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(54) TRAINING DEVICE FOR SIMULATING VERTICAL CLIMBING

(57) A vertical climbing simulation equipment that has an intensity regulation system that allows the resistance of the routines carried out in it to be graduated, and that also has a mechanism that allows to vary the angle of inclination of its pedals in order to be coupled to the natural angle of the user ankles.

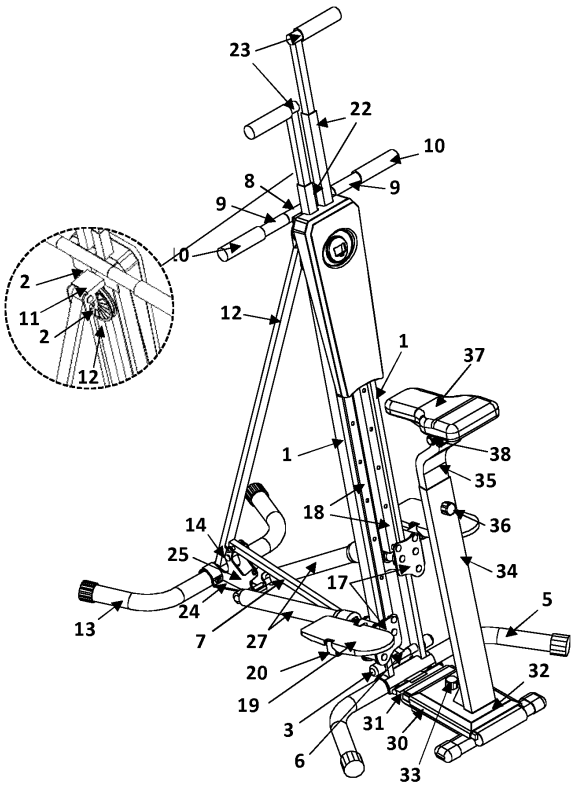

Figure 1

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Description

Field of the Invention

[0001] The present invention relates to exercise equipment of the type used for physical training routines that simulate the action of climbing a vertical wall and more particularly to an exercise equipment for vertical climbing simulation through a system of strategically placed actuators to regulate the intensity of the routines performed regardless of the weight and force that the user is applying to the equipment. Likewise, the present invention also provides a series of modifications that allow the actuator system to be detachably coupled to the equipment support frame and its pedals, so that it can be placed not only in said equipment but in other equipment of similar characteristics.

BACKGROUND OF THE INVENTION

[0002] There is equipment for the vertical climbing simulation routines, which provide users with the benefits of this type of exercise, in which the extremities of the body rise and fall simultaneously, either in an alternating or coordinated manner on the same side. These equipment allow to train both the upper and lower limbs at the same time without having to change their functionalities between routines, as is the case of many of the conventional homely gymnasiums in which it is necessary to change the position of the user in order to train different muscle groups, so the vertical climbing simulation equipment represents one of the best options when choosing a training equipment.

[0003] Examples of this type of equipment are described, for example, in Utility Model MX 3204 B, which describes an exercise equipment formed by a central frame with a pulley that supports a cable that coordinates the movement of the foot supports, which are coupled to a pair of bars that end in supports for fists. Due to this conformation, said equipment raises and lowers in coordination the upper and lower members of the same side. However, the intensity of the exercise routines carried out in it, only depends on the user weight and how much force is applied to the foot supports. Also, the position of the user ankles is not optimal, so the angle that the feet form with the body is not a natural angle, which can lead to accelerated fatigue problems or in some cases cause ligament and muscle injuries.

[0004] Patent US 5679100 A describes a vertical climbing equipment that uses a series of chains and gearwheels that coordinate the ascending and descending movements of the upper and lower limbs. In said equipment the upper and lower members of the same side of the user rise and fall in a coordinated manner. However, there is no way to regulate the intensity of the routines and the footrests cannot vary their angle in order to adapt to the natural position of the ankles.

[0005] Patent US 5090690 A, describes a climbing equipment that uses a pair of pneumatic cylinders that support the footrest of the equipment, the movement of which is coordinated by a system of pulleys. However, the user upper limbs are not coordinated with this movement and his handlebar system is independent of it. Moreover, there is no way to increase the resistance of the routines, neither it is allowed that the pedals be conformed to the natural angle of the ankles.

[0006] Patent US 5040785 A, describes a climbing equipment, using a cable joined at its ends, which is twisted and placed on two pulleys in order to coordinate the movement of the upper and lower limbs of the user. In this equipment the coordination of the members is alternated, since the leg and arm of opposite sides go up and down at the same time. Also, there is no way to regulate the resistance of the equipment and the pedals remain fixed in a single position, therefore they are not adapted to the natural position of the user ankles.

[0007] The afore mentioned devices use only the weight of the user body and the force it applies to the equipment to carry out the routines, greatly limiting the intensity of the same, since no extra effort can be added to the equipment to carry out resistance or power training. While it is true that the users of them could choose to use dumbbells or weights to increase the effort required to perform their routines, the use of such devices could cause complications when performing the movements, since they may fall during physical training or cause bruises on the user skin.

[0008] According to the above mentioned, even though the physical training equipment that simulates the action of climbing represents one of the most complete alternatives of physical training equipment, none of them can modify the intensity of the routines carried out in them, since they have not systems that allow varying the resistance of their mobile systems, so that the routines performed are subject only to the weight and/or force applied by the user. Likewise, since the supports of the feet are rigidly fixed, it is avoided that they accompany the natural movement of the user ankles, causing premature wear of the user joints and/or injuries due to muscle fatigue or cramping due to the unnatural position of the ankles.

[0009] In view of the previous problem, it is necessary to provide equipment for the vertical climbing simulation routines, with systems that allow to regulate the intensity of the routines carried out in them and that also allow to modify the force necessary to carry out the movements of ascent and descent of their supports. Likewise, it is necessary to provide said equipment with pedals that conform to the natural angle of the ankles, to avoid possible injuries during their operation.

SUMMARY OF THE INVENTION

[0010] The object of the present invention is to provide an exercise equipment for vertical climbing simulation that allows to vary the intensity of exercise routines by means of an actuator system.

[0011] A further object of the present invention is to provide an exercise equipment for vertical climbing simulation with a separable system of intensity regulation.

[0012] It is also an object of the invention to provide an exercise equipment for vertical climbing simulation that allows to regulate the intensity of the exercise performed at different levels in a controlled manner according to the user requirements.

[0013] A further object of the present invention is to provide an exercise equipment for vertical climbing simulation that allows the user to decide whether the routine will be performed with or without resistance by simply decoupling the pedals from the actuator system.

[0014] Another object of the present invention is to provide an exercise equipment for vertical climbing simulation that can be folded even with the actuator system coupled to it.

[0015] A further object of the present invention is to provide an exercise equipment for vertical climbing simulation with a pedal system that adjusts to the natural movement of the user ankles.

[0016] It is also an object of the present invention to provide an exercise equipment for vertical climbing simulation that has a seat with means for the adjustment of posture, which allows to carry out the routines of exercise, supporting most of the weight of the user on said structure, to reduce the impact on the joints.

[0017] The afore mentioned objects, as well as others and the advantages of the present invention, will become apparent from the following detailed description thereof.

BRIEF DESCRIPTION OF THE FIGURES OF THE INVENTION

[0018]

Figure 1 is a perspective view of an exercise equipment for vertical climbing simulation of the present invention.

Figure 2 is a perspective view of the intensity regulation system.

Figure 3 is an exploded view of the pedals and the rotating bases of the equipment of the present invention.

Figure 4 is an exploded view of the folding seat of the exercise equipment for vertical climbing simulation of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] As best seen in figures, the vertical climbing simulation exercise equipment of the present invention is constituted by a main structure formed by two parallel rectangular profiles (1), joined together at the top by a bridge (2) that has wheels that act as a guide for two parallel poles; a "C" shaped piece (4), directly attached to the lower part of the parallel rectangular profiles (1) and to a bent tube (5) which is the front base of the equipment and; a bar (6), located in perforations, which are above the "C" shaped piece (4), made in the parallel rectangular profiles (1), which has a tilting coupling profile (7) which serves as a device extension control mechanism and a pair of extensions (3) that serve as equipment travel stops.

[0020] On the rear face of the bridge (2), a horizontal tubular piece (8) is welded supporting two removable fist supports (9), one on each side, covered with protectors (10) and; a "L" shaped extension (11), to allow the folding of the equipment, which holds a vertical rectangular profile (12) that functions as an articulated arm, said vertical rectangular profile (12) having a bent tube (13) arranged horizontally constituting the rear base of the vertical climber and a "C" shaped piece (14) receiving the profile (7) fixed to it by means of a latch, the displacement of the vertical rectangular profile (12) being limited by a stop (15) .

[0021] On the other hand, the mechanical system of the exercise equipment for vertical climbing simulation, is constituted by a pulley (16), arranged in an enlargement of the "L" shaped extension; a pair of "C" shaped supports (17) placed on the outside of each of the parallel rectangular profiles (1), with three wheels (18) guiding them; a pair of pedals (19), each supported on a rotating base (20) that allows it to carry out a tilting movement during the operation of the equipment, said rotating base being coupled by means of a "T" shaped piece (21) to each of the "C" shaped supports (17); a cable with connectors that are attached to each one of the "C" shaped supports (17), said cable being supported by the pulley (16) to coordinate the movement of ascent and descent of the "C" shaped supports (17) and; a pair of telescopic profiles (22) coupled by screws to the "C" shaped supports, with "L" shaped handlebars (23) to be grasped by the user during exercise routines.

[0022] In order to increase the intensity of the vertical equipment routines of the present invention, it has an intensity regulator system formed by a lower base (24) joined to the bent tube (13), constituted, for example, by a pair of parallel surfaces (25) joined by a "L" shaped surface (26), which receive a pair of actuators (27), which are detachably connected to the "C" shaped supports (17) by connectors (28), fixing the latter in a separable way through bolts (29). With the intensity regulating system described above, it is possible to increase the resistance of the routine carried out by using rigid actuators that oppose the forces applied to them or, if necessary, to smooth the movements of ascent and descent by controlling their speed.

[0023] In one embodiment of the present invention, the mechanical system of the exercise equipment for vertical climbing simulation, comprises a central gearwheel located on a base placed in the middle portion of the parallel poles (1) and; a pair of toothed zips located on the internal face of each of the telescopic profiles (22), which replace the pulley (16) and the cable, in such a way that said gearwheel interacts with the zippers allowing to coordi-

nate the ascent and descent movements of the equipment.

[0024] In one of the preferred embodiments of the present invention the bridge (2) has a cable that joins the tubular piece (4) to each of the detachable fist supports (5), while in another of its embodiments it has a pair of bases for the placement of the detachable fist supports (5).

[0025] In another embodiment of the present invention, the pair of pedals (19) are coated by and/or their surface is a non-skid textured surface, with a pattern of grooves that prevent the user feet from moving during exercise routines. On the other hand, each of the "T" shaped supports of the rotating bases (20) is tilting coupled to each of the "C" shaped supports (17), in order to allow its folding upwards.

[0026] In a further embodiment of the present invention, the rotating bases (20) have position stops that limit the movement of the pedals (19), to prevent them exceeding 30° of inclination in both directions, in order to avoid injuries to inexperienced users in the ankle region. On the other hand, said pedals (19) optionally, may have straps to secure the feet of the users.

[0027] In one of the preferred embodiments of the present invention, the intensity regulator system is detachably attached to the main frame of the equipment. To achieve the above, both the lower base (24) and the connectors (28) are joined by screws to the bent tube (13) and each of the "C" shaped supports (17) respectively, allowing to separate all the equipment system. In this situation, said intensity regulating system can be coupled to other vertical climbing simulation equipment available in the market with main frames of similar characteristics. On the other hand, in a preferred embodiment of the present invention, the actuators (27) are pneumatic or hydraulic cylinders, which are preferably cylinders of variable resistance, thereby allowing the intensity regulator system to modify the intensity of the routines carried out on it.

[0028] In a further embodiment of the present invention, the vertical climbing simulation exercise equipment of the invention further comprises a seat formed by a foldable base (30) with a fixing part (31) attached thereto that allows it to be placed on the pair of extensions (3) of the bar (6) or directly on the "C" shaped piece (4); a sliding base (32) that is placed on the base (30), with a latch (33) that allows it to be fixed to holes in the base (30); a vertical post (34), within which an "L" shaped extension (35) is slidable placed, said "L" shaped extension(35) being fixed to the vertical post (34) by means of a latch (36)), which in one of the preferred embodiments of the present invention has at least 3 height levels and; a seat (37), which is placed on the short end of the "L" shaped extension (35), which has means (38) for controlling the inclination of said seat (37). The above described seat, can vary its position both in its distance from the central frame of the equipment on the "X" axis, vary its height on the "Y" axis and vary the angle of inclination of the seat (37), so that this can be adapted to any type of user regardless of their body dimensions. Also, because the weight of the user is directly transferred to the ground and not to the central frame of the equipment, the stability is not compromised and the transfer of load towards the parallel rectangular profiles (1) is avoided.

[0029] The present invention has been described according to a preferred embodiment; however, it will be apparent to a technician with average knowledge in the matter, that modifications to the invention may be made, without departing from its spirit and scope.

Claims

1. A vertical climbing simulation equipment comprising two parallel rectangular profiles (1), joined at the top by a bridge (2) that has wheels (3), which serve as a guide; a "C" shaped piece (4), attached to the lower part of the parallel rectangular profiles (1) and to a bent tube (5); a bar (6), located in perforations made in the parallel rectangular profiles (1) above the "C" shaped piece (4), which has a tilting coupling profile (7) to control the angle of the opening of the equipment; a horizontal tubular piece (8), welded on the rear face of the bridge (2), with two removable fist supports (9), one on each side, coated with protectors (10); a "L" shaped extension (11), to allow the equipment folding, which holds a vertical rectangular profile (12) having a bent tube (13) arranged horizontally and, a "C" shaped piece (14)) to receive the profile (7) and to be fixed to it by means of a latch, its displacement being limited by a stop (15) and; a mechanical system with a pulley (16), arranged in an enlargement of the "L" shaped extension; a pair of "C" shaped supports (17) placed on the outside of each of the parallel rectangular profiles (1), with three wheels (18) guiding them; a cable with connectors that are attached to each one of the "C" shaped supports (17), said cable being supported by the pulley (16) to coordinate the ascent and descent movement of the "C" shaped supports (17) and; a pair of telescopic profiles (22) coupled by screws to the "C" shaped supports, with "L" shaped handlebars (23) to be grasped by the user during exercise routines; **characterized in that** it comprises a pair of pedals (19), each supported on a rotating base (20), said rotating base being coupled by a "T" shaped piece to each of the "C" shaped supports (17) and; an intensity regulating system with a lower base (24) joined to the bent tube (13), which receives a pair of actuators (27) that are detachably connected to the "C" shaped supports (17) by means of connectors (28), fixing to the latter in a separable way through bolts (29).

2. The equipment according to claim 1, **characterized in that** the lower base (24) comprises a pair of par-

allel surfaces (25) joined by an "L" shaped surface (26).

3. The equipment according to claim 1, **characterized in that** the bridge (2) has a cable (2a) that connects the tubular part (4) to each of the detachable fist supports (5).

4. The equipment according to claim 1, **characterized in that** the bridge (2) has coupled a pair of bases (2b) for the placement of the detachable fist supports (5) .

5. The equipment according to claim 1, **characterized in that** the pair of pedals (19) are coated by and/or its surface is a non-skid textured surface, with a pattern of grooves to prevent the user feet from moving during exercise routines.

6. The equipment according to claim 1, **characterized in that** each of the "T" shaped supports of the rotating bases (20) is tilting coupled to each one of the "C" shaped supports (17), to allow it to fold up.

7. The equipment according to claim 1, **characterized in that** the rotating bases (20) have position stops that limit the movement of the pedals (19).

8. The equipment according to claim 7, **characterized in that** the position stops limit the movement of the rotating bases (2) up to 30° inclination in both directions.

9. The equipment according to claim 1, **characterized in that** the pedals (19) have straps to secure the feet of the user.

10. The equipment according to claim 1, **characterized in that** the intensity regulating system is detachably connected to the main frame of the equipment, the lower base (24) and the connectors (27) being joined to the bent tube (13) and to each of the "C" shaped supports (17) respectively by screws.

11. The equipment according to claim 1, **characterized in that** the actuators (24) are pneumatic or hydraulic cylinders.

12. The equipment according to claim 11, **characterized in that** the pneumatic or hydraulic cylinders are cylinders of variable resistance.

13. The equipment according to claim 1, **characterized in that** the mechanical system comprises a central gearwheel located on a base placed in the middle portion of the parallel posts (1) and; a pair of toothed zips located on the inner face of each of the telescopic profiles (22), in such a way that said gearwheel interacts with the zips to coordinate the ascent and descent movements of the equipment, replacing the pulley (16) and the cable.

14. The equipment according to claim 1, **characterized in that** it also comprises a seat formed by a foldable base (30) with a fixing part (31) attached to it to place it on the pair of extensions (3) of the bar (6) or directly on the "C" shaped piece (4); a sliding base (32) that is placed on the base (30), with a latch (33) that allows it to fix some perforations of the base (30) to provide different distances with respect to the parallel posts (1); a vertical post (34), within which an "L" shaped extension (35) is slidable placed, said "L" shaped extension (35) being fixed to the vertical post (34) by means of a latch (36)) and; a seat (37), which is placed on the short end of the "L" shaped extension (35), with means (38) for controlling the inclination of said seat (37).

15. The equipment according to claim 14, **characterized in that** the latch (36) of the "L" shaped extension (35), allows to place said "L" shaped extension (35) in at least 3 levels of height.

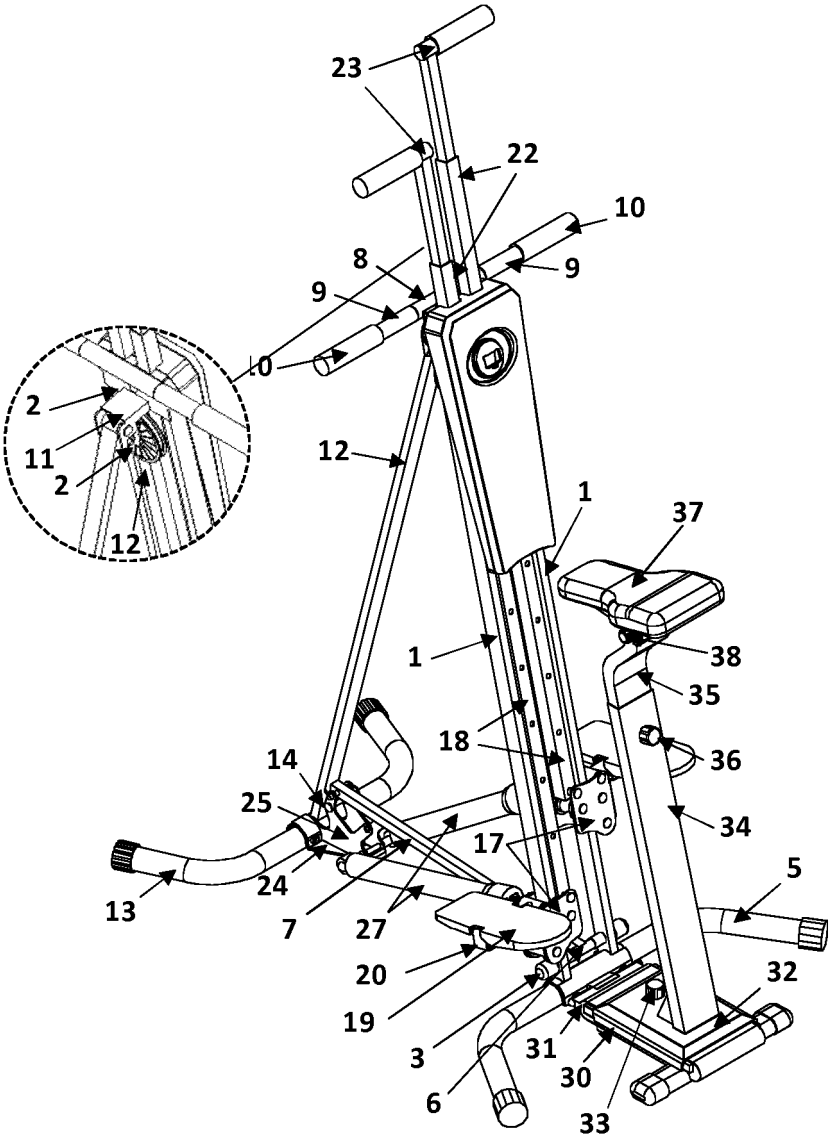
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Figure 1

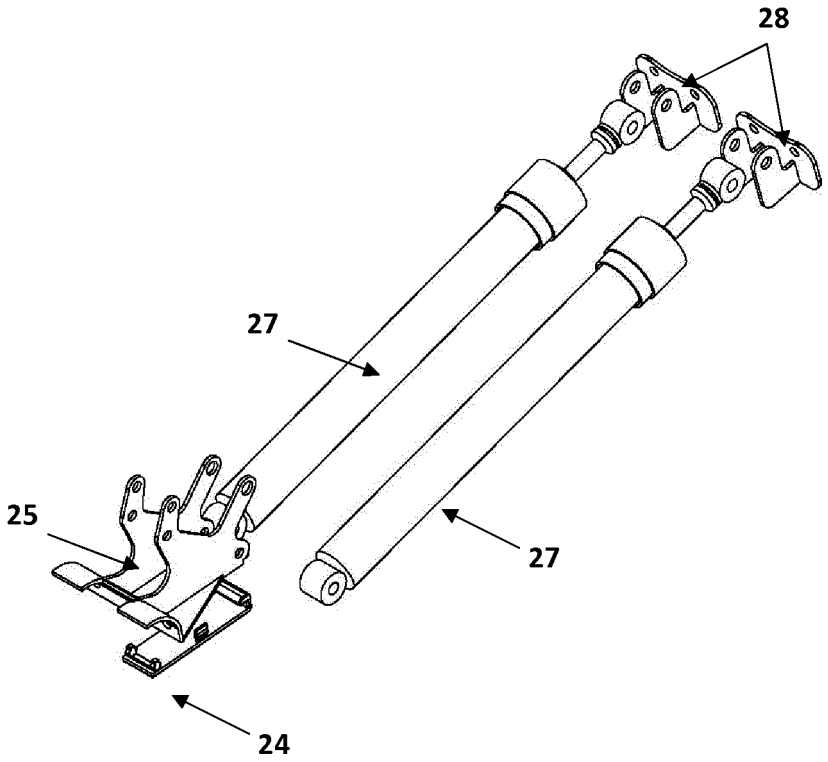

Figure 2

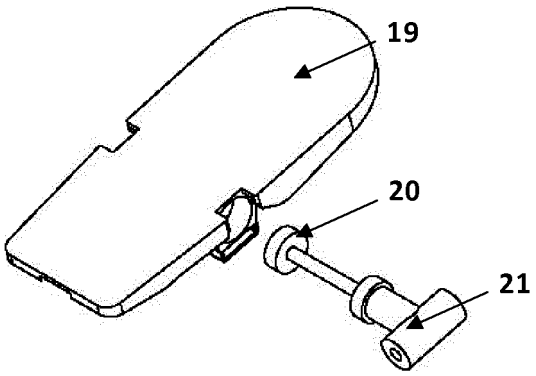

Figure 3

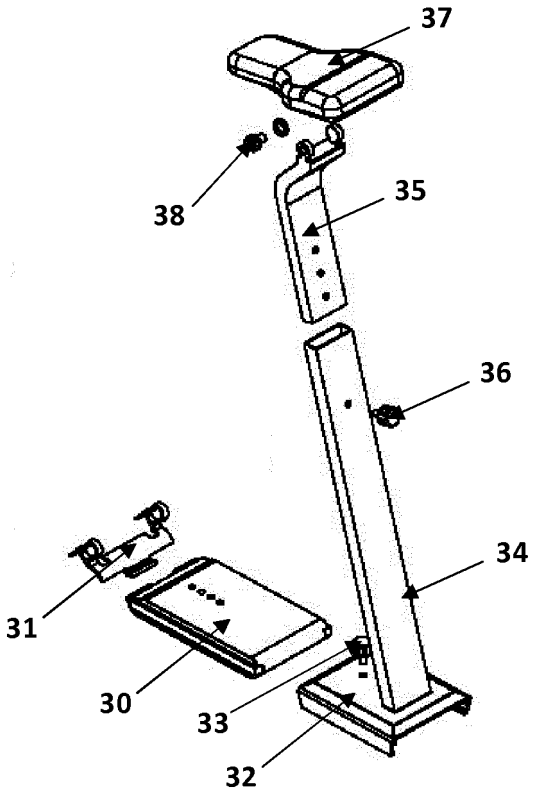

Figure 4

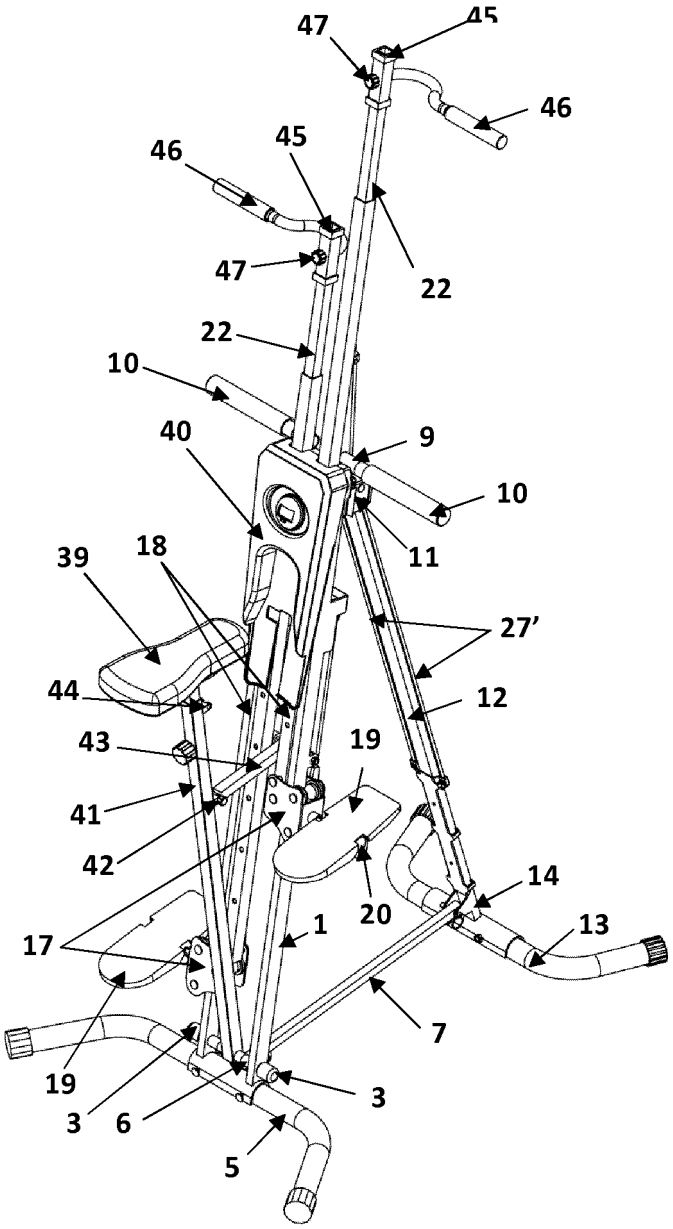
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Figure 5

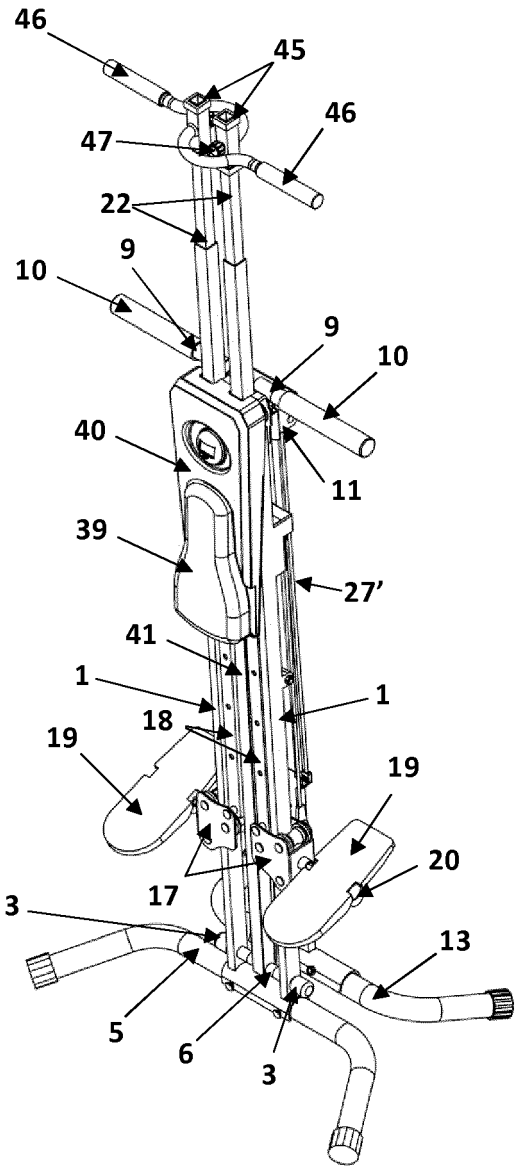

Figure 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/MX2017/050008

A. CLASSIFICATION OF SUBJECT MATTER

A63B22/12 (2006.01)
A63B21/008 (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)
A63B

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

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

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 2944356 A1 (MERCENARI URIBE FERNANDO HUMBERTO) 18/11/2015, figures 1, 5a-5b, 8; paragraphs [9 - 20]	1-15
Y	US 4982952 A (WANG SHUI-MU) 08/01/1991, column 1, line 52 - column 3, line 13; figures 1 - 2.	1-15
A	CN 201404635Y Y (XIAMEN ZHOULONG SPORTS EQUIPMENT CO LTD) 17/02/2010, Abstract from DataBase EPODOC. Retrieved from EPOQUE; figures 1 - 2.	1-5
A	US 4838543 A (ARMSTRONG TIMOTHY O ET AL.) 13/06/1989, the whole document.	1-13
A	US 2009253558 A1 (LOFGREN MICHAEL SHANE ET AL.) 08/10/2009, paragraph [59]; figure 9,	14, 15

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

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Date of the actual completion of the international search	Date of mailing of the international search report
03/11/2017	**(06/11/2017)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer A. Fernández Pérez Telephone No. 91 3498539

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/MX2017/050008

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
EP2944356 A1	18.11.2015	HK1217671 A1	20.01.2017
		CL2015001376 A1	09.10.2015
		JP3206889U U	13.10.2016
		AR095212 A4	30.09.2015
		PE19742015 A1	19.12.2015
		US2015343259 A1	03.12.2015
		US9358421 B2	07.06.2016
		CN105120964 A	02.12.2015
		KR20150123948 A	04.11.2015
		WO2014142641 A1	18.09.2014
CN201404635Y Y	17.02.2010	NONE	
US4838543 A	13.06.1989	CA1325820 C	04.01.1994
US4982952 A	08.01.1991	US5000441 A	19.03.1991
		DE9016769U U1	28.02.1991
US2009253558 A1	08.10.2009	US8007412 B2	30.08.2011
		US2006116248 A1	01.06.2006
		US7530932 B2	12.05.2009

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5679100 A **[0004]**
- US 5090690 A **[0005]**
- US 5040785 A **[0006]**