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(71) Applicant: **OMA METAL INDUSTRIAL CO., LTD.**
Foshan City, Guangdong 528311 (CN)

(72) Inventor: **XING, Kaibin**
Foshan City,, Guangdong 528311 (CN)

(74) Representative: **Brevalex**
95, rue d'Amsterdam
75378 Paris Cedex 8 (FR)

(54) A TREADMILL

(57) The present invention relates to a treadmill comprising a frame and a tread bench that is provided on said frame, wherein a magnetic control mechanism connected to said tread bench is provided on a first end of said frame, and a brake mechanism connected to said magnetic control mechanism is further provided on the first end of said frame, said magnetic control mechanism and said brake mechanism linkage control the movement of said tread bench. The present invention is simple in construction, safe, reliable, easy to use and, when compared to traditional treadmills, it can operate as a treadmill without control system, motor, and similar electrical devices, and accordingly decreases the cost and offers a performance similar to an automatic treadmill while allowing the user to control the treadmill.

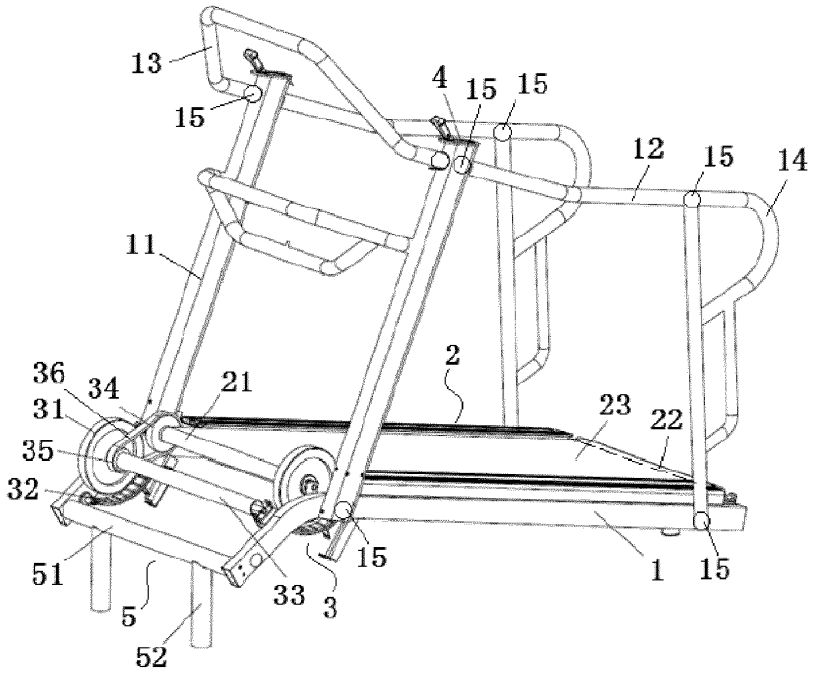

Fig. 1

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Description

Technical field

[0001] The present invention relates to the field of sports equipment, and more particularly, to a treadmill.

Background

[0002] Over recent years, more and more people are doing outdoor sports and gym fitness exercise. A treadmill is common auxiliary fitness equipment used for keeping fit, but the traditional treadmills are operated by electricity, so the prior art treadmills must be placed close to electric power and a power socket to work, and this creates a big limitation to the work of these treadmills. A magnetic treadmill is a power-independent treadmill controlled by magnetism, and it does not need motor, lift motor, controller and the like, is not affected by the availability of electricity, and accordingly is much cheaper in cost. However, the resistance regulation mechanism of existent magnetic control treadmills because of unreasonable structural design does not provide satisfactory movement resistance in treadmills. Furthermore, while existent magnetic treadmills are not affected by the availability of electricity, they are too large and too cumbersome to provide an easy handling and installation.

[0003] The above-mentioned information disclosed in the Background is only intended to enhance the understanding of the background of the invention and therefore may contain information that is not the prior art known to those skilled in the art.

Content of the Invention

[0004] In view of this, it is intended that the embodiments of the present application provide a treadmill to solve at least the problems existing in the prior art.

[0005] The technical solutions of the present application are implemented as below: According to one embodiment of the present application there is provided a treadmill comprising a frame and a tread bench that is provided on the frame, wherein a magnetic control mechanism connected to the tread bench is provided on a first end of the frame, a brake mechanism connected to the magnetic control mechanism is further provided on the first end of the frame, the magnetic control mechanism and the brake mechanism are configured to linkage control the movement of the tread bench. In some embodiments, the brake mechanism comprises a regulation part and a brake wire that are provided on the frame, the first end of the brake wire being retractably connected to the regulation part, and the second end of the brake wire being connected to the magnetic control mechanism.

[0006] In some embodiments, a collapsible support frame is provided on the first end of the frame, the support frame is configured to adjust the inclination of the tread bench.

[0007] In some embodiments, a holder is provided on the upper portion of the frame, comprises a plurality of support rods hinged each other, the support rods being able to be folded into a position parallel to the tread bench.

[0008] In some embodiments, the magnetic control mechanism comprises a flywheel provided on the end of the rotating shaft of the tread bench and a brake plate provided below the flywheel, one end of the brake plate being rotatably connected to the frame, and another end of the brake plate being connected to the second end of the brake wire.

[0009] In some embodiments, the flywheel is provided on the other end of the rotating shaft, and the brake plate is provided below the flywheel, one end of the brake plate being rotatably connected to the frame, and the other end of the brake plate being connected to the brake wire.

[0010] In some embodiments, a transmission shaft is rotatably connected to the first end of the frame, the flywheel is provided at one end of the transmission shaft, and the brake plate is provided below the flywheel, one end of the brake plate being rotatably connected to the frame, and another end of the brake plate being connected to the brake wire; and a first belt wheel is provided on the transmission shaft at a location close to the flywheel, a second belt wheel is provided on the rotating shaft, and a conveying belt is provided between the first belt wheel and the second belt wheel.

[0011] In some embodiments, the flywheel is provided on the other end of the transmission shaft, and the brake plate is provided below the flywheel, one end of the brake plate being rotatably connected to the frame, and the other end of the brake plate being connected to the brake wire.

[0012] In some embodiments, a magnet is provided on the side face of the brake plate, that is closer to the flywheel. In some embodiments, a non-magnetism permeable baffle ring is sleeved outside of the flywheel. In some embodiments, limit mechanism is provided a between the other end of the brake plate and the frame, the limit mechanism is configured to prevent the magnet from contacting with the flywheel.

[0013] In some embodiments, the support frame comprises a rotatable rod, which is rotatably connected to the first end of the frame, and legs connected to the rotatable rod.

[0014] The present invention because of having incorporated the above technical solutions possesses the following advantages: 1. The present invention is simple in construction, safe, reliable, easy to use and, when compared to traditional treadmills, it can operate as a treadmill without control system, motor, and similar electrical devices, and accordingly cuts the cost and offers a performance similar to an automatic treadmill while allowing the user to control the treadmill. 2. The holder in the present invention, consisting of a plurality of support rods hinged each other, can be folded to minimize the space occupied by the treadmill during transport, handling, or idle time, which may reduce greatly the number of containers and

the transport cost. 3. The present invention provides on the first end of the frame a collapsible support frame so that the inclination of the tread bench can be adjusted by means of the support frame and therefore affords the user different exercise experiences, meanwhile the collapsible support frame makes it possible to minimize the space occupied by the treadmill during transport, handling, or idle time. 4. The present invention provides as needed a flywheel and a brake plate on the rotating shaft and the transmission shaft respectively, and each brake plate may be connected to a same brake wire or to a separate brake wire, such that the brake plates can be operated separately or in a linked manner through the brake mechanism to provide resistance of different magnitudes. 5. The present invention provides a non-magnetism permeable baffle ring sleeved outside of the flywheel and therefore prevents the danger of the flywheel being contacted with and seized by the magnet of the brake plate and thus enhances the safety of the treadmill. 6. The present invention provides a limit mechanism between the frame and the brake plate and therefore prevents the danger of the flywheel being contacted with and seized by the magnet of the brake plate and thus enhances the safety of the treadmill.

[0015] The above summary is for the sole purpose of illustration and is not intended to be restrictive in any way. In addition to the illustration aspects, embodiments and features described above, further aspects, embodiments, and features of the present invention will become readily apparent from the following detailed description with reference to accompanying drawings.

Description of Accompanying Drawings

[0016] In the drawings, the same reference numbers are used for same or similar parts or elements throughout the drawings, unless otherwise specified. These drawings are not necessarily drawn to scale. It is to be understood that these drawings only depict some embodiments according to the present disclosure and should not be construed as limiting the scope of the present invention.

Fig. 1 shows schematically the overall structure of the present invention;

Fig. 2 gives an enlarged view of the magnetic control mechanism of the present invention;

Fig. 3 is an enlarged view of the regulation part according to one embodiment of the present invention;

Fig. 4 is an enlarged view of the regulation part according to another embodiment of the present invention; and

Fig. 5 shows schematically the structure of the limit mechanism of the present invention.

Detailed description

[0017] The following provides a brief description of some exemplary embodiments only. As can be appreciated by those skilled in the art, the described embodiments may be modified in various ways without departing from the spirit or scope of the present invention. Accordingly, the drawings and description are to be regarded as being illustrative rather than restrictive in nature.

[0018] In the description of the invention, it is to be understood that the orientation or positional relationship indicated by the terms "center", "longitude", "transverse", "length", "width", "thickness", "up", "down", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "internal", "external", "outside", "inside", "clockwise", "counterclockwise" and the like is based on the orientation or positional relationship indicated in the drawings, and is intended solely to facilitate illustration of the present invention and simplify the description and is not intended or implied that the devices or elements thus indicated must have a specific orientation and be constructed and operated in a particular orientation and therefore should not be understood as limitations to the present invention. In addition, the terms "first" and "second" are merely for illustrative purposes and are not to be construed as expressing or implying a relative importance or implicitly indicating the number of technical features indicated. Thus, a feature that is qualified by "first" or "second" may explicitly or implicitly include one or more such features. In the description of the present invention, the meaning of "a plurality of" or "a number of" and the like refers to two or more, unless otherwise specified.

[0019] In the description of the present invention, it is to be noted that, unless otherwise expressly specified or limited, the terms "install", "mount", "connect", "couple" and the like are to be broadly interpreted, for example, it may be a dead connection, a removable connection, or an integral connection; it may be a mechanical connection or an electrical connection or communication with each other; it may be a direct connection or an indirect connection via an intermediate medium; it may be interconnection of two elements or an interaction between two elements. The specific meanings to be carried in the present invention by the above terms may be understood by those skilled in the art in light of the circumstances.

[0020] In the invention, unless otherwise expressly specified or limited, a first feature being "above" or "below" a second feature may include the first feature coming into direct contact with the second feature and may further include, rather than coming in direct contact with each other, the first feature coming in contact with the second feature by another feature therebetween. Also, a first feature being "on", "above", "over" a second feature includes the first feature being directly above or obliquely above the second feature, that is it only indicates that the level of the first feature is higher than that of the second feature. A first feature being "beneath", "below" and "under" a second feature includes the first feature being directly below or obliquely below the second feature, or only indicates that the level of the first feature is lower than that of the second feature.

[0021] Specifically, as shown in Fig. 1, the treadmill of the present invention includes a frame 1 and a tread bench 2 that is provided on the lower portion of the frame 1, there being provided on the lower portion of the first end 11 of the frame 1 a magnetic control mechanism 3 that is connected to the tread bench 2, there being provided on the upper portion of the first end 11 of the frame 1 a brake mechanism 4 that is connected to the magnetic control mechanism 3, and the magnetic control mechanism 3 and the brake mechanism 4 act in a linked manner to control the movement resistance of the tread bench 2.

[0022] The tread bench 2 includes a rotating shaft 21 rotatably connected to the first end 11 of the frame 1, a rotating shaft 22 rotatably connected to the second end 12 of the frame 1, and a tread belt 23 supported jointly by the rotating shaft 21 and the rotating shaft 22.

[0023] The upper portion of the frame 1 is equipped with a holder, the holder being made up of several segments of support rods 12, both ends of the support rods 12 being articulated with the ends of adjacent support rods 12, such that the support rods 12 can be folded into a position parallel to the tread bench 2, which minimizes the space occupied by the frame 1. Articulated points 15 are provided at the connection points of the support rods 12.

[0024] It should be noted that to further minimize the space occupied by the frame 1 the adjacent support rods 12 are removably connected into one piece.

[0025] In one preferred embodiment, there is provided on the holder and close to the first end 11 of the frame 1 a handle 13, and there is provided a handle 14 of loop shape close to the second end 12 of the frame 1, the handle 13 being tilted upward, the support rods 12 running essentially horizontally between the handle 13 and the handle 14 to facilitate gripping by the user. It should be noted that to prevent injury or collision of the user in exercise the support rods 12 may be enveloped with a layer of "tearproof" foam.

[0026] As shown in Fig. 1, to further adjust the size of the frame 1 there may be provided on the first end 11 of the frame 1 a collapsible support frame 5, the support frame 5 being designed to support the frame 1 such that the first end 11 of the frame 1 is at a higher level than that of the second end 12 of the frame 1 and such that the tread bench is inclined, the exercise intensity being regulated by adjusting the inclination of the tread bench 2. Wherein, the support frame 5 includes a rotatable rod 51 rotatably connected to the first end 11 of the frame 1, and legs 52 deadly connected to the rotatable rod 51, the legs 52 being used to support the frame 1 and, in the process of collapsing, the rotatable rod 51 being rotated to sweep a certain angle such that the height and the length of the frame 1 are reduced.

[0027] The brake mechanism 4 includes a regulation part 41 and a brake wire (not shown) that are provided on the frame 1, the first end of the brake wire being retractably connected to the regulation part 41, and the second end of the brake wire being connected to the magnetic control mechanism 3.The regulation part 41 is equipped with a plurality of gear positions such that the user may shift into different gear positions to control the length of the brake wire that is to extend out of the regulation part 41 and thus achieve the purpose of controlling the magnetic control mechanism 3 through the brake wire.

[0028] In one preferred embodiment, as shown in Fig. 3, the regulation part 41 includes a regulation table 411 and a lever 412 that is rotatably connected to the regulation table 411, there being provided a plurality of gear positions in the regulation table 411, the lever 412 rotating to a different angular position to shift into a different gear position in the regulation table 411, and the length of the brake wire extending out of the regulation table 411 being regulated by shifting into different gear positions.

[0029] In another preferred embodiment, as shown in Fig. 4, the regulation part 41 includes a knob 413 and a lever 414 that is connected to the knob 413, there being provided a plurality of gear positions in the knob 413, the lever 414 rotating to a different angular position to shift into a different gear position in the knob 413, and the length of the brake wire extending out of the knob 413 being regulated by shifting into different gear positions.

[0030] The magnetic control mechanism 3 includes a first flywheel 31 provided on the end of the rotating shaft 21 of the tread bench 2, and a first brake plate 32 provided below the first flywheel 31, one end of the first brake 32 being rotatably connected to the frame 1, the other end of the first brake 32 being connected to the second end of the brake wire, such that when the brake wire is being pulled the first brake plate 32 rotates with respect to the frame 1 with the effect of changing the spacing between the first brake plate 32 and the outer rim of the first flywheel 31. Wherein, one end or both ends of the rotating shaft 21 can be equipped with the first flywheel 31. When both ends are equipped with a first flywheel 31, the two first brake plates 32 can be either connected to a same brake wire or to a separate brake wire respectively. If the connection is made to a same brake wire, when the brake wire length is being regulated the two first brake plates 32 act together in a linked manner to adjust the rotation resistance of the two first flywheels 31; if the connection is made to two separate brake wires, that is if the two first flywheels are controlled independently, when the length of one of the brake wires is being regulated the first brake plate 32 connected to this brake wire controls the rotation resistance of the corresponding first flywheel 31, and when the length of the other brake wire is being regulated the first brake plate 32 connected to the other brake wire controls the rotation resistance of the corresponding first flywheel 31.

[0031] In one preferred embodiment, as shown in Fig. 1 and Fig. 2, there is on the first end 11 of the frame 1 rotatably connected a horizontal transmission shaft 33, one end of the transmission shaft 33 being equipped with a second flywheel 31, there being provided a second brake plate 32 below the second flywheel 31, one end of

the second brake plate 32 being rotatably connected to the frame 1, and the second end of the second brake plate 32 being connect to the brake wire; there is provided a first belt wheel 34 on the transmission shaft 33 and close to the flywheel 31, there being provided on the rotating shaft 21 a second belt wheel 35, there being provided a conveying belt 36 between the first belt wheel 34 and the second belt wheel 35, such that when the rotating shaft 21 rotates, the transmission shaft 33 is brought to rotate by means of the conveying belt 36. Wherein, the first brake plate 32 and the second brake plate 32 may be connected to a same brake wire, that is the first brake plate 32 and the second brake plate 32 act in a linked manner, such that when the brake wire is being regulated for its length both the first flywheel 31 and the second flywheel 32 are controlled by the brake plate 32; the first brake plate 32 and the second brake plate 32 may be connected to a separate brake wire respectively, that is the two brake wires are controlled independently, such that when the brake wire connected to the first brake plate 32 is being regulated for its length the first flywheel 32 sustains a rotation resistance and when the brake wire connected to the second brake plate 32 is being regulated for its length the second flywheel 32 sustains a rotation resistance. Wherein, the first belt wheel 34 can be made to have a larger diameter than the second belt wheel 35, alternatively the first belt wheel 34 may have a smaller diameter than the second belt wheel 35, whichever is desirable in view of the service so as to satisfy the demand for differing transmission efficiency.

[0032] It should be noted that a third flywheel 31 can be provided on the other end of the transmission shaft 33 such that when the transmission 33 rotates, the second flywheel 31 and the third flywheel 31 rotate altogether, there being provided a third brake plate 32 blow the third flywheel 31, one end of the third brake plate 32 being rotatably connected to the frame 1, the other end of the third brake plate 32 being connect to the brake wire. Wherein, the first, the second, and the third brake plates 32 may altogether be connected to a same brake wire or be connected to an independent brake wire each or any two of the brake plates 32 may be connected to a same brake wire. This enables simultaneous control or independent control of the first, the second, and the third flywheels 31.

[0033] In another preferred embodiment, the second flywheel 31 may be replaced by a self-generating unit, the output end of the self-generating unit being connected to the rotating shaft 21 by means of the conveying belt 36, such that the movement resistance of the tread bench 2 is changed by adjusting the rotational speed of the output end of the self-generating unit.

[0034] In the above embodiment, the brake plate 32 can be a curved plate, whose shape is to match with the outer rim of the flywheel 31.

[0035] In the above embodiment, a magnet 37 is provided on the face, which face is closer to the flywheel 31, of the brake plate 32 (as shown in Fig. 2). It should be noted that the magnet 37 can be one object or a plurality of objects spaced apart and, when the magnet 37 is a plurality of objects, it includes a number of common magnets and a number of strong magnets. Wherein, the strong magnets are provided on the end of the brake plate that is closer to the brake wire. For instance, six magnets 37 can be mounted on the brake plate 32, consisting of two strong magnets and four common magnets, wherein the strong magnets are mounted on the end closer to the brake wire, and when the two strong magnets are closest to the flywheel 31 the resistance becomes maximum. When the brake wire is being pulled, the spacing between the brake plate 32 and the flywheel 31 varies in response, and the resistance created by the magnet 37 against the flywheel 31 also varies in response, the closer the brake plate 32 to the flywheel 31 the greater the resistance. The flywheel 31 decelerates or stops the tread bench 2 by use of the rotation resistance created by the magnet 37 against the flywheel 31.

[0036] It should be noted that the quantity and/or layout of the magnet 37 may be adjusted as needed and are not limited to the above-described as long as the magnet 37 provides an adequate force, a force that is not too strong as to interfere with the normal operation of the flywheel 31 and not too weak as to be unable to regulate the resistance of the flywheel 31.

[0037] In the above embodiment, a non-magnetism permeable baffle ring (not shown) may be provided sleeved outside of the flywheel 31 to prevent the flywheel 31 from contacting with the brake plate 32 and to avoid too small a spacing between the magnet 37 on the brake plate 32 and the flywheel 31 and to avoid the flywheel 31 being seized by the magnet 37. It should be noted that the baffle ring can be of any thickness and any material available in prior art. For example, a 2mm thick aluminum ring.

[0038] In the above embodiment, as shown in Fig. 5, a limit mechanism 6 can be provided between the other end of the brake plate 32 and the frame 1, the limit mechanism 6 being used to prevent the magnet 37 from contacting with the flywheel 31. The limit mechanism 6 includes a stop plate 61, a stopper 62, and a spring 63. There are two stop plates 61, the first stop plate 61 being fixed on the frame 1, the second stop plate 61 being provided below the first stop plate 61 and being connected to the other end of the brake plate 32, there being provided a stopper 62 between the two stop plates 61, the stopper 62 being connected to the first stop plate 61, the stopper 62 being used to limit the spacing between the brake plate 32 and the flywheel 31 so as to prevent the magnet 37 of the brake plate 32 from contacting with the flywheel 31 and seizing the flywheel 31. The two ends of the spring 63 is connected to the first and the second stop plates 61 respectively, and the spring 63 is such that the length of the brake wire can be regulated by use of the regulation part 41, with the effect that the spacing between the magnet 37 and the flywheel 31 is regulated. Specifically, when the brake wire is retracted, the brake

plate 32 is fixed by use of the tension of the spring 63; when the brake wire is released, the brake plate 32 is restored to its position under the action of the recoil of the spring 63.

[0039] In the above embodiment, the transmission shaft 33, the rotating shaft 21, and the rotating shaft 22 may be designed with a larger diameter so as to increase the operational inertia of the tread bench.

[0040] While the device of the present invention is working, the user holds the holder and, by jogging, causes the tread belt 23 to move and the rotating shafts 21 and 22 to rotate altogether, and rotating shaft 21 rotates to make the flywheel 31 rotate along with it; the user, when desiring to change the movement resistance, manually operates the regulation part 41 to change the length of the brake wire extending out of the regulation part 41, and when the brake wire is shortened, the other end of the brake wire pulls the brake plate 32 to rotate anticlockwise by a certain angle such that the spacing between the brake plate 32 and the flywheel 31 narrows and the rotation resistance of the flywheel 31 increases under the action of the magnet 37, with the effect of increasing the challenge of jogging. When the brake wire extends, the other end of the brake wire pulls the brake plate 32 to rotate clockwise by a certain angle such that the spacing between the brake plate 32 and the flywheel 31 widens, the magnetic force exerted on the flywheel 37 by the magnet 37 weakens, with the effect of reducing the rotation resistance of the tread bench 2. If it is desired to change the tread bench inclination so as to change the load of exercise, the user may make adjustments by use of the legs 52 of the support frame 5. When it is desired to stow or move the treadmill, the support frame 5 is folded and the support rods of the holder are rotated such that the support rods 12 and the support frame 5 are folded in a position in parallel to the tread bench 2, which minimized the space occupied by the treadmill.

[0041] The above are only specific embodiments of the invention, but the scope of the invention is not to be limited thereto. Any person skilled in the art can easily conceive various changes or replacements within the scope of the invention as disclosed, and these changes or replacements are to be contained within the scope of the invention. Accordingly, the scope of protection of the invention should be determined by the enclosed claims.

Claims

1. A treadmill comprising a frame and a tread bench that is provided on the frame, wherein a magnetic control mechanism connected to the tread bench is provided on a first end of the frame, and a brake mechanism connected to the magnetic control mechanism is further provided on the first end of the frame, the magnetic control mechanism and the brake mechanism are configured to linkage control the movement of the tread bench.

2. The treadmill according to claim 1, wherein the brake mechanism comprises a regulation part and a brake wire that are provided on the frame, a first end of the brake wire is retractably connected to the regulation part, and a second end of the brake wire is connected to the magnetic control mechanism.

3. The treadmill according to claim 1, wherein a collapsible support frame is provided on the first end of the frame, the support frame is configured to adjust the inclination of the tread bench.

4. The treadmill according to claim 3, wherein a holder is provided on the upper portion of the frame a holder, and comprises a plurality of support rods hinged each other, the support rods being able to be folded into a position parallel to the tread bench.

5. The treadmill according to claim 2, wherein the magnetic control mechanism comprises a flywheel provided on an end of the rotating shaft of the tread bench and a brake plate provided below the flywheel, one end of the brake plate is rotatably connected to the frame, and another end of the brake plate is connected to the second end of the brake wire.

6. The treadmill according to claim 5, wherein the flywheel is provided at another end of the rotating shaft, and the brake plate is provided below the flywheel, the one end of the brake plate is rotatably connected to the frame, and the other end of the brake plate is connected to the brake wire.

7. The treadmill according to claim 5, wherein a transmission shaft is rotatably connected to the first end of the frame, the flywheel is provided at one end of the transmission shaft, and the brake plate is provided below the flywheel, one end of the brake plate is rotatably connected to the frame, and another end of the brake plate is connected to the brake wire; and a first belt wheel is provided on the transmission shaft at a location close to the flywheel, a second belt wheel is provided on the transmission shaft, and a conveying belt is provided between the first belt wheel and the second belt wheel.

8. The treadmill according to claim 7, wherein the flywheel is provided at another end of the transmission shaft and the brake plate is provided below the flywheel, the one end of the brake plate is rotatably connected to the frame, and the other end of the brake plate is connected to the brake wire.

9. The treadmill according to any one of claims 5 to 8, wherein a magnet is provided on a side face of the brake plate, that is close to the flywheel.

10. The treadmill according to claim 9, wherein a non-

magnetism permeable baffle ring is sleeved outside of the flywheel.

11. The treadmill according to claim 9, wherein a limit mechanism is provided between the other end of the brake plate and the frame, the limit mechanism is configured to prevent the magnet from contacting with the flywheel.

12. The treadmill according to claim 3, wherein the support frame comprises a rotatable rod rotatably connected to the first end of the frame, and legs connected to the rotatable rod.

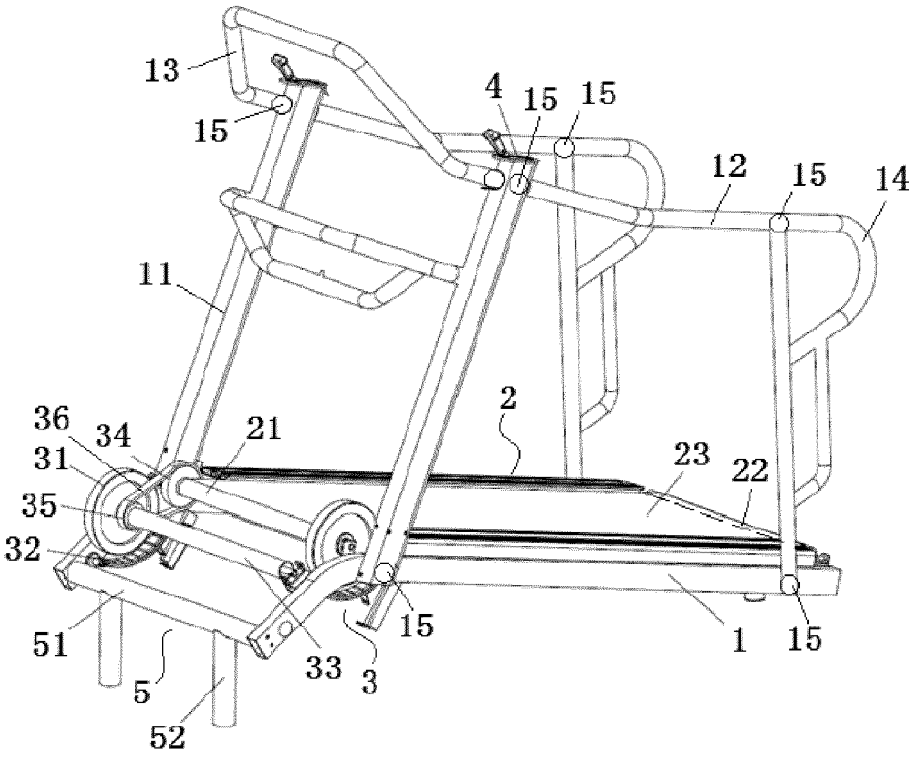
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Fig. 1

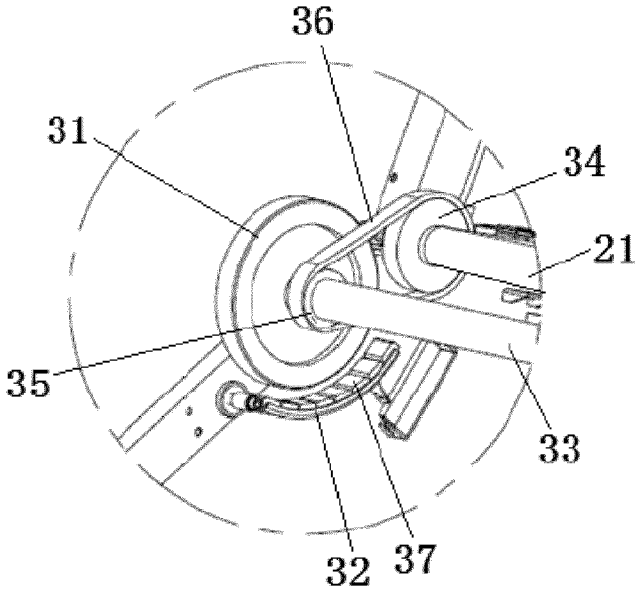
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Fig. 2.

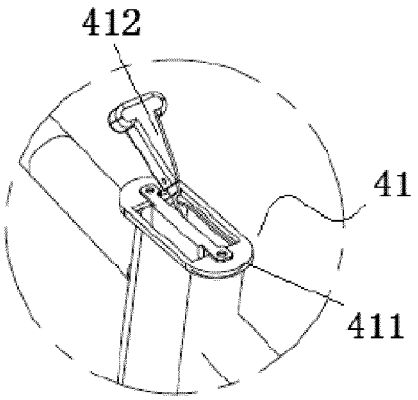

Fig. 3.

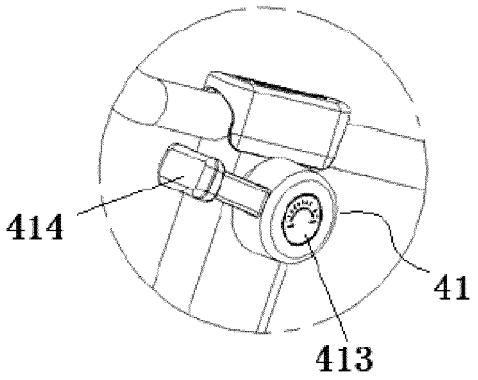

Fig. 4.

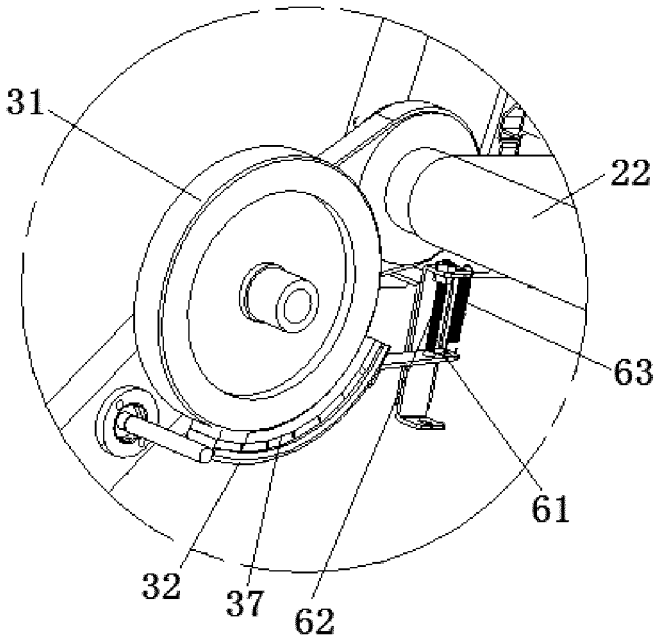

Fig. 5.

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 17 5110

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2015/080189 A1 (VILLANI ANTHONY J [US]) 19 March 2015 (2015-03-19) * paragraph [0016] - paragraph [0030]; figures *	1-12	INV. A63B21/005 A63B22/02 A63B21/22 A63B21/00
X	DE 20 2016 107038 U1 (YING LIANG HEALTH TECH CO LTD [TW]) 25 January 2017 (2017-01-25) * paragraph [0015] - paragraph [0023]; figures *	1-12	
X	US 2015/209610 A1 (DALEBOUT WILLIAM T [US] ET AL) 30 July 2015 (2015-07-30) * paragraph [0104] - paragraph [0113]; figures *	1-12	
X	EP 3 100 772 A1 (JOHNSON HEALTH TECH CO LTD [CN]) 7 December 2016 (2016-12-07) * paragraph [0027] - paragraph [0033]; figures *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 December 2017	Borrás González, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
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