

(19)



(11)

EP 3 342 470 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
01.07.2020 Bulletin 2020/27

(51) Int Cl.:
E04H 4/14 (2006.01) A63B 69/12 (2006.01)

(21) Application number: **17157185.4**

(22) Date of filing: **21.02.2017**

(54) **SWIMMING TRAINING APPARATUS**

SCHWIMMENDE TRAININGSVORRICHTUNG

APPAREIL D'ENTRAÎNEMENT DE NATATION

(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**

(30) Priority: **27.12.2016 CN 201621444884 U**

(43) Date of publication of application:
04.07.2018 Bulletin 2018/27

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Description

BACKGROUND INFORMATION

Technical Field

[0001] The invention is related to the technical field of swimming devices, and more particularly related to a swimming training apparatus.

Background

[0002] At present for common ground pools and assembled ground pools, due to space constraints, generally only for family fun, cannot be used as swimming training purpose. Currently, swimming training devices in the market are mainly installed in ground swimming pools and include axial-flow type swimming training devices and jet type swimming training devices. The axial-flow type training devices generally use hydraulic transmission system or direct-current power supply. The hydraulic transmission devices are relatively heavy and high cost. The direct-current power supplied device is low power and low water dynamic, and therefore the training effect is not ideal. While for the above-mentioned jet-type swimming training device, the water flows are concentrated on several points and would directly hit human faces easily, thus leading to bad user experience. Besides, when the above-mentioned swimming training devices are used, a manual vacuuming action is required to activate the swimming training devices to realize a water circulation. Document FR 2 918 290 A1 proposes an apparatus comprising a turbine unit with an axial thrust propeller and an electric motor unit coupled with a hydraulic pump, wherein the turbine unit is immersed in water and the electric motor unit and hydraulic pump are on land and wherein the hydraulic pump is connected to the turbine unit by means of hydraulic hoses. Document DE 26 06 919 A1 proposes a swimming training apparatus comprising an upper motor casing part and a lower pump casing part, wherein the pump casing part may be immersed in water. Document JP H05 76632 A proposes an apparatus to induce water flow in a pool. Document US 2007/039092 A1 proposes a swimming machine operated by a hydraulic pump and hydraulic motor.

SUMMARY

[0003] In view of the disadvantages of the prior art described above, the instant disclosure provides a swimming training apparatus for solving the problem of bad training effect in the prior art.

[0004] The embodiment of the instant disclosure provides a swimming training apparatus as claimed in claim 1 that includes a drive mechanism driven with electricity and a pumping execution mechanism. The drive mechanism and the pumping execution mechanism are disposed separately and spaced apart. The drive mechanism

and the pumping execution mechanism are connected by a connection pipeline.

[0005] The drive mechanism comprises a swimming pump and a power distribution box. The pumping execution mechanism comprises a first pneumatic switch controlling the turning-on and turning-off of the swimming pump, a filter mechanism with a filter pump and a jet connector, the connection pipeline comprising a control pipeline, an outlet pipe and an inlet pipe. The first pneumatic switch is connected to the distribution box by the control pipeline. An inlet end of the outlet pipe is connected to the swimming pump. An outlet end of the outlet pipe is connected to the jet connector, an inlet of the inlet pipe is connected to the filter mechanism, and an outlet of the inlet pipe is connected to the swimming pump.

[0006] The pumping execution mechanism is enclosed in a first housing, the swimming pump and the power distribution box being of one-piece construction.

[0007] The pumping execution mechanism is enclosed in a first housing, power distribution box and the swimming pump enclosed in a second housing, the connection pipeline disposed in a third housing, the first housing and the second housing both connected to the third housing.

[0008] A bearing plate and a height adjustment structure for lifting the bearing plate are included in the second housing, the swimming pump and the distribution box both disposed on the bearing plate.

[0009] The height adjustment structure comprises an upper housing and a lower housing formed the second housing and a rotation adjustment bolt distributed at each edge of the second housing, the bearing plate fixedly connected to the upper housing; a thread hole included in the upper housing, one end of the rotation adjustment bolt disposed in the thread hole, the other end of the rotation adjustment bolt abutted against the lower housing, the rotation adjustment bolt included with a rotation sleeve, one end of the sleeve rotatably connected to the upper housing, and the rotation of the sleeve driven the rotation adjustment bolt to move up and down in the thread hold, and then driven the bearing plate moved up and down.

[0010] The height adjustment structure comprises a rotation wheel deposited outside the second housing, a thread pillar included in the thread hole at the lower part of the second housing and a wheel disc connected to the thread pillar, the bearing plate fixedly connected to the top of the wheel disc, the rotation wheel engaged with the wheel disc, and the rotation of the wheel driven the thread pillar to move up and down in the thread hole, and then driven the bearing plate moved up and down.

[0011] The second housing is connected to a support rod for connecting the second housing to a swimming pool.

[0012] The outlet end of the outlet pipe is connected to the jet connector via an extension pipe having a threaded outer surface, the outlet end having internal threads matched with the external threads of the extension pipe and the outlet end connected to a hoop for fixing the outlet

pipe and the extension pipe.

[0013] The jet connector comprises an adjustment mechanism for adjusting water yield, the adjustment mechanism comprising a fixed first pipe and a second pipe connected with the first pipe, the first pipe having a columnar plug core, a cylindrical inner pipe wall and an arc-shaped outer pipe wall, all arranged in a spaced manner from inside to outside along a radial direction on the first pipe, and the space between the plug core and the inner pipe wall communicated with the main water outlet pipe; the second pipe comprising a rotatable main pipe and an auxiliary pipe sleeved on the main pipe by threads, the auxiliary pipe having an arc-shaped pipe wall, which fixedly connected with the outer pipe wall, the main pipe having a radiated flared portion inserted between the plug core and the inner pipe wall, the maximum outer diameter of the flared portion equal to the inner diameter of the inner pipe wall, and changing the relative position between the flared portion and the plug core by rotating the main pipe and thereby adjusting the amount of water inlet.

[0014] The main pipe is formed by two pipe sections by ultrasonic welding, one end of one pipe section having the flared portion, the outer surface of the other end of one pipe section having a threaded section which is screwed to the auxiliary pipe, and the outer surface of the other pipe section having a rotating part protruding radially.

[0015] The inner pipe wall, the flaring part, the outer pipe wall and the arc pipe wall are enclosed to form an air inlet space, communicating with the inlet pipe of the control pipeline, the inlet pipe further included with a second pneumatic switch for adjusting air inflow.

[0016] The swimming training apparatus is disposed in an overground pool or an underground pool.

[0017] The filter mechanism comprises the filter pump, the second pneumatic switch controlling the turning-on and turning-off of the filter pump and a filter core included in the inlet pipeline of the filter pump, the outlet pipeline of the filter pump connected to the outlet pipe, and the second pneumatic switch connected to the power distribution box by the control pipeline.

[0018] In an alternative embodiment not subject to this invention, the drive mechanism is a drive motor, the pumping execution mechanism comprising an impeller and a water guiding member included above the impeller for changing the water outlet direction, the drive motor and the pumping execution mechanism included in independent housings, and the drive motor connected to the impeller by the transmission mechanism.

[0019] An inlet is included at the lower part of the housing of the pumping execution mechanism, an outlet included at the upper sidewall of the housing of the pumping execution mechanism, and a filter screen included at the inlet and outlet, respectively.

[0020] The water guiding member comprises a plurality of arc water guiding sheets distributed in a ladder-like form.

[0021] The drive motor and the pumping execution

mechanism are included side by side and the transmission mechanism is a belt transmission mechanism.

[0022] An output shaft of the drive motor is connected to the power shaft of the belt transmission mechanism by a coupler, a hole for the power shaft to pass through included on the housing of the drive motor, and a lip-like seal included between the power shaft and the hole wall of the hole.

[0023] A separator is included in the housing of the drive motor, the drive motor placed in an independent cavity enclosed by the separator and the housing, a hole for the output shaft of the drive motor to pass through included on the separator, and a seal included between the output shaft and the hole wall.

[0024] A driven shaft of the belt transmission mechanism is connected to the shaft of the impeller by a coupler.

[0025] A hole for the driven shaft to pass through is included in the housing of the pumping execution mechanism and a lip seal is included between the driven shaft and the hole wall.

[0026] The drive motor and the pumping execution mechanism are arranged side by side and the transmission mechanism is a gear transmission mechanism.

[0027] The drive motor is arranged above the pumping execution mechanism and the transmission mechanism is a gear transmission mechanism.

[0028] A support frame is arranged on an outer wall of the housing of the pumping execution mechanism.

[0029] As mentioned above, the swimming training apparatus according to the invention has the following beneficial effects: the separation of the drive mechanism and the pumping execution mechanism ensures the separation of water and power in the swimming training apparatus and thus ensures the safety in use of the swimming training apparatus, besides, there is no need of manpower to initially start the water cycle, i.e., water cycling effects may be formed as long as the swimming training apparatus started.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030]

Fig. 1 is an overall schematic diagram of an swimming training apparatus according to a first embodiment of the invention.

Fig. 2 is an internal structure schematic diagram of the swimming training apparatus according to the first embodiment of the invention.

Fig. 3 is a shaft side view of the swimming training apparatus according to the first embodiment of the invention.

Fig. 4 is a schematic diagram of an swimming training apparatus according to a second embodiment of the invention.

Fig. 5 is an internal structure schematic diagram of the swimming training apparatus according to the second embodiment of the invention.

Fig. 6 is a schematic diagram of a height adjustable mechanism in the swimming training apparatus according to the second embodiment of the invention. Fig. 7 is a schematic diagram of an swimming training apparatus according to a third embodiment of the invention.

Fig. 8 is a schematic diagram of a height adjustable mechanism in the swimming training apparatus according to the third embodiment of the invention.

Fig. 9 is a schematic diagram of a jet connector according to the invention.

Fig. 10 is a section view of the jet connector according to the invention.

Fig. 11 is a partial enlargement view of Fig. 10.

Fig. 12 is a schematic diagram of an swimming training apparatus according to an embodiment not subject to the invention.

Fig. 13 is an internal structure schematic diagram of an swimming training apparatus according to an embodiment not subject to the invention.

Fig. 14 is an overall schematic diagram of the swimming training apparatus according to the embodiments shown in figures 12 and 13.

Fig. 15 is a schematic diagram of a first operation status of an swimming training apparatus according to the invention.

Fig. 16 is a schematic diagram of a second operation status of an swimming training apparatus according to the invention.

Fig. 17 is a schematic diagram of a second operation status of an swimming training apparatus according to the invention.

DETAILED DESCRIPTION

[0031] The embodiments of the invention will be described by way of specific embodiments, and those skilled in the art may readily understand other advantages and effects of the invention from the disclosure of the description.

[0032] As shown in Figs. 1 to 17, the instant disclosure provides a swimming training apparatus that includes a drive mechanism driven with electricity and a pumping execution mechanism. The drive mechanism and the pumping execution mechanism are disposed separately and spaced apart. The drive mechanism and the pumping execution mechanism are connected by a connection pipeline or a transmission mechanism. The separation of the drive mechanism and the pumping execution mechanism ensures the separation of water and power in the swimming training apparatus and thus ensures the safety in use of the swimming training apparatus.

First Embodiment

[0033] Fig. 1 is an overall schematic diagram of an swimming training apparatus according to a first embodiment. Fig. 2 is an internal structure schematic diagram

of the swimming training apparatus according to the first embodiment. Fig. 3 is a shaft side view of the swimming training apparatus according to the first embodiment. The swimming training apparatus in this embodiment is a jet swimming device (i.e., JET swimming device). In this embodiment, the drive mechanism comprises a swimming pump 5 and a power distribution box 4. The pumping execution mechanism comprises a first pneumatic switch 14 controlling the turning-on and turning-off of the swimming pump, a filter mechanism with a filter pump 9 and a jet connector 11. The connection pipeline comprises a control pipeline 6, an outlet pipe 8 and an inlet pipe 7. The first pneumatic switch 14 is connected to the distribution box 4 by the control pipeline 6. The inlet end of the outlet pipe 8 is connected to the swimming pump 5, and the outlet end of the outlet pipe 8 is connected to the jet connector 11. The inlet of the inlet pipe 7 is connected to the filter mechanism, and the outlet of the inlet pipe 7 is connected to the swimming pump 5. In this embodiment, the swimming pump and the power distribution box form the drive mechanism, which is independent of the pumping execution mechanism and ensures safety. In addition, the filter mechanism has a filter pump, and the swimming pump can be evacuated by the filter pump and then ensure the rapid use of the swimming pump.

[0034] As a more particular embodiment of the first embodiment, as shown in Fig. 1, the pumping execution mechanism is enclosed in a first housing 1. The swimming pump 5 and the power distribution box 4 are of one-piece construction and enclosed in a second housing 2. In this embodiment, the first housing 1 and the second housing 2 are independent housings and are connected by a connection pipeline only, which ensures the separation of water and power and ensures the safety in use of the swimming training apparatus.

[0035] Furthermore, as shown in Fig. 2, the filter mechanism further comprises the filter pump 9, a second pneumatic switch 14 controlling the turning-on and turning-off of the filter pump 9 and a filter core 10 included in the inlet pipeline of the filter pump 9. The outlet pipeline 15 of the filter pump 9 is connected to the inlet pipe 7. The second pneumatic switch 14 is connected to the power distribution box 4 by the control pipeline 6.

[0036] When the swimming training apparatus in this embodiment is installed for use initially, the second pneumatic switch 14 is pressed to start up the filter pump 9, the filter pump 9 pumps the water in the swimming pool to the inlet pipe 7 by the filter core and further into the swimming pool by the swimming pump 5. The process expels the air in the swimming pump 5, i.e., the swimming pump 5 is evacuated and the swimming pump 5 is brought into a normal operation state. When the filter pump 9 operates to a preset time, the filter pump 9 stops automatically, and the swimming pump 5 starts to operate by the first pneumatic switch 13, and at this moment, water flows into the swimming pump 5 by the inlet pipe 7 and ejects into the swimming pool from the jet connector 11 by the outlet pipe 8. The continuous water cycle makes

the swimming pool form a flowing "river" and to facilitate swimming training. Wherein the water in the inlet pipe 7 is mainly directly drawn from the swimming pool and a small amount of water comes into the outlet pipeline 15 of the filter pump 9 by the inlet pipeline of the filter pump 9 and converges to the inlet pipe 7.

[0037] In this embodiment, the filter mechanism may filter the water in the swimming pool directly. When the second pneumatic switch 13 is pressed, the filter pump 9 started, the water flows from the swimming pool through the filter core 10, the filter pump 9, the outlet pipeline 15 of the filter pump 9, the inlet pipe 7, the swimming pump 5, and the outlet pipe 8 to the swimming pool, to achieve the filtering of the pool.

[0038] In order to facilitate the installation and use of the swimming training apparatus in this embodiment, as shown in Fig. 3, an adjustable groove 32 is included at the back of the first housing 1, and a ladder-like neck included in the adjustable groove, one end of an angling strut supported in the neck and hinged with the first housing 1, the other end of the angling strut included with a support plate 33, and the distance between the support plate 33 and the first housing 1 may be adjusted according to the support angle of the angling strut. During installation, the support plate 33 is supported on the inner wall of the swimming pool, and the supporting plate 33 can be adjusted so that the in situ swimming pool of the present disclosure can be applied to swimming pools of different wall thickness.

Second Embodiment

[0039] Fig. 4 is an overall schematic diagram of a swimming training apparatus according to a second embodiment and Fig. 5 is a particular structure schematic diagram of the swimming training apparatus according to the second embodiment. The swimming training apparatus in this embodiment is also a jet swimming device. As shown in Fig. 4, the differences between this embodiment and the first embodiment is that the pumping execution mechanism in this embodiment enclosed in the first housing 1, the power distribution box 4 and the swimming pump 5 enclosed in the second housing 2, the connection pipeline included in a third housing 17. The first housing 1 and the second housing 2 are both connected to the third housing 17. In this embodiment, the connection pipeline is also enclosed so that the first housing 1 and the second housing 2 form an one-piece construction by the third housing 17, so it is clean in appearance and easy to transport.

[0040] Furthermore, in the second embodiment, a bearing plate 164 and a height adjustable structure 16 for lifting the bearing plate 164 are included in the second housing 2. The swimming pump 4 and the distribution box 5 are both included on the bearing plate 164. In this embodiment, the height of the swimming pump 4 and the power distribution box 5 could be adjusted by lifting the bearing plate 164 to adapt to swimming pools with various

wall heights.

[0041] Furthermore, the second housing is connected to a support rod (not shown) for connecting the second housing to a swimming pool to secure the position between the swimming training apparatus and the swimming pool in this embodiment.

[0042] In order to facilitate height adjustment, in this embodiment, the height adjustment structure 16 comprises an upper housing and a lower housing formed the second housing and a rotation adjustment bolt 161 distributed at each edge of the second housing. The bearing plate 164 is fixedly connected to the upper housing. A thread hole is included in the upper housing, one end of the rotation adjustment bolt 161 disposed in the thread hole, the other end of the rotation adjustment bolt 161 abutted against the lower housing. The rotation adjustment bolt 161 is included with a rotation sleeve 162, one end of the sleeve 162 rotatably connected to the upper housing. The rotation of the sleeve 162 drive the rotation adjustment bolt 161 to move up and down in the thread hold, and then drive the bearing plate 164 to move up and down. The threaded hole in the upper housing is formed by a threaded sleeve, which is integrated with the rotation sleeve 162. A positioning sleeve 163 for positioning is included at the other end of the rotary adjustment bolt 161. The in-situ swimming pool of the present embodiment is adapted to swimming pools with different heights by rotating the rotating sleeve to make the rotary adjustment bolt 161 move up and down along the upper housing.

[0043] The connection pipeline and the pumping execution mechanism in this embodiment are substantially the same as that in the first embodiment, as shown in Fig. 5, and the difference is that the outlet pipeline 15 of the filter pump and the inlet pipe 7 comes to the inlet of the swimming pump 5 in parallel and connected to the inlet by a total transfer interface. When the swimming training apparatus in this embodiment is installed for use initially, the second pneumatic switch 14 still needs to be pressed to start up the filter pump 9. The filter pump 9 draws the water in the swimming pool to the inlet pipe 7 by the filter core and further into the swimming pool by the swimming pump 5. The process expels the air in the swimming pump, i.e., the swimming pump 5 is evacuated and the swimming pump 5 is brought into a normal operation state. When the filter pump 9 operates to a preset time, the filter pump 9 stops automatically, and the swimming pump 5 starts to operate by the first pneumatic switch 13, and at this moment, the water flows into the swimming pump 5 by the inlet pipe 7 and the outlet pipeline 15 of the filter pump and ejects into the swimming pool from the jet connector 11 by the outlet pipe 8. The continuous water cycle makes the swimming pool form a flowing "river" and to facilitate swimming training.

[0044] In this embodiment, the filter mechanism may filter of the water in the swimming pool directly. When the second pneumatic switch 13 is pressed, the filter pump 9 is started, the water flows from the swimming

pool though the filter core 10, the filter pump 9, the outlet pipeline 15 of the filter pump 9, the inlet pipe 7, the swimming pump 5, and the outlet pipe 8 to the swimming pool, to achieve the filtering of the pool.

Third Embodiment

[0045] Fig. 7 is an overall schematic diagram of an swimming training apparatus according to a third embodiment. Fig. 8 is a height adjustment structure in the third embodiment. The swimming training apparatus in this embodiment is also a jet swimming device. This embodiment is substantially the same as the embodiment 2. The connection pipeline is also enclosed and the connection pipeline is enclosed in the third housing 17, so that the first housing 1 and the second housing 2 form an one-piece construction by the third housing 17, so it is clean in appearance and easy to transport.

[0046] The difference from the embodiment 2 is that the height adjustment implementation of the height adjustable structure in this embodiment is different from that in the second embodiment. As shown in Fig. 8, this embodiment comprises a rotation wheel 19 included outside the second housing 2, a thread pillar 201 included in the thread hole at the lower part of the second housing and a wheel disc 20 connected to the thread pillar 201. The bearing plate is fixedly connected to the top of the shaft of the wheel disc by a bearing base 21. The rotation wheel 19 is engaged with the wheel disc 20, and the rotation of the wheel drive the thread pillar to move up and down in the thread hole, and then drive the bearing plate up and down. In this embodiment, the height adjustable structure completes the lifting of the bearing plate by rotating the externally disposed rotation wheel 19 and transmission wheel, that is, the above mentioned wheel disc drive the thread pillar to rotate and lift in the thread hole, so that the in situ swimming pool in this embodiment may be adapted to swimming pools with different heights. In this embodiment, the second housing is an integral piece, and the bearing plate is independently included in the second housing.

[0047] Furthermore, the second housing 2 is connected to a support rod 18 for connecting the second housing 2 to a swimming pool to secure the positioning between the swimming training apparatus and the swimming pool in this embodiment.

[0048] The operation of this embodiment is the same as that of the first embodiment and the second embodiment, i.e., the pumping execution mechanism and the connection pipeline in this embodiment may be the same as those in the first embodiment and may the second embodiment.

Fourth Embodiment

[0049] Fig. 12 is a schematic diagram of an swimming training apparatus according to a fourth embodiment and Fig. 14 is an overall schematic diagram of the fourth em-

bodiment. The swimming training apparatus in this embodiment is an axial-flow swimming device. In this embodiment, the drive mechanism is a drive motor 106, the pumping execution mechanism comprising an impeller 110 and a water guiding member 114 included above the impeller 110 for changing the water outlet direction. The drive motor 106 and the pumping execution mechanism are included in independent housings. The drive motor 106 is included in the first housing 113, the pumping execution mechanism included in the second housing 112, and the drive motor 106 connected to the impeller 110 by a transmission mechanism. The impeller 110 is rotated by the drive motor 106, and then the water in the pool is pumped up, and the water is turned over by the water guiding member 114 above the impeller 110 and discharged into the pool. Driving the impeller by the transmission mechanism, would ensure the stable driving, separate drive motor from water, that is, separate electricity from water, thus improve the safety for use.

[0050] In addition, since the drive motor 106 is isolated from the water, the AC motor can be used for the drive motor 106 in the present embodiment, so, the power of the entire in-situ swimming pool can be increased and a better use effect can be obtained. The impeller 110 is an axial flow vane, and the flow velocity is smooth and the cross-sectional area is large, so that the swimming experience in the swimming pool is as good as in the river. During installation, it merely requires the water level in the swimming pool exceeded the impeller 110 and it is not easy to generate cyclone.

[0051] In order to realize reliable transmission of the drive motor and the impeller, in this embodiment, the drive motor 106 and the pumping execution mechanism are included side by side, and the transmission mechanism is a belt transmission mechanism. As shown in Fig. 12, the output shaft of the drive motor 106 is connected to the power shaft of the belt transmission mechanism by a coupler 104, a hole for the power shaft to pass through included on the housing (i.e., the first housing 113) of the drive motor 106, and a lip-like seal 102 included between the power shaft and the hole wall of the hole. The driven shaft 108 in the belt transmission mechanism is connected to the shaft of the impeller 110 by a coupler 115. The arrangement of the coupler 115 improves the movement stability of the impeller. Furthermore, a hole for the driven shaft 108 to pass through is included in the housing (i.e., the fourth housing 112) of the pumping execution mechanism. A lip-like seal is included between the driven shaft 108 and the hole wall. The belt transmission mechanism comprises a first belt wheel 101, a second belt wheel 107 and a belt wound on the first belt wheel and the second belt wheel. The first belt wheel 101 is installed on the power shaft. The second belt wheel 107 is installed on the driven shaft 108.

[0052] Furthermore, a separator is included in the housing (i.e., the first housing 113) of the drive motor 106. The drive motor 106 is included in the independent cavity formed by the separator and the first housing. A

hole for the output shaft of the drive motor 106 to pass through is included on the separator, and a seal ring 105 is included between the output shaft and the hole wall. The seal ring is an alien seal ring to adapt to the appearance of the shaft and match with the outer diameter of the output shaft of the drive motor 106. A plurality of spaced-apart tooth lobes are included at the circumference of the alien seal ring, which may be adapted to output shafts with different outer diameters and hold the output shaft circumferentially and realize better sealing performance. In this embodiment, the drive motor is further sealed and separated by the separator and the seal ring 105, which further ensures the separation of the drive motor 106 and water and improves safety.

[0053] Furthermore, an inlet 117 is included at the lower part of the housing (i.e., the lower part of the second housing 112) of the pumping execution mechanism, an outlet 109 included on the upper sidewall of the housing (i.e., the upper sidewall of the second housing 112) of the pumping execution mechanism, and a filter screen is included at the inlet and outlet, respectively. In this embodiment, the angle between the inlet direction and the outlet direction is 90° , i.e., the water guide direction of the water guiding member is turned by 90° . In order to increase the water inlet volume and adapt to different water levels, the bottom wall of the housing of the pumping execution mechanism is also included with the inlet 117, and the inlet is included with a filter screen.

[0054] For better water direction turning of the impeller shaft, the water guiding member 114 comprises a plurality of arc water guide sheets. As shown in Fig. 11, all the water guide sheets are arranged in a ladder shape and constitute a diagonal line of a quadrangle. And the water guide sheet is a 1/4 width tubular structure.

[0055] Furthermore, in order to facilitate the installation and use of the swimming training apparatus in this embodiment, a support frame 118 is included on the outer wall of the housing (i.e., the second housing 112) of the pumping execution mechanism. When in use, the support frame 118 may be supported on the inner wall of the swimming pool to increase the stability of the swimming device.

Fifth Embodiment

[0056] Fig. 13 is an internal structure schematic diagram of a swimming training apparatus according to a fifth embodiment. Fig. 14 is an overall schematic diagram of the swimming training apparatus according to the fifth embodiment. This embodiment is an axial-flow swimming device, which is similar to the structure of the fourth embodiment. In this embodiment, the impeller 110 is also rotated by the drive motor 106, and the water in the pool is pumped up, and then the water is turned over by the water guiding member 114 above the impeller 110 and discharged into the pool. Thus ensures a stable driving, separates drive motor from water, that is, separates electricity from water, and improves the safety in use.

The difference between this embodiment and the fourth embodiment is that the transmission mechanism in this embodiment adopts a gear transmission structure 111 to complete transmission. As shown in Fig. 12, the gear transmission structure 111 comprises a small gear, a middle gear and a large gear. The three gears engage with each other. The transmission ratio is increased by increasing the outer diameter of the gear. The small gear is connected to the output shaft of the drive motor. The large gear is connected to the shaft of the impeller.

[0057] In this embodiment, the drive motor and the pumping execution mechanism may be included side by side, as shown in Fig. 13, which is the same as the fourth embodiment.

[0058] Furthermore, in order to facilitate the installation and use of the swimming training apparatus in this embodiment, a support frame 118 is included on the outer wall of the housing (i.e., the second housing 112) of the pumping execution mechanism. When in use, the support frame 118 may be supported on the inner wall of the swimming pool to increase the stability of the swimming device.

Sixth Embodiment

[0059] This embodiment is similar to the fifth embodiment and not shown. The transmission mechanism is still a gear transmission mechanism. The difference is that the drive motor in this embodiment is disposed above the pumping execution mechanism, and the gear transmission mechanism may directly engage the large gear with the small gear. The small gear is connected to the output shaft of the drive motor and the large gear is connected to the shaft of the impeller.

7th Embodiment

[0060] This embodiment is based on embodiment 1, embodiment 2 and embodiment 3 and further improves the outlet pipe 8 therein. As shown in Figs. 9 and 10, the outlet end of the outlet pipe 8 is connected to the jet connector 11 via an extension pipe 24 having a threaded outer surface, the outlet end having internal threads matched with the external threads of the extension pipe 24 and the outlet end connected to a hoop 23 for fixing the outlet pipe 8 and the extension pipe 24. The location of the jet connector 11 relative to the swimming pool may be adjusted by rotating the positioning hoop 23 so as to be adapted to different water levels in the swimming pool.

Eighth Embodiment

[0061] This embodiment is based on embodiment 1, embodiment 2, embodiment 3 and embodiment 7 and further improves the jet connector 11. As shown in Figs. 10 and 11, the jet connector 11 comprises an adjustment mechanism for adjusting water yield, the adjustment mechanism comprising a fixed first pipe 31 and a second

pipe connected with the first pipe 31. The first pipe 31 has a columnar plug core 313, a cylindrical inner pipe wall 311 and an arc-shaped outer pipe wall 312. All are arranged in a spaced manner from inside to outside along a radial direction on the first pipe, and the space between the plug core 313 and the inner pipe wall 311 communicated with the main water outlet pipe 8. The second pipe comprise a rotatable main pipe 30 and an auxiliary pipe 26 sleeved on the main pipe by threads. The auxiliary pipe 26 has an arc-shaped pipe wall 261, which fixedly connected with the outer pipe wall 312. The main pipe 30 has a radiated flared portion 221 inserted between the plug core 313 and the inner pipe wall. The maximum outer diameter of the flared portion 221 equal to the inner diameter of the inner pipe wall 311. The relative position between the flared portion 221 and the plug core 313 can be changed by rotating the main pipe and thereby adjust the amount of water inlet.

[0062] In this embodiment, the main pipe in the second pipe 30 can move forward and backward relative to the first pipe 31, when the main pipe 30 moves forward, i.e., the main pipe 30 moves far away from the first pipe 31, the flared portion 221 also moves far away from the first pipe 31, the gap between the flared portion 221 and the plug core 313 is increased and thereby the amount of water entering the main pipe from the main water outlet pipe 8 is increased, i.e., the amount of water outlet from the jet nozzle 11 is increased; when the main pipe 30 moves backward, i.e., the main pipe 30 moves close to the first pipe 31, the flared portion 221 moves close to the first pipe 31, the gap between the flared portion 221 and the plug core 313 is decreased and thereby the amount of the water entering the main pipe 30 from the main water outlet pipe 8 is decreased, i.e., the amount of water outlet from the jet nozzle 11 is decreased. In this embodiment, the forward and backward movement of the main pipe 30 in the second pipe relative to the first pipe is realized by rotating the main pipe 30.

[0063] Further, the above-described main pipe 30 is formed by two pipe sections by ultrasonic welding, one end of one pipe section (i.e., the first segment 22 in Fig. 11) has the flared portion 221, the outer surface of the other end of one pipe section (i.e., the first segment 22 in Fig. 11) has a threaded section which is screwed to the auxiliary pipe 26, and the outer surface of the other pipe section (i.e., the first segment 27 in Fig. 11) has a rotating part 301 protruding radially. Rotating the rotating part 301 to rotate the main pipe 30 and thereby the main pipe 30 move forward and backward relative to the auxiliary pipe 26 and the first pipe 31.

[0064] For better water jet, the inner pipe wall 311, the flaring part 221, the outer pipe wall 312, and the arc pipe wall 261 on the auxiliary pipe 26 enclose to form an air inlet space which communicates with the interior of the main pipe and communicates with the inlet pipe 12 in the control pipeline 6. An adjustment switch for adjusting air inlet volume is included on the inlet pipe 12. This embodiment may increase the pressure of the water and adjust

the jet effect of the jet connector 11 by adjusting the air inlet volume.

[0065] In this embodiment, a seal ring 28 and a seal pad 29 are included at the connection of the first pipe 31 and the outlet pipe 8. A sealing ring 25 is included at the inner side surface of the inner pipe wall of the first pipe. The arrangements of the seal ring 28, the seal pad 29 and the sealing ring 25 are all used for sealing the connections between various pathways for better sealing.

Ninth Embodiment 9

[0066] This embodiment is an application example of embodiments 1 to 8. The swimming training apparatus in the above embodiments may all be included in an overground pool or an underground pool. Fig. 15 shows the swimming training apparatus according to embodiment 1 being applied to an underground pool 200. Fig. 16 shows the swimming training apparatus according to embodiment 1 being applied to an overground pool 3. Fig. 17 shows the swimming training apparatus according to embodiment 2 being applied to an overground water pool 3, and the support plate 33 being supported on the inner wall of the overground pool.

[0067] In summary, in the swimming training apparatus according to the invention, the separation of the drive mechanism and the pumping execution mechanism ensures the separation of water and power of the swimming training apparatus and thus ensures the safety in use of the swimming training apparatus. Therefore, the invention effectively overcomes the defects in the prior art and has high industry values.

[0068] The above embodiments merely illustrate the principles and effects of the invention rather than limiting the invention.

Claims

1. A swimming training apparatus, comprising:

a drive mechanism driven with electricity, wherein said drive mechanism comprises a pump (5) and a power distribution box (4); and a pumping mechanism, wherein said drive mechanism and said pumping mechanism are disposed separately and spaced apart, and wherein said drive mechanism and said pumping mechanism are connected by a connection pipeline
said pumping mechanism comprising a first pneumatic switch (13) controlling the turning-on and turning-off of said pump (5),
said pumping mechanism including a filter mechanism with a filter pump (9) and a jet connector (11),
said connection pipeline comprising a control pipeline (6), said first pneumatic switch (13) be-

- ing connected to said power distribution box (4) by the control pipeline (6),
 said connection pipeline comprising an outlet pipe (8), wherein an inlet end of the outlet pipe (8) is connected to said pump (5), and wherein an outlet end of the outlet pipe (8) is connected to said jet connector (11), and
 said connection pipeline comprising an inlet pipe (7), wherein an inlet of the inlet pipe (7) is connected to the filter mechanism, and an outlet of the inlet pipe (7) is connected to said pump (5).
2. The swimming training apparatus according to claim 1, wherein said pumping mechanism is enclosed in a first housing (1), and said pump (5) and said power distribution box (4) are of one-piece construction.
 3. The swimming training apparatus according to claim 1, wherein said pumping mechanism is enclosed in a first housing (1), said power distribution box (4) and said pump (5) enclosed in a second housing (2), said connection pipeline disposed in a third housing (17), the first housing (1) and the second housing (2) both connected to the third housing (17).
 4. The swimming training apparatus according to claim 3, wherein said second housing (2) included with a bearing plate (164) and a height adjustment structure (16) for lifting the bearing, said pump (5) and said power distribution box (4) both disposed on said bearing plate (164).
 5. The swimming training apparatus according to claim 4, wherein said height adjustable structure (16) comprises an upper housing and a lower housing formed said second housing (2) and a rotation adjustment bolt (161) distributed at each edge of said second housing (2), said bearing plate (164) fixedly connected to the upper housing; a thread hole included in the upper housing, one end of the rotation adjustment bolt (161) disposed in the thread hole, the other end of the rotation adjustment bolt (161) abutted against the lower housing, the rotation adjustment bolt (161) included with a rotation sleeve (162), one end of the sleeve rotatably connected to the upper housing, and the rotation of the sleeve driven the rotation adjustment bolt (161) to move up and down in the thread hold, and then driven said bearing plate (164) to move up and down.
 6. The swimming training apparatus according to claim 4, wherein said height adjustable structure (16) comprising a rotation wheel (19) deposed outside said second housing (2), a thread pillar (201) included in the thread hole at the lower part of said second housing (2) and a wheel disc connected to the thread pillar (201), said bearing plate (164) fixedly connected to the top of the wheel disc, the rotation wheel (19) engaged with the wheel disc, and the rotation of the wheel driven the thread pillar (201) to move up and down in the thread hole, and then driven said bearing plate (164) to move up and down.
 7. The swimming training apparatus according to claim 6, wherein said second housing (2) is connected to a support rod (18) for connecting the second housing (2) to a swimming pool (3).
 8. The swimming training apparatus according to claim 1, wherein the outlet end of said outlet pipe (8) is connected to said jet connector (11) via an extension pipe (24) having a threaded outer surface, said outlet end having internal threads matched with the external threads of the extension pipe (24) and the outlet end connected to a hoop for fixing the outlet pipe (8) and the extension pipe (24).
 9. The swimming training apparatus according to claim 1, wherein the said connector comprises an adjustment mechanism for adjusting water yield, said adjustment mechanism comprising a fixed first pipe (31) and a second pipe connected with the first pipe (31), said first pipe (31) having a columnar plug core (313), a cylindrical inner pipe wall (311) and an arc-shaped outer pipe wall (312), all arranged in a spaced manner from inside to outside along a radial direction on the first pipe (31), and the space between the plug core (313) and the inner pipe wall (311) communicated with the main outlet pipe (8); said second pipe comprising a rotatable main pipe (30) and an auxiliary pipe (26) sleeved on the main pipe (30) through threads, the auxiliary pipe (26) having an arc-shaped pipe wall (261), which fixedly connected with the outer pipe wall (312), the main pipe (30) having a radiated flared portion (221) inserted between the plug core (313) and the inner pipe wall (311), the maximum outer diameter of the flared portion (221) equal to the inner diameter of the inner pipe wall (311), and changing the relative position between the flared portion (221) and the plug core (313) by rotating the main pipe (30).
 10. The swimming training apparatus according to claim 9, wherein said main pipe (30) is formed by two pipe sections by ultrasonic welding, one end of one pipe section having said flared portion (221), the outer surface of the other end of one pipe section having a threaded section which is screwed to the auxiliary pipe (26), and the outer surface of the other pipe section having a rotating part (301) protruding radially.
 11. The swimming training apparatus according to claim 9, wherein said inner pipe wall (311), said flared portion (221), said outer pipe wall (312) and said arc-shaped pipe wall (261) enclosed to form an air inlet

space, communicating with the inlet pipe (7) of said control pipeline (6), the inlet pipe (7) further included with a second pneumatic switch (14) for adjusting air inflow for adjusting air inlet volume.

12. The swimming training apparatus according to claim 1, wherein said swimming training apparatus is disposed in an overground pool (3) or an underground pool (200).
13. The swimming training apparatus according to claim 1, wherein said filter mechanism comprising said filter pump (9), the second pneumatic switch (14) controlling the turning-on and turning-off of said filter pump (9) and a filter core (10) included in the inlet pipeline of said filter pump (9), the outlet pipeline (15) of said filter pump (9) connected to said inlet pipe (7), and said second pneumatic switch (14) connected to said power distribution box (4) through said control pipeline (6).

Patentansprüche

1. Schwimmende Trainingsvorrichtung, umfassend:

einen mit elektrischem Strom betriebenen Antriebsmechanismus, wobei der Antriebsmechanismus eine Pumpe (5) und eine Stromverteilerbox (4) aufweist; und
einen Pumpmechanismus, wobei der Antriebsmechanismus und der Pumpmechanismus getrennt und im Abstand angeordnet sind, und wobei der Antriebsmechanismus und der Pumpmechanismus durch eine Verbindungsleitung verbunden sind,
der Pumpmechanismus einen ersten Druckluftschalter (13) aufweist, der das Einschalten und Abschalten der Pumpe (5) steuert,
der Pumpmechanismus einen Filtermechanismus mit einer Filterpumpe (9) und ein Strahlverbindungsstück (11) einschließt,
die Verbindungsleitung eine Steuerleitung (6) einschließt, der erste Druckluftschalter (13) mit der Stromverteilerbox (4) durch die Steuerleitung (6) verbunden ist,
die Verbindungsleitung ein Auslassrohr (8) aufweist, wobei ein Einlassende des Auslassrohrs (8) mit der Pumpe (5) verbunden ist, und wobei ein Auslassende des Auslassrohrs (8) mit dem Strahlverbindungsstück (11) verbunden ist, und die Verbindungsleitung ein Einlassrohr (7) aufweist, wobei ein Einlass des Einlassrohrs (7) mit dem Filtermechanismus verbunden ist, und ein Auslass des Einlassrohrs (7) mit der Pumpe (5) verbunden ist.

2. Schwimmende Trainingsvorrichtung nach Anspruch

1, wobei der Pumpmechanismus in einem ersten Gehäuse (1) umschlossen ist und die Pumpe (5) und die Stromverteilerbox (4) in einteiliger Ausführung sind.

3. Schwimmende Trainingsvorrichtung nach Anspruch 1, wobei der Pumpmechanismus in einem ersten Gehäuse (1) umschlossen ist, die Stromverteilerbox (4) und die Pumpe (5) in einem zweiten Gehäuse (2) umschlossen sind, die Verbindungsleitung in einem dritten Gehäuse (17) angeordnet ist, das erste Gehäuse (1) und das zweite Gehäuse (2) beide mit dem dritten Gehäuse (17) verbunden sind.

4. Schwimmende Trainingsvorrichtung nach Anspruch 3, wobei mit dem zweiten Gehäuse (2) eine Lagerplatte (164) und eine höhenverstellbare Struktur (16) zum Anheben des Lagers einbezogen ist, die Pumpe (5) und die Stromverteilerbox (4) beide an der Lagerplatte (164) angeordnet sind.

5. Schwimmende Trainingsvorrichtung nach Anspruch 4, wobei die höhenverstellbare Struktur (16) ein das zweite Gehäuse (2) bildendes Gehäuseoberteil und Gehäuseunterteil und eine Drehstellschraube (161) an jeder Kante des zweiten Gehäuses (2) verteilt aufweist, wobei die Lagerplatte (164) mit dem Gehäuseoberteil fest verbunden ist; in dem Gehäuseoberteil eine Gewindebohrung enthalten ist, wobei ein Ende der Drehstellschraube (161) in der Gewindebohrung angeordnet ist, das andere Ende der Drehstellschraube (161) am Gehäuseunterteil anliegt, mit der Drehstellschraube (161) eine Drehhülse (162) einbezogen ist, wobei ein Ende der Hülse drehbar mit dem Gehäuseoberteil verbunden ist, und die Drehung der Hülse die Drehstellschraube (161) antreibt, um sich in der Gewindebohrung nach oben und unten zu bewegen und anschließend die Lagerplatte (164) zur Bewegung nach oben und unten antreibt.

6. Schwimmende Trainingsvorrichtung nach Anspruch 4, wobei die höhenverstellbare Struktur (16) ein außerhalb des zweiten Gehäuses (2) angeordnetes Drehrad (19) aufweist, eine Gewindesäule (201) in der Gewindebohrung am unteren Teil des zweiten Gehäuses (2) enthalten ist und eine Radscheibe mit der Gewindesäule (201) verbunden ist, wobei die Lagerplatte (164) starr mit der Oberseite der Radscheibe verbunden ist, das Drehrad (19) mit der Radscheibe in Eingriff gebracht wird, und die Drehung des Rades die Gewindesäule (201) antreibt, um sich in der Gewindebohrung nach oben und unten zu bewegen und anschließend die Lagerplatte (164) antreibt, um sich nach oben und unten zu bewegen.

7. Schwimmende Trainingsvorrichtung nach Anspruch 6, wobei das zweite Gehäuse (2) mit einem Haltes-

tab (18) zur Verbindung des zweiten Gehäuses (2) mit einem Swimmingpool (3) verbunden ist.

8. Schwimmende Trainingsvorrichtung nach Anspruch 1, wobei das Auslassende des Auslassrohrs (8) mit dem Strahlverbindungsstück (11) über ein Ausdehnungsrohr (24) verbunden ist, das eine mit Gewinde versehene Außenfläche besitzt, wobei das Auslassende Innengewinde aufweist, die mit den Außengewinden des Ausdehnungsrohrs (24) zusammenpassen, und das Auslassende mit einem Ring verbunden ist, um das Auslassrohr (8) und das Ausdehnungsrohr (24) zu befestigen. 5

9. Schwimmende Trainingsvorrichtung nach Anspruch 1, wobei das Verbindungsstück einen Einstellmechanismus zur Einstellung von Wasserausstoß aufweist, der Einstellmechanismus ein feststehendes erstes Rohr (31) und ein mit dem ersten Rohr (31) verbundenes zweites Rohr aufweist, wobei das erste Rohr (31) einen säulenförmigen Zylinderkern (313), eine zylindrische Rohrrinnenwand (311) und eine bogenförmige Rohraußenwand (312) aufweist, die alle im Abstand von innen nach außen entlang einer radialen Richtung auf dem ersten Rohr (31) angeordnet sind, und der Raum zwischen dem Zylinderkern (313) und der Rohrrinnenwand (311) mit dem Hauptauslassrohr (8) in Verbindung steht; das zweite Rohr ein drehbares Hauptrohr (30) und ein auf dem Hauptrohr (30) durch Gewinde aufgesetztes Hilfsrohr (26) aufweist, wobei das Hilfsrohr (26) eine bogenförmige Rohrwand (261) besitzt, die fest mit der äußeren Rohrwand (312) verbunden ist, wobei das Hauptrohr (30) einen strahlenförmig ausgebreiteten, konisch erweiterten Abschnitt (221) aufweist, der zwischen dem Zylinderkern (313) und der Rohrrinnenwand (311) eingesetzt ist, wobei der maximale Außendurchmesser des konisch erweiterten Abschnitts (221) dem Innendurchmesser der Rohrrinnenwand (311) entspricht, und die relative Position zwischen dem konisch erweiterten Abschnitt (221) und dem Zylinderkern (313) durch Drehen des Hauptrohrs (30) verändert wird. 20 25

10. Schwimmende Trainingsvorrichtung nach Anspruch 9, wobei das Hauptrohr (30) durch Ultraschallschweißen zweier Rohrabschnitte gebildet ist, wobei ein Ende eines Rohrabschnitts den konisch erweiterten Abschnitt (221) aufweist, die Außenfläche des anderen Endes von einem Rohrabschnitt einen Gewindeabschnitt aufweist, der an das Hilfsrohr (26) geschraubt wird, und die Außenfläche des anderen Rohrabschnitts einen rotierenden Teil (301) aufweist, der radial hervorsteht. 30 35 40

11. Schwimmende Trainingsvorrichtung nach Anspruch 9, wobei die Rohrrinnenwand (311), der konisch abgeflachte Abschnitt (221), die Rohraußenwand (312) 45 50 55

und die bogenförmige Rohrwand (261) umschlossen sind, um einen Lufteinlassraum zu bilden, der mit dem Einlassrohr (7) der Steuerleitung (6) in Verbindung steht, wobei in dem Einlassrohr (7) des Weiteren ein zweiter Druckluftschalter (14) zur Einstellung des Luftzustroms enthalten ist, um das Lufteinlassvolumen einzustellen.

12. Schwimmende Trainingsvorrichtung nach Anspruch 1, wobei die schwimmende Trainingsvorrichtung in einem über dem Erdboden gelegenen Bassin (3) oder einem unter dem Erdboden gelegenen Bassin (200) angeordnet ist. 10

13. Schwimmende Trainingsvorrichtung nach Anspruch 1, wobei der Filtermechanismus die Filterpumpe (9), den zweiten Druckluftschalter (14), der das Ein- und Abschalten der Filterpumpe (9) steuert, und einen Filterkern (10) aufweist, der in der Einlassleitung der Filterpumpe (9) enthalten ist, wobei die Auslassleitung (15) der Filterpumpe (9) mit dem Einlassrohr (7) verbunden ist, und der zweite Druckluftschalter (14) mit der Stromverteilerbox (4) durch die Steuerleitung (6) verbunden ist. 25

Revendications

1. Appareil d'entraînement de natation, comprenant : 30
 - un mécanisme d'entraînement alimenté avec de l'électricité, ledit mécanisme d'entraînement comprenant une pompe (5) et une boîte de distribution de puissance (4) ; et
 - un mécanisme de pompage, ledit mécanisme d'entraînement et ledit mécanisme de pompage étant disposés séparément et espacés l'un de l'autre, et ledit mécanisme d'entraînement et ledit mécanisme de pompage étant connectés par une tubulure de connexion ;
 - ledit mécanisme de pompage comprenant un premier commutateur pneumatique (13) qui commande la mise en marche et la mise à l'arrêt de ladite pompe (5),
 - ledit mécanisme de pompage incluant un mécanisme de filtre avec une pompe de filtre (9) et un connecteur à jet (11), ladite tubulure de connexion comprenant une tubulure de commande (6), ledit premier commutateur pneumatique (13) étant connecté à ladite boîte de distribution de puissance (4) par la tubulure de commande (6),
 - ladite tubulure de connexion comprenant un tube de sortie (8), une extrémité d'entrée du tube de sortie (8) étant connectée à ladite pompe (5), et une extrémité de sortie du tube de sortie (8) étant connectée audit connecteur à jet (11), et ladite tubulure de connexion comprenant un tu-

- be d'entrée (7), et l'entrée du tube d'entrée (7) étant connectée au mécanisme de filtre, et une sortie du tube d'entrée (7) étant connectée à ladite pompe (5).
2. Appareil d'entraînement de natation selon la revendication 1, dans lequel ledit mécanisme de pompage est enfermé dans un premier boîtier (1), et ladite pompe (5) et ladite boîte de distribution de puissance (4) ont une construction d'une seule pièce.
 3. Appareil d'entraînement de natation selon la revendication 1, dans lequel ledit mécanisme de pompage est enfermé dans un premier boîtier (1), ladite boîte de distribution de puissance (4) et ladite pompe (5) sont enfermées dans un second boîtier (2), ladite tubulure de connexion est disposée dans un troisième boîtier (17), le premier boîtier (1) et le second boîtier (2) sont connectés tous les deux au troisième boîtier (17).
 4. Appareil d'entraînement de natation selon la revendication 3, dans lequel ledit second boîtier (2) inclut une plaque porteuse (164) et une structure d'ajustement de hauteur (16) pour soulever la plaque porteuse, ladite pompe (5) et ladite boîte de distribution de puissance (4) étant toutes deux disposées sur ladite plaque porteuse (164).
 5. Appareil d'entraînement de natation selon la revendication 4, dans lequel ladite structure d'ajustement en hauteur (16) comprend un boîtier supérieur et un boîtier inférieur formant ledit second boîtier (2), et un boulon d'ajustement de rotation (161) distribué au niveau de chaque bordure dudit second boîtier (2), ladite plaque porteuse (164) étant connectée de manière fixe au boîtier supérieur ; un trou taraudé inclus dans le boîtier supérieur, une extrémité du boulon d'ajustement de rotation (161) étant disposée dans le trou taraudé, l'autre extrémité du boulon d'ajustement de rotation (161) étant en butée contre le boîtier inférieur, le boulon d'ajustement de rotation (161) incluant un manchon rotatif (162), une extrémité du manchon est connectée en rotation au boîtier supérieur, et la rotation du manchon entraîne le boulon d'ajustement de rotation (161) pour se déplacer vers le haut et vers le bas dans le trou taraudé, et entraîne ainsi ladite plaque porteuse (164) à se déplacer vers le haut et vers le bas.
 6. Appareil d'entraînement de natation selon la revendication 4, dans lequel ladite structure d'ajustement en hauteur (16) comprend un volant rotatif (19) disposé à l'extérieur dudit second boîtier (2), un pilier fileté (201) inclus dans le trou taraudé au niveau de la partie inférieure dudit second boîtier (2), et un disque de volant connecté au pilier fileté (201), ladite plaque porteuse (164) étant connectée de manière fixe au sommet du disque de volant, le volant rotatif (19) étant engagé avec le disque de volant, et la rotation du volant entraîne le pilier fileté (201) à se déplacer vers le haut et vers le bas dans le trou taraudé, et entraîne ainsi ladite plaque porteuse (164) à se déplacer vers le haut et vers le bas.
 7. Appareil d'entraînement de natation selon la revendication 6, dans lequel ledit second boîtier (2) est connecté à une barre de support (18) afin de connecter le second boîtier (2) à une piscine de natation (3).
 8. Appareil d'entraînement de natation selon la revendication 1, dans lequel l'extrémité de sortie dudit tube de sortie (8) est connectée audit connecteur à jet (11) via un tube d'extension (24) ayant une surface extérieure filetée, ladite extrémité de sortie ayant des pas de vis internes accordés aux pas de vis externes du tube d'extension (24), et l'extrémité de sortie étant connectée à une boucle pour fixer le tube de sortie (8) et le tube d'extension (24).
 9. Appareil d'entraînement de natation selon la revendication 1, dans lequel ledit connecteur comprend un mécanisme d'ajustement pour ajuster le débit d'eau, ledit mécanisme d'ajustement comprenant un premier tube fixe (31) et un second tube connecté au premier tube (31), ledit premier tube (31) ayant un noyau de bouchon (313) en forme de colonne, une paroi de tube intérieur cylindrique (311), et une paroi de tube extérieur de forme arquée (312), qui sont toutes agencées d'une manière espacée depuis l'intérieur vers l'extérieur le long d'une direction radiale sur le premier tube (31), et l'espace entre le noyau de bouchon (313) et la paroi de tube intérieur (311) communique avec le tube de sortie principale (8), ledit second tube comprenant un tube principal rotatif (30) et un tube auxiliaire (26) manchonné sur le tube principal (30) via des pas de vis, le tube auxiliaire (26) ayant une paroi de tube en forme d'arc (261), qui est connectée de manière fixe à la paroi de tube extérieur (312), le tube principal (30) ayant une portion radiante évasée (221), insérée entre le noyau de bouchon (313) et la paroi de tube intérieur (311), le diamètre extérieur maximum de la portion évasée (221) étant égal au diamètre intérieur de la paroi du tube intérieur (311), et change la position relative entre la portion évasée (221) et le noyau de bouchon (313) en faisant tourner le tube principal (30).
 10. Appareil d'entraînement de natation selon la revendication 9, dans lequel ledit tube principal (30) est formé par deux tronçons de tube par soudage aux ultrasons, une extrémité d'un tronçon de tube ayant ladite portion évasée (221), la surface extérieure de l'autre extrémité d'un tronçon de tube ayant une sec-

tion à pas de vis qui est vissée sur le tube auxiliaire (26), et la surface extérieure de l'autre tronçon de tube ayant une partie rotative (301) qui se projette radialement.

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11. Appareil d'entraînement de natation selon la revendication 9, dans lequel ladite paroi de tube intérieur (311), ladite portion évasée (221), ladite paroi de tube extérieur (312) et ladite paroi de tube en forme d'arc (261) sont enfermées pour former un espace d'entrée, qui communique avec le tube d'entrée (7) de ladite tubulure de commande (6), le tube d'entrée (7) incluant en outre un second commutateur pneumatique (14) afin d'ajuster l'écoulement d'air entrant afin d'ajuster un volume d'entrée d'air.
12. Appareil d'entraînement de natation selon la revendication 1, dans lequel ledit appareil d'entraînement de natation est disposé dans une piscine au-dessus du sol (3) ou dans une piscine en sous-sol (200).
13. Appareil d'entraînement de natation selon la revendication 1, dans lequel ledit mécanisme de filtre comprend ladite pompe de filtre (9), ledit second commutateur pneumatique (14) commande la mise en marche et la mise à l'arrêt de ladite pompe de filtre (9), et un noyau de filtre (10) inclus dans la tubulure d'entrée de ladite pompe de filtre (9), la tubulure de sortie (15) de ladite pompe de filtre (9) étant connectée audit tube d'entrée (7) et ledit second commutateur pneumatique (14) étant connecté à ladite boîte de distribution de puissance (4) via ladite tubulure de commande (6).

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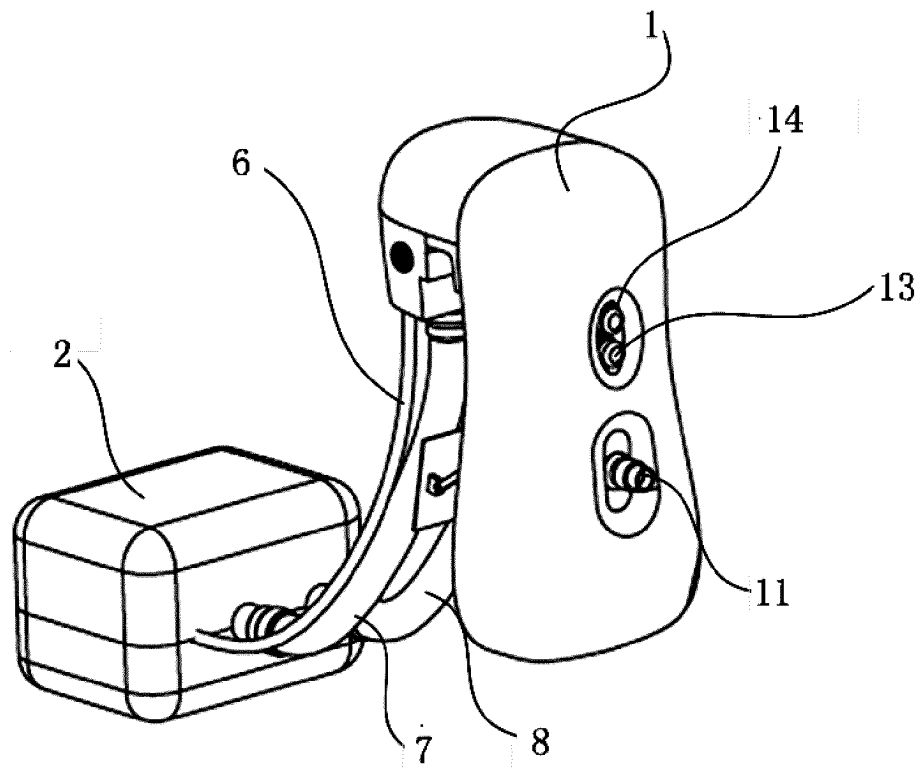


Fig. 1

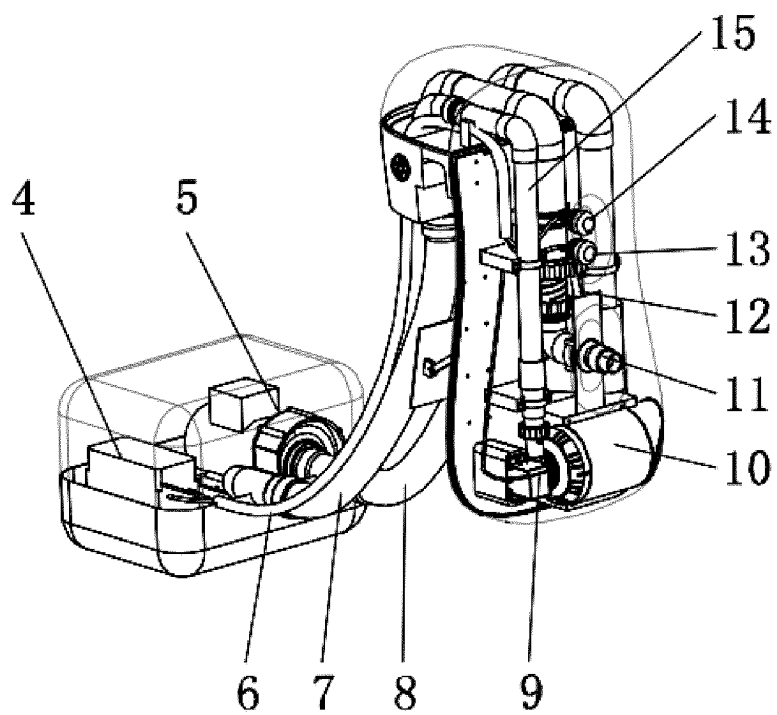


Fig. 2

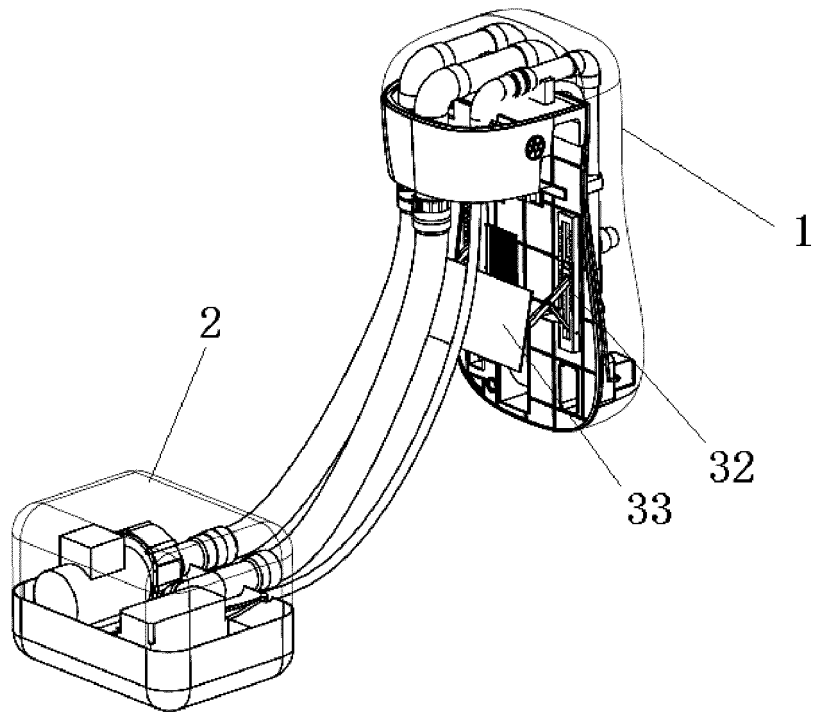


Fig. 3

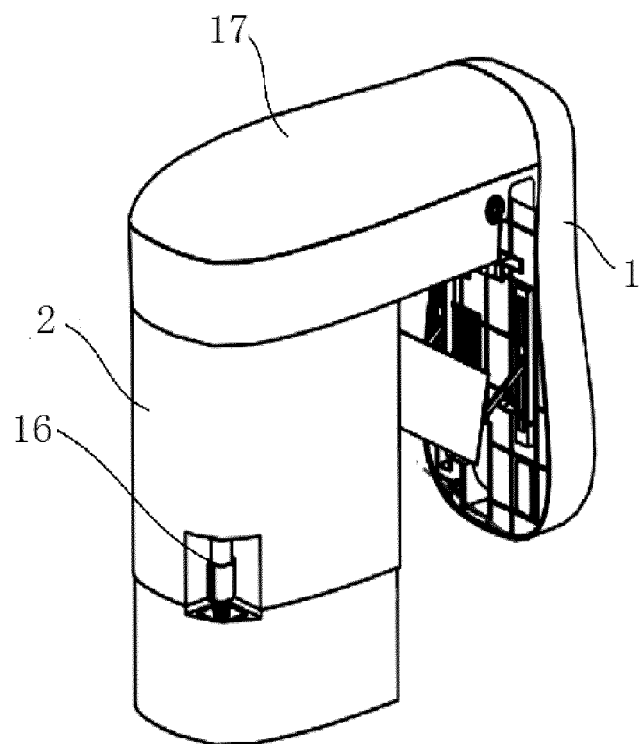


Fig. 4

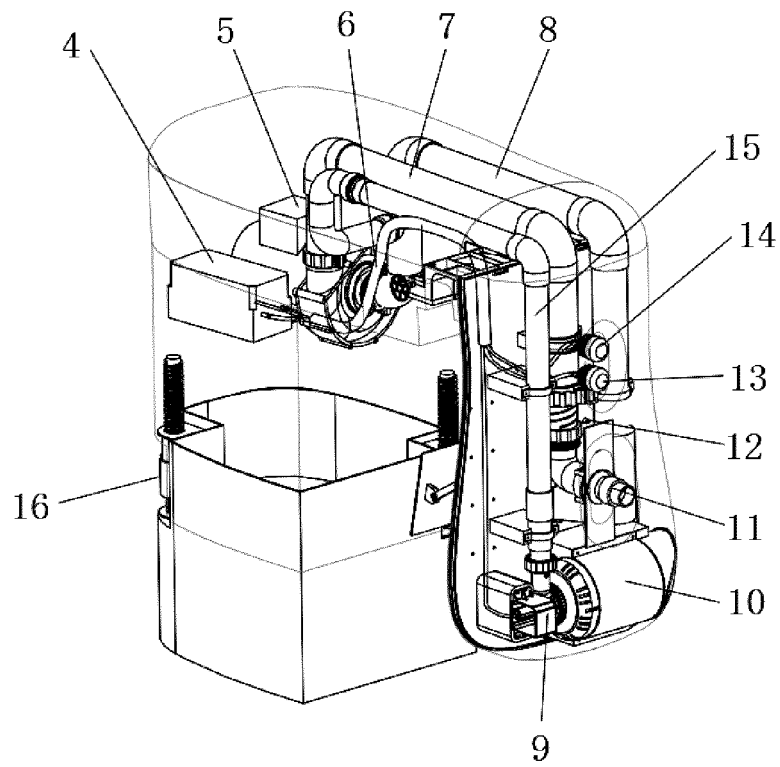


Fig. 5

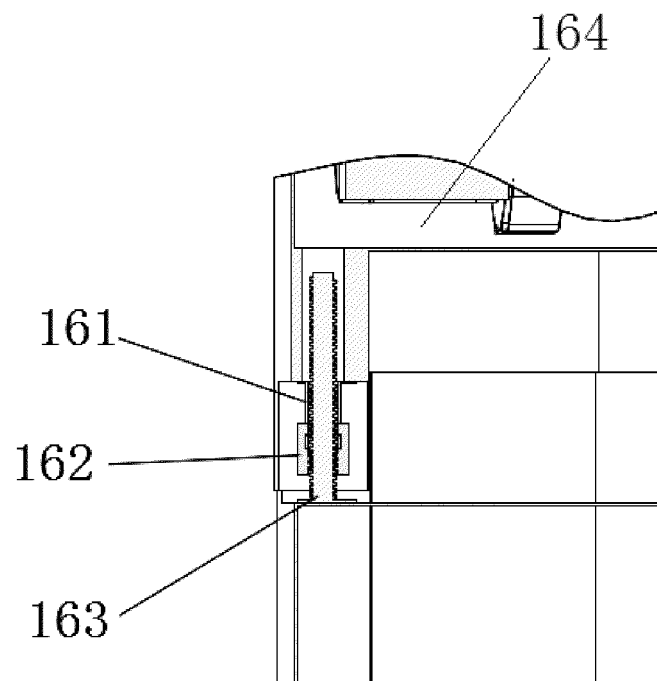


Fig. 6

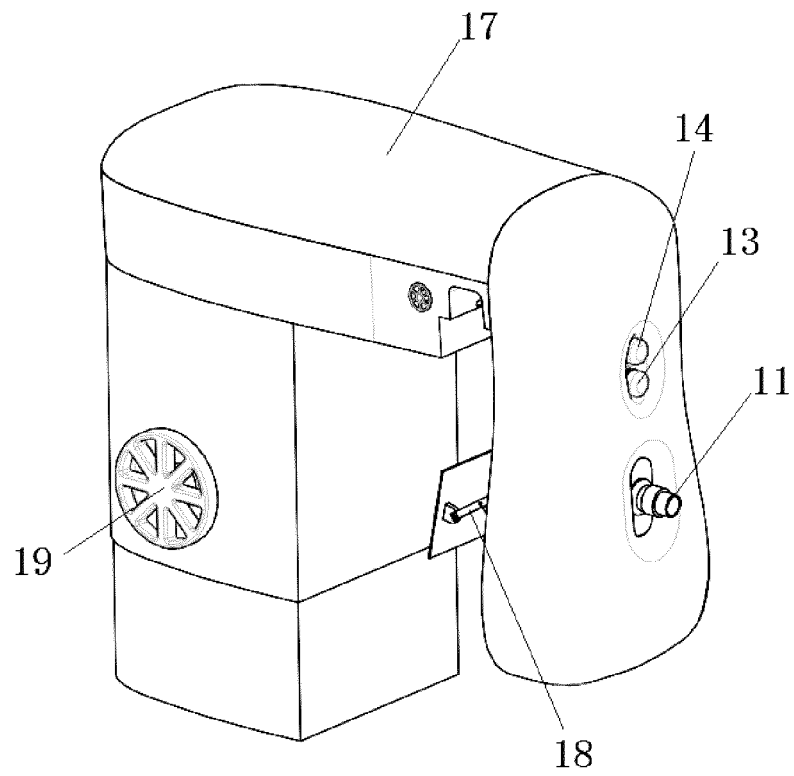


Fig. 7

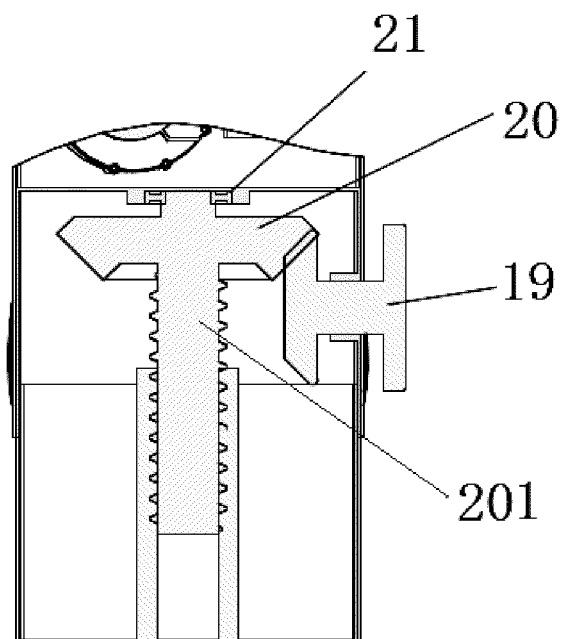


Fig. 8

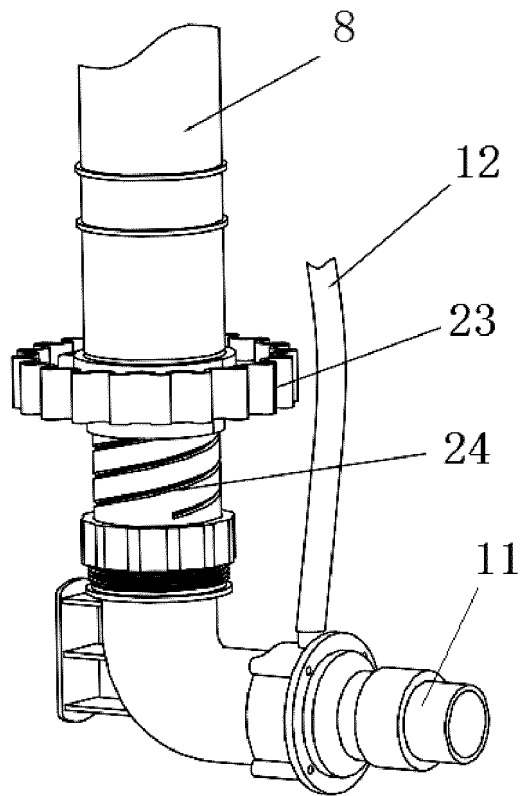


Fig. 9

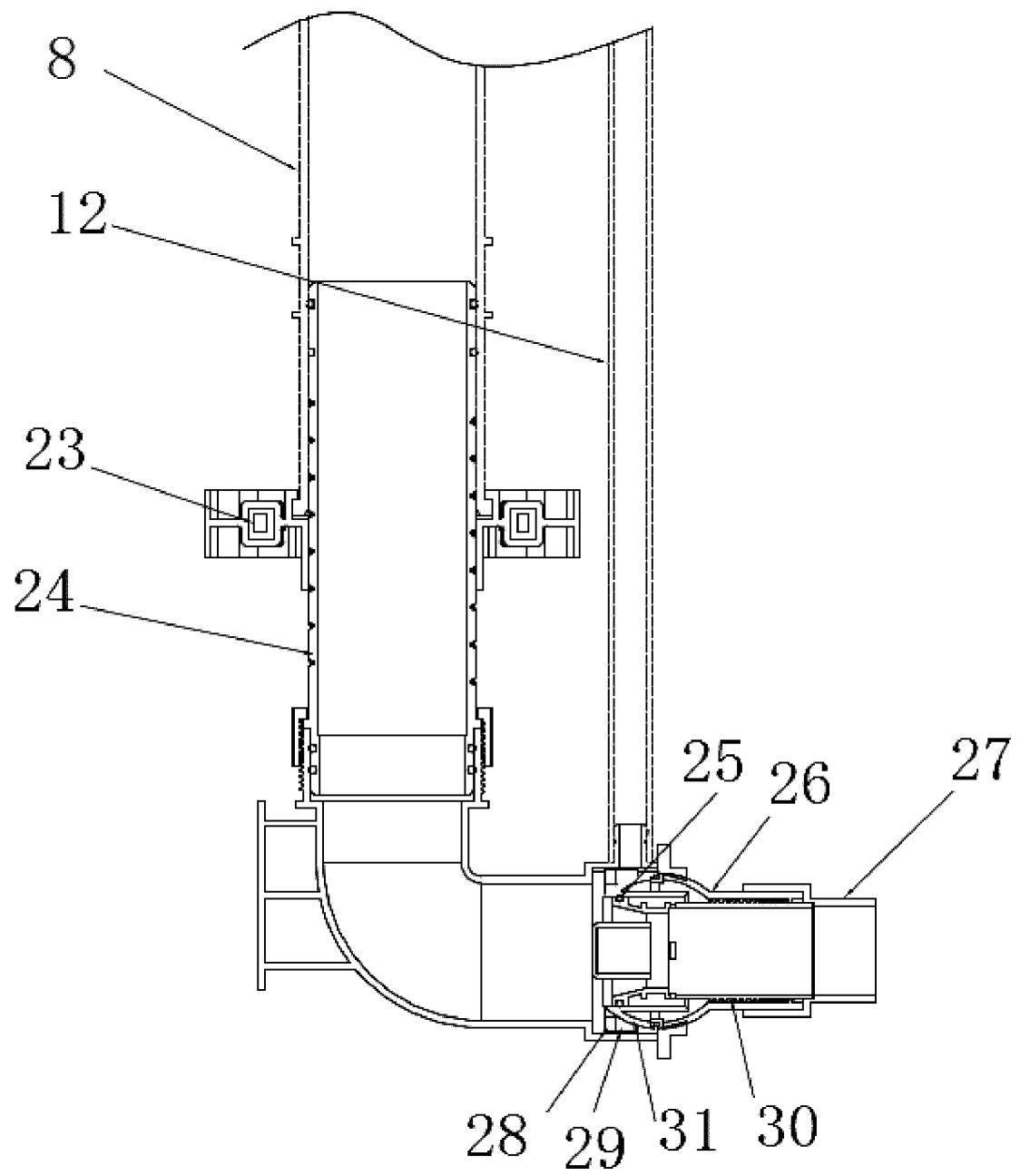


Fig. 10

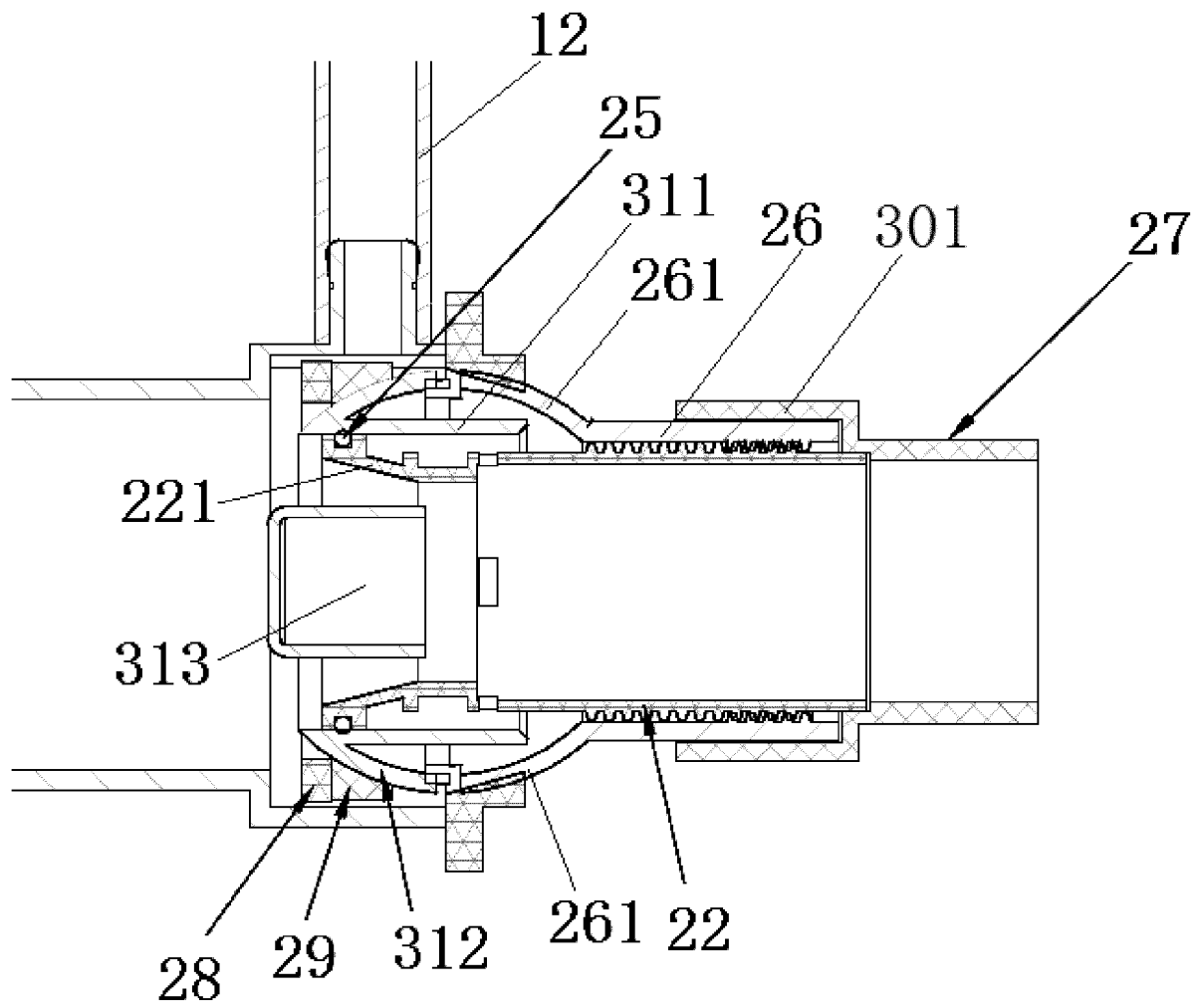


Fig. 11

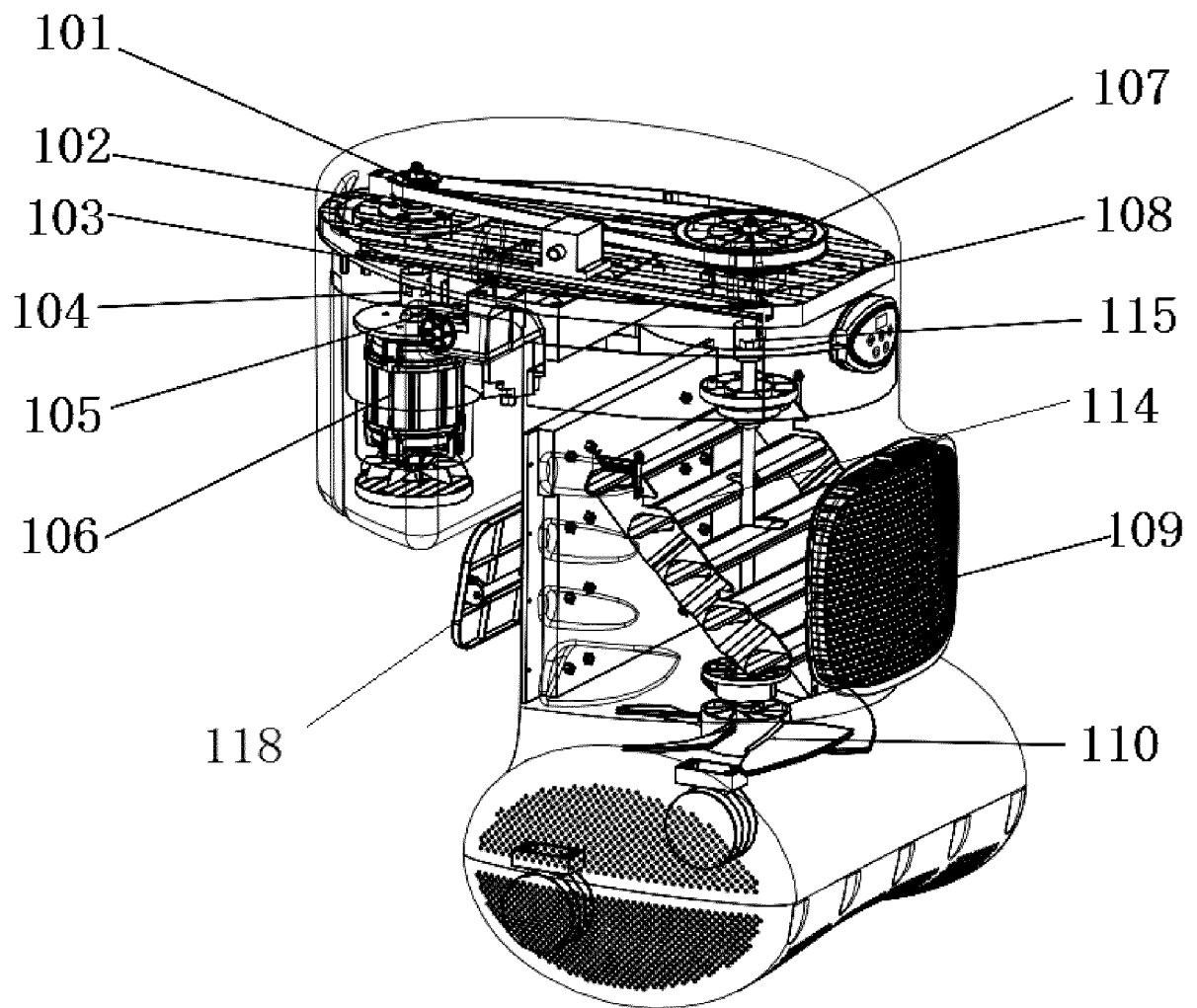


Fig. 12

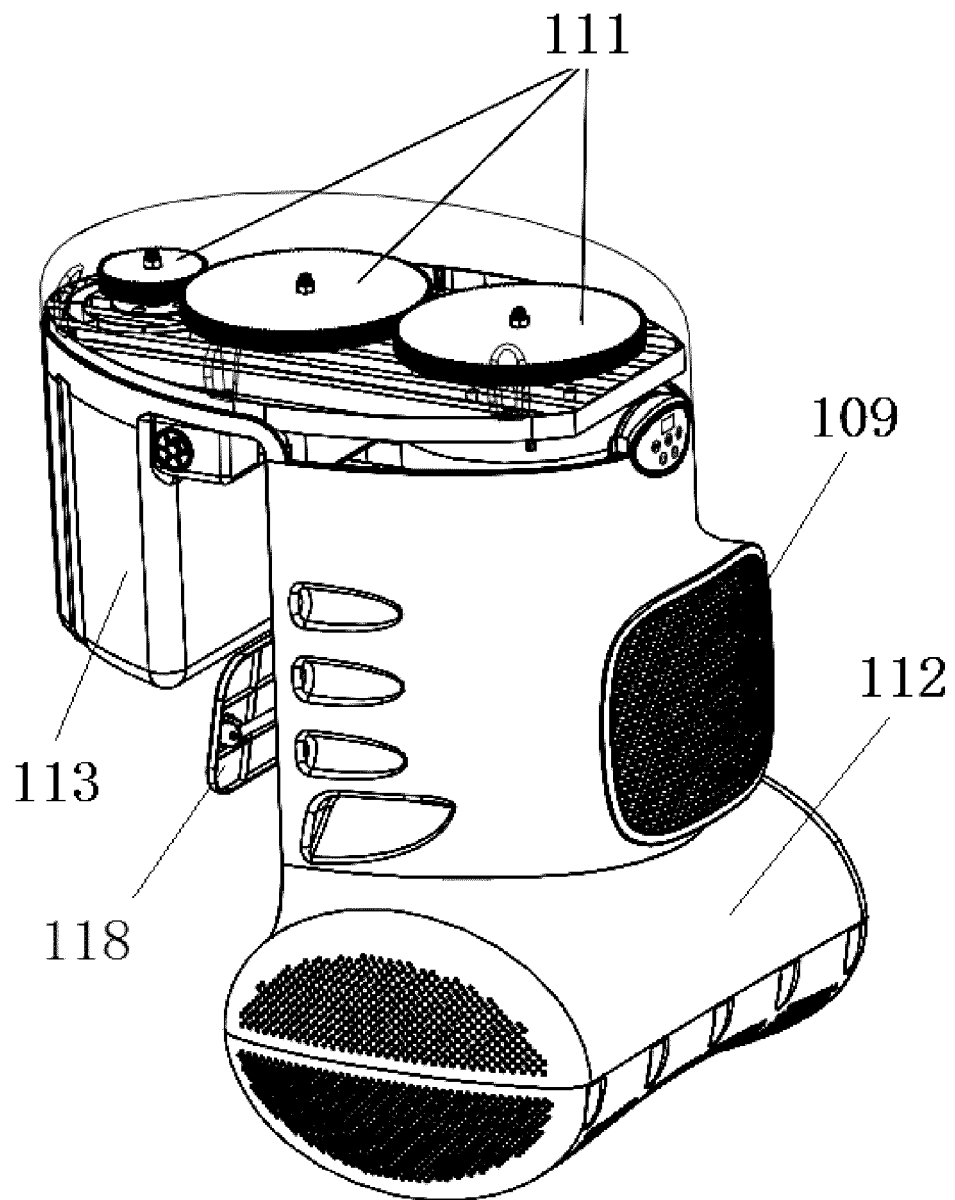


Fig. 13

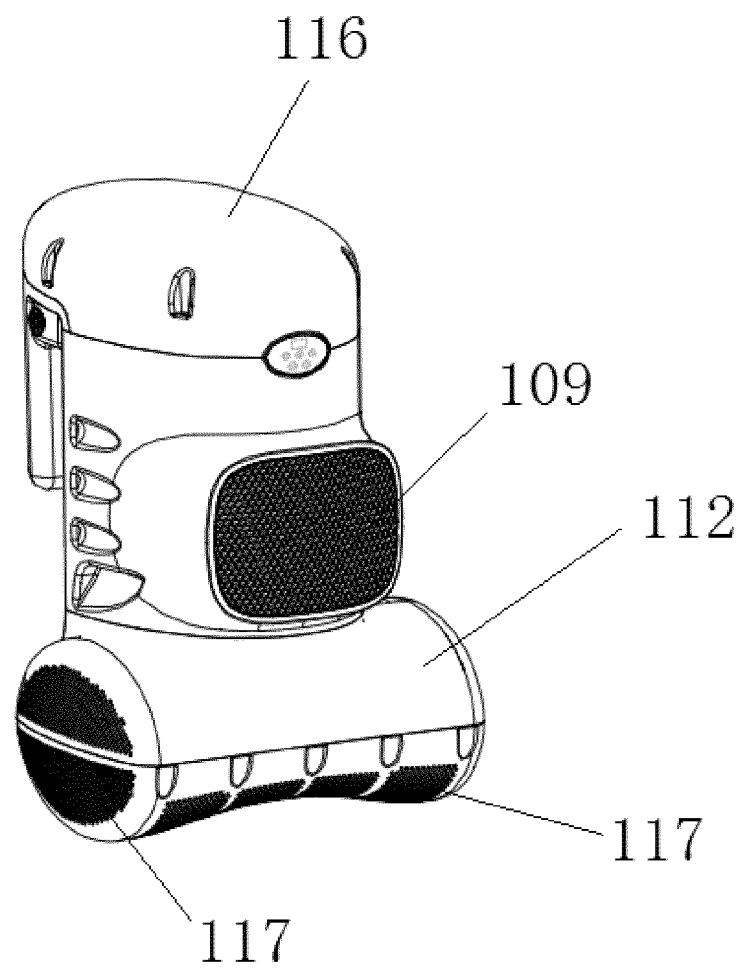


Fig. 14

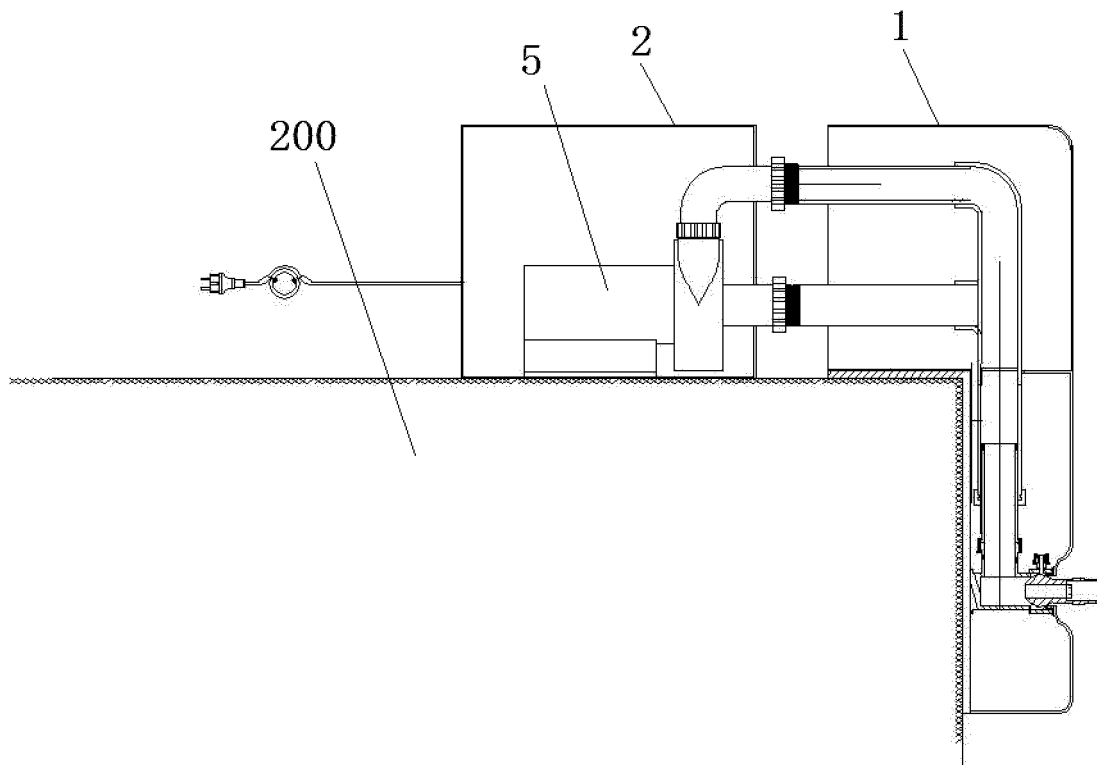


Fig. 15

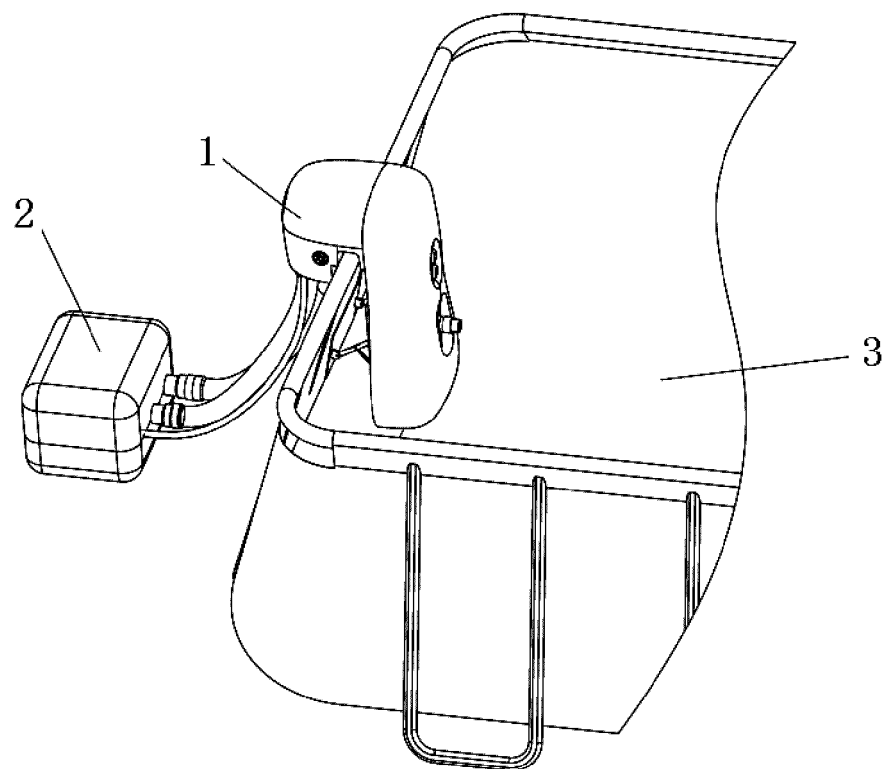


Fig. 16

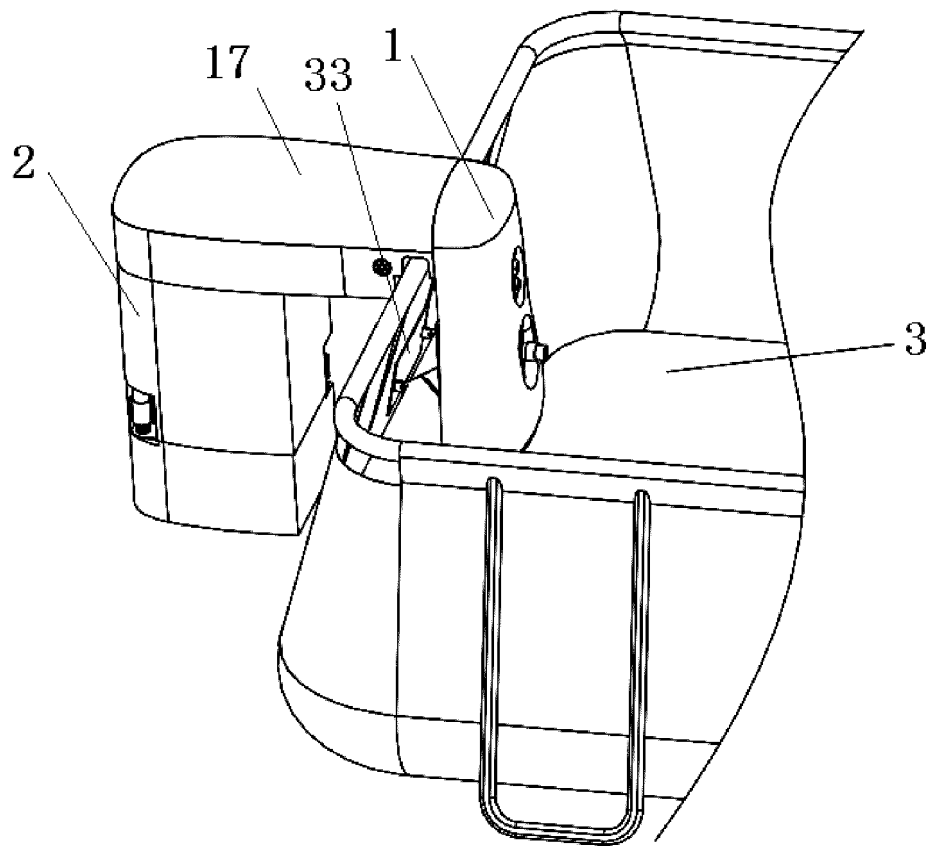


Fig. 17

REFERENCES CITED IN THE DESCRIPTION

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