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Declarations under Rule 4.17:

— as to the identity of the inventor (Rule 4.17(i))

Published:

— with international search report (Art. 21(3))

(54) Title: EXERCISE APPARATUS WITH OSCILLATING TILT SYSTEM

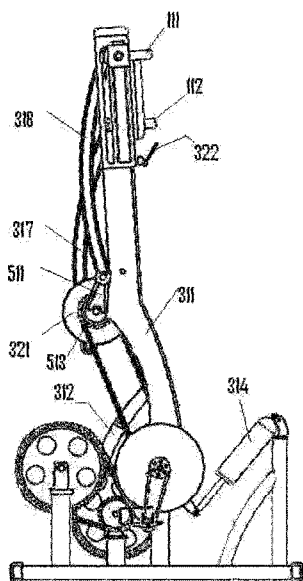


Figure 12

(57) Abstract: An exercise apparatus with oscillating tilt system includes a main frame for supporting all the components of the apparatus, a tiltable upstanding support is tilted continuously, a mechanism which enabling a user of the apparatus to move hands and feet up and down harmoniously, and another mechanism to change the orientation of the user in relation to the vertical line continuously during the exercise, and consequently changing the direction of the forces affecting on different muscles of the user of the apparatus.



EXERCISE APPARATUS WITH OSCILLATING TILT SYSTEM

1. FIELD OF THE INVENTION:

The invention relates to the field of exercise equipment and in particular a motion-based mechanism to be used to change user's body orientation and consequently changing the forces affecting on different muscles of the user.

2. BACKGROUND

Maintaining proper fitness is a growing concern for many people. Medical community has become increasingly aware of the value of exercise to the overall health of an individual. Furthermore, athletes need regular and stringent workout to maintain their abilities. Exercise apparatuses have been, and still are, an important part of the sport and workout. Exercise apparatuses have evolved from simple equipment to advanced and technically sophisticated equipment with special mechanisms. Using mechanical and electrical parts and new software enables users to take more advantages of exercise apparatuses.

In conventional exercise machine usually the user's body orientation does not change notably and continuously, if user wants a harder workout then the user increases the resistance of the running platform and thereby increasing the forces affecting the same muscles. The problem with this type of resistance in the exercise machine is that there is a limited range and direction of resistance for increasing the strength of the users. Changing the orientation of the user will change effects and directions of the resisting forces and this helps user to have a better workout.

3. DESCRIPTION:

The described exercise apparatus enables a user of the apparatus to move hands and feet up and down harmoniously, providing a continuous

oscillating tilt on the tiltable upstanding support of the apparatus while the user is getting exercise, this changes the user's body orientation in relation to the vertical line, thus enabling user to do exercises in a wide range of different orientations.

5

SUMMARY OF THE INVENTION:

Therefore, the object of the present invention is to provide an exercise apparatus that enables users to move hands and feet up and down harmoniously, and also changing the user's orientation continuously during the exercise and consequently changing the effects and direction of the forces on different muscles.

According to this invention an exercise apparatus with oscillating tilt system comprises a main frame, a tiltable upstanding support, a pedaling unit, a crank-slider mechanism, a power transmission system, a synchronizer, a tilt mechanism, slide unit, at least one gas spring, a controlling means for adjusting resistance force and a computerized panel for the purpose of showing the parameters such as heart rate, calories burned and speed of said user.

Described apparatus comprising:

a main frame which consists of a base support adapted to be mounted on a supporting surface and at least 5 pivot stands for supporting plurality of components, a pedaling unit enabling a user to pedaling action, a tiltable upstanding support that changes the user's orientation, a crank-slider mechanism enabling said user to move hands up and down harmoniously, a tilt mechanism for the purpose of tilting said upstanding support and changing said user's orientation, a power transmission system to transfer power from said pedaling unit to said tilt mechanism for the purpose of tilting said upstanding support, a synchronizer to transfer power between said pedaling unit and said crank-slider mechanism for the purpose of effecting a

harmonious movement between feet and hands motion, a gas spring to balance forces on said upstanding support in various orientations, a controlling means and magnetic brake and resistance wheel for the purpose of adjusting resistance force and a computerized panel for the purpose of showing the parameters such as heart rate, calories burned and speed.

BRIEF DESCRIPTION OF DRAWINGS:

Other features and advantages of described invention will become apparent in the following detailed description of preferred embodiments with reference to the appended drawings, of which:

Figure 1 is a perspective view of described exercise apparatus including all parts, cases and shows position of the user.

Figure 2 is schematic side view of the described exercise apparatus when upstanding support is at the end of the tilt stroke with negative angle in relation to vertical line.

Figure 3 is schematic side view of the described exercise apparatus when upstanding support is in a vertical position.

Figure 4 is schematic side view of the described exercise apparatus when upstanding support is at the end of the tilt stroke with positive angle in relation to vertical line.

Figure 5 is schematic front view of the described exercise apparatus shows pedaling unit and slid unit also demonstrates grip members 111,112 move up and down in fully harmony with pedal members 113,114.

Figure 6 is a perspective view of the main frame of described exercise apparatus and shows base support and pivot stands.

Figure 7 is a perspective view of power transmission system and synchronizer.

Figure 8 is a schematic side view of power transmission system to transfer power from pedaling unit to tilt mechanism, and also synchronizer for the purpose of effecting harmonious movement between hands and feet.

Figure 9 is schematic side view of the described exercise apparatus
5 shows crank-slider mechanism.

Figure 10, 11 are schematic side views of the described exercise apparatus show tilt mechanism and tilt angle range of the upstanding support.

Figure 10 shows maximum tilt angle of upstanding support with negative angle in relation to vertical line

Figure 11 shows the maximum tilt angle of upstanding support with positive angle in relation to vertical line.

Figure 12 shows general layout of the described exercise apparatus.

DETAILED DESCRIPTION OF EMBODIMENT

The description which follows and the embodiments described therein
10 are provided by way of illustration of an example of particular embodiment of principles of present invention. This example is provided for the purposes of explanation and not limitation of those principles and of the invention.

Referring to Figures 1 to 12, the preferred embodiment of an exercise
15 apparatus with oscillating tilt system according to present invention is shown to comprise a main frame 6, pedaling unit 1, slide unit 2, power transmission system 3, synchronizer 7, tilt mechanism 4, crank-slider mechanism 5, upstanding support 311, gas spring 314, resistance wheel 321, console 323, resistance control lever 322, computerized panel 324.

The main frame 6 which includes a base support 315, adapted to be
20 mounted on the supporting surface, and also at least 5 pivot stands 302,303,304,305,306 to support plurality of components. (See figures 6)

Pedaling unit 1 which includes main shaft 101 is rotatably connected to the pivot stand 305 (See figures 6,7), and also crank arms 115,116 whose rear ends are fixed on the both ends of the main shaft 101, and also pedals 117,118 are pivotally connected to front ends of crank arms 117,118. (See figure 7)

Upstanding support 311 is pivotally connected to the main shaft 101 of said pedaling unit 1. (See figure 12)

Crank-slide mechanism 5 which includes main shaft 301 is rotatably connected to the middle section of the upstanding support 311, and also crank arms 511,512 whose rear ends are fixed on the both ends of the main shaft 301, and also linkages 317,318 whose rear ends are pivotally connected to the front ends of the crank arms 511,512 and having front end pivotally connected to the slide unit 2, and also resistance wheel 321 is fixed on the main shaft 301. (See figure 9)

Slide unit 2 which includes linear rails 711,712 are fixed at the top section of the upstanding support 311, and also sliders 111,112 whose bottoms are slidably connected to rails 711,712 and having top ends are pivotally connected to the front ends of the linkages 317,318. (See figure 5, 9)

Synchronizer 7 which includes sprocket/pulley 412 is fixed on the main shaft 101 of said pedaling unit 1, and also sprocket/pulley 513 is fixed on the main shaft 301 of said crank-slider mechanism 5, and also chain/belt 520 transfers power between pedaling unit 1 and crank-slide mechanism 5. (See figures 7, 8)

Console 323 is fixed at the top section of the upstanding support 311 and resistance control lever 322 pivotally connected to the console 323 enabling the user to control magnetic brake 611 which is pivotally connected to the middle section of the upstanding support 311 for the purpose of controlling resisting force. (See figure 9)

Tilt mechanism 4 which includes main shaft 401 is rotatably connected to pivot stands 303, and also main shaft 501 is rotatably connected to pivot stands 302, and also crank arm 515 whose rear end is fixed on the main shaft 401 and having front end is fixed on the shaft 601, and also crank arm
5 515 whose rear end is fixed on the main shaft 501 and having front end is fixed on the shaft 601, and also linkage 312 whose rear end pivotally connected to shaft 601 and having front end pivotally connected to the middle section of the upstanding frame 311. (See figures 7, 10)

Power transmission system 3 which includes sprocket/pulley 411 is fixed
10 on the main shaft 101, and also sprocket/pulley 415 is fixed on the main shaft 501, and also sprockets/pulleys 413,414 are rotatably connected to the pivot stand 304, and also chains/belts 417,418 that transfer power from pedaling unit 1 to tilt mechanism 4, while decreases angular velocity and increases torque for the purpose of providing required torque for tilt mechanism. (See
15 figure 7, 8)

Gas spring 314 whose front is end pivotally connected to the bottom section of the upstanding support 311 and having rear end is pivotally connected to the pivot stand 306 to balance forces on said upstanding support in various orientations

20 Furthermore, described exercise apparatus comprises a panel 324 is mounted on the console 323. The panel 324 is a computerized device for the purpose of showing the parameters such as heart rate and calories burned of the user. Grip sections may include sensors (not shown) to detect the pulse rate of the user.

25 While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and
30 equivalent arrangement.

WHAT IS CLAIMED IS:

1. An exercise apparatus with continuous oscillating tilt system having a plurality of components comprising: a main frame, pedaling unit, tiltable upstanding support, crank-slider mechanism, slide unit, tilt mechanism,
5 power transmission system, synchronizer, gas spring, controlling means, computerized panel.
2. The exercise apparatus of claim 1, wherein said main frame, further includes base support adapted to be mounted on a supporting surface, and also at least two pivot stands at front end, and also at least one pivot stand at
10 rear end, and also at least two pivot stands at middle section for the purpose of supporting said plurality of components.
3. The exercise apparatus of claim 1, wherein said pedaling unit enabling the user to pedaling action.
4. The exercise apparatus of claim 1, wherein said pedaling unit further
15 includes a main shaft is rotatably connected to said pivot stand at the middle section of said main frame, and also two crank arms whose rear ends are fixed on the both ends of the said main shaft, and also two pedals are pivotally connected to the front ends of said crank arms.
5. The exercise apparatus of claim 1, wherein said tiltable upstanding
20 support is pivotally connected to said main shaft of said pedaling unit for the purpose of changing user's orientation.
6. The exercise apparatus of claim 1, wherein said crank-slider mechanism installed at the top section of the upstanding support, enabling said user to move hands up and down in the opposite direction and in full
25 harmony with feet.
7. The exercise apparatus of claim 1, wherein said crank-slider mechanism further includes two crank arms whose rear ends are rotatably connected to the middle section of said upstanding support, and also two

linkages whose rear ends are pivotally connected to the front ends of said crank arms and having front ends are pivotally connected to the slide unit.

8. The exercise apparatus of claim 1, wherein said slide unit installed at the top section of the upstanding support, further includes two rails are fixed laterally at the top section of the said upstanding support, and also two
5 sliders whose bottoms are slidably connected to said rails and having top ends pivotally connected to the front ends of said linkages of said crank-slider mechanism.

9. The exercise apparatus of claim 1, wherein said tilt mechanism for the
10 purpose of tilting upstanding support in positive and negative angle in relation to vertical line.

10. The exercise apparatus of claim 1, wherein said tilt mechanism further includes two crank arms whose rear ends are rotatably connected to said pivot stands at the front end of said main frame, and also at least one linkage
15 whose rear end is pivotally connected to the front ends of said crank arms and having front end pivotally connected to the middle section of said upstanding support.

11. The exercise apparatus of claim 1, wherein said power transmission system to transfer power from said pedaling unit to said tilt mechanism.

20 12. The exercise apparatus of claim 1, wherein said synchronizer for the purpose of effecting harmonious movement between feet and hands, and also transfers power between said pedaling unit and said crank-slider mechanism.

25 13. The exercise apparatus of claim 1, wherein said gas spring whose front end is pivotally connected to the bottom section of said upstanding support and having rear end is connected pivotally to said pivot stand at the rear end of said main frame for the purpose of balancing the forces on said upstanding support in various orientations.

14. The exercise apparatus of claim 1, wherein said computerized panel is used for the purpose of showing the parameters such as heart rate, calories burned and speed.

5 15. The exercise apparatus of claim 1, wherein said controlling means is used for the purpose of adjusting resisting force, wherein adjusting changes effect of the user's workout.

16. The exercise apparatus of claim 1, wherein said tilt mechanism, there is an option that tilt mechanism can be outfitted with electrical power instead of relying on transferred power produced by said pedaling unit.

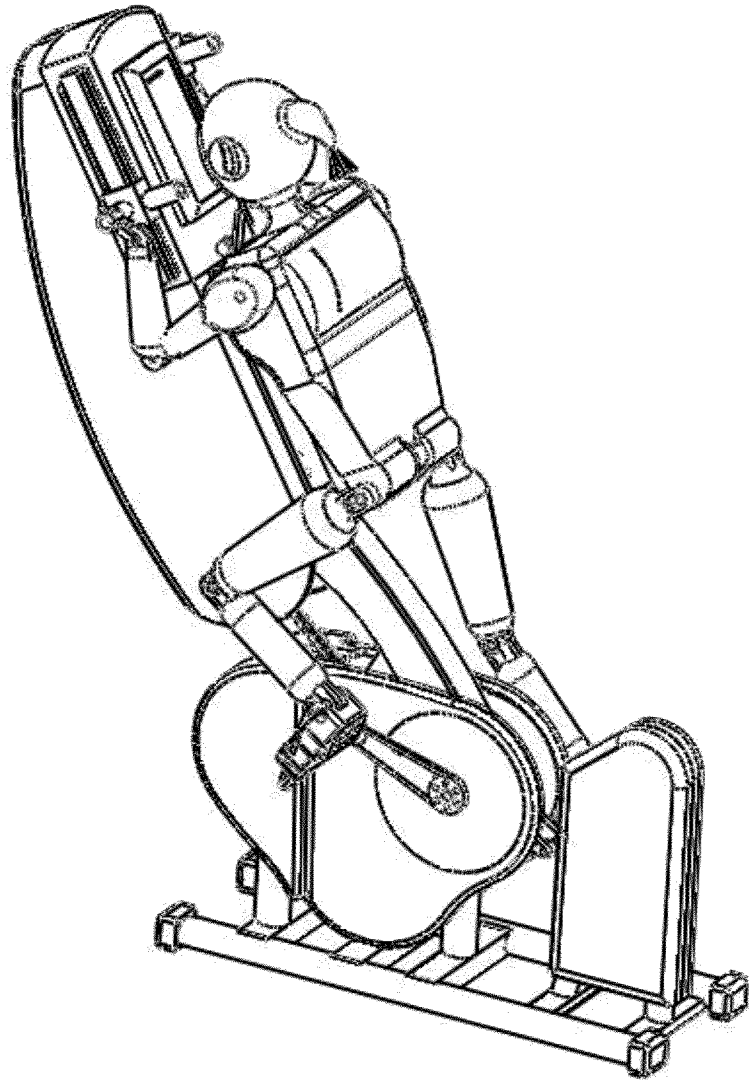


Figure 1

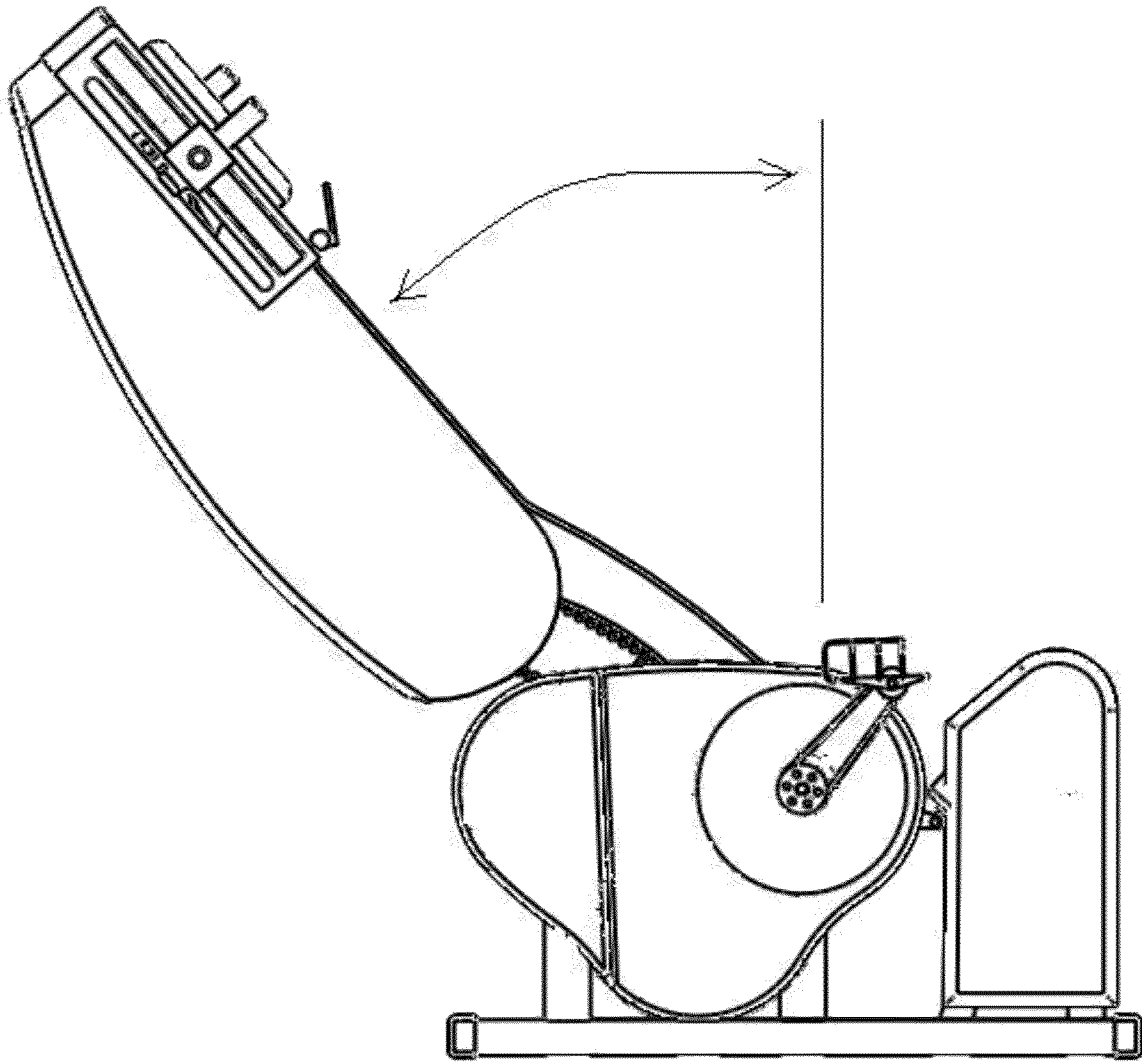


Figure 2

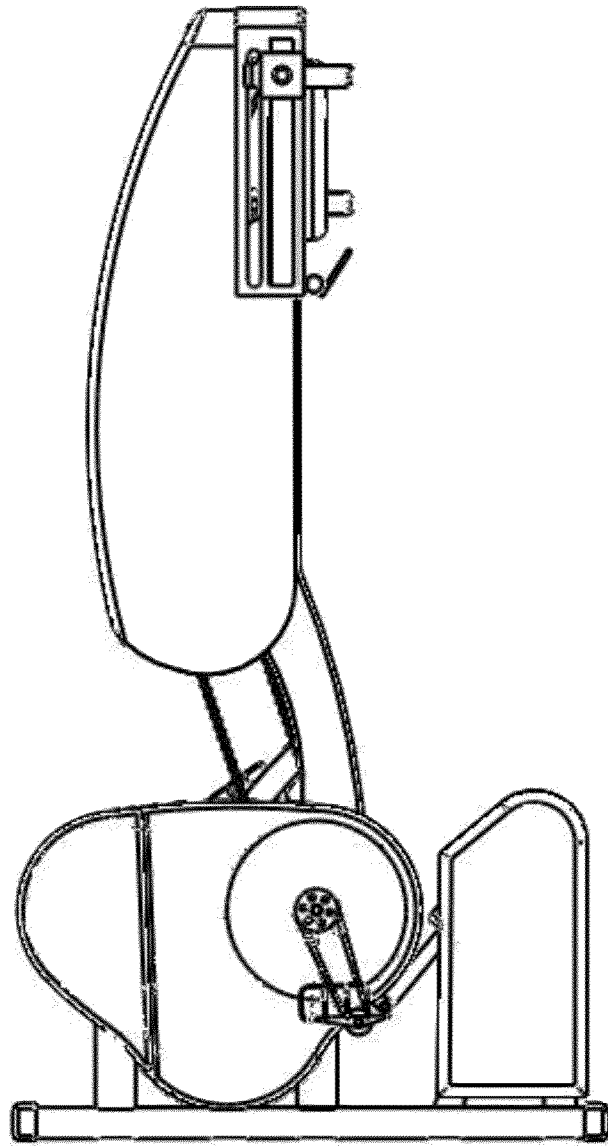


Figure 3

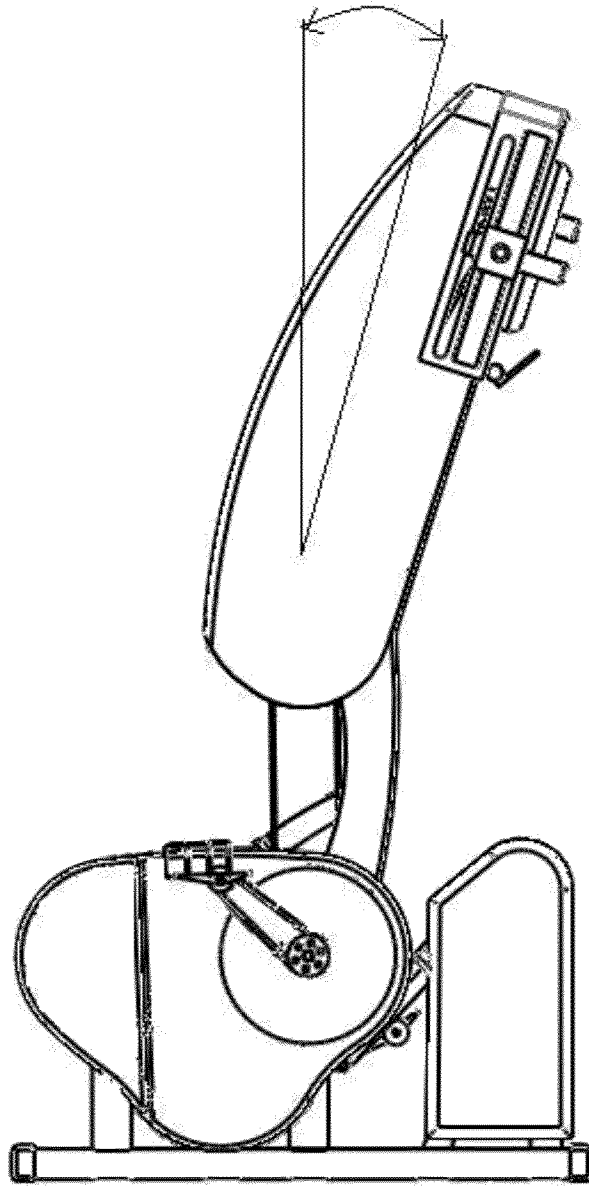


Figure 4

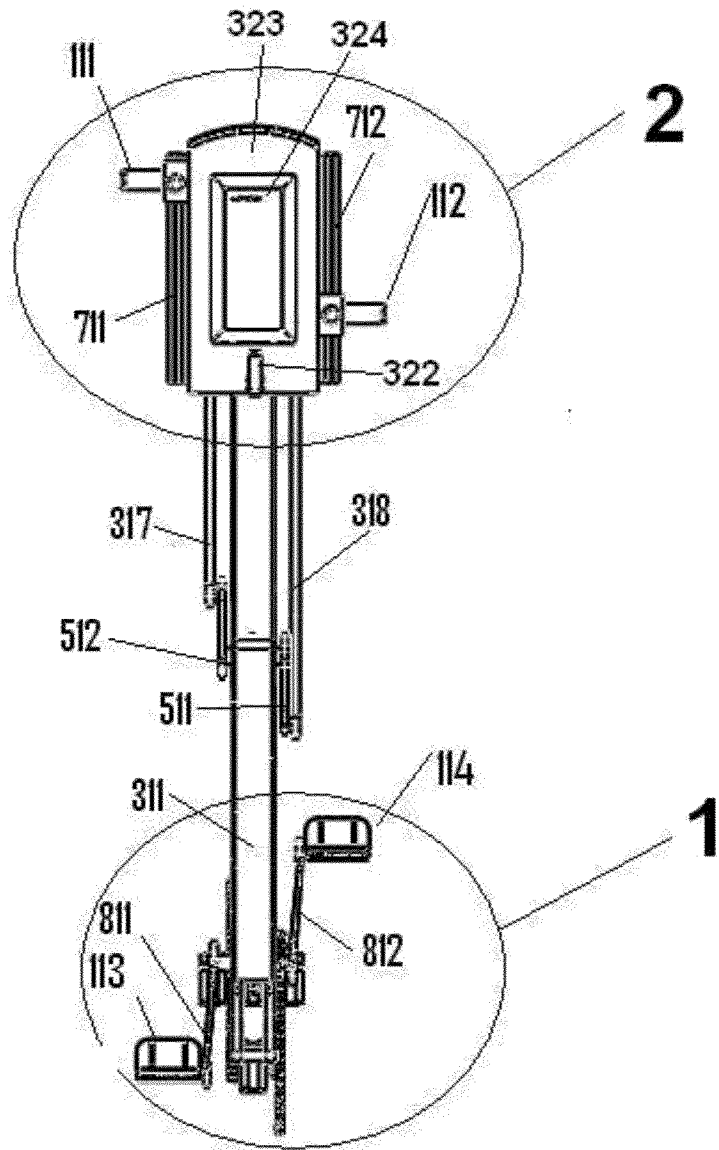


Figure 5

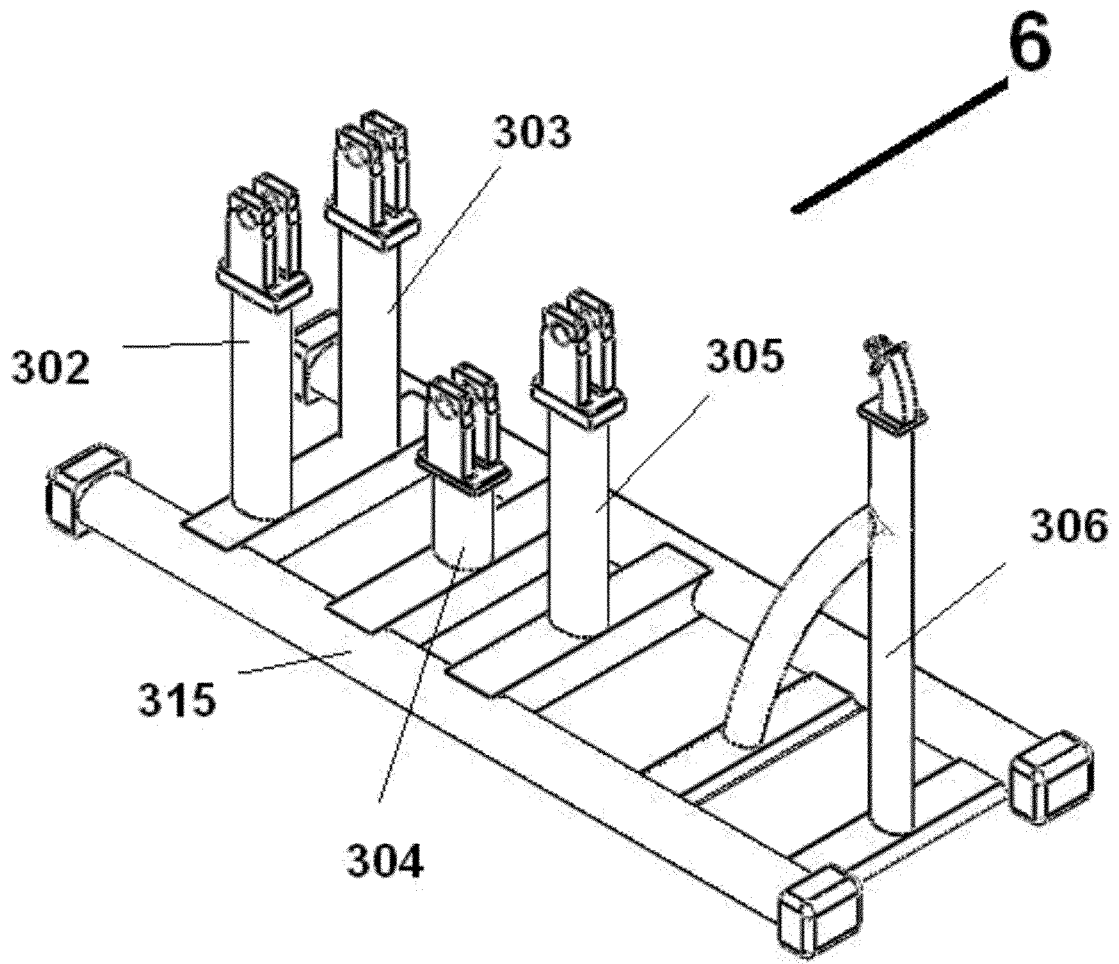


Figure 6

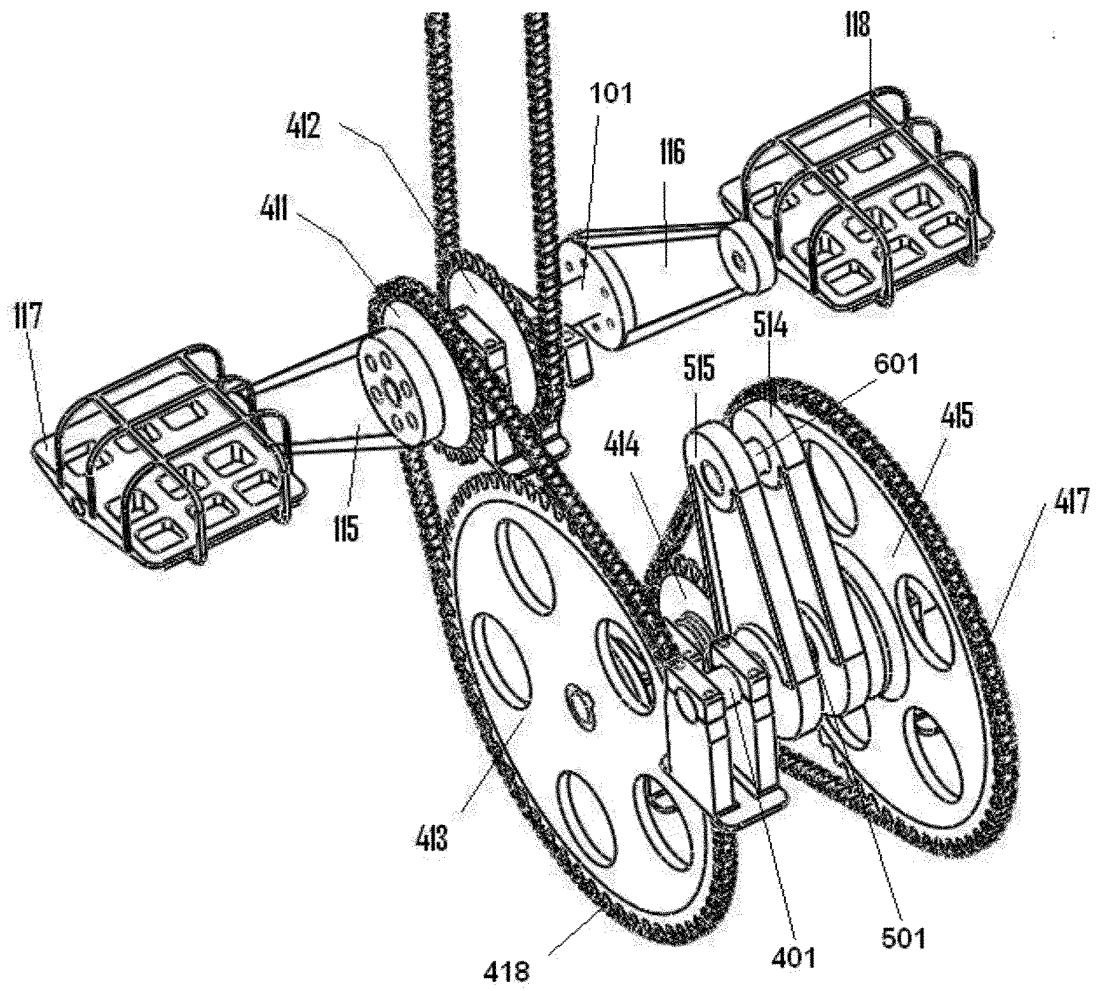


Figure 7

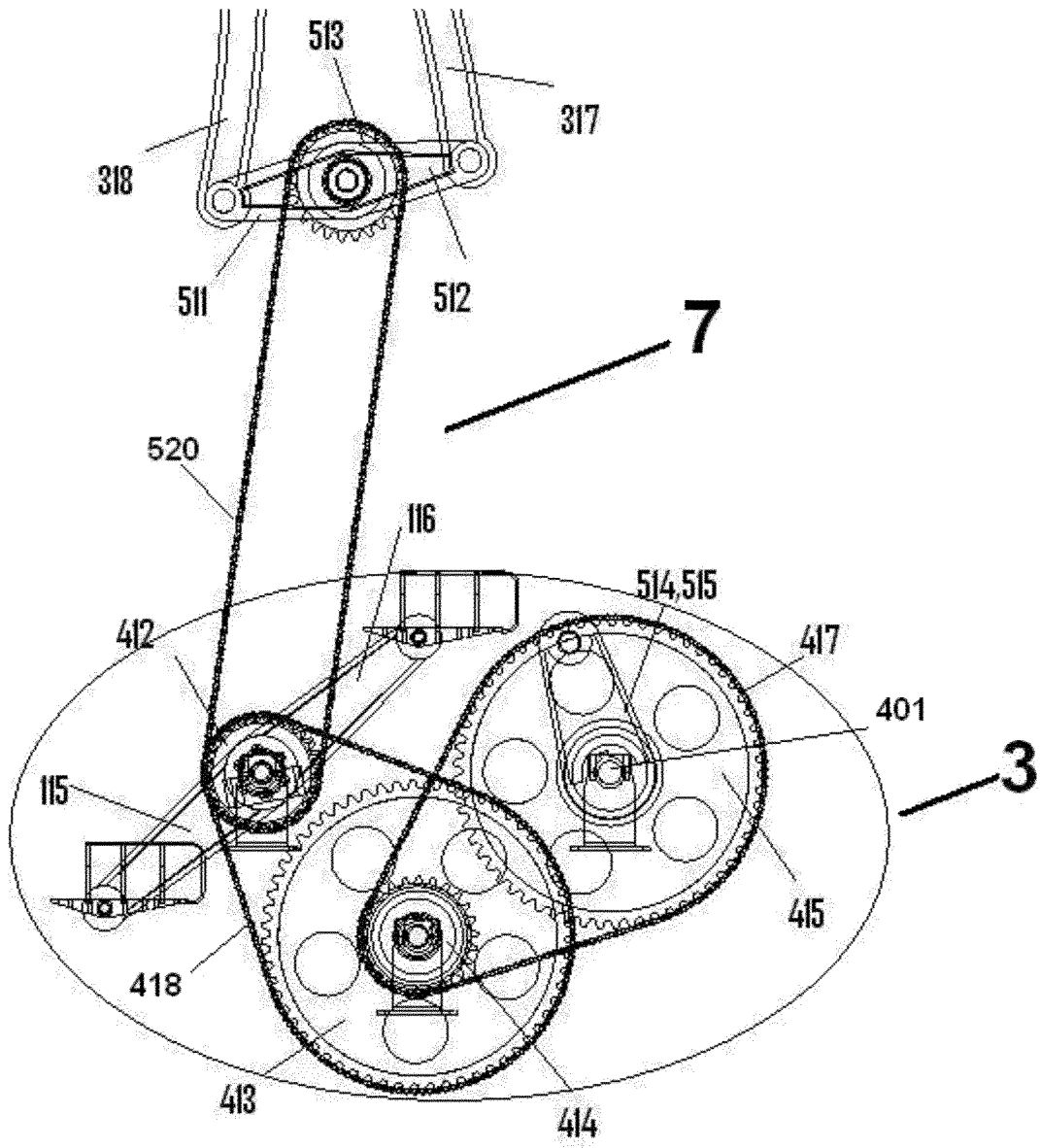


Figure 8

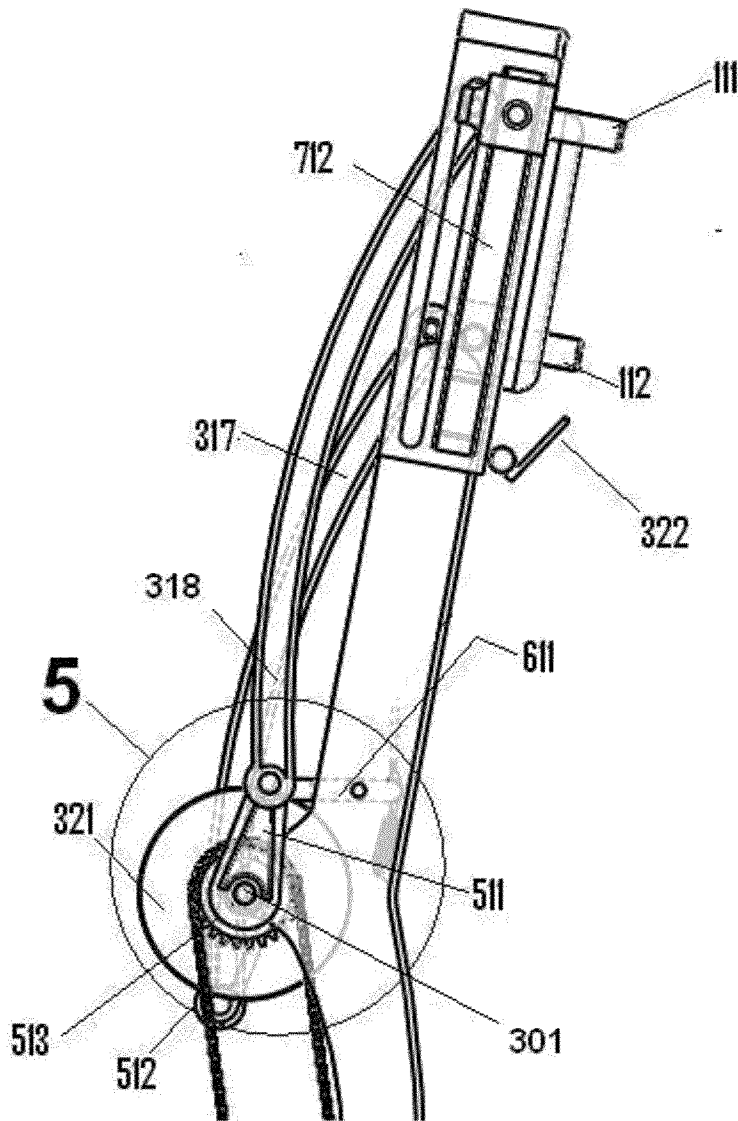


Figure 9

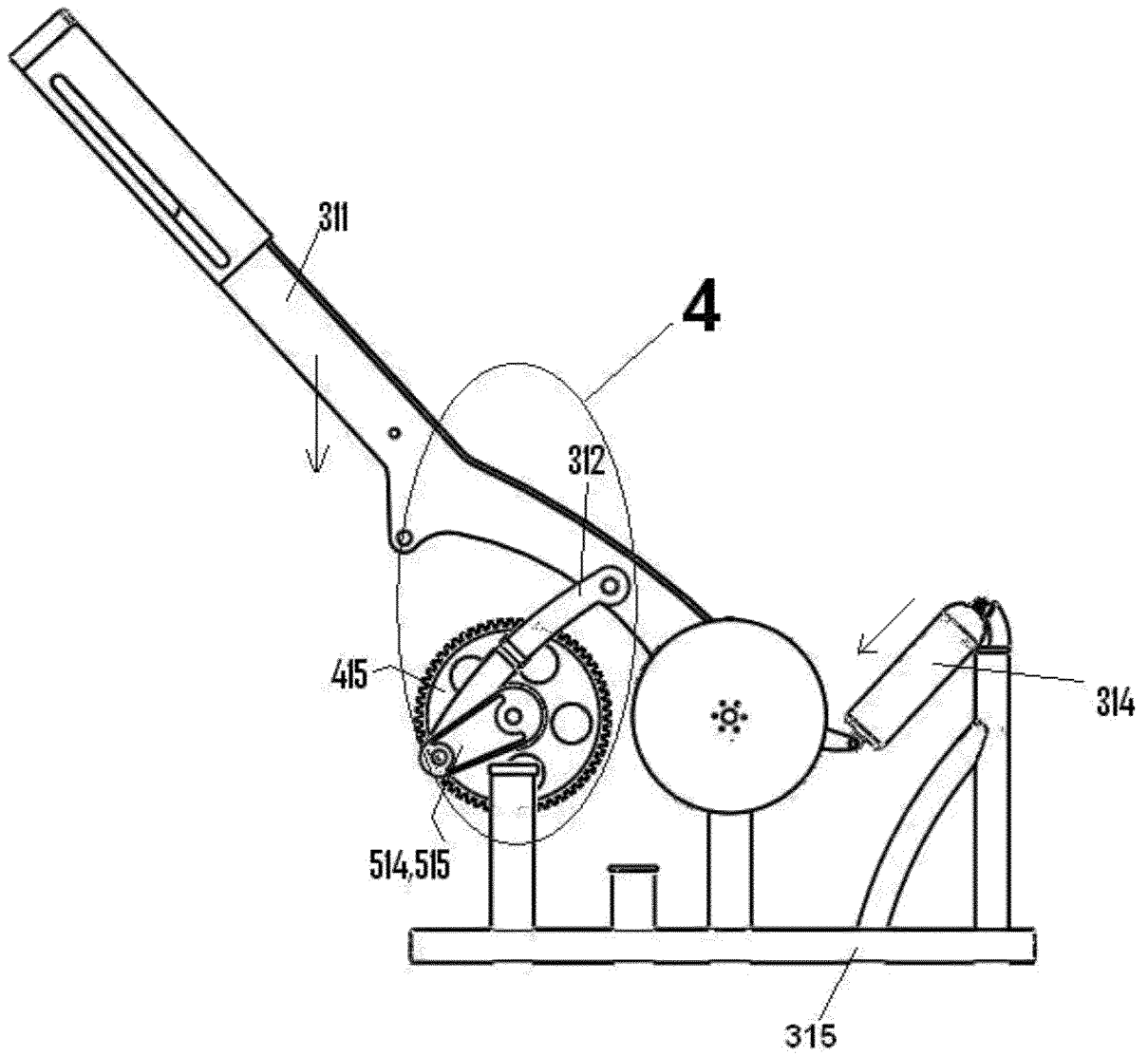


Figure 10

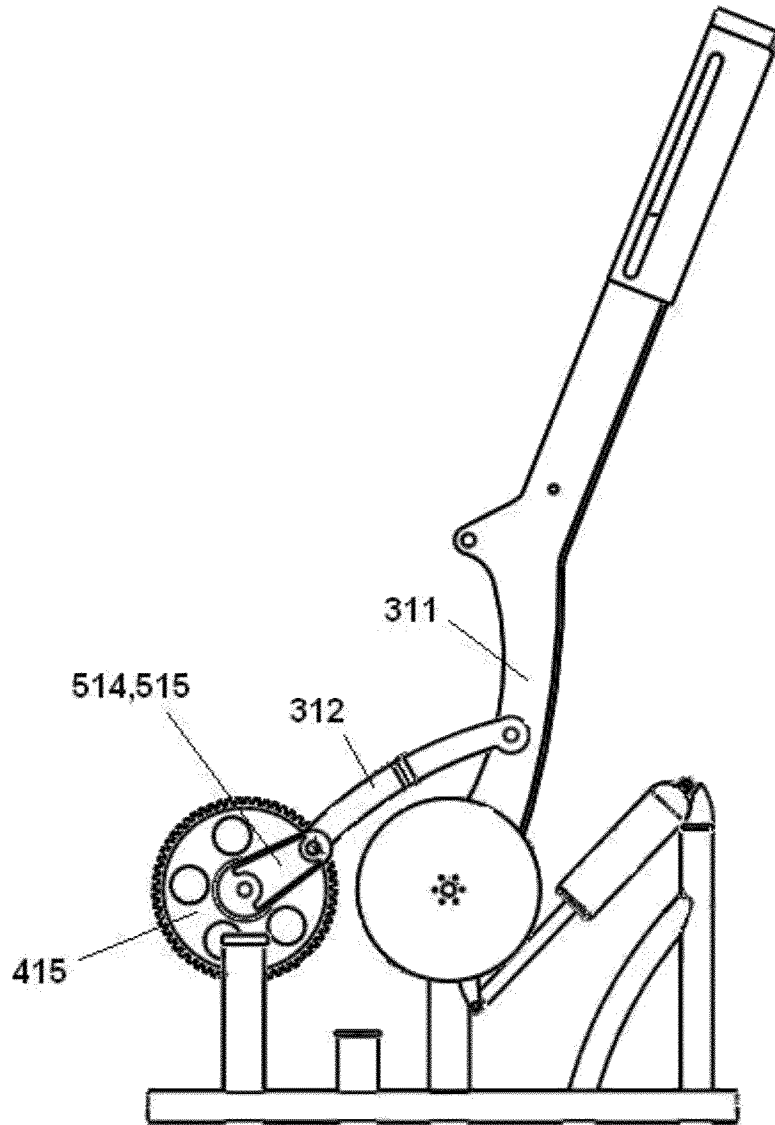


Figure 11

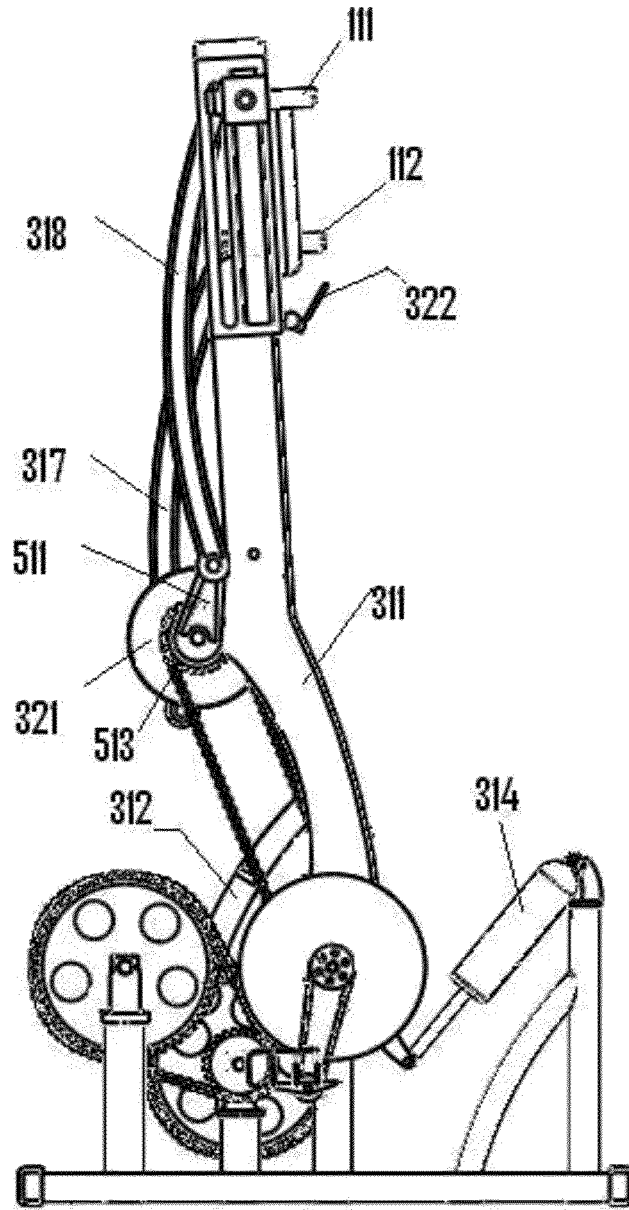


Figure 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2017/051311

A. CLASSIFICATION OF SUBJECT MATTER
IPC: *A63B 22/12* (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: *A63B 22/12* (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Questel-Orbit (FAMPAT)

Keywords used in combination: up; down; motion; slide+; torso; upper; pedal; linkage+; crank; rocking; tilting; oscillating; frame; pumping; IPC; inventor's name

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7,682,293 B2; (ESCHENBACH); 23 March 2010 (23-03-2010) Entire document	Claims 1 to 17
A	US 5,928,115 A; (ARROYO, Jr.); 27 July 1999 (27-07-1999) Entire document	Claims 1 to 17
A	US 2002/0198082 A1; (ARROYO); 26 December 2002 (16-12-2002) Entire document	Claims 1 to 17
A	US 4,982,952 A; (WANG); 08 January 1991 (08-01-1991) Entire document	Claims 1 to 17
A	US 6,533,708 B2; (TAGGETT); 18 March 2003 (18-03-2003) Entire document	Claims 1 to 17

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:
 "A" document defining the general state of the art which is not considered to be of particular relevance
 "E" earlier application or patent but published on or after the international filing date
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
 "&" document member of the same patent family

Date of the actual completion of the international search
08 January 2018 (08-01-2018)

Date of mailing of the international search report
29 January 2018 (29-01-2018)

Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2017/051311

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2007 268146 A; (NAKANISHI RYUSUKE); 18 October 2007 (18-10-2007) Entire document	Claims 1 to 17
A	JP 3979187 B2; (IMAHORI OSAMU et al.); 19 September 2007 (19-09-2007) Entire document	Claims 1 to 17
A	DE 2020 13004377 U1; (RECK) ; 19 September 2013 (19-09-2013) Entire document	Claims 1 to 17
A	CN 205127274 U; (CHEN XUEJUN); 06 April 2016 (16-04-2016) Entire document	Claims 1 to 17
A	US 6,648,802 B2; (WARE); 18 November 2003 (18-11-2003) Entire document	Claims 1 to 17
A	US 2016/0346599 A1; (DALEBOUÏ et al.); 01 December 2016 (01-12-2016) Entire document	Claims 1 to 17

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
The independent claim is unclear as presented. The claim is nothing more than a mere list of components without any functional relationship or sufficient technical details. A search of the "individual" components has been completed and listed as "A" type documents.

3. Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2017/051311

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US7682293B2	23 March 2010 (23-03-2010)	US2008214362A1 US2008214363A1 US7686743B2	04 September 2008 (04-09-2008) 04 September 2008 (04-09-2008) 30 March 2010 (30-03-2010)
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