(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 679 992 A1**

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

(43) Date of publication:
15.07.2020 Bulletin 2020/29

(21) Application number: **17921851.6**

(22) Date of filing: **14.08.2017**

(51) Int Cl.:
A63B 69/06 *(2006.01)* ***A63B 23/04*** *(2006.01)*

(86) International application number:
PCT/CN2017/097427

(87) International publication number:
WO 2019/033244 (21.02.2019 Gazette 2019/08)

(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: **Leiyun (Shanghai) Industrial Co., Ltd.**
Shanghai 200000 (CN)

(72) Inventor: **CHEN, Xiao**
Ji'an
Jiangxi 343400 (CN)

(74) Representative: **Ipside**
7-9 Allées Haussmann
33300 Bordeaux Cedex (FR)

(54) **WATER-RESISTANCE ROWING EXERCISE MACHINE**

(57) Provided is a water-resistance rowing exercise machine, comprising a bracket (100), a water tank (1) fixed to the bracket (100), a linkage mechanism (2), and a rotation angle adjustment mechanism. The water tank (1) is internally provided with a first impeller (11) and a second impeller (12). The first impeller (11) comprises a first plate portion (111) and a plurality of first blades (112) distributed on the periphery of the first plate portion (111). The second impeller (12) comprises a second plate portion (121) and a plurality of second blades (122) distributed on the periphery of the second plate portion (121). The rotation angle adjustment mechanism is configured to adjust a relative rotation angle between the first impeller (11) and the second impeller (12) so that the first blades (112) and the second blades (122) may approach to or depart from each other. The distance between the first blades (112) and the second blades (122) can be adjusted by adjusting the relative rotation angle between the first impeller (11) and the second impeller, so that the resistance to which the two impellers (11, 12) are subjected when rotating in the water tank (1) can be adjusted, thereby achieving the function of adjusting the magnitude of resistance of the water-resistance rowing exercise machine.

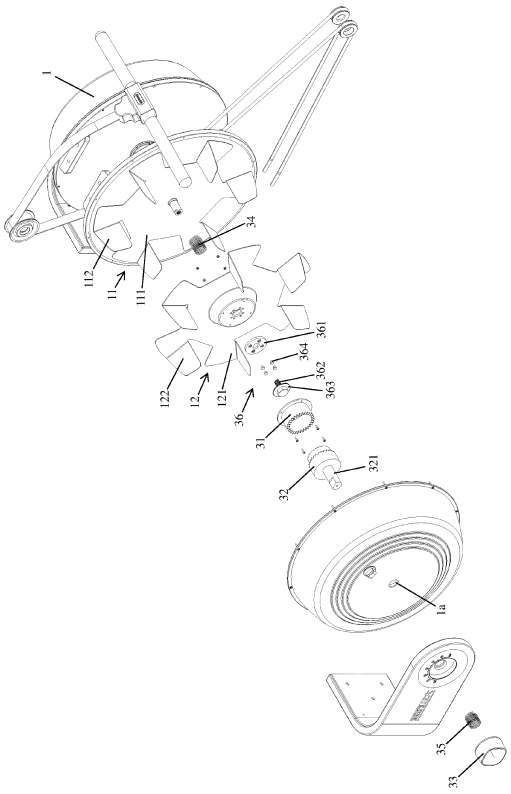

FIG. 5

EP 3 679 992 A1

Description

Technical Field

[0001] The disclosure relates to the technical field of fitness equipment, and in particular to a water-resistance rowing exercise machine.

Background of the Invention

[0002] A rowing device, also known as a rowing machine or a rowing exercise machine, is used for indoor exercise. It is a fitness device that simulates rowing on land and has significant effect on muscle strengthening of the legs, waist, upper limbs, chest, and back, and is popular among fitness people. At present, the rowing devices on the market can be divided into the following types: gravity rowing devices, rocking rowing devices, pulling rod rowing devices, wind-resistance rowing devices, magnetic-resistance rowing devices and water-resistance rowing devices. Each type of the aforementioned rowing devices has its own unique advantages and disadvantages. The water-resistance rowing device is a rowing device that appears late. When the water-resistance rowing device is used, the muscles of almost the whole body can be exercised in a short time by employing water-resistance and changes of impeller speeds so as to create a visual, acoustic and sensory effect of real rowing. Compared with other types of rowing devices, the water-resistance rowing device has a more realistic simulation experience, and is more popular with fitness people. For example, a water-resistance type rowing machine is disclosed in Chinese patent CN206228840U, and a rowing machine is disclosed in Chinese patent CN205924911 U. The existing water-resistance rowing device generally comprises a linear slide rail and a seat cushion on the linear slide rail. A water tank is provided in the extending direction of the linear slide rail. An impeller is provided in the water tank through a rotation shaft, and a number of blades are provided on the impeller. The rotation shaft is provided with a pulley that can rotate synchronously therewith. A conveyor belt wound on the pulley is connected with a handle. The pulley is also provided with an elastic rope. When the handle is pulled hard, the conveyor belt can drive the pulley to rotate, thereby driving the rotation shaft and the impeller to rotate. When the impeller rotates, the blade is subjected to the resistance of the water in the water tank, and in the meantime the elastic rope is stretched to generate tension and is wound around the pulley as the pulley rotates. When the handle is no longer pulled hard, the tension of the elastic rope causes the pulley and the rotation shaft to rotate in reverse, thereby resetting the handle to its initial state. The water-resistance rowing device in the prior art cannot be adjusted after being installed in the water tank due to its constant number of blades and inclination angle. When using a rowing device for exercising, users usually need to adjust the resistance of the rowing device for the purpose of adjusting their own exerting force based on the magnitude of the resistance, which cannot be achieved in the existing water-resistance rowing device.

Summary of the Invention

[0003] The present disclosure is intended to overcome the disadvantages in the prior art and provide a double-impeller water-resistance rowing exercise machine, in which a distance between the blades on the two impellers is adjustable to achieve the purpose of adjusting the resistance during rotation.

[0004] In order to achieve the aforementioned object, a water-resistance rowing exercise machine of the present disclosure comprises a bracket, a water tank fixed on the bracket, a linkage mechanism and a rotation angle adjustment mechanism. A first impeller and a second impeller are disposed inside the water tank. The linkage mechanism comprises a rotation shaft assembly partially inserted into the water tank and connecting the first impeller and the second impeller, a pulley fixed on a portion of the rotation shaft assembly located outside the water tank, a conveyer belt capable of being wound around the pulley, a handle connected to an end of the conveyor belt away from the pulley, and an elastic rope connected to the bracket and capable of being wound on the pulley. The first impeller comprises a first plate portion and a number of first blades distributed on the periphery of the first plate portion. The second impeller comprises a second plate portion and a number of second blades distributed on the periphery of the second plate portion. The rotation angle adjustment mechanism is configured to adjust a relative rotation angle between the first impeller and the second impeller so as to enable the first blades and the second blades to approach toward or depart from each other.

[0005] The rotation angle adjustment mechanism comprises a first gear portion fixed to the second plate portion, a second gear portion capable of approaching the first gear portion to mesh therewith and push the second plate portion to move toward the first plate portion or capable of moving away from the first gear portion to be disengaged therefrom, a knob connected to the second gear portion and located outside the water tank, a compression spring having two ends bearing against the first plate portion and the second plate portion respectively, a clamping mechanism located on a side of the second plate portion away from the first plate portion and fixed to the rotation shaft assembly. The clamping mechanism is capable of clamping the second plate portion so that the second impeller is able to rotate along with the rotation of the rotation shaft assembly, and the clamping mechanism is capable of being disengaged from the second plate portion when the second plate portion moves toward the first plate portion.

[0006] A push shaft is fixed on a side of the second gear portion away from the first gear portion, and the

push shaft is fixed to the knob after passing through a shaft hole on a side wall of the water tank. A return spring is disposed between the knob and the side wall of the water tank; the knob is configured to push the second gear portion toward the first gear portion so that the second gear portion can be meshed with the first gear portion and can continue to push the second plate portion to move close to the first plate portion, making the clamping mechanism to be disengaged from the second plate portion, and configured to rotate the second impeller after the clamping mechanism is disengaged from the second plate portion.

[0007] The clamping mechanism comprises at least one limiting post, and the second plate portion is provided with at least one group of holes corresponding to the limiting post. The group of holes comprises a plurality of limiting holes capable of accommodating the limiting post.

[0008] Each group of holes comprises two limiting holes, and an angle between two perpendicular lines from the two limiting holes to an axis of the rotation shaft assembly is 30°.

[0009] The clamping mechanism further comprises a clamping plate, a fastening screw, and a compression ring. The clamping plate is key-connected with an end of the rotation shaft assembly so that the clamping plate can rotate synchronously with the rotation shaft assembly. A cap is provided at an end of the limiting post away from the second plate portion, and the limiting post is configured to pass through a perforation hole on the clamping plate. The fastening screw is configured to be screwed to an internal threaded hole at the end of the rotation shaft assembly and press the compression ring so that the compression ring can press the cap against the clamping plate.

[0010] The second plate portion is provided with a bowl portion protruding toward a side away from the first plate portion, and the compression spring is configured to bear against the bowl portion.

[0011] The pulley comprises a first cylinder, a second cylinder coaxially sleeved outside the middle of the first cylinder, and a plurality of connection plates disposed between the first cylinder and the second cylinder and spaced apart from each other; the two ends of the elastic rope are fixedly connected to the bracket, and the middle portion of the elastic rope passes through a gap between the two adjacent connection plates; an end of the conveyor belt away from the handle is fixed to the second cylinder.

[0012] There are two water tanks. The axis of the rotation shaft assembly is horizontally arranged, and the two water tanks are arranged on two sides of the pulley.

[0013] The water-resistance rowing exercise machine further comprises a linear guide rail provided on the bracket, and a seat cushion capable of sliding along the linear guide rail is mounted on the linear guide rail.

[0014] With the above technical solutions, the water-resistance rowing exercise machine of the present disclosure can adjust the distance between the first blades and the second blades by adjusting the relative rotation angle of the first impeller and the second impeller. When the first blades and the second plates almost overlap, the resistance of the two impellers rotating in the water tank is small; when the first blades and the second blades are spaced apart from each other, the resistance of the two impellers rotating in the water tank is large. Therefore, the purpose of adjusting the magnitude of resistance of the water-resistance rowing exercise machine can be achieved by adjusting the resistance encountered by the two impellers rotating in the water tank. The water-resistance rowing exercise machine of the disclosure can adjust the water-resistance by adjusting the morphology of the two impellers, which is not disclosed in the water-resistance rowing device in the prior art. The design of two impellers in each water tank has been implemented currently, and further modification can be made by increasing the number of the impellers for adjustment.

Brief description of the Drawings

[0015]

Fig. 1 illustrates a schematic structural diagram according to an embodiment of the disclosure.

Fig. 2 illustrates a schematic structural diagram showing two water tanks and a linkage mechanism according to an embodiment of the disclosure.

Fig. 3 illustrates a schematic diagram in which a water tank and a rotation shaft assembly in Fig. 2 are shown disassembled from each other.

Fig. 4 illustrates a schematic diagram of a rotation shaft assembly and a pulley.

Fig. 5 illustrates a schematic diagram showing an exploded internal structure of a water tank in Fig. 2.

Fig. 6 illustrates an exploded schematic diagram showing an assembly portion between a knob and a second gear portion.

Fig. 7 illustrates an exploded schematic diagram showing an assembly portion between a first gear portion and a second impeller.

Fig. 8 illustrates an exploded schematic diagram showing an assembly portion between a clamping mechanism and a first impeller and a second impeller.

Fig. 9 illustrates a schematic perspective diagram of a water tank cut along an axial section thereof.

Fig. 10 illustrates a partial enlargement diagram showing part "A" in Fig. 9.

Fig. 11 illustrates a schematic diagram showing an axial section in Fig. 9.

Fig. 12 illustrates a partial enlargement diagram showing part "B" in Fig. 11.

Fig. 13 illustrates a schematic perspective diagram of a water tank cut along an axial section thereof in a state when the second gear portion is meshed with the first gear portion by pressing a knob and a limiting

post is disengaged from a limiting hole.

Fig. 14 illustrates a partial enlargement diagram of part "C" in Fig. 13.

Fig. 15 illustrates a schematic diagram showing an axial section in FIG. 13.

Fig. 16 illustrates a partial enlargement diagram of part "D" in Fig. 15.

Fig. 17 illustrates a schematic diagram showing a state where the first blades and the second blades are substantially overlapped.

Fig. 18 illustrates a schematic diagram showing a state where the second blades are separated from the first blades after the second impeller is rotated.

Fig. 19 illustrates a schematic diagram showing an installation structure of a slide rail and a telescopic plate.

Detailed Description of Embodiments

[0016] In the following, the technical solutions of the present disclosure will be described in detail with reference to the drawings and specific embodiments of the present disclosure.

[0017] As shown in Figs. 1 and 2, an embodiment of the present disclosure provides a water-resistance rowing exercise machine, which can comprise a bracket 100, two water tanks 1 fixed to the bracket 100, a linkage mechanism 2, and a rotation angle adjustment mechanism.

[0018] As shown in Figs. 3 and 4, the linkage mechanism 2 can comprise a rotation shaft assembly 21, a pulley 22, a conveyor belt 23, a conveyor belt guide wheel 231, a handle 24, an elastic rope 25 and an elastic rope guide wheel 251. The rotation shaft assembly 21 can comprise a rotation shaft 211 whose axis is horizontally arranged, and two connection shafts 212 screwed to two ends of the rotation shaft 211. The pulley 22 can comprise a first cylinder 221, a second cylinder 222 coaxially sleeved around the middle of the first cylinder 221, and a number of connection plates 223 provided between the first cylinder 221 and the second cylinder 222 and spaced apart from one another. Two ends of the elastic rope 25 are fixedly connected to the bracket 100. A middle portion of the elastic rope 25 passes through a gap 223a between the two adjacent connection plates 223, so that it can be hooked by one of the connection plates 223. The conveyor belt 23 is wound on the second cylinder 222, and one end thereof is fixed to the second cylinder 222, and the other end thereof is connected to the handle 24. When the handle 24 is pulled, the pulley 22 is rotated, so that the elastic rope 25 can be tensioned and wound around the first cylinder 221. When no pulling force is applied to the handle 24, the pulley 22 is subjected to the tension of the elastic rope 25 and is rotated reversely, so that the conveyor belt 23 can be rewound on the second cylinder 222.

[0019] As shown in Fig. 5, a first impeller 11 and a second impeller 12 are provided coaxially inside each water tank 1. The first impeller 11 can comprise a first plate portion 111 and a plurality of first blades 112 distributed on the periphery of the first plate portion 111. The second impeller 12 can comprise a second plate portion 121 and a plurality of second blades 122 distributed on the periphery of the second plate portion 121. Two ends of the rotation shaft assembly 21 are respectively inserted into the two water tanks 1, and each connection shaft 212 is fixed to one of the first impellers 11 respectively so that the first impellers 11 can always rotate synchronously with the rotation shaft assembly 21.

[0020] The rotation angle adjustment mechanism is configured to adjust the relative rotation angle between the first impeller 11 and the second impeller 12 so that the first blades 112 and the second blades 122 can be approach to or depart from each other.

[0021] Specifically, as shown in Figs. 6 and 7, the rotation angle adjustment mechanism can comprise a first gear portion 31, a second gear portion 32, a knob 33, a compression spring 34, a return spring 35, and a clamping mechanism 36. The first gear portion 31 is fixed to the second plate portion 121 on a side away from the first plate portion 111 by a fixing screw 311. A push shaft 321 is fixed on the second gear portion 32, and the push shaft 321 is fixed to the knob 33 after passing through a push shaft hole 1a on a side wall of the water tank 1. The return spring 35 is provided between the knob 33 and the side wall of the water tank 1. When the knob 33 is pressed forward, the knob 33 drives the push shaft 321 and the first gear portion 31 to move forward, so that the second gear portion 32 can be meshed with the first gear portion 31. At this time when the knob 33 is pushed forward continuously, the second gear portion 32 pushes the first gear portion 31 and the second plate portion 121 to move close to the first plate portion 111, so that the clamping mechanism 36 can be disengaged from the second plate portion 121 to release the second plate portion 121. The compression spring 34 is disposed between the first plate portion 111 and the second plate portion 121 to always bear against the second plate portion 121 so that the second plate portion 121 can be always biased in a direction away from the first plate portion 111. When the knob 33 is no longer pressed, the second plate portion 121 is reset by the elasticity of the compression spring 34, so that the clamping mechanism 36 can continue to clamp it, and the knob 33 can be reset by the elasticity of the return spring 35, and the second gear portion 32 can be disengaged from the first gear portion 31.

[0022] The clamping mechanism 36 can comprise a clamping plate 361, a fastening screw 362, a compression ring 363, and four limiting posts 364. Each of the limiting posts 364 is provided with a cap 364a. The clamping plate 361 is key-connected to the end of the connection shaft 212, so that the clamping plate 361 can rotate synchronously with the rotation shaft assembly 21. In some embodiments, the end of the connection shaft 212 is provided with a stepped portion 212a, and an insertion hole 361a corresponding to the shape of the end surface

of the connection shaft 212 is arranged in the middle of the clamping plate 361. When the end of the connection shaft 212 is inserted into the insertion hole 361a, the clamping plate 361 can rotate synchronously with the connection shaft 212. The limiting posts 364 pass through the perforations 361b on the clamping plate 361, and the fastening screw 362 is screwed into an internal threaded hole 212b on the end of the connection shaft 212, so that the fastening screw 362 can press the compression ring 363, and the compression ring 363 can press the caps 364a on the clamping plate 361, making the clamping plate 361 to be pressed on the stepped portion 212a so as not to be able to move in the axial direction of the connection shaft 212. There are four sets of hole groups 121a corresponding to the limiting posts 364 perforated on the second plate portion 121. Each set of hole groups 121a can comprise two limiting holes 121a' capable of accommodating the limiting posts 364, and an angle between perpendicular connection lines from the two limiting holes 121a' of each hole group 121a to the axis of the rotation shaft assembly 21 is 30°.

[0023] Under the action of the compression spring 34, the second plate portion 121 is pressed by the compression spring 34 and moves close to the clamping mechanism 36, so that the limiting posts 364 can be inserted into the limiting holes 121a'. At this time, the rotation shaft assembly 21 can drive the first impeller 11 and the second impeller 12 to rotate synchronously therewith. When the knob 33 is pushed to bring the second plate portion 121 to be closer to the first plate portion 111, the limiting posts 364 can disengage from the limiting holes 121a', and at this time the first impeller 11 and the second impeller 12 can rotate relative to each other. Therefore, when the knob 33 is further rotated, the knob 33 can drive the second gear portion 32, the first gear portion 31 and the second impeller 12, to rotate. When it is rotated by a rotation angle of 30°, the knob 33 is released, and then the second impeller 12 is reset under the action of the compression spring 34, so that the limiting posts 364 can enter another limiting holes 121a' and the rotation shaft assembly 21 can continue to drive the second impeller 12 to rotate.

[0024] In some embodiments, it is of course to be understood that the angle between the two perpendicular lines from the two limiting holes 121a' of each hole group 121a to the axis of the rotation shaft assembly 21 may be 30°, because the number of the first blades 112 and the second blades 122 is six respectively. If the number of the first blades 112 and the second blades 122 are set to other number, for example, two or three, then the number of the limiting holes 121a' in each hole group 121a may also be more than two, and an angle between the perpendicular connection lines from adjacent limiting holes 121a' to the axis of the rotation shaft assembly 21 may also be less than or greater than 30°.

[0025] The second plate portion 121 is provided with a bowl portion 121b protruding toward the side away from the first plate portion 111, and the compression spring 34 bears against the bowl portion 121b. The bowl portion 121b is configured to accommodate the compression spring 34, so that other portions of the second impeller 12 except the bowl portion 121b can be made closer to the first impeller 11.

[0026] As shown in Figs. 1 and 19, the water-resistance rowing exercise machine can further comprise a pedal part 105 and a linear guide rail 101. A seat cushion 102 capable of sliding along the linear guide rail 101 is mounted on the linear guide rail 101. The linear guide rail 101 is mounted on a telescopic plate 103, and a slide rail 104 is provided on the bracket 100. The telescopic plate 103 is capable of being extended or retracted on the slide rail 104. When the machine is not in use, the telescopic plate 103 can be retracted toward the inside of the bracket, thereby reducing the floor space and facilitating storage.

[0027] Obviously, the aforementioned embodiments are only examples for a clear explanation, and are not intended to limit the way of implementation. For those of ordinary skill in the art, other forms of changes or modifications can be made based on the above description. There is no need and it is impossible to exhaustively list all implementations. Any obvious changes or modifications derived from this disclosure are still within the scope of the disclosure.

Claims

1. A water-resistance rowing exercise machine, comprising: a bracket, a water tank fixed on the bracket, a linkage mechanism and a rotation angle adjustment mechanism,
   wherein a first impeller and a second impeller are disposed inside the water tank;
   the linkage mechanism comprises a rotation shaft assembly partially inserted into the water tank and connecting the first impeller and the second impeller, a pulley fixed on a portion of the rotation shaft assembly located outside the water tank, a conveyer belt capable of being wound around the pulley, a handle connected to an end of the conveyor belt away from the pulley, and an elastic rope connected to the bracket and capable of being wound on the pulley;
   the first impeller comprises a first plate portion and a number of first blades distributed on the periphery of the first plate portion;
   the second impeller comprises a second plate portion and a number of second blades distributed on the periphery of the second plate portion; and
   the rotation angle adjustment mechanism is configured to adjust a relative rotation angle between the first impeller and the second impeller so as to enable the first blades and the second blades to approach toward or depart from each other.

2. The water-resistance rowing exercise machine of claim 1, wherein the rotation angle adjustment mechanism comprises a first gear portion fixed to the second plate portion, a second gear portion capable of approaching the first gear portion to mesh therewith and push the second plate portion to move toward the first plate portion or capable of moving away from the first gear portion to be disengaged therefrom, a knob connected to the second gear portion and located outside the water tank, a compression spring having two ends bearing against the first plate portion and the second plate portion respectively, and a clamping mechanism located on a side of the second plate portion away from the first plate portion and fixed to the rotation shaft assembly;
and wherein the clamping mechanism is capable of clamping the second plate portion so that the second impeller is able to rotate along with the rotation of the rotation shaft assembly, and the clamping mechanism is capable of being disengaged from the second plate portion when the second plate portion moves toward the first plate portion.

3. The water-resistance rowing exercise machine of claim 2, wherein a push shaft is fixed on a side of the second gear portion away from the first gear portion, and the push shaft is fixed to the knob after passing through a shaft hole on a side wall of the water tank;
a return spring is disposed between the knob and the side wall of the water tank; and
the knob is configured to push the second gear portion toward the first gear portion so that the second gear portion can be meshed with the first gear portion and can continue to push the second plate portion to move close to the first plate portion, making the clamping mechanism to be disengaged from the second plate portion, and configured to rotate the second impeller after the clamping mechanism is disengaged from the second plate portion.

4. The water-resistance rowing exercise machine of claim 2 or 3, wherein the clamping mechanism comprises at least one limiting post, and the second plate portion is provided with at least one group of holes corresponding to the limiting post, and wherein the group of holes comprises a plurality of limiting holes capable of accommodating the limiting post.

5. The water-resistance rowing exercise machine of claim 4, wherein each group of holes comprises two limiting holes, and an angle between two perpendicular lines from the two limiting holes to an axis of the rotation shaft assembly is 30°.

6. The water-resistance rowing exercise machine of claim 4, wherein the clamping mechanism further comprises a clamping plate, a fastening screw, and a compression ring;
and wherein the clamping plate is key-connected with an end of the rotation shaft assembly so that the clamping plate can rotate synchronously with the rotation shaft assembly;
a cap is provided at an end of the limiting post away from the second plate portion, and the limiting post is configured to pass through a perforation hole on the clamping plate; and
the fastening screw is configured to be screwed to an internal threaded hole at the end of the rotation shaft assembly and press the compression ring so that the compression ring can press the cap against the clamping plate.

7. The water-resistance rowing exercise machine of claim 2, wherein the second plate portion is provided with a bowl portion protruding toward a side away from the first plate portion, and the compression spring is configured to bear against the bowl portion.

8. The water-resistance rowing exercise machine of claim 1, wherein the pulley comprises a first cylinder, a second cylinder coaxially sleeved outside the middle of the first cylinder, and a plurality of connection plates disposed between the first cylinder and the second cylinder and spaced apart from each other;
and wherein the two ends of the elastic rope are fixedly connected to the bracket, and a middle portion of the elastic rope passes through a gap between the two adjacent connection plates; and an end of the conveyor belt away from the handle is fixed to the second cylinder.

9. The water-resistance rowing exercise machine of claim 1, 2, 3, 7 or 8, wherein there are two water tanks; the axis of the rotation shaft assembly is horizontally arranged, and the two water tanks are arranged on two sides of the pulley.

10. The water-resistance rowing exercise machine of claim 1, 2, 3, 7 or 8, wherein the water-resistance rowing exercise machine further comprises a linear guide rail, and a seat cushion capable of sliding along the linear guide rail is mounted on the linear guide rail;
and wherein the linear guide rail is mounted on a telescopic plate;
a slide rail is provided on the bracket; and
the telescopic plate is capable of being extended or retracted on the slide rail.

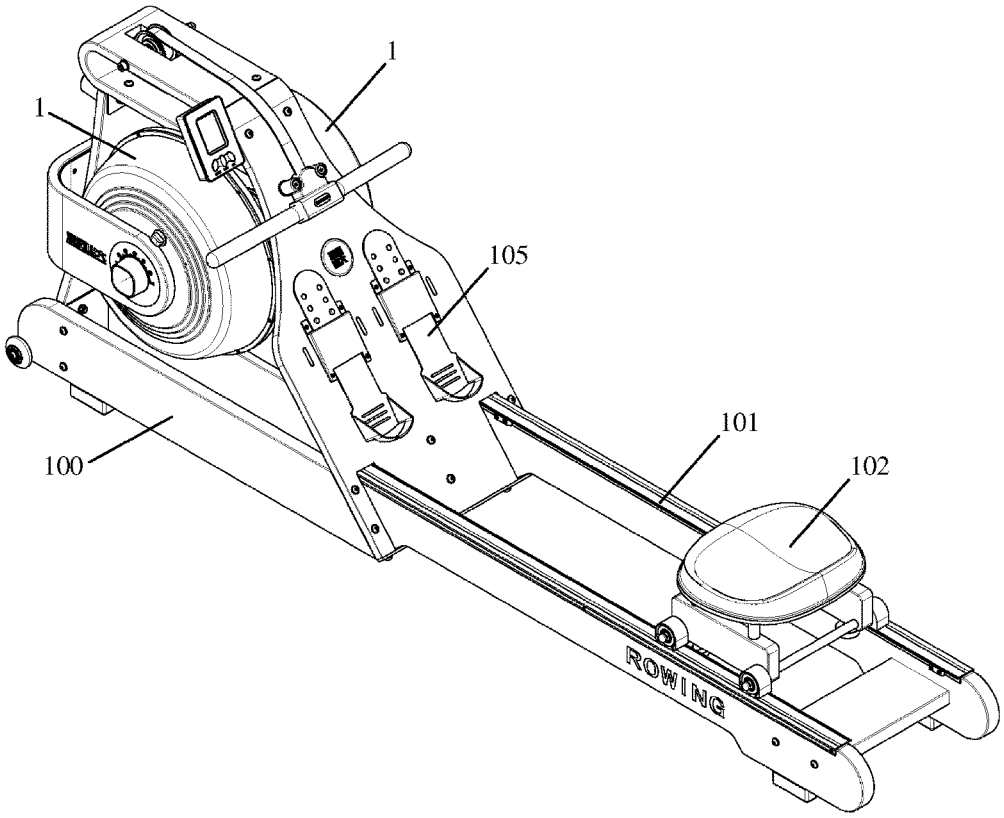

FIG. 1

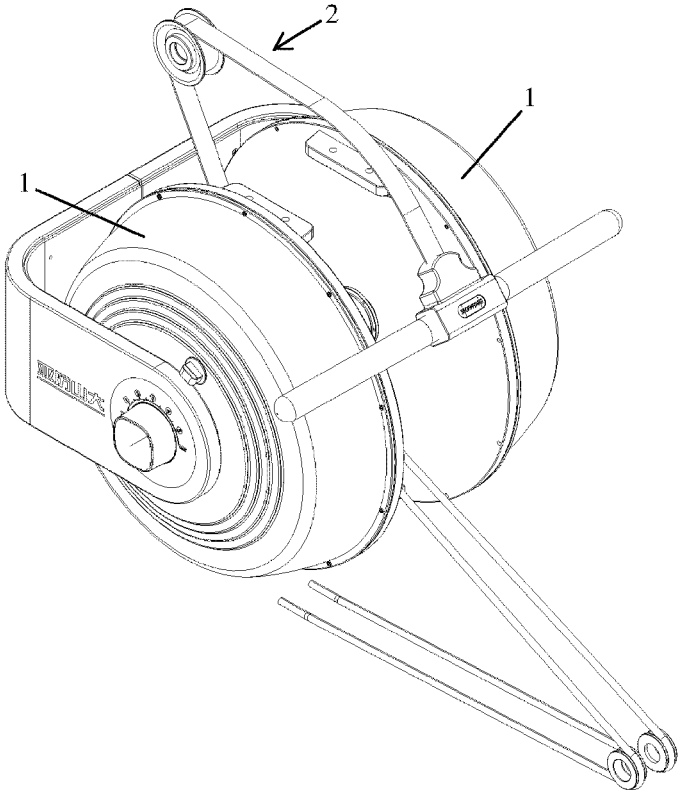

FIG. 2

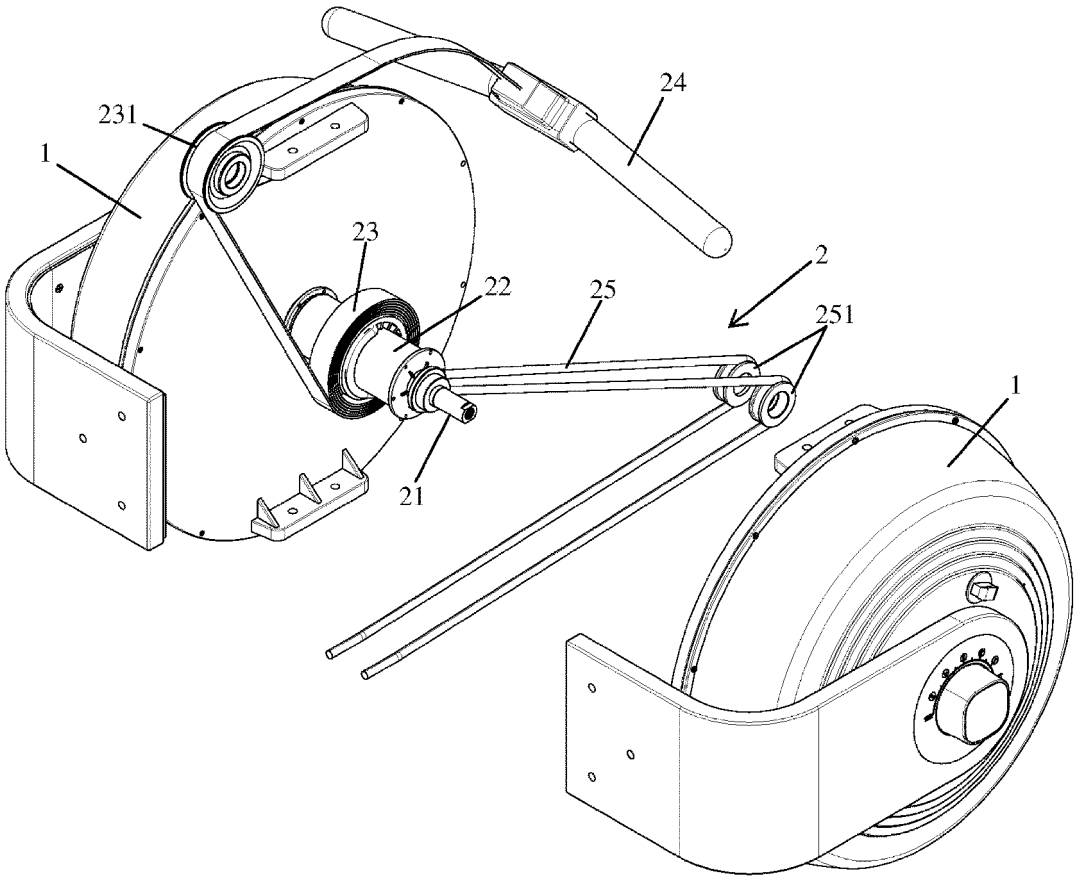
231
1
24
23
22
25
2
251
1
21

FIG. 3

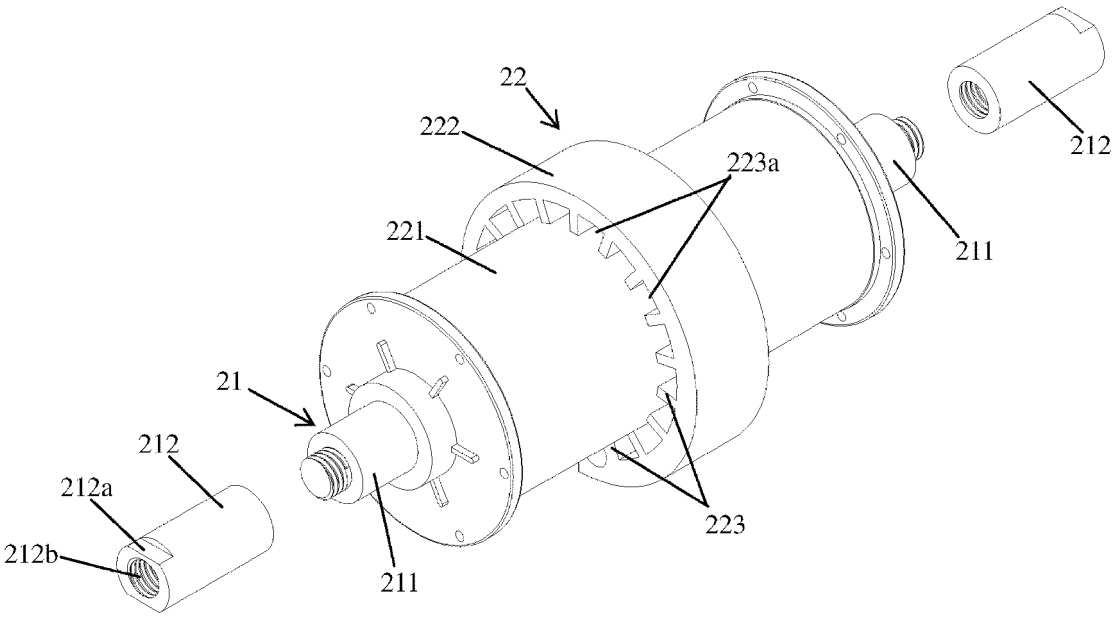
22
222
223a
212
221
211
21
212
212a
212b
223
211

FIG. 4

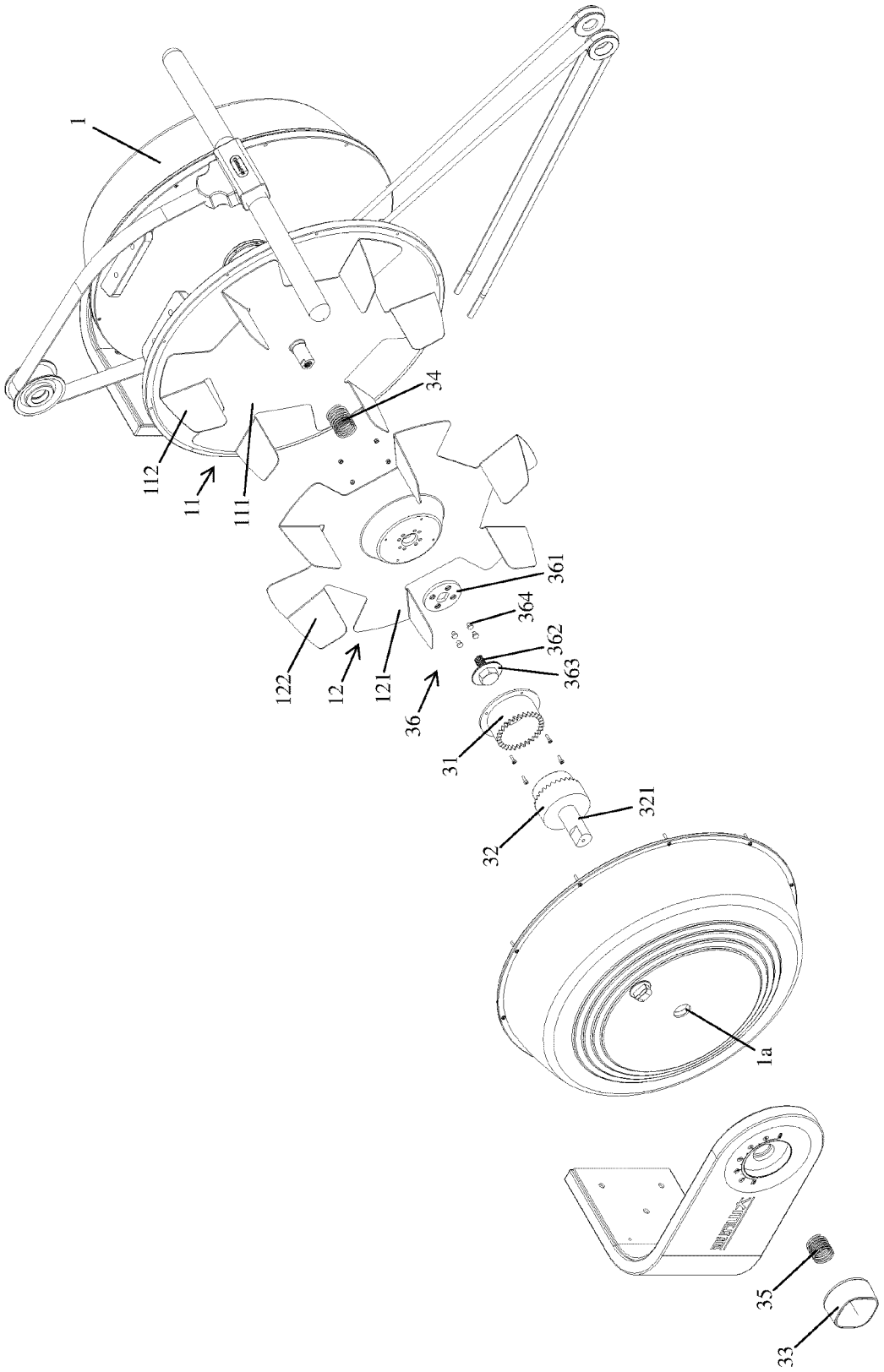

FIG. 5

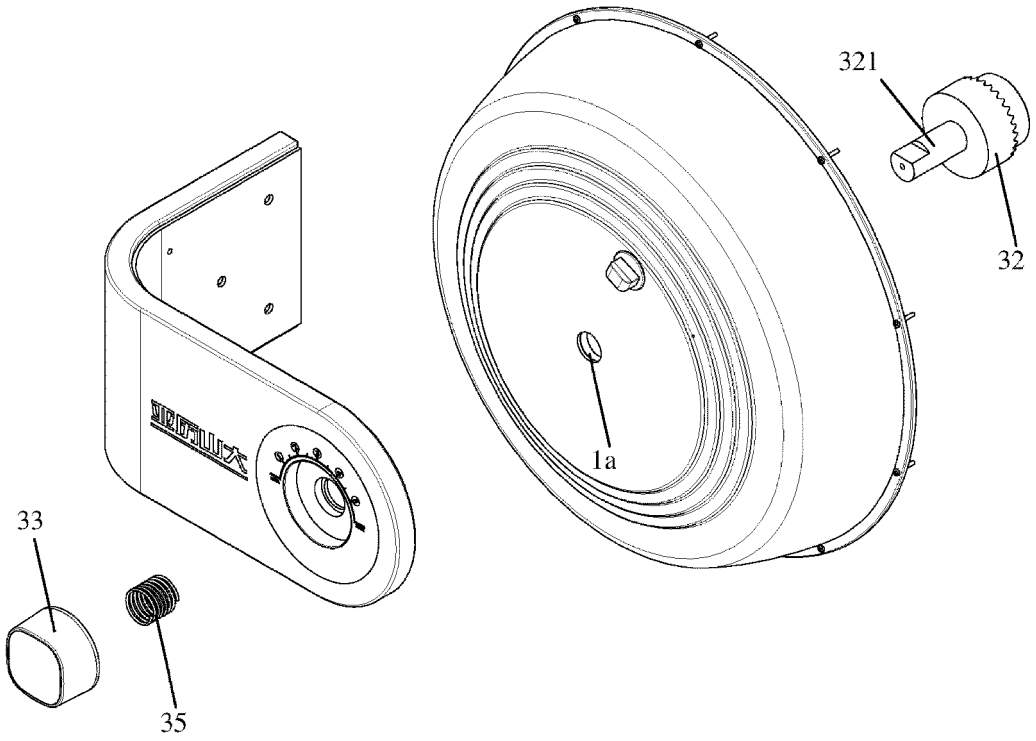

FIG. 6

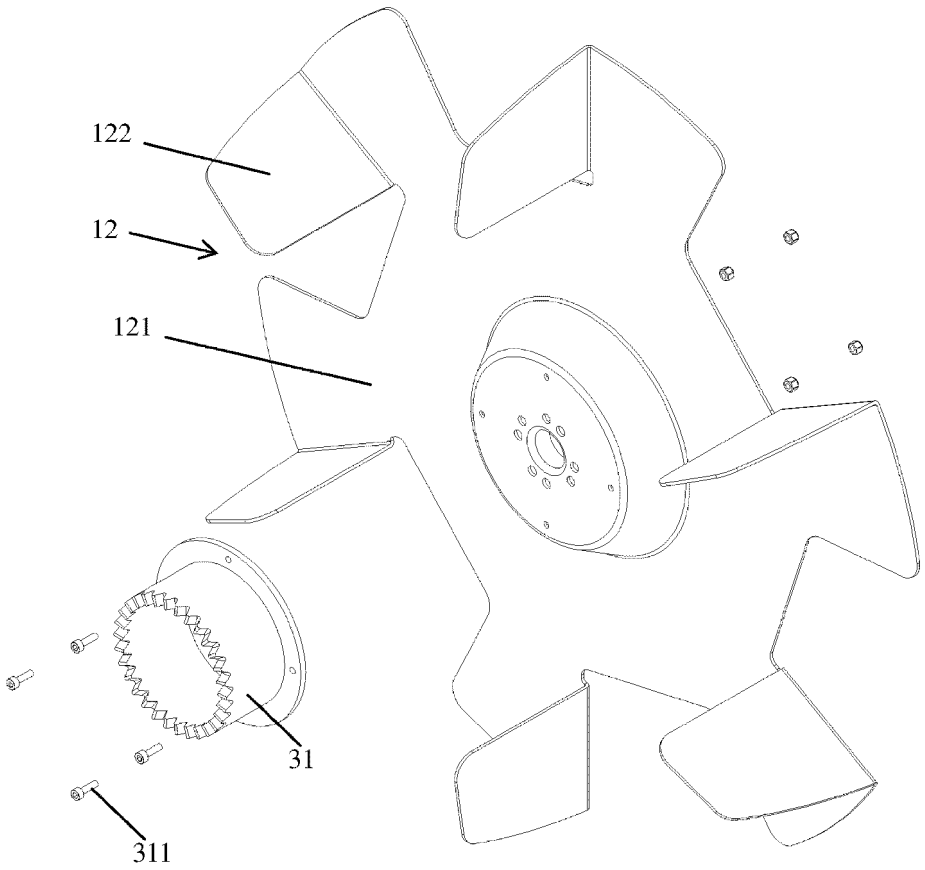

FIG. 7

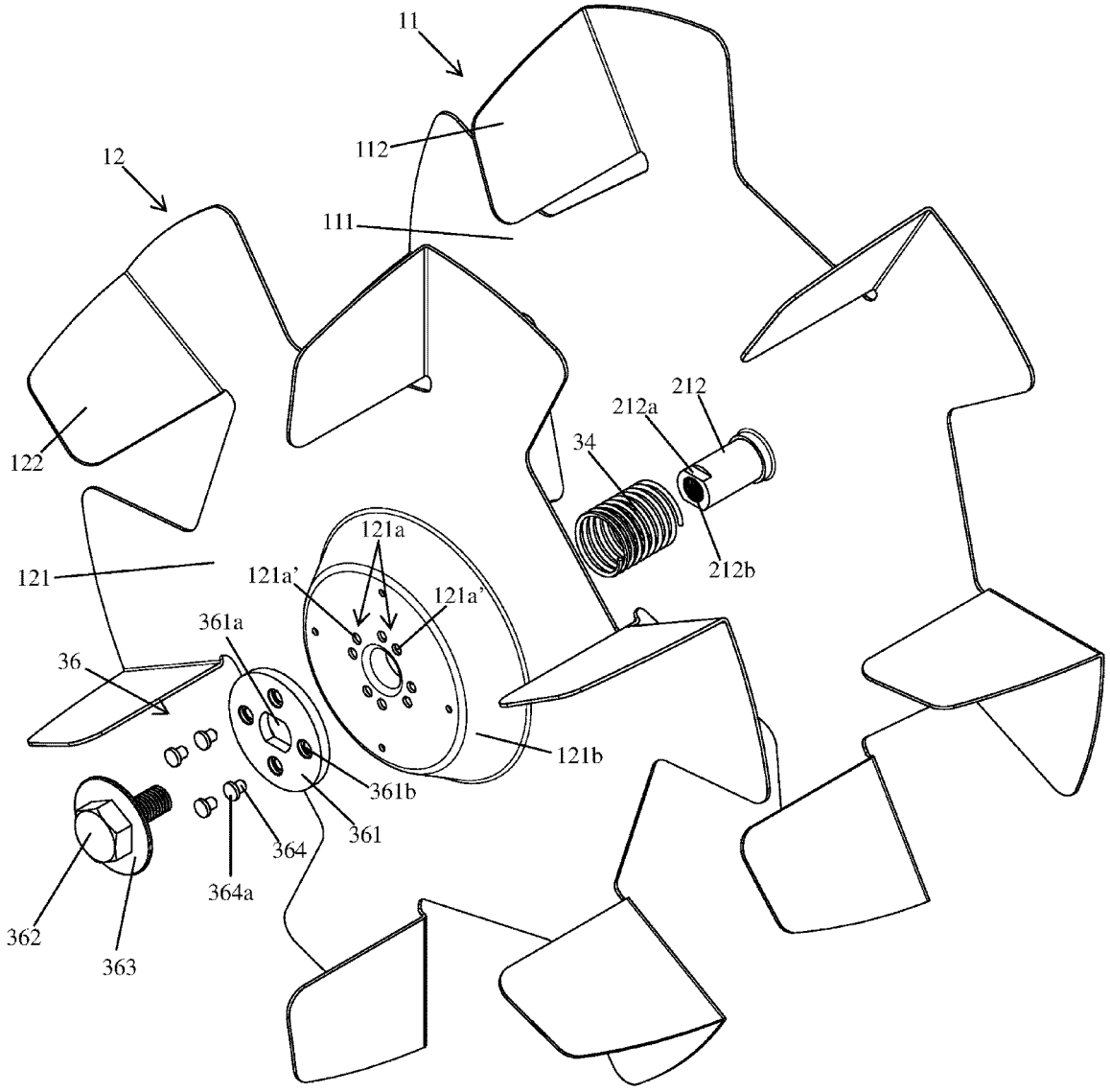
11
112
12
111
212
212a
34
122
212b
121a
121
121a'
121a'
361a
36
121b
361b
361
364
364a
362
363

FIG. 8

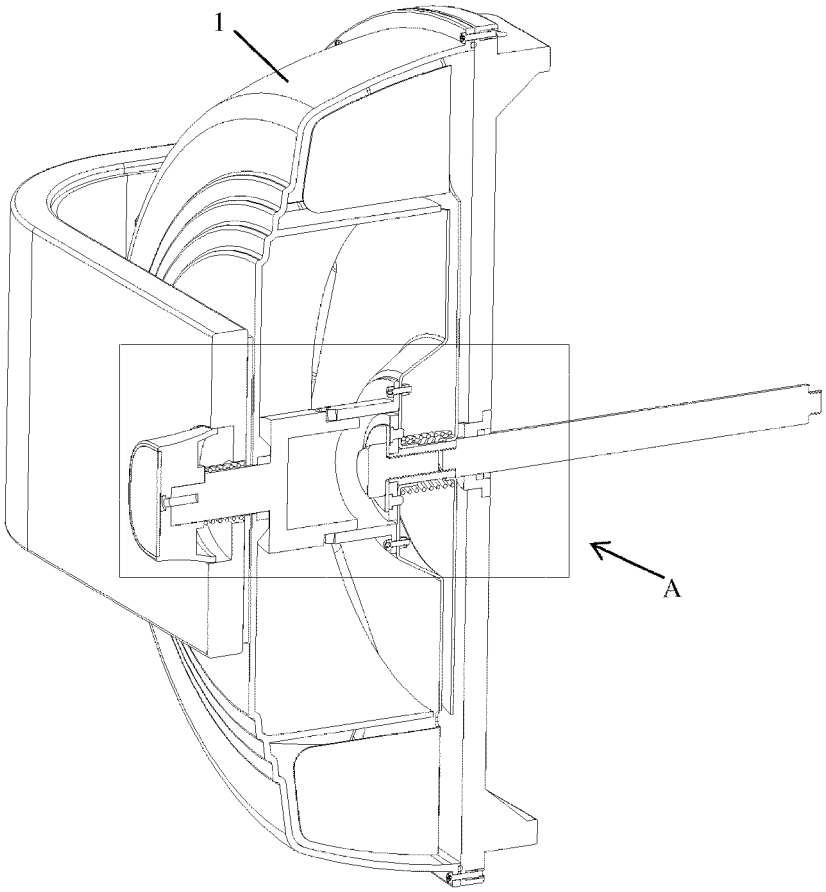

FIG. 9

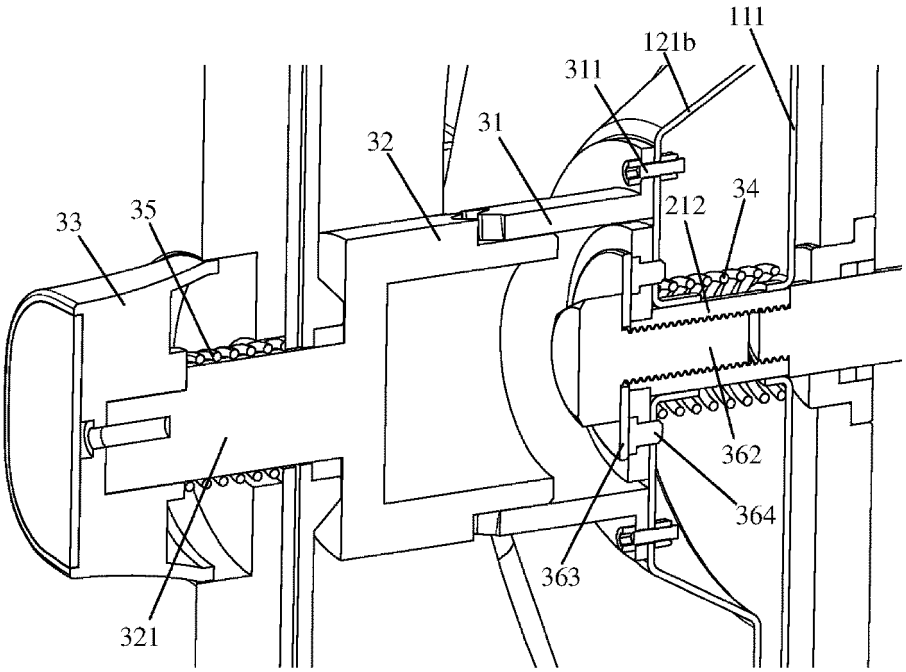

FIG. 10

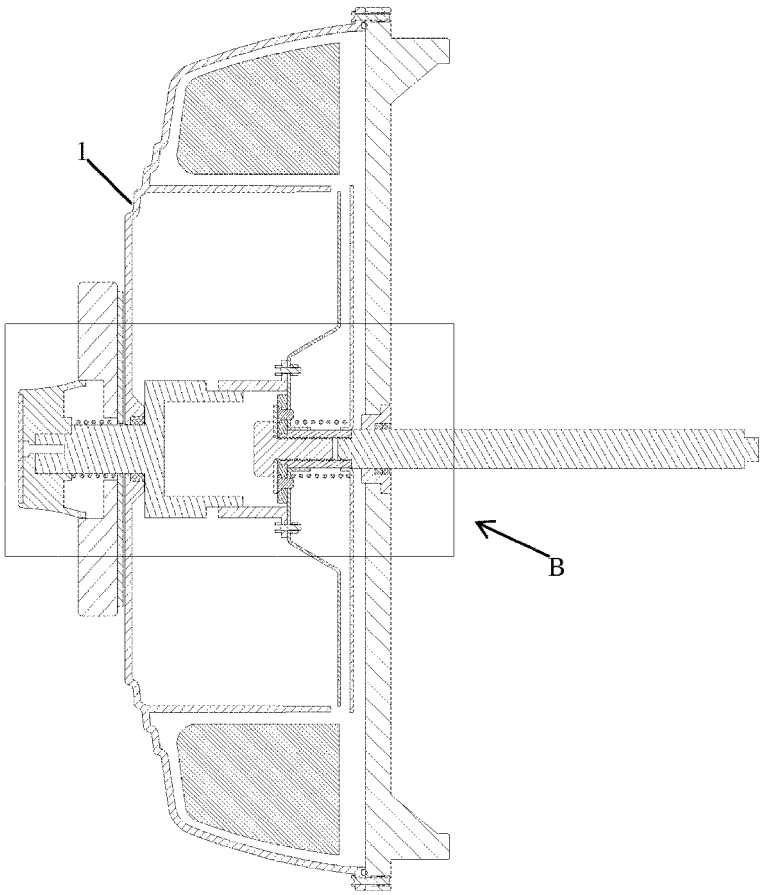

FIG. 11

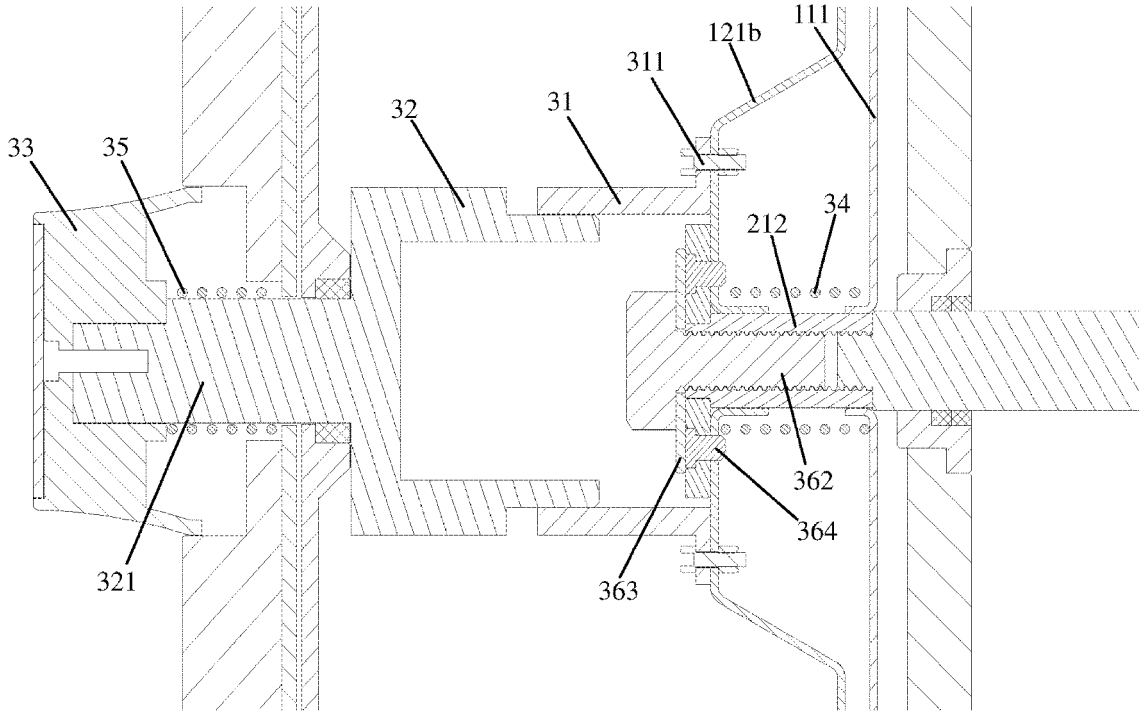

FIG. 12

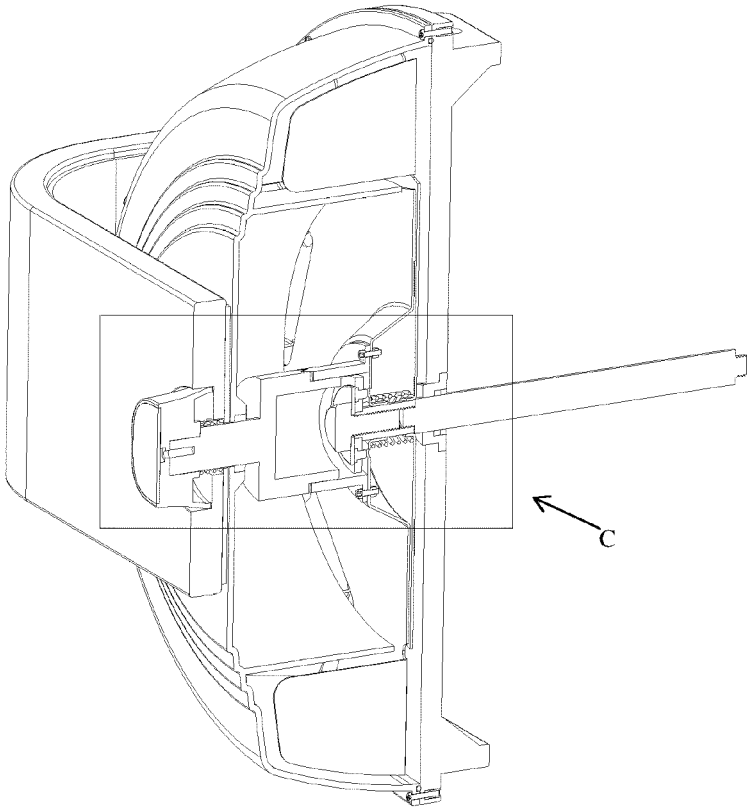

FIG. 13

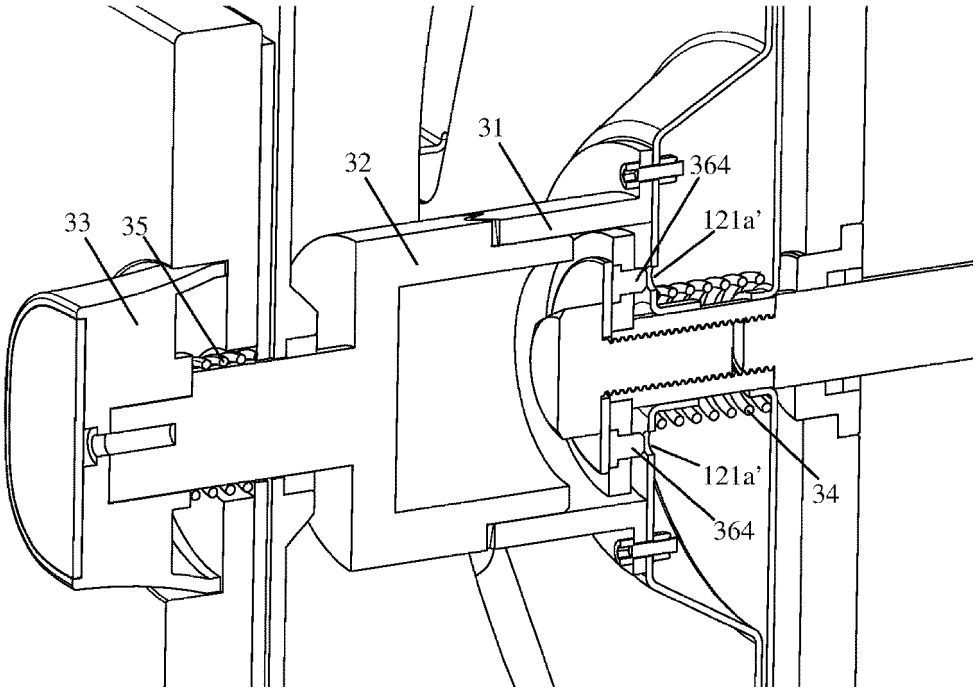

FIG. 14

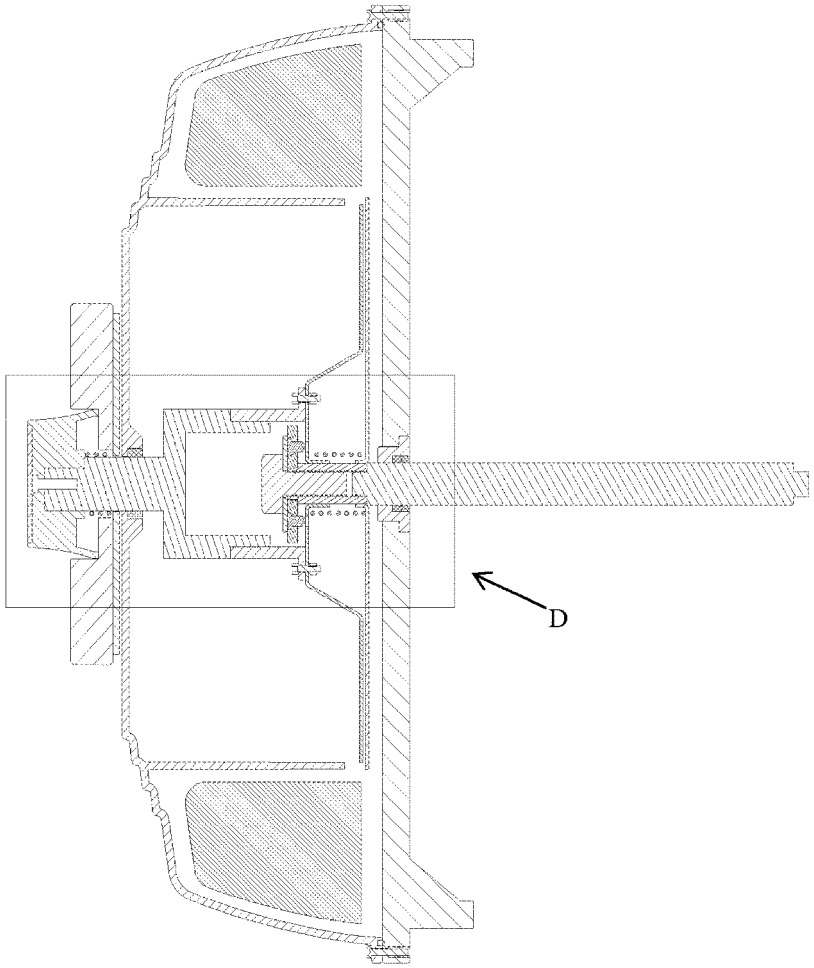

FIG. 15

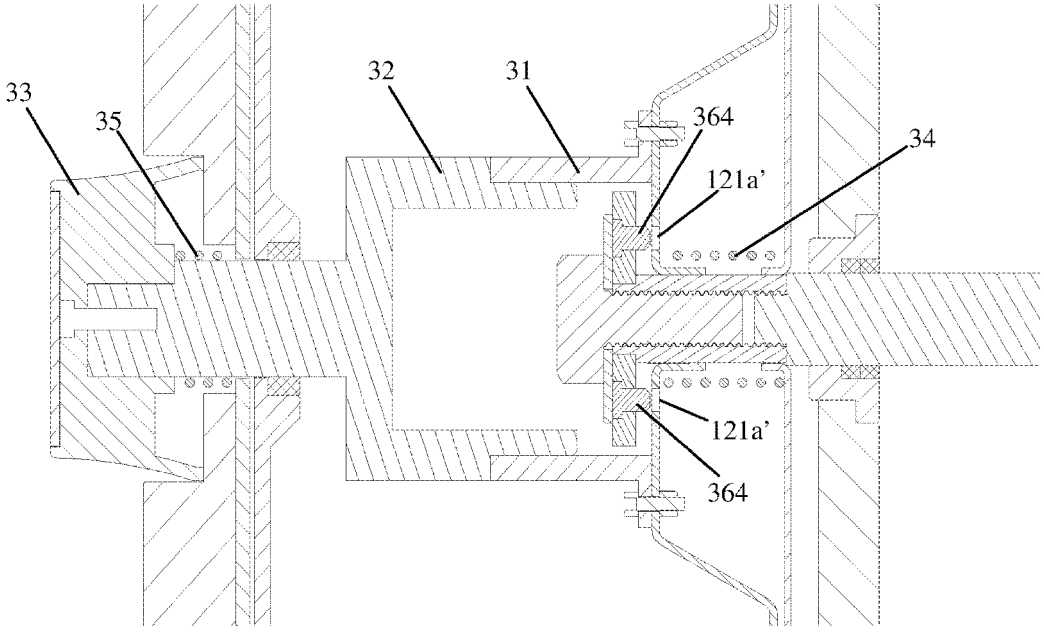

FIG. 16

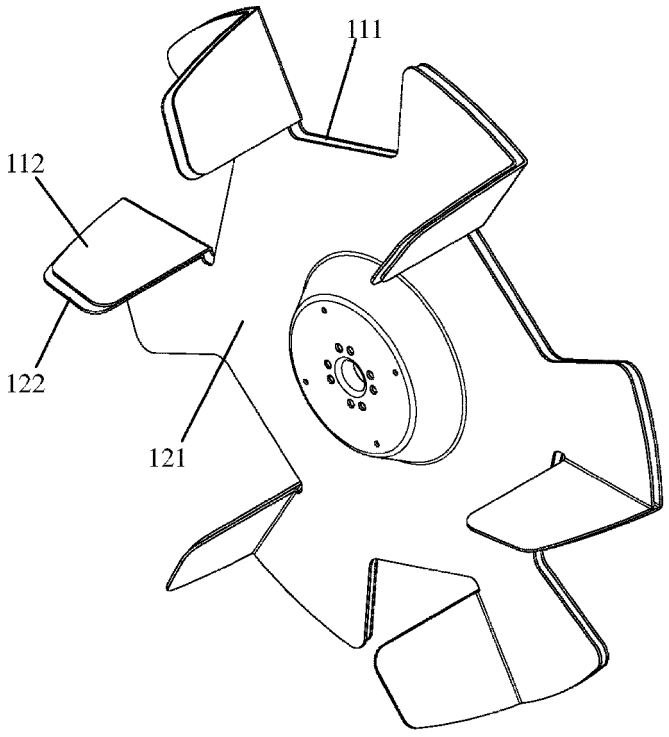

FIG. 17

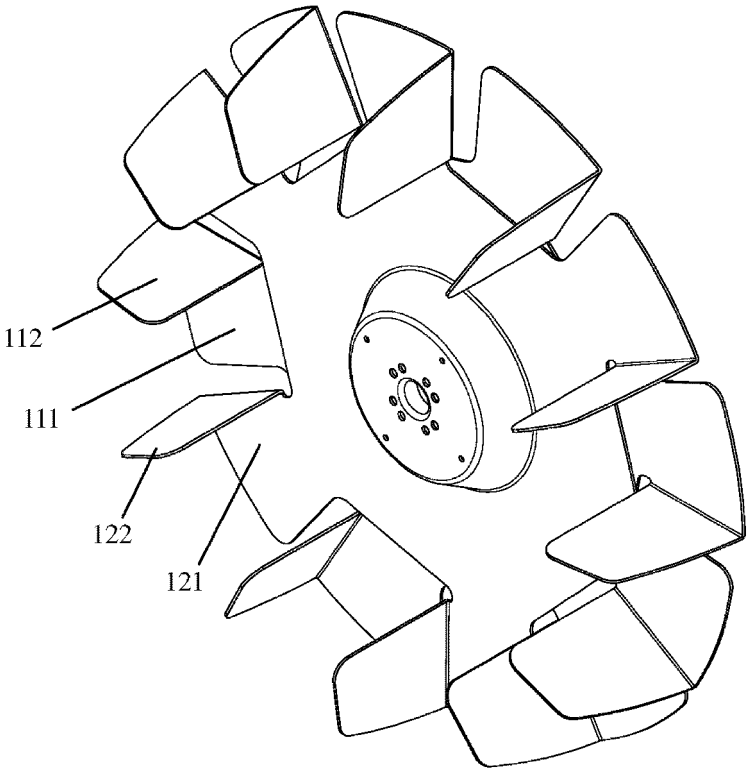

FIG. 18

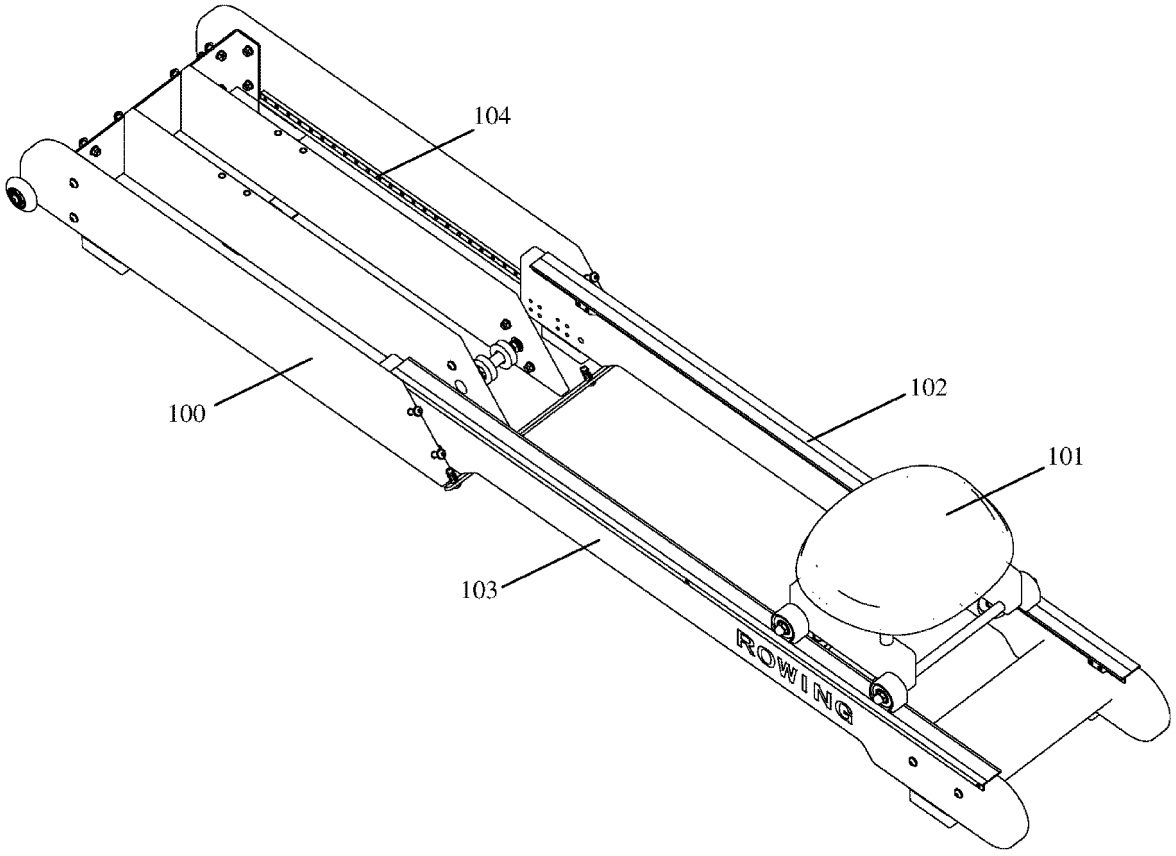

FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/097427

A. CLASSIFICATION OF SUBJECT MATTER

A63B 69/06 (2006.01) i; A63B 23/04 (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 69; A63B 23/04

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)

CNPAT, CNKI, WPI, EPODOC: 水阻, 划船, 健身, 水箱, 叶轮, 叶片, 角度, 距离, 阻力, 调节, resistance, rowing, exercise, tank, impeller, fan, vane, angle, distance, adjust+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 206228840 U (XIE, Xiaojie et al.) 09 June 2017 (09.06.2017), description, paragraphs [0024]-[0026], and figures 1, 2 and 6	1-10
A	CN 205924911 U (SHANGHAI BAOTING SPORTS GOODS CO., LTD.) 08 February 2017 (08.02.2017), entire document	1-10
A	CN 105920778 A (XIAMEN AOLRO TECHNOLOGY CO., LTD.) 07 September 2016 (07.09.2016), entire document	1-10
A	CN 106039677 A (CAI, Wenjin) 26 October 2016 (26.10.2016), entire document	1-10
A	GB 0502339 D0 (YANG LIEN CHUAN) 16 March 2005 (16.03.2005), entire document	1-10

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

* Special categories of cited documents:

"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

"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)

"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

"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

"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

"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

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2018	21 May 2018
Name and mailing address of the ISA 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 CHAI, Guorong Telephone No. (86-10) 62084951

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/097427

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 206228840 U	09 June 2017	None	
CN 205924911 U	08 February 2017	None	
CN 105920778 A	07 September 2016	None	
CN 106039677 A	26 October 2016	CN 106039677 B	16 January 2018
GB 0502339 D0	16 March 2005	GB 2422789 A	09 August 2006
		GB 2422789 A9	30 August 2006
		GB 2422789 B	10 January 2007
		US 7115077 B2	03 October 2006
		US 2006189455 A1	24 August 2006
		DE 202005003947 U1	04 August 2005
		FR 2882524 A3	01 September 2006

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 206228840 U **[0002]**
- CN 205924911 U **[0002]**