxially connected, the rotating chain plate is assembled to the rack, the small chain plate is linked to the rotating plate by a first chain, the large chain plate is linked to the damping wheel by a second chain.

[0009] In another preferred embodiment, the oar component comprises a shaft sleeve, a bearing and an oar; the shaft sleeve is connected to the end portion of the rotating shaft by the bearing, so that the shaft sleeve is rotatable with respect to the rotating shaft, the shaft sleeve is disposed with two lugs, one end of the oar is inserted between the two lugs and pivoted to the two lugs, so that the oar is capable of axially swinging with respect to the shaft sleeve; the oar is universally jointed to the end portion of the rotating shaft by the shaft sleeve.

[0010] In another preferred embodiment, the damping mechanism further comprises a magnetic board component, the damping wheel is a magnetic control wheel, the magnetic board component is assembled to the rack and is coupled to the magnetic control wheel, the magnetic board component is connected to a spinner or an electronic control component by a pull wire.

[0011] In another preferred embodiment, the damping mechanism further comprises an electromagnetic component, the damping wheel is a magnetic control wheel, the electromagnetic component is assembled to the rack and is coupled to the magnetic control wheel, the elec-

tromagnetic component is connected to an electronic control instrument by a wire.

[0012] In another preferred embodiment, the damping mechanism is a windage damping mechanism, the damping wheel is a fan blade.

[0013] In another preferred embodiment, the damping mechanism is a water resistance damping mechanism, the damping wheel is a water wheel.

[0014] Compared with the prior art, the invention has the following beneficial effects:

The present invention adopts the rotating plate, the oar components, the accelerating transition transmission mechanism and the rotation damping mechanism to form the main components of the new rowing machine, and the rotating plate with a fixing rotating shaft is rotatably assembled to the rack through the rotating shaft; two oar components are respectively connected to the two ends of the rotating shaft by unilateral bearings in universal joining way to unilaterally drive the rotating plate to rotate when swinging; the rotation damping mechanism assembled to the rack; the acceleration type transition transmission mechanism is assembled between the rotating plate and the damping mechanism to drive a damping wheel of the damping mechanism when the rotating plate rotates. This kind of new rowing machine of the present invention can not only adjust the damping strength to adapt to different intensity of training, but also achieve simulation of single hand/double hands rowing. the machine has well simulation effect, simple structure and low producing cost; it is a rowing machine with new structure.

[0015] The oar components of the present invention are linked to the damping mechanism through the rotating plate and the transmission mechanism; in this way, there is no drawback that the webbing of the existing known technology is easily broken. The oar components of the present invention are connected to the rotating shaft through the bearings and unilateral bearings. In this way, when the oar is rotated in one direction (it is actually the equivalent of swinging due to the small angle of rotation), the oar drives the rotating plate to rotate through the bearings and unilateral bearings. When the oar is rotated in another direction, the oar rotates by itself through the unilateral bearings, that is to say, the oar rotates bland with respect to the rotating shaft. In this way, no resistance exists when the oar returns; the present invention adopt two oar components, which are respectively connected to the unilateral bearing and the end portion of the rotating shaft in universal joining way. In this way, two oar components can be used simultaneously, but also one can be used only. The present invention can not only well simulate the rowing action, but also realize various simulation effects.

[0016] A seat back is added at the rear part of the cushion plate, and the seat back is pivoted to the rear end of

the cushion plate by a torsion spring, such to provide support to the back of the rowing athlete in the process of simulating rowing, greatly improving the effect of simulating rowing. Further more, the cross bars are sleeved with cylindrical rollers, the cylindrical roller can roll when used, providing massage on the back of the rowing athlete, and increasing health care of the product.

[0017] The present invention will be further described with the drawings and the embodiments; but it should be noted that, the new rowing machine of the present invention is not limited to the embodiments.

Brief description of the drawings

[0018]

FIG.1 illustrates a schematic diagram of a first embodiment of the present invention.

FIG.2 illustrates a schematic diagram of the first embodiment of the present invention in another view angle.

FIG.3 illustrates an exploded and schematic diagram of the first embodiment of the present invention.

FIG.4 illustrates a schematic diagram of the rack of the first embodiment of the present invention.

FIG.5 illustrates a schematic diagram of the rotating plate, the damping wheel and the transmission mechanism in coupling way of the first embodiment of the present invention.

FIG.6 illustrates an exploded diagram of the rotating sleeve and the rotating plate of the oar component in coupling way of the first embodiment of the present invention.

FIG.7 illustrates a sectional diagram of the rotating sleeve and the rotating plate of the oar component in coupling way of the first embodiment of the present invention.

FIG.8 illustrates a first schematic diagram of the first embodiment of the present invention in usage state.

FIG.9 illustrates a second schematic diagram of the first embodiment of the present invention in usage state.

FIG.10 illustrates a third schematic diagram of the first embodiment of the present invention in usage state.

FIG.11 illustrates a schematic diagram of the rotating plate, the damping wheel and the transmission mechanism in coupling way of the second embodiment of the present invention.

FIG.12 illustrates a schematic diagram of the rotating plate, the damping wheel and the transmission mechanism in coupling way of the third embodiment of the present invention.

FIG.13 illustrates a schematic diagram of the rotating plate, the damping wheel and the transmission mechanism in coupling way of the fourth embodiment of the present invention.

FIG.14 illustrates an exploded diagram of the shaft

sleeve and the rotating plate of the oar component in coupling way of the fifth embodiment of the present invention.

FIG.15 illustrates a sectional diagram of the rotating sleeve and the rotating plate of the oar component in coupling way of the fifth embodiment of the present invention.

FIG.16 illustrates a schematic diagram of the seat cushion of the sixth embodiment of the present invention.

FIG.17 illustrates a schematic diagram of the seat cushion in usage state of the sixth embodiment of the present invention.

FIG.18 illustrates a schematic diagram of the sixth embodiment of the present invention.

FIG.19 illustrates a schematic diagram of the sixth embodiment of the present invention in another view angle.

FIG.20 illustrates a schematic diagram of the sixth embodiment of the present invention in usage state.

Detailed description of the embodiments

First embodiment:

[0019] Referring to FIGS 1-10, a rowing machine of the present invention comprises:

a base 1 with a rack 11 and a slope rail 12;
a seat cushion 2 slidably coupled to the rail 12;
a rotating plate 3 with a fixing rotating shaft 31 rotatably assembled to the rack 11 through the rotating shaft 31;
two oar components 4 respectively connected to the two ends of the rotating shaft 31 by unilateral bearings 51 in universal joining way to unilaterally drive the rotating plate 3 to rotate when swinging;
a rotation damping mechanism 6 with strength adjustable and assembled to the rack 11; and
an acceleration type transition transmission mechanism 7 assembled between the rotating plate 3 and the damping mechanism 6 to drive a damping wheel 61 of the damping mechanism when the rotating plate 3 rotates.

[0020] The base 1 further comprises a front base pipe component 13 and a rear base pipe component 14, the front base pipe component 13 is connected to the front portion of the rack 11, the rail 12 is connected between the rear portion of the rack and the rear base pipe component 14; the rack 11 is disposed with a rotating plate assembly portion 15, a transmission mechanism assembly portion 16 and a damping mechanism assembly portion 17.

[0021] The acceleration type transition transmission mechanism 7 is a belt pulley component, which comprises a rotating belt pulley 71 and a belt 72; the rotating belt pulley 71 comprises a large and a small belt pulleys co-

axially connected, the rotating belt pulley 71 is assembled to the rack 11, the small belt pulley 711 is linked to the rotating plate 3 by a first belt 72, the large belt pulley 712 is linked to the damping wheel 61 by a second belt 72.

5 The rotating plate is a belt pulley as well, the damping wheel 61 is disposed with a small wheel, a belt connection portion is disposed at the small wheel.

[0022] The acceleration type transition transmission mechanism further comprises two tensioning pulleys 73 assembled to the rack 11 respectively to couple to the first and the second belts. The effect of the tensioning pulleys 73 is to make the belts tension between the rotating plate 3 and transition transmission mechanism 7, and between transition transmission mechanism 7 and the damping wheel 61.

[0023] The transmission mechanism of this embodiment is belt transmission; it can also be available when it is gear transmission or chain transmission. When using gear transmission, the acceleration type transition transmission mechanism is a gear component with at least one stage. When using chain transmission, the acceleration type transition transmission mechanism is a chain component comprising a rotating chain plate and a chain; the rotating chain plate comprises a large and a small chain plates coaxially connected, the rotating chain plate is assembled to the rack, the small chain plate is linked to the rotating plate by a first chain, the large chain plate is linked to the damping wheel by a second chain.

[0024] The oar component 4 comprises a shaft sleeve 41, a bearing 42 and an oar 43; the shaft sleeve 41 is connected to the end portion of the rotating shaft 31 by the bearing 42, so that the shaft sleeve 41 is rotatable with respect to the rotating shaft 31, the shaft sleeve 41 is disposed with two lugs 411, one end of the oar 43 is inserted between the two lugs 411 and is pivoted to the two lugs 411, so that the oar 43 is capable of axially swinging with respect to the shaft sleeve 41; the oar 43 is universally jointed to the end portion of the rotating shaft 31 by the shaft sleeve 41.

[0025] In this way, the shaft sleeve 41 is connected to the rotating shaft 31 by the bearing 42 and the unilateral bearing 51. When the oar 43 drive the shaft sleeve 41 rotated in one direction, the rotation of the rotating shaft 31 is caused by the action of the unilateral bearings 51, which is equivalent to drive the rotating plate 3 to rotate. When the oar 43 drives the shaft sleeve 41 to rotate in another direction, as with the universal bearing 51, the shaft sleeve doesn't drive the rotating shaft 31 to rotate blank with respect to the rotating shaft 31, therefore, the rotating plate 3 doesn't rotate.

[0026] The damping mechanism 6 further comprises a magnetic board component 62, the damping wheel 61 is a magnetic control wheel, the magnetic board component 62 is assembled to the rack 11 and is coupled to the magnetic control wheel, the magnetic board component 62 is connected to a spinner 63 by a pull wire.

[0027] In this embodiment, the damping mechanism 6 is magnetic control type and manual operated, the dis-

tance of the magnetic board component 62 and the magnetic control wheel is adjustable by the spinner 63, such to adjust the damping.

[0028] In another case, an electronic control method is available to adjust the distance between the magnetic board component 62 and the magnetic control wheel by a motor (i.e., an electronic control component).

[0029] The oar component of the present invention is linked to the damping mechanism 6 through the rotating plate 3 and the transmission mechanism 7; in this way, there is no drawback that the webbing of the existing known technology is easy broken. The oar component 4 of the present invention is connected to the rotating shaft 31 by the bearing 42 and unilateral bearing 51. In this way, when the oar 43 is rotated in one direction (it is actually the equivalent to swinging due to the small angle of rotation), the oar 43 drives the rotating plate 3 to rotate through the bearings 42 and unilateral bearings 51. When the oar 43 rotates in another direction, the oar 43 rotates by itself through the bearings 42 and unilateral bearings 51, that is to say, the oar 43 rotates blank with respect to the rotating shaft 31. In this way, no resistance exists when the oar 43 returns back, user's hands can return naturally; the present invention applies with two oar components 4, which are connected to the end portions of the rotating shaft 31 by unilateral bearings 51 in universal joining way. In this way, two oar components 4 can be used simultaneously, but also one can be used only. It can not only well simulate the rowing action, but also realize various simulation effects (such as single hand and double hands rowing, etc.).

[0030] As can be seen from FIG. 8 to FIG.10, during the use, the user 100 can achieve simulation of single hand/double hands rowing, and have a better exercise on enhancing the muscles of the legs, the waist, the upper limbs, the chest and the back.

Second embodiment:

[0031] Referring to FIG.11, the difference of a rowing machine of this embodiment from the first embodiment is the damping mechanism. The damping mechanism further comprises an electromagnetic component 64, the damping wheel 61 is a magnetic control wheel, the electromagnetic component 64 is assembled to the rack 11 and is coupled to the magnetic control wheel, the electromagnetic component 64 is connected to an electronic control instrument by a wire.

[0032] The damping strength of the damping wheel 61 can be adjusted by adjusting the current of the electromagnetic component 64.

Third embodiment:

[0033] Referring to FIG.12, the difference of a rowing machine of this embodiment from the first embodiment is the damping mechanism. The damping mechanism is a windage damping mechanism; the damping wheel is a

fan blade 65.

Fourth embodiment:

[0034] Referring to FIG.13, the difference of a rowing machine of this embodiment from the first embodiment is the damping mechanism. The damping mechanism is a water resistance damping mechanism; the damping wheel is a water wheel 66.

Fifth embodiment:

[0035] Referring to FIGS 14-15, the difference of a rowing machine of this embodiment from the first embodiment is the oar component. The oar component 4 of this embodiment comprises a shaft sleeve 41 and an oar 43, without the bearing; the shaft sleeve 41 is connected to the end portion of the rotating shaft 31 by two unilateral bearings 51, so that the shaft sleeve 41 is rotatable unilaterally with respect to the rotating shaft 31; the shaft sleeve 41 is disposed with two lugs 411, one end of the oar 43 is inserted between the two lugs 411 and is pivoted to the two lugs 411, so that the oar 43 is capable of axially swinging with respect to the shaft sleeve 41; the oar 43 is universally jointed to the end portion of the rotating shaft 31 by the shaft sleeve 41.

[0036] In this way, the shaft sleeve 41 is connected to the end portion of the rotating shaft 31 by two unilateral bearings 51. When the oar 43 drives the shaft sleeve 41 rotated in one direction, the rotation of the rotating shaft 31 is caused by the action of the unilateral bearings 51, which is equivalent to driving the rotating plate 3 to rotate. When the oar 43 drives the shaft sleeve 41 rotated in another direction, as with the unilateral bearing 51, the shaft sleeve 41 doesn't drive the rotating shaft 31 to rotate blank with respect to the rotating shaft 31, therefore, the rotating plate 3 doesn't rotate.

Sixth embodiment:

[0037] Referring to FIGS 16-20, the difference of the rowing machine of this embodiment from the first embodiment is the seat cushion. The seat cushion 2 of this embodiment comprises a cushion plate 21, a sliding groove 22 disposed at the bottom portion of the cushion plate and a seat back 23, the seat back 23 is pivoted to the rear end of the cushion plate 21 by a torsion spring. The sliding groove 22 is coupled to the rail 12 of the base 1.

[0038] A connecting element 24 is disposed between the cushion plate 21 and the sliding groove 22, the seat back 23 is pivoted to the rear end of connecting element 24 by a torsion spring. The seat back 23 comprises a seat back bar 231 and a plurality of cross bars 232, the bottom end of the seat back bar 231 is pivoted to the rear end of the connecting element 24 by the torsion spring, the cross bars 232 are respectively fixedly connected to the two sides of the seat back bar 231; The number of the cross bars 232 is even, two cross bars 232 for a group

symmetrically fixed on both sides of the seat back bar 231. The seat back bar 231 is a rectangular hollow tube, two cross bars 232 for a group symmetrically fixed on both sides of the rectangular hollow tube. Two cross bars 232 for a group connect into an integrated structure, and pass through the rectangular hollow tube in the transverse direction. That is, two cross bars 232 fixed on both sides of the seat back bar 231 is actually one. And each cross bar 232 is sleeved with a cylindrical roller 233.

[0039] Referring to FIG.17, as the seat back 23 is pivoted to the rear end of the connecting element 24 by torsion spring, when the rowing simulator applies force on the seat back 23, the seat back 23 can overturn backwardly, theoretically, the seat back 23 can overturn from position A to position B; when the rowing simulator doesn't apply force on the seat back 23, the seat back 23 is reset under the action of the torsion spring and overturns from position B to position A.

[0040] To summarize, the new rowing machine can have a variety of acceleration type transition transmission mechanism, such as belt transmission mechanism, gear transmission mechanism, and chain transmission mechanism. The purpose is to connect the power of the oar component to the damping mechanism to form a different damping effect. The rotation damping mechanism can also have many types, such as magnetic control, electromagnet control, windage control and water resistance control. Among them, some rotation damping mechanism can choose manual control, electric control is also available. The seat cushion can be provided with a seat back or without a seat back. Although the present invention has been described with reference to the preferred embodiments thereof for carrying out the patent for invention, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the patent for invention which is intended to be defined by the appended claims.

Industrial applicability

[0041] The present invention adopts the base, the seat, the rotating plate, the oar components, the rotation damping mechanism and the acceleration type transition transmission mechanism to constitute a new rowing machine. The base with a rack and a slope rail; the rotating plate with the rotating plate and a fixing rotating shaft; the oar component with a shaft sleeve and an oar; the rotation damping mechanism with a magnetic board component and a magnetic control wheel, or an electromagnetic component and a magnetic control wheel, or a fan blade, or a water wheel; the acceleration type transition transmission mechanism with a belt pulley component, or a gear component, or a chain component. The invention is easy to realize in industry, and the base, the seat, the rotating plate, the oar components, the rotation damping mechanism and the acceleration type transition transmission mechanism and other components is also easy to process in the industry.

Claims

1. A rowing machine, wherein comprising:

5 a base with a rack and a slope rail;
a seat cushion slidably coupled to the rail;
a rotating plate with a fixing rotating shaft rotatably assembled to the rack through the rotating shaft;
10 two oar components respectively connected to the two ends of the rotating shaft by unilateral bearings in universal joining way to unilaterally drive the rotating plate to rotate when swinging;
a rotation damping mechanism with strength adjustable and assembled to the rack; and
15 an acceleration type transition transmission mechanism assembled between the rotating plate and the damping mechanism to drive a damping wheel of the damping mechanism when the rotating plate rotates.

2. The rowing machine according to claim 1, wherein the acceleration type transition transmission mechanism is a belt pulley component, which comprises a rotating belt pulley and a belt; the rotating belt pulley comprises a large and a small belt pulleys coaxially connected, the rotating belt pulley is assembled to the rack, the small belt pulley is linked to the rotating plate by a first belt, the large belt pulley is linked to the damping wheel by a second belt.

3. The rowing machine according to claim 2, wherein the acceleration type transition transmission mechanism further comprises two tensioning pulleys assembled to the rack respectively to couple to the first and the second belts.

4. The rowing machine according to claim 1, wherein the acceleration type transition transmission mechanism is a gear component with at least one stage.

5. The rowing machine according to claim 1, wherein the acceleration type transition transmission mechanism is a chain component comprising a rotating chain plate and a chain; the rotating chain plate comprises a large and a small chain plates coaxially connected, the rotating chain plate is assembled to the rack, the small chain plate is linked to the rotating plate by a first chain, the large chain plate is linked to the damping wheel by a second chain.

6. The rowing machine according to claim 1, wherein the oar component comprises a shaft sleeve, a bearing and an oar; the shaft sleeve is connected to the end portion of the rotating shaft by the bearing, so that the shaft sleeve is rotatable with respect to the rotating shaft, the shaft sleeve is disposed with two lugs, one end of the oar is inserted between the two

lugs and pivoted to the two lugs, so that the oar is capable of axially swinging with respect to the shaft sleeve; the oar is universally jointed to the end portion of the rotating shaft by the shaft sleeve.

5

7. The rowing machine according to claim 1, wherein the damping mechanism further comprises a magnetic board component, the damping wheel is a magnetic control wheel, the magnetic board component is assembled to the rack and is coupled to the magnetic control wheel, the magnetic board component is connected to a spinner or an electronic control component by a pull wire. 10
8. The rowing machine according to claim 1, wherein the damping mechanism further comprises an electromagnetic component, the damping wheel is a magnetic control wheel, the electromagnetic component is assembled to the rack and is coupled to the magnetic control wheel, the electromagnetic component is connected to an electronic control instrument by a wire. 15 20
9. The rowing machine according to claim 1, wherein the damping mechanism is a windage damping mechanism, the damping wheel is a fan blade. 25
10. The rowing machine according to claim 1, wherein the damping mechanism is a water resistance damping mechanism, the damping wheel is a water wheel. 30
11. The rowing machine according to claim 1, wherein the seat cushion comprises a cushion plate, a sliding groove disposed at the bottom portion of the cushion plate and a seat back, the seat back is pivoted to the rear end of the cushion plate by a torsion spring. 35
12. The rowing machine according to claim 11, wherein a connecting element is disposed between the cushion plate and the sliding groove, the seat back comprises a seat back bar and a plurality of cross bars, the bottom end of the seat back bar is pivoted to the rear end of the connecting element by the torsion spring, the cross bars are respectively fixedly connected to the two sides of the seat back bar; each cross bar is sleeved with a cylindrical roller. 40 45

50

55

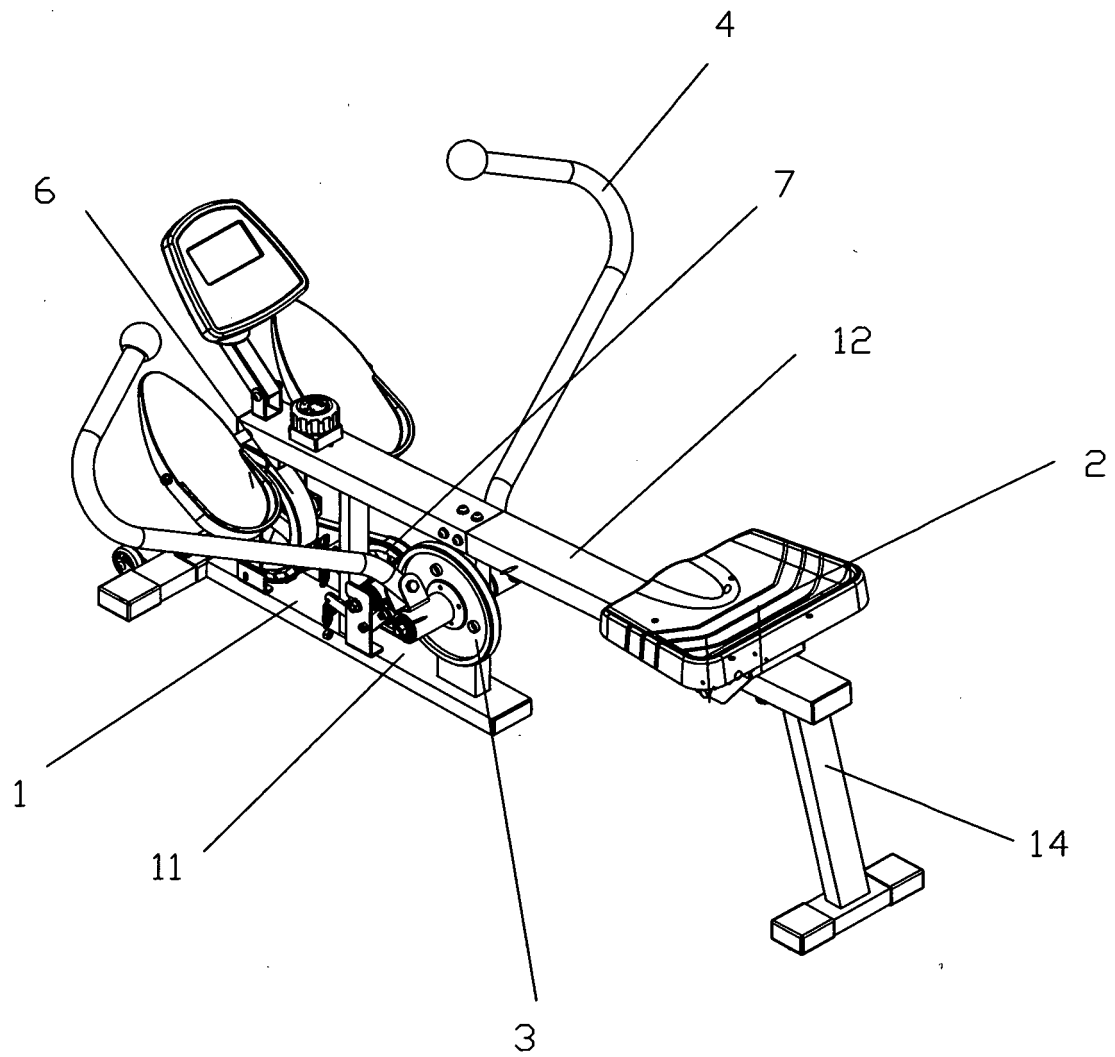


FIG. 1

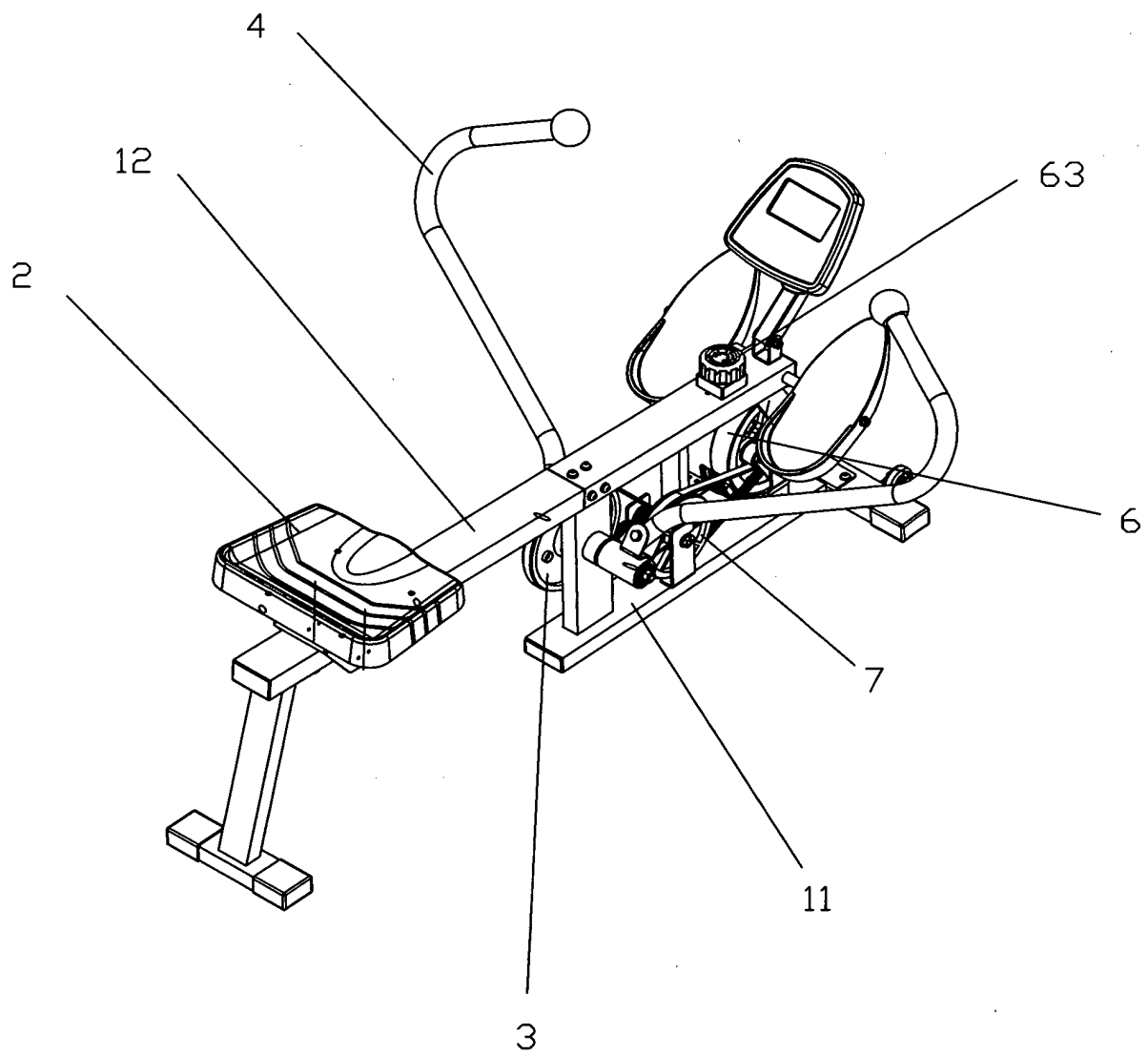


FIG. 2

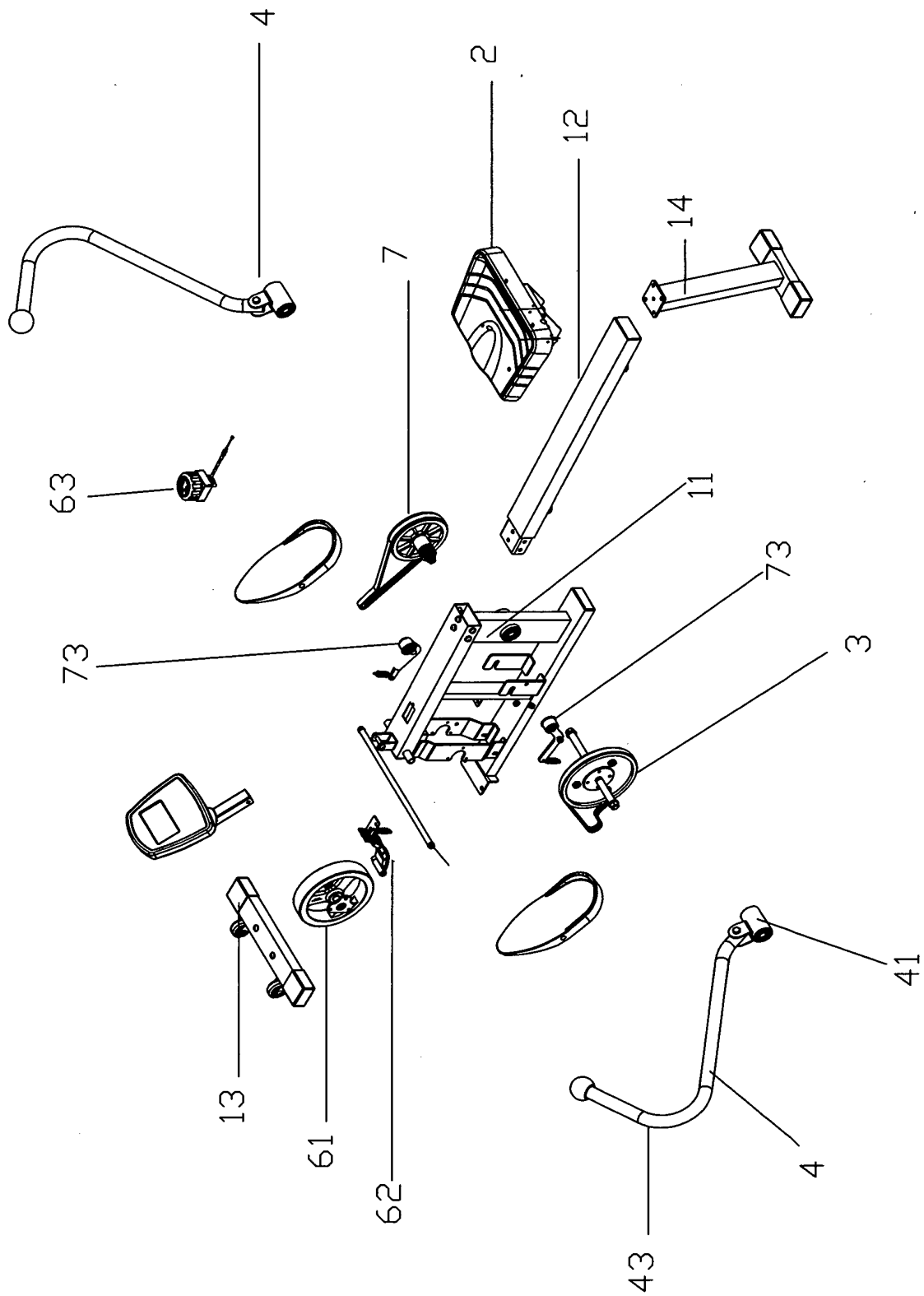


FIG. 3

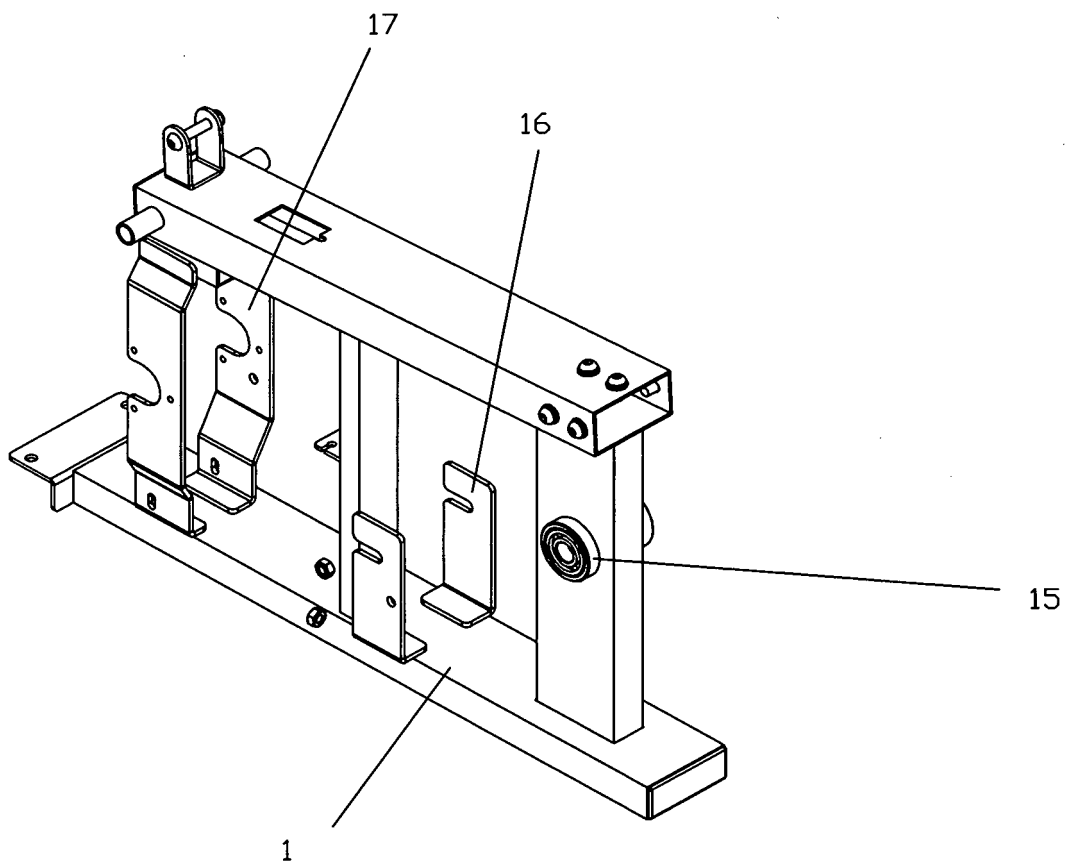


FIG. 4

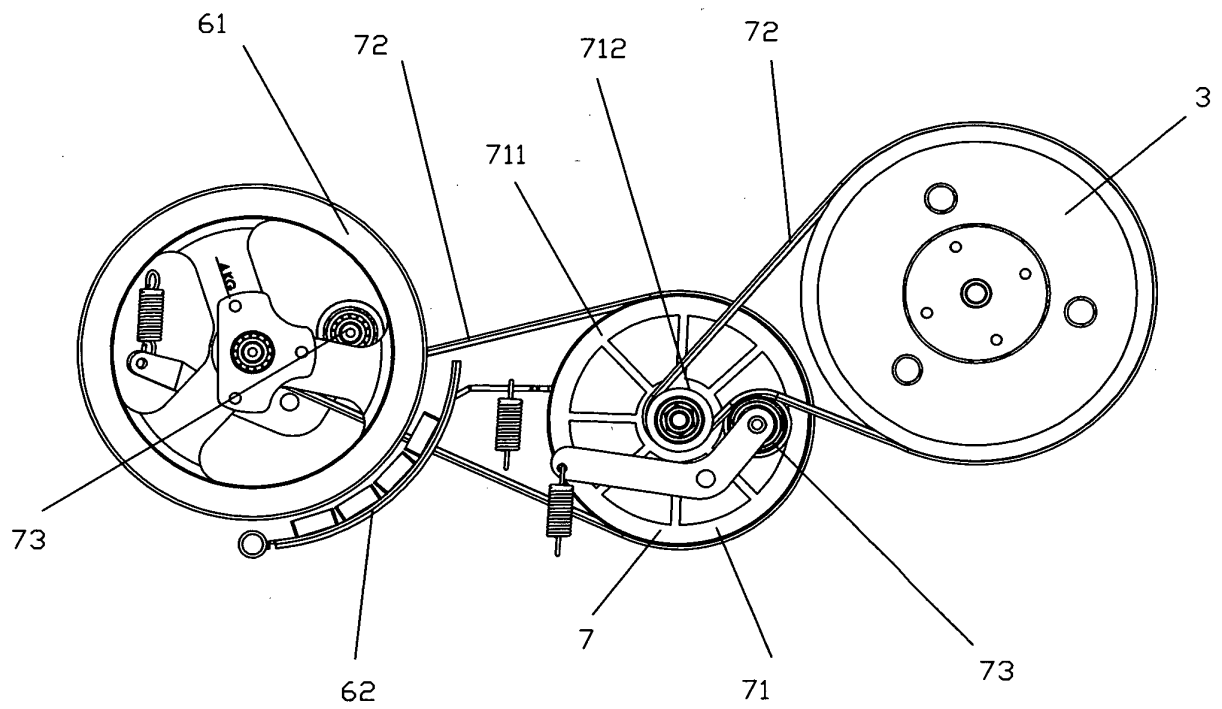


FIG. 5

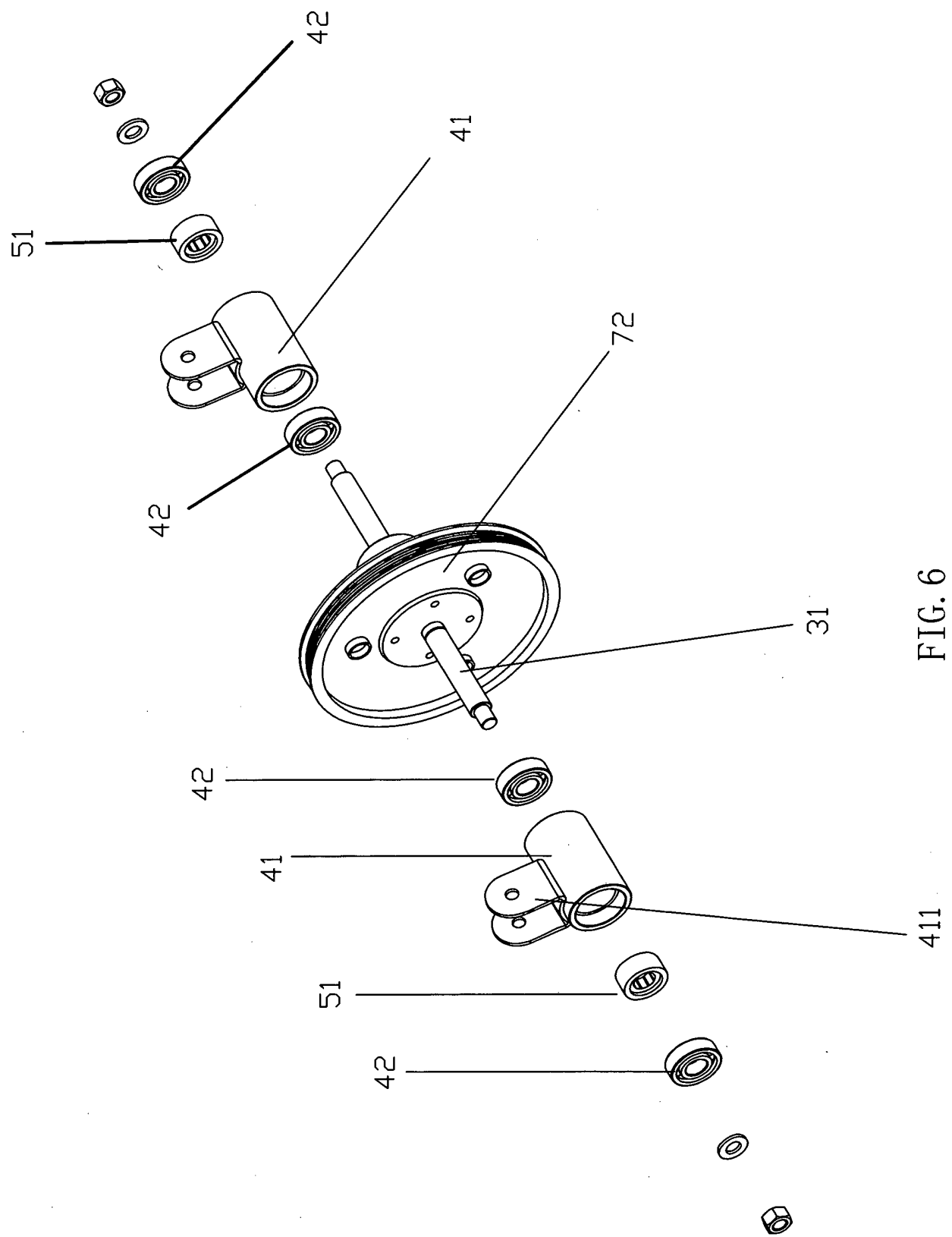


FIG. 6

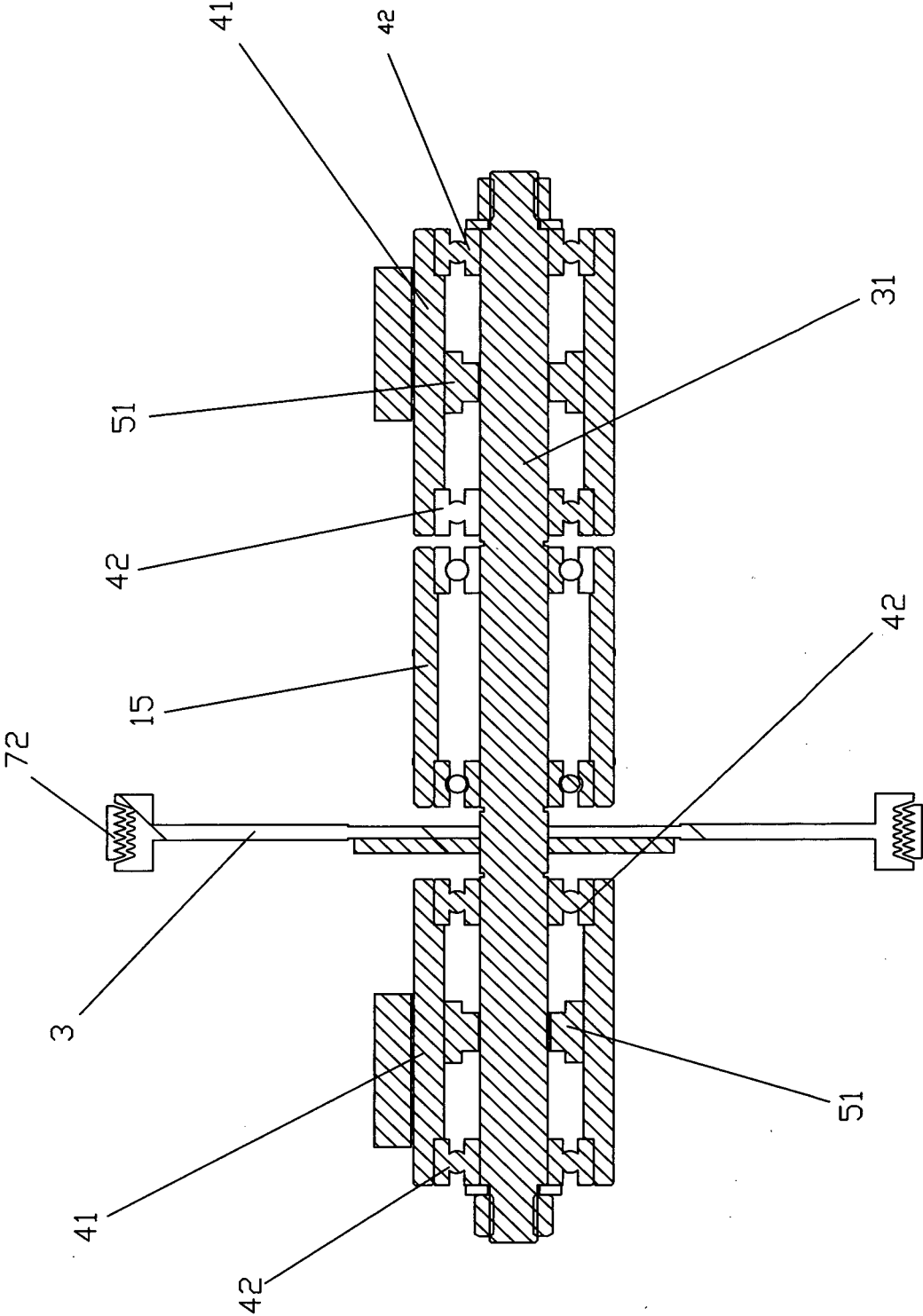


FIG. 7

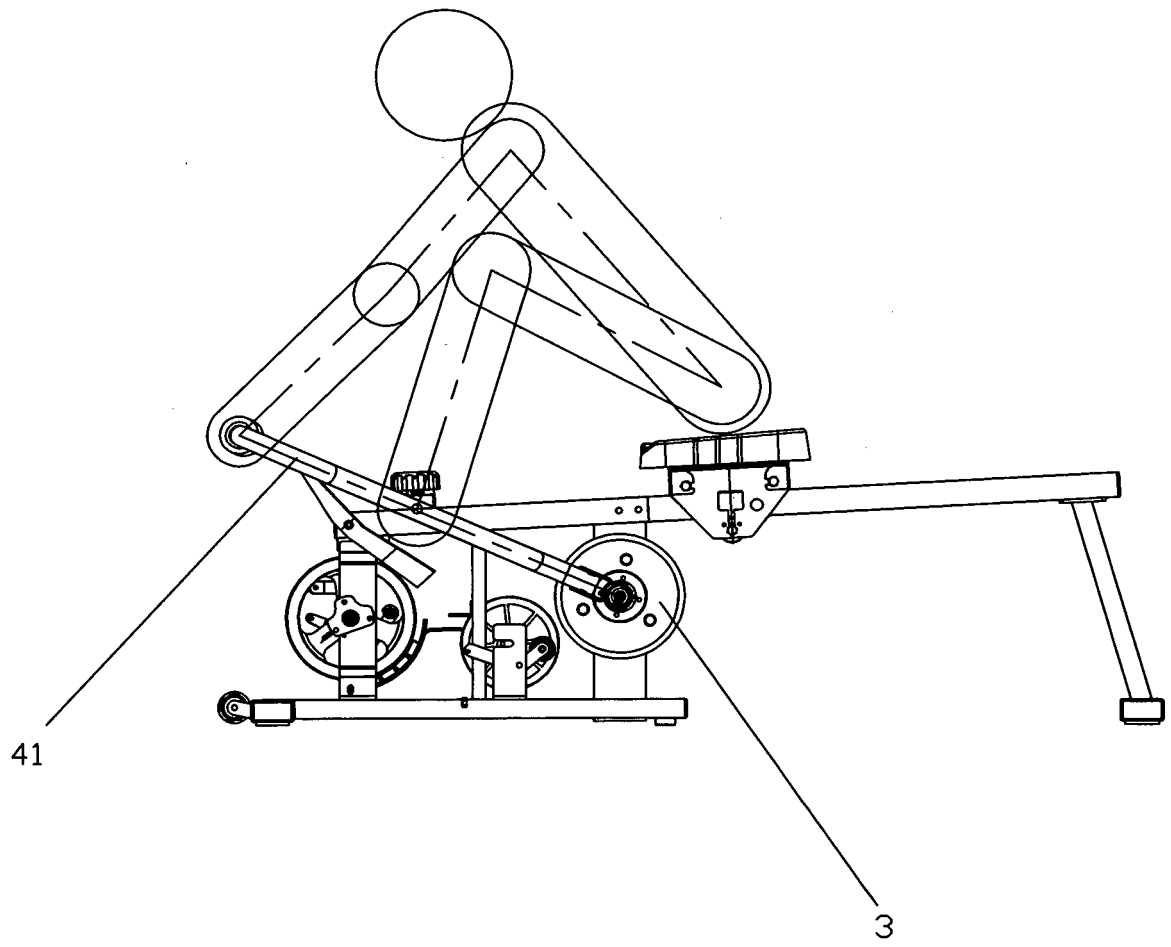


FIG. 8

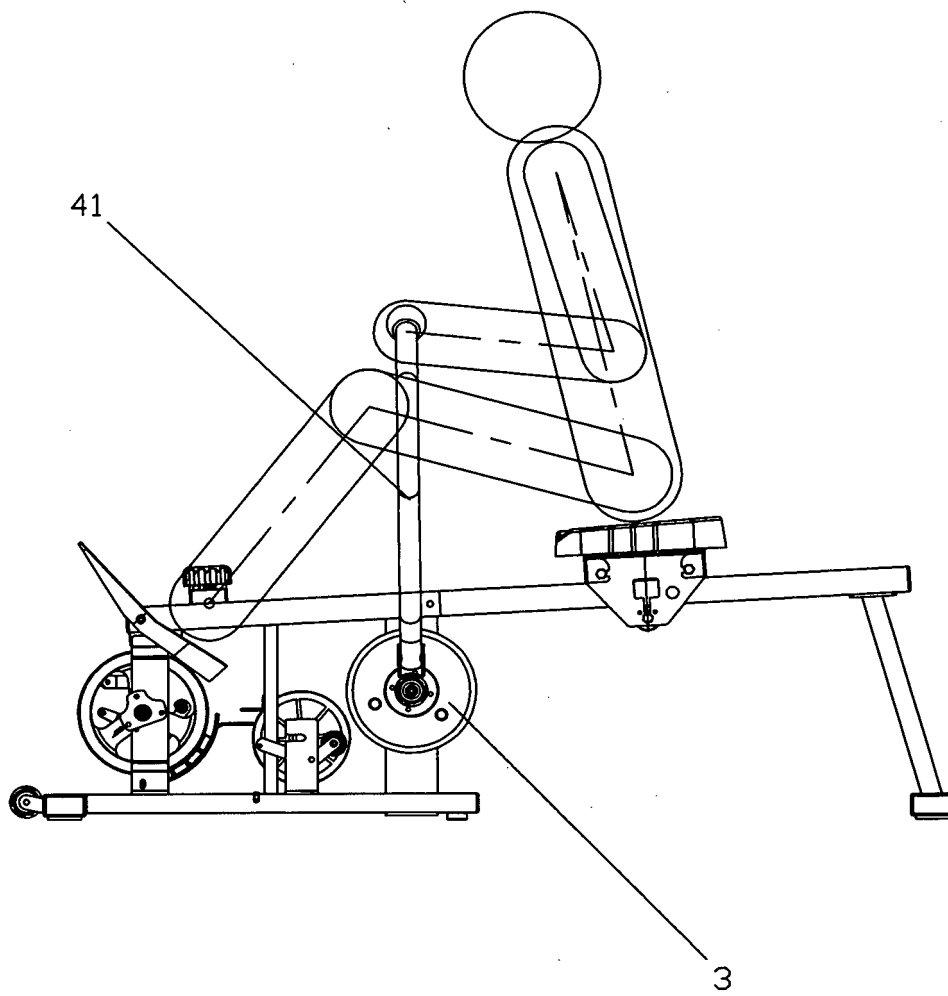


FIG. 9

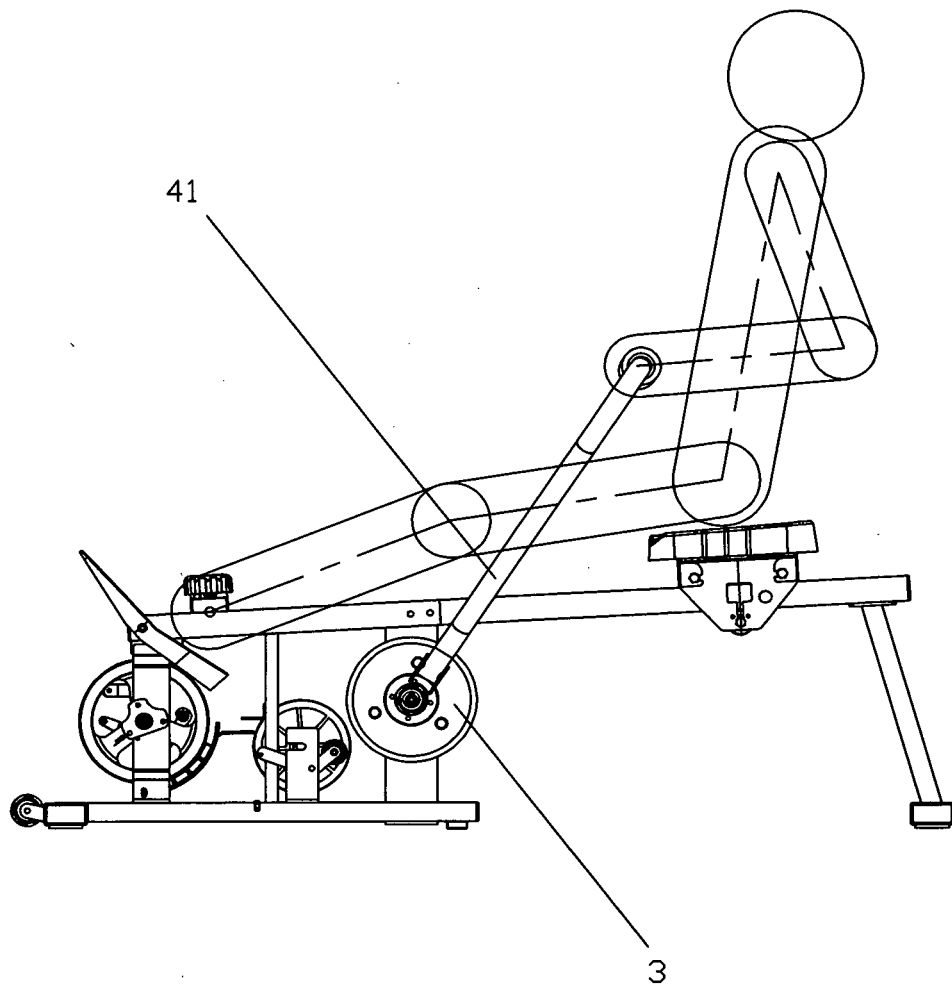


FIG. 10

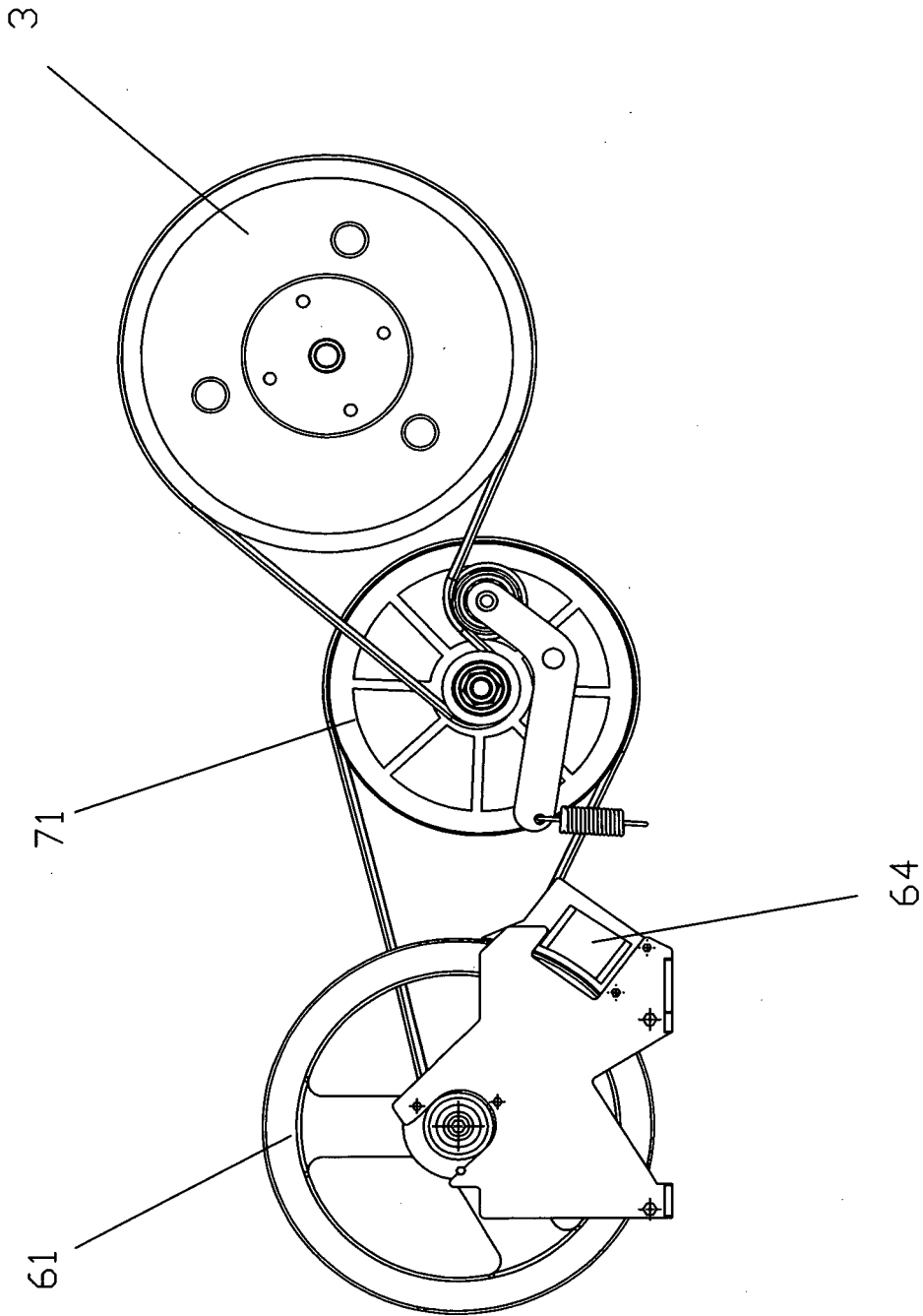


FIG. 11

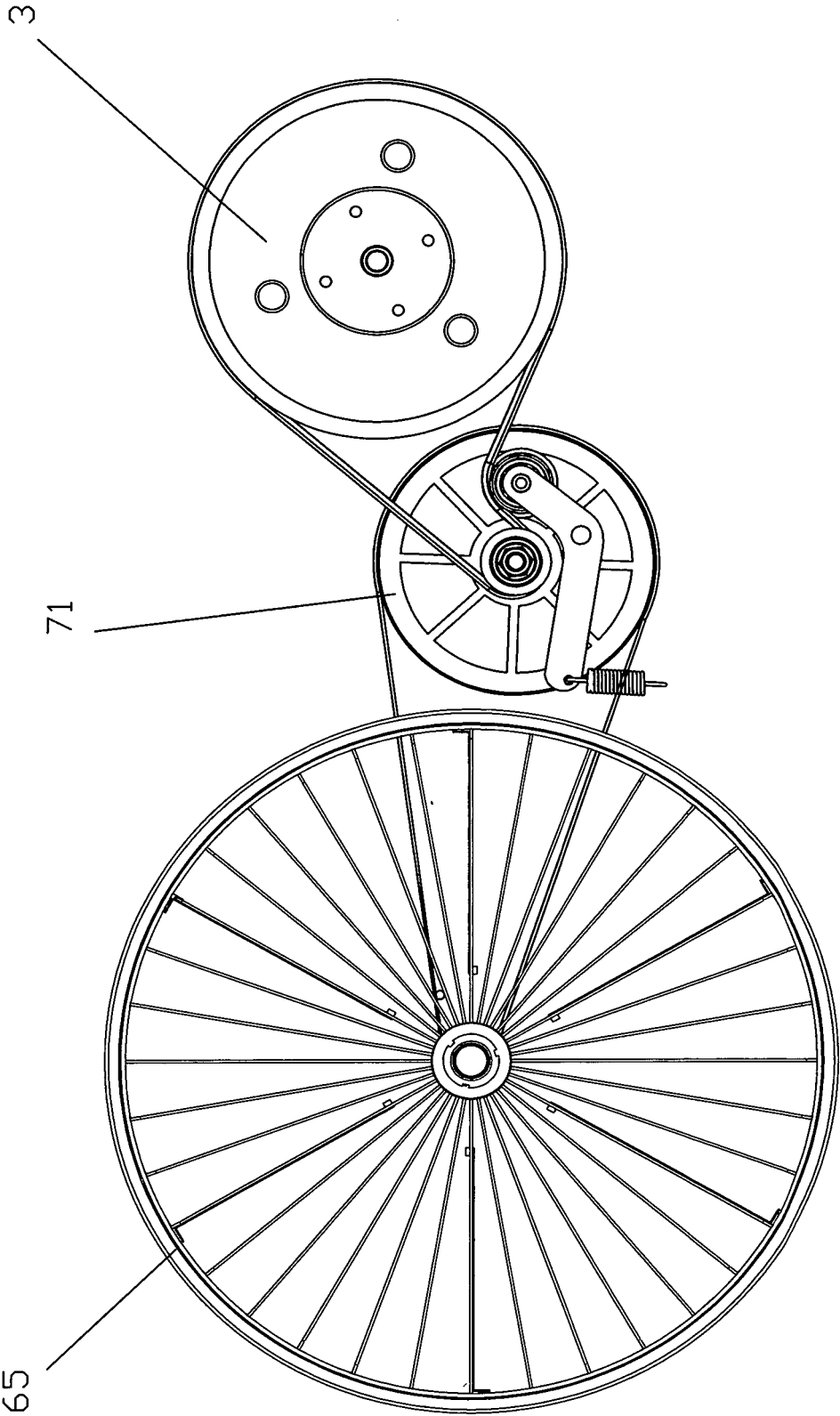


FIG. 12

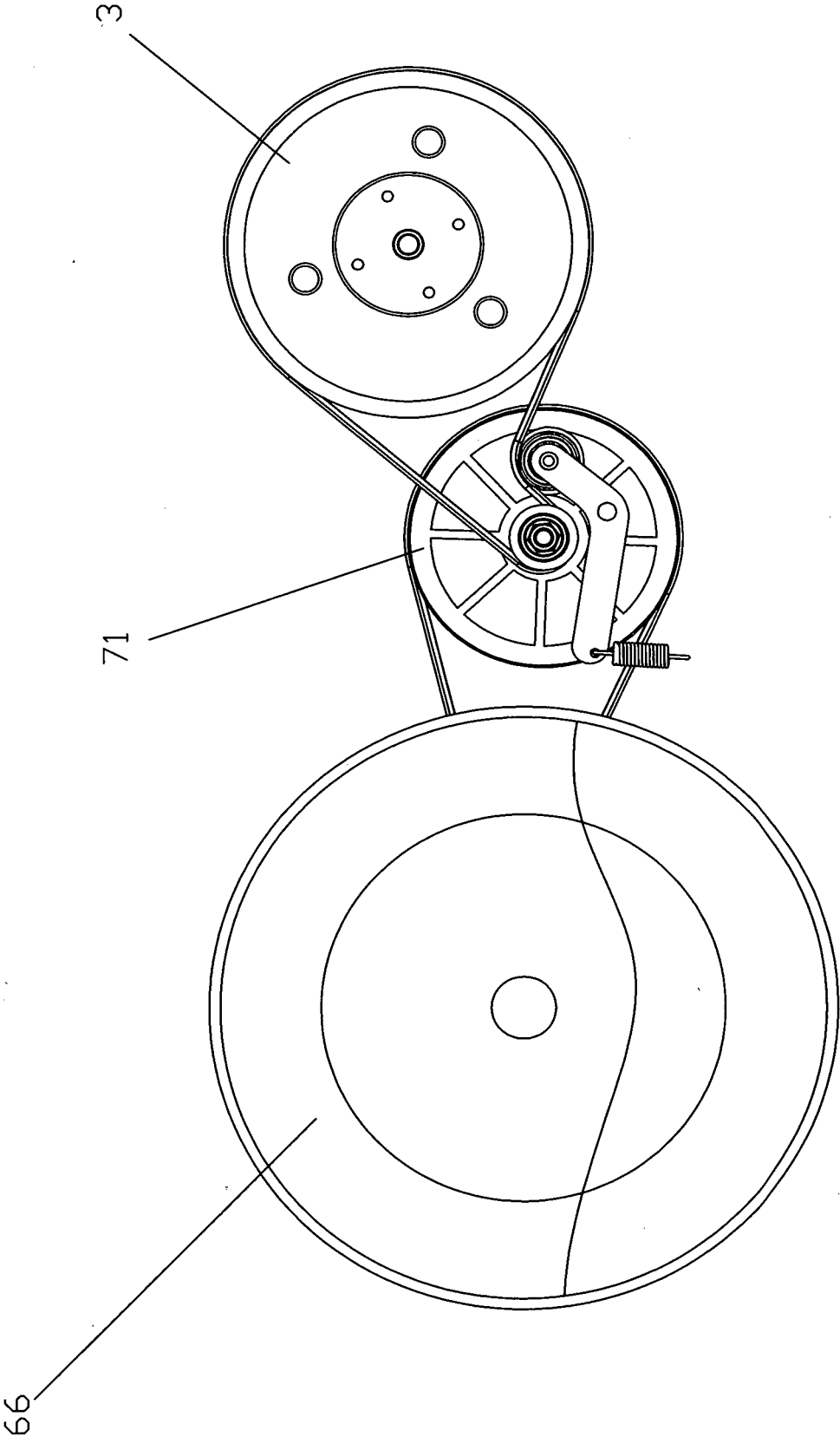


FIG. 13

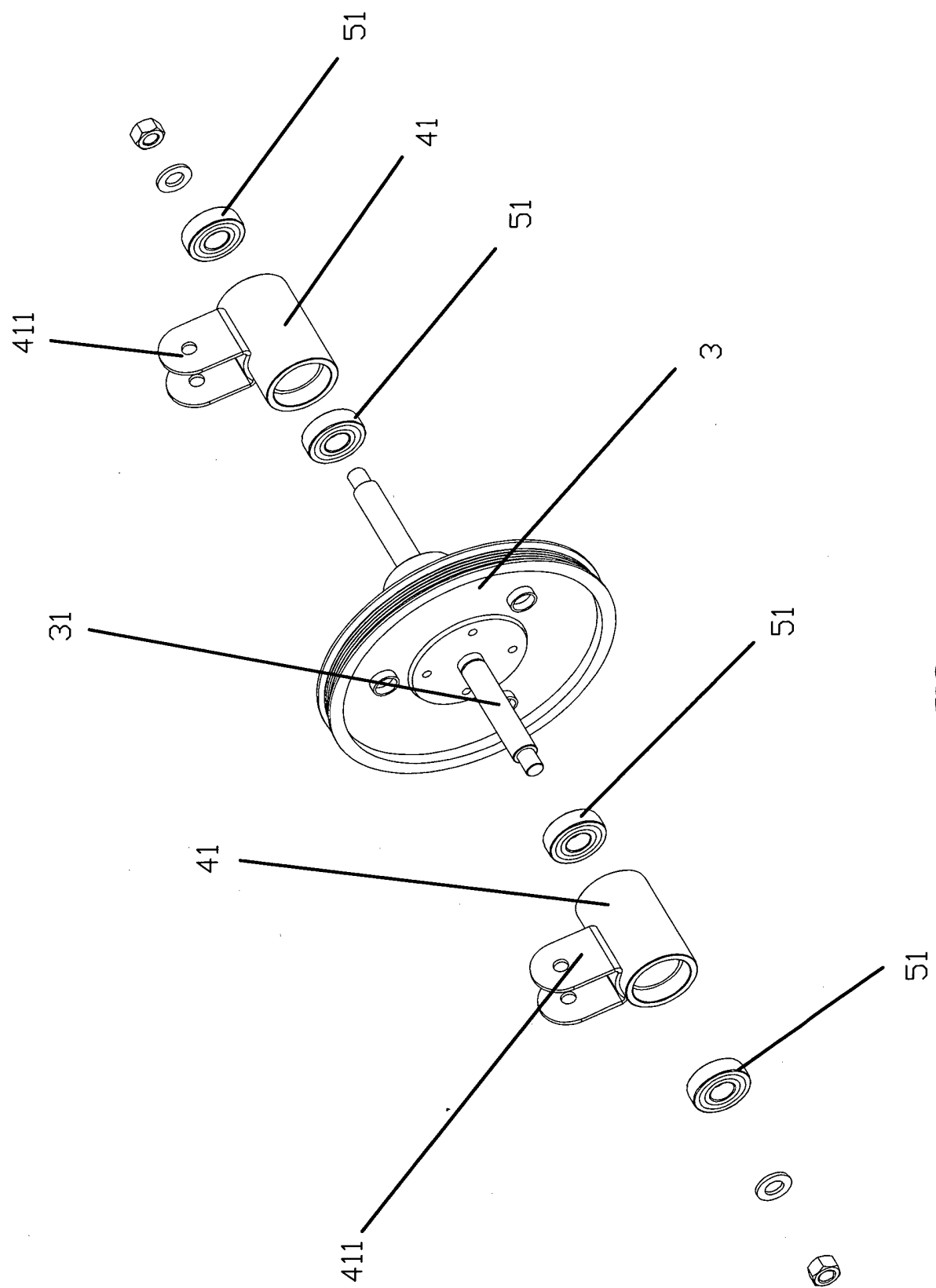


FIG.14

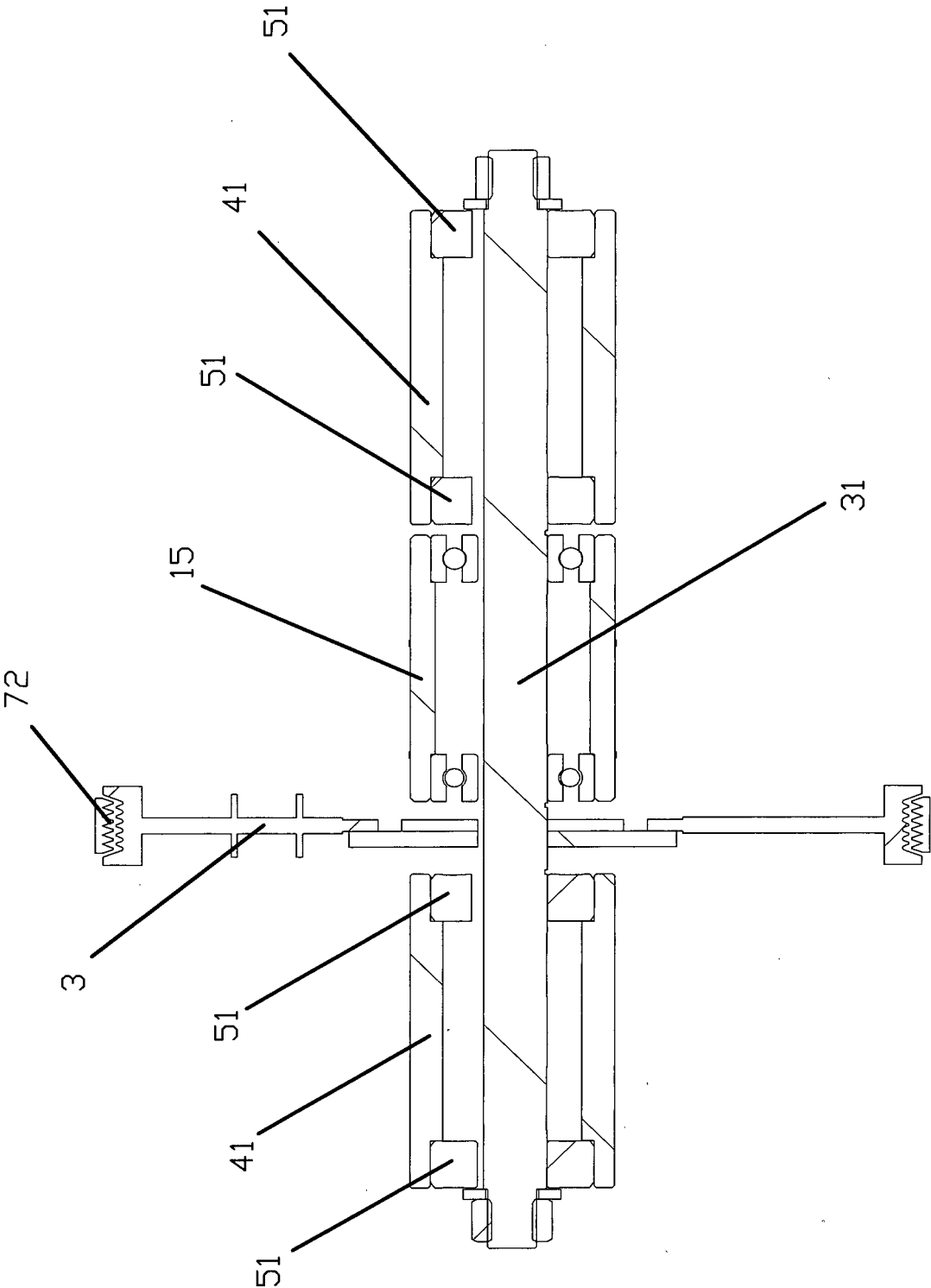


FIG.15

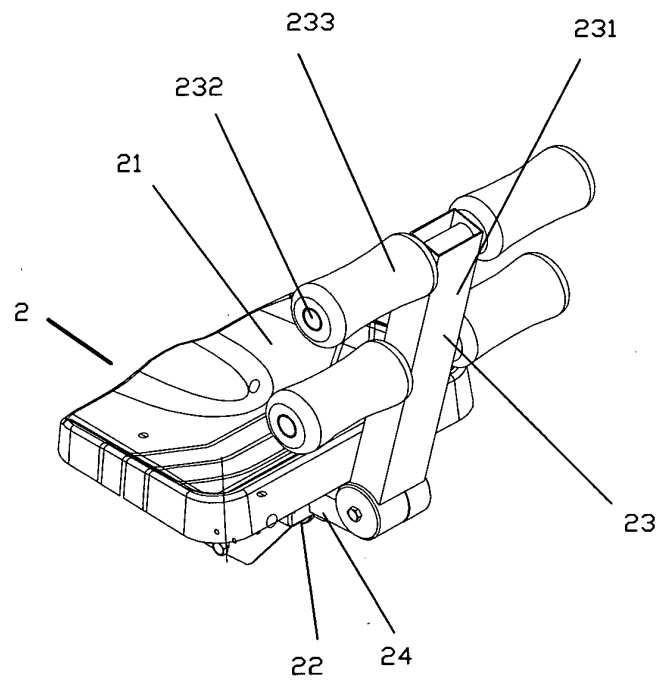


FIG. 16

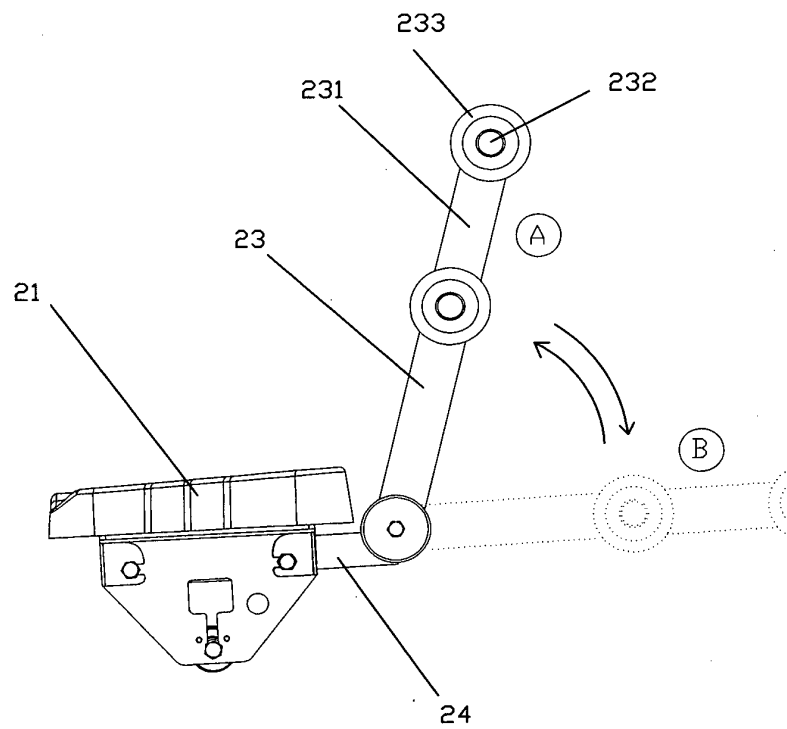


FIG. 17

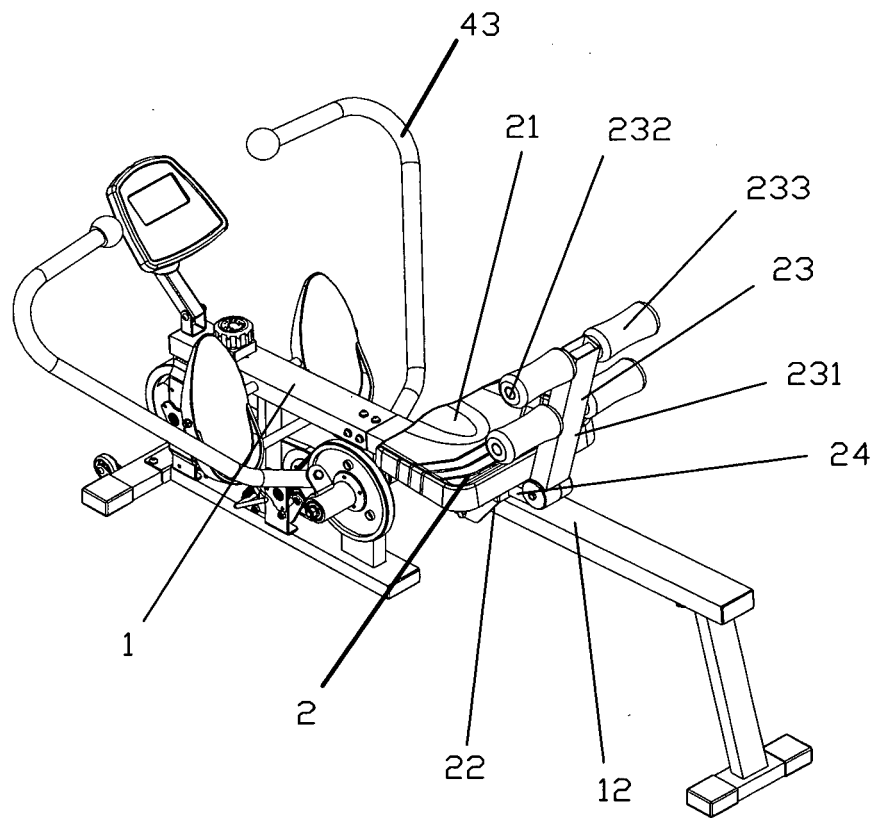


FIG.18

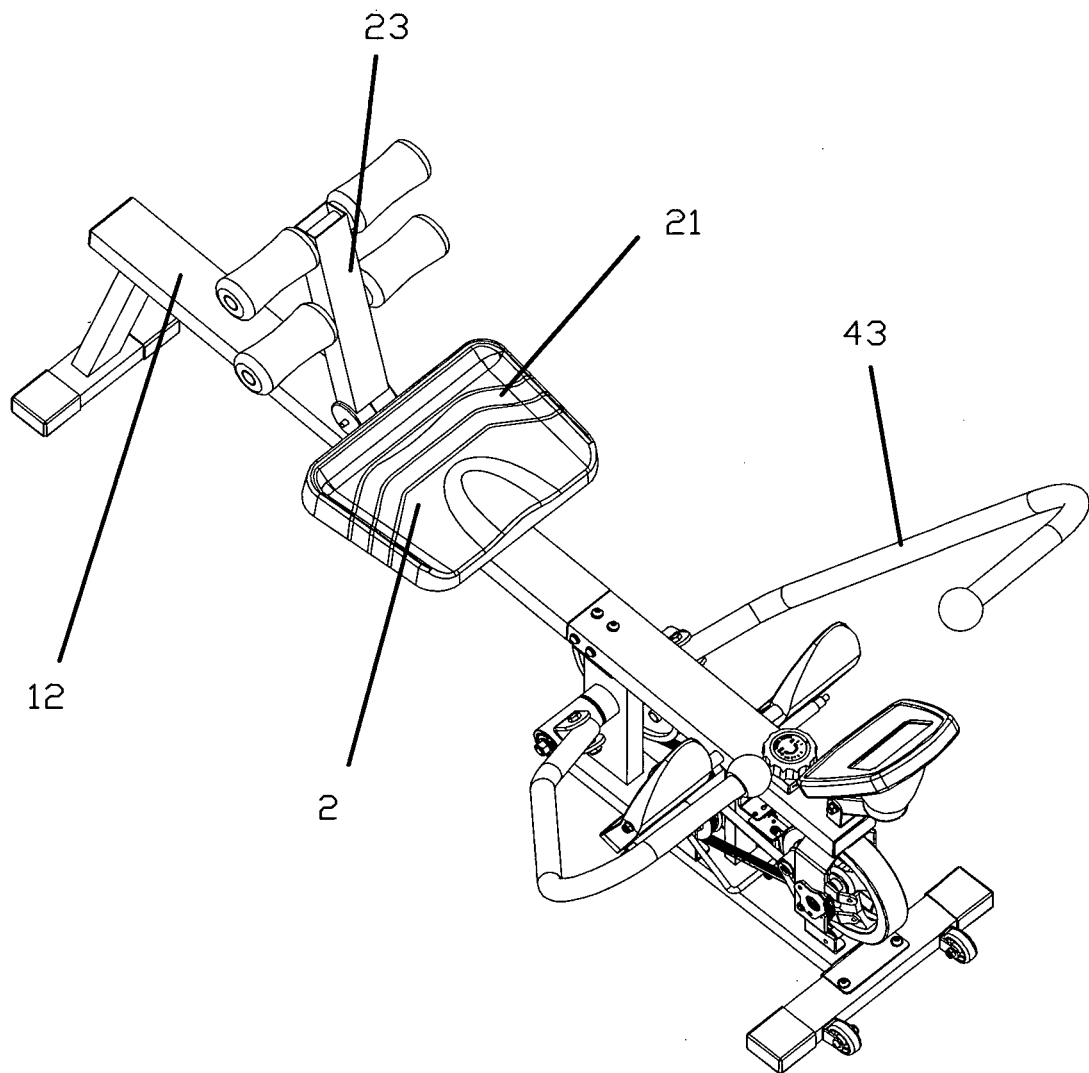


FIG.19

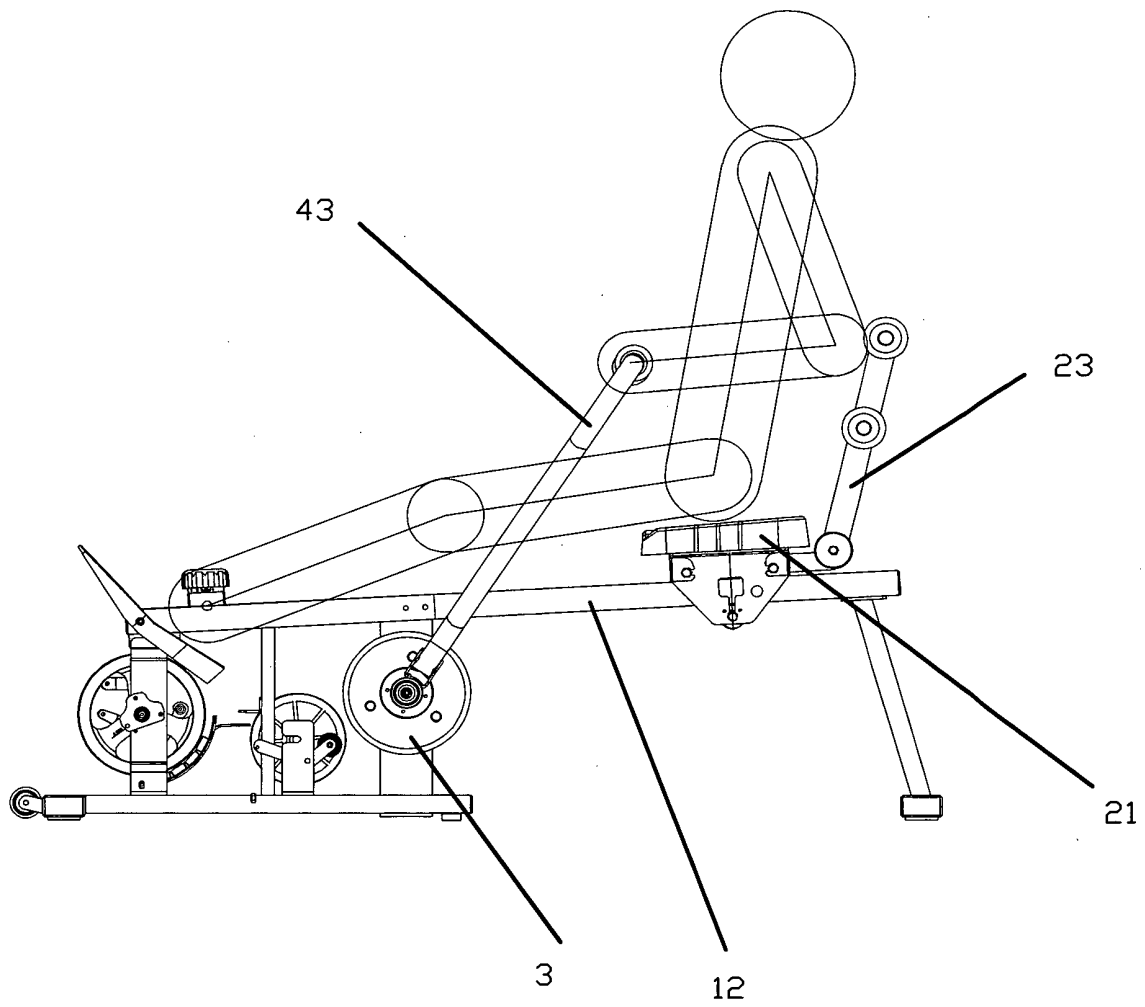


FIG.20

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/080323

A. CLASSIFICATION OF SUBJECT MATTER

A63B 21/00 (2006.01) i; A63B 23/12 (2006.01) i
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 21; A63B 22; A63B 23

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)
VEN, CPRS, CNKI: boating, rowing, sculling, damp, damping, deboost, dial, turnplate, turntable, rotor plate, revolving tray, rotating shaft, turning gear, arm, rocker, lever

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 105169616 A (XIAMEN AOLRO TECHNOLOGY CO., LTD.), 23 December 2015 (23.12.2015), claims 1-10	1-10
PX	CN 204891059 U (XIAMEN AOLRO TECHNOLOGY CO., LTD.), 23 December 2015 (23.12.2015), claims 1-10	1-10
A	CN 102441251 A (XIONG, Bao et al.), 09 May 2012 (09.05.2012), description, paragraphs [0029]-[0062], and figures 1-6	1-12
A	CN 203886152 U (TONGXIANG JIUGE SPONGE MATS CO., LTD.), 22 October 2014 (22.10.2014), the whole document	1-12
A	CN 201603335 U (XIAMEN DIANSHI TRADE CO., LTD. et al.), 13 October 2010 (13.10.2010), the whole document	1-12
A	EP 2801394 A1 (GYMGURU IP HOLDINGS LTD.), 12 November 2014 (12.11.2014), the whole document	1-12
A	US 5865713 A (HSU, H.), 02 February 1999 (02.02.1999), the whole document	1-12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search 25 July 2016 (25.07.2016)	Date of mailing of the international search report 02 August 2016 (02.08.2016)
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer LIU, Xuesong Telephone No.: (86-10) 62084957

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2016/080323

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 105169616 A	23 December 2015	None	
CN 204891059 U	23 December 2015	None	
CN 102441251 A	09 May 2012	None	
CN 203886152 U	22 October 2014	None	
CN 201603335 U	13 October 2010	None	
EP 2801394 A1	12 November 2014	US 2014336015 A1	13 November 2014
US 5865713 A	02 February 1999	DE 29709387 U1	07 August 1997

Form PCT/ISA/210 (patent family annex) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 203425451 U [0002]