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(54) Gymnastic machine

Gymnastikgerät

Machine de gymnastique

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Description

[0001] The present invention relates to a gymnastic machine. In particular, the present invention relates to a gymnastic machine usable for performing functional exercises. In more detail, the present invention relates to a gymnastic machine usable for performing functional exercises for the arms and/or legs.

BACKGROUND TO THE INVENTION

[0002] In the field of gymnastic machines of the functional type, it is known that the rowing machine is one of the first ones built, because of the specific nature of the rowing motion, which is easily reproducible in a low cost machine that takes up a small amount of space. Starting from the late Sixties, rowing machines were provided with hinged levers to reproduce the part of oar the user can grip, as in the Patent US3528653 by inventors Stuckenschneider and Ross, but from the early Eighties simplified machines have been produced of the type described with reference to the patent US4714244 now expired - by the American firm Bally Manufacturing Corporation. Since the early Nineties, the rowing machine "Concept 2" has been known, in which the brake system comprises a blade rotor rotating in air inside a casing provided with inputs for adjusting resistance inversely to the allowable air flow.

[0003] Such rowing machines are very simple, since the load group comprises a drum connected to a brake on which is wound in spiral fashion a cable whereto is connected a handlebar that simulates the oar. The load group is supported by a frame, carrying a seat movable with reciprocating motion on a guide of the alternating rectilinear motion. Familiarity with the rowing motion has facilitated the widespread use of rowing machines also in homes. On the other hand, the familiarity with the motion has frequently led to an underestimation of its particular complexity, sometimes causing damage that could be treated only surgically. The correct proportioning of the forces exercised by the muscles of the upper region and of the lower region, co-ordinated by the part of the torso that connects them, determines the execution of an elegant motion, safe from muscle trauma and discopathy. Hence, prior art rowing machines need to be used under the close control of an experienced trainer, to avoid serious injury.

[0004] In view of the above description, use of prior art rowing machines does not exclude, a priori, the risk of permanent damage to the spine. Therefore, use of functional machine on which to train more than one body region with total safety is currently an unsolved problem, and it represents an interesting challenge for the applicant, which confronted it through its own researchers and was able to solve it.

[0005] Further examples of rowing machines according to the prior art as stated in the preamble of claim 1 are known from each of documents US 5072929, US 4709918, US 5277678, GB 325435 and US 1905092.

[0006] In consideration of the situation described above, it would be desirable to have available a gymnastic machine which, in addition to enabling to limit and possibly to overcome the typical drawbacks of the art illustrated above, could define a new standard for these types of gymnastic machines.

SUMMARY OF THE PRESENT INVENTION

[0007] The present invention relates to a gymnastic machine. In particular, the present invention relates to a gymnastic machine usable for performing functional exercises. In more detail, the present invention relates to a gymnastic machine usable for performing functional exercises for the arms and/or legs.

[0008] The objective of the present invention is to construct a functional gymnastic machine that allows the disadvantages described above to be solved, and which is suitable to satisfy a plurality of requirements that to date have still not been addressed, and therefore, suitable to represent a new and original source of economic interest and capable of modifying the current fitness market.

[0009] According to the present invention, a gymnastic machine is constructed, whose main characteristics are described in at least one of the appended claims.

[0010] In particular, the present invention relates to a rowing machine, said rowing machine being effectively usable for the safe execution of training sessions which globally involve the muscle regions of the body.

[0011] A further objective of the present disclosure is to provide a training method implementable on functional gymnastic machines, and in particular on gymnastic machines similar to rowing machine.

BRIEF DESCRIPTION OF DRAWINGS

[0012] Further characteristics and advantages of the machine according to the present invention will be more apparent from the description below, set forth with reference to the accompanying drawings, which illustrate some non-limiting examples of embodiment, in which identical or corresponding parts of the machine itself are identified by the same reference numbers. In particular:

- figure 1 is a schematic side elevation view of a first preferred embodiment of the present invention;
- figure 2 is a plan view of figure 1; and
- figure 3 is a schematic side elevation view of a second preferred embodiment of figure 1.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0013] In figure 1, no. 1 indicates, in its entirety, a gymnastic machine comprising a frame 10, which is provided with a guide 20 of rectilinear motion extending along a given direction 30 to carry a user support member 40 in

a freely sliding manner. A load device 50 contained inside a casing 51 and supported by the frame 10 comprises at least one load unit 52 of a given nature, and at least one implement 60 (shown in figures 1 and 3) coupled with the load unit 52 by means of a traction device 70. The guide 20 presents a first end 22, and the load device comprises a further load unit 54 that may or may not be distinct from the unit 52 and associated with the support member 40 to condition its mobility along the guide 20, in order to exercise two actions, controllable jointly or separately on a user's muscles. It must be noted that, without limiting the generality of the present invention, hereinafter the support member 40 comprises a seat that shall be indicated with the same reference number. In this regard, the seat 40 is coupled with the load unit 54 by means of a fastening device 72, comprising a traction member 72. Similarly, without limiting the generality of the present invention, the traction device 70 comprises a cable 70, which may indifferently be made of textile fibre or braided metal; also similarly, the implement 60 comprises a handlebar 60 connected to the cable 70 in centreline position; and the traction member 72 comprises a further cable 72.

[0014] Again according to figure 1, the machine 1 comprises a regulating unit 80 associated with the load device 50 to regulate or balance, according to criteria preferred by the user, the resisting actions exercisable on the load units 52 and 54 respectively on the implement 60 and on the seat 40 along the direction 30. At least one of the load units 52 and 54, or even both, may be of the gravitational type, so comprising, for example, a plurality of bricks carried slidably by vertical guides, known in themselves and therefore purposely not shown. Alternatively, at least one of the load units 52 and 54 may be of the mechanical type and may comprise, for example, although not limitingly, friction brake devices, known and thus not illustrated, for example, although not limitingly, band brakes or shoe brakes; or at least one of the load units 52 e 54 may be of a known fluid-dynamic type, for example, although not limitingly, provided with a blade rotor movable in a fluid, generally air, water or oil as in the case of the aforementioned "Concept 2" rowing machine. One the other hand, it is certainly more practical and less bulky if at least one of the load units 52 and 54 is of the electromagnetic type. In particular, with reference to figure 1, each load unit 52 and 54 comprises an electromagnetic device 56 suitable to dissipate rotational mechanical energy, and in particular at least one of said load units comprises, without limiting the generality of the present invention, an electromagnetic brake 57. For the sake of convenience, both of the load units 52 and 54 comprise a brake 57 of electromagnetic type.

[0015] Therefore, the unit 80 is electronically connected to each electromagnetic brake 57 and, without limiting the generality of the present invention, it can be positioned internally to the casing 51, as shown in figure 1, or externally to the case 51 protecting the load units 52 and 54 as shown in figure 2, and be supported by the frame 10 and totally contained within a console 59, hence not visible from the exterior. The unit 80 comprises a logic device, generally an electronic card 82, programmable by means of a keyboard or at least a plurality of keys 84 carried by the console 59 and electronically connected to the card 82 in known fashion. Furthermore, the console 59 is provided with at least a display 86 through which it is possible to verify the current operating state of the load device 50, and therefore also the total power absorbed by the device 50 through the two units 52 and 54, and the percentage of power absorbed by each of the two units, but also the number of strokes per minute of the implement 60 and/or of the seat 40. For the sake of simplicity, the card 82 could coincide or be a part of a programmable logic programmer, known and not illustrated, because it is functionally suitable to embody, in use, what is described above.

[0016] From the constructive point of view, each brake 57 is associated with a transmission 58 with parallel axes, in which two shafts 58' and 58" are mechanically connected to each other by means of a belt or any other flexible member wound in a loop on one of the wheels carried by the same shafts 58' and 58", or in any other way. In the case of unit 52, the shaft 58' is supported by the frame 10 in known fashion and not illustrated, and carries, keyed on, a disk 62 of the brake 57 itself; furthermore, in this transmission 58 the further shaft 58" is positioned side by side and parallel to the shaft 58', and is also supported by the frame 10 in known fashion and not illustrated. This second shaft 58" carries, keyed, a drum 64, whereon is wound in spiral fashion a flexible member, generally the cable 70 made of braided textile material, which is stably connected to the implement 60. In the case of transmission 58 of the unit 54, what has already been specified with reference to the shafts 58' and 58" applies, whilst the drum 64 carried by the corresponding shaft 58" carries, wound in spiral, the cable 72 made of braided textile material which is stably connected to the seat 40. Furthermore, with reference to any of the figures 1 and 2, the guide 20 presents a first end 22 provided with an abutment member 24 (visible in figures 1 and 3) connected rigidly to the guide 20 between the seat 40 and the load device 50 to serve as a contrast member for an effort exercised on the seat 40.

[0017] In view of what is described above, the machine 1 can be interpreted as a rowing machine 1, wherein the implement 60, if embodied by means of a handlebar 60, simulates an oar and the seat 40 simulates a seat carried movable with alternative motion on rails in the cockpit of the boat.

[0018] As is well known, the athlete positions himself on the seat 40 after having secured his/her feet to the fixed abutment member 24 before starting to row.

[0019] Use of the machine 1, taken by itself or as a rowing machine 1, is easily understood from the above description and requires no further explanation. However, it may be opportune to provide some additional information, among them the fact that the start of the training

session is preceded by the steps of taking place on the seat 40 carried movable by the guide 20 from and to a respective rest position; connecting the lower limbs to the member 24 carried fixed by the frame 10 to have a bearing point to exercise thrust on the seat 40 against the resistance exercised by the load unit 54; gripping the handlebar 60 to exercise the traction effort on the load unit 52 through the cable 70 to train the upper limbs. At this point it possible to start the training alternating a step of exercising a thrust with the lower limbs against the member 24 to displace the seat 40 from and to the corresponding rest position against the action of the unit 54 through the cable 72, and a step of imposing a traction effort on said load unit 52 through implement 60 and cable 70. It should be kept in mind that, in any case, the step of exercising thrust with the lower limbs against the member 24 to displace the seat 40 can be performed against the resistance of the load unit 54 independently from the way this unit 54 is constructed, and that the latter unit can be distinct from the load unit 52 itself, or said units 52 and 54 may be mechanically or electronically coupled to each other to determine energy absorption in manners mentioned above, as will be better specified below. Furthermore, the step of exercising a traction effort on the handlebar acting on the load unit 52 and the step of exercising a thrust with the lower limbs against the member 24 can be subsequent or simultaneous to a step of balancing at will the traction effort and the thrust through the regulating unit 80. Said balancing is particularly useful in the case of less experienced users, given that, if performed under medical supervision, in addition to making the rowing exercise more effective in training terms, enables to control and prevent the formation of herniated disks, which can be caused by an improper use of the rowing machine 1 itself.

[0020] It should be specified that, if the regulating unit 80 is provided with devices for detecting the instantaneous position of the implement 60 and/or of the seat 40 in association with the traction device 70, e.g. encoders 66 provided with a rotatable equipment associated with the drums 64 and/or linear associated with the implement 60 and/or with the seat 40, it is possible to interact with the units 52 and 54 by means of the electronic card 82 of the unit 80 in such a way as to generate electronic signals usable in feedback control loops to drive the units 52 and 54 at will. In this way, it is possible to cause a variation of the load produced by the corresponding electromagnetic brakes 57 for setting training profiles on the basis of current or average operating data, combined in real time with given parameters set by the user and/or predetermined according to criteria derived from physiological and/or other types of analyses. Naturally, the complexity of the operating functions of the regulating unit 80 may require it to be provided with a programmable logic programmer which may or may not be able to communicate with resident memory cards and/or memory cards loaded on customisable portable memories.

[0021] In particular, among the determined parameters measurable by the encoders 66 can be considered static or dynamic values such as the instantaneous position of the handlebar 60 and/or of the seat 40, the instantaneous velocity of the handlebar 60 and/or of the seat 40, the instantaneous traction effort exercised on the handlebar 60 or the thrust of the lower limbs on the seat 40.

[0022] Finally, it is clear that modifications and variants can be made to the machine described and illustrated herein without however departing from the protective scope of the present invention.

[0023] For example, with reference to figure 3, the set-up of the machine 1 could be changed by utilising, instead of the fastening member 72, and therefore of the cable 72, a linear electric motor 90, in which a stator 92 is connected to the guide 20 and a respective cursor 94 is connected to the seat 40. In this way it may be possible considerably to reduce the bulk on the ground of the device 50, and enable to make the machine 1 markedly slighter, in such a way as to make it also easier to store in small spaces at the end of the training session.

[0024] On the other hand, this solution would enable to make the seat 40 controllable by means of the regulating unit 80 in relation to the power dissipated both in the movement away from and in the movement back towards a given rest position, similarly to what would be possible if the seat were connected to a double acting motor 90.

[0025] Again in order to make the machine 1 easy to store in a small space when not in use, the connection between the guide 20 and the frame 10 could be rigid and selectively releasable, or the guide 20 could even be hinged to the frame 10 from the side of the device 50. In this way, the simple rotation of the guide 20 relative to the portion of the frame 10 carrying the device 50 would allow a considerable reduction in the bulk on the ground of the machine 1.

[0026] It is thus clear that the presence of two distinct load units 52 and 54 and of the regulating unit 80, that allows their dynamic balancing, allows to set training paths in which the distinct regions of a user's body, normally the upper and lower limbs, are stressed to a different percentage and in any case such as to avoid traumas to less experienced users. Therefore, every machine 1 or rowing machine 1 having the structure and the equipment described above enables to combine the characteristics of ease of use and safety of operation even in the case of training profiles in which the current ratio between the loads imposed by the units 52 and 54 individually and in combination is managed in a personalised, advanced manner with respect to similar machines constructed according to the teachings of the prior art.

Claims

1. A gymnastic machine (1) comprising a frame (10) associated with a guide (20) extending along a given direction (30) to carry a support member (40) in a

freely sliding manner; load means (50) supported by said frame (10) and comprising at least one load unit (52) and at least one implement (60) associated with said load unit (52) by means of a traction device (70); said load means (50) comprising a further load unit (54) associated with said support member (40) to condition its mobility along said guide (20) in order to exercise separately controllable actions on distinct regions of an user's body; **characterised in that** said load unit (52) and said further load unit (54) are mechanically or electronically coupled, and **in that** said machine further comprises a regulating unit (80) associated with said load means (50) and allowing the dynamic balancing of said load unit (52) and said further load unit (54) thus allowing, in use, the dynamic balancing of their respective resisting actions on said distinct regions of a user's body.

2. A machine according to claim 1, **characterised by** comprising regulating means (80) associated to said load means (50) to regulate, in use, resisting actions exerted on said implement (60) and/or on said support member (40).

3. A machine according to claim 2, **characterised in that** said regulating means (80) comprise at least one programmable logic device (82).

4. A machine according to claim 2 or 3 , **characterised in that** said regulating means (80) comprise at least one device (66) for the instantaneous measurement of dynamic parameters corresponding to every said implement (60) and/or said support member (40) for the setting of training profiles on the basis of current or average operating data combined in real time with given pre-set and/or predetermined parameters.

5. A machine according to claim 4, **characterised in that** said dynamic parameters comprise alternatively or in combination information about the instantaneous position of each said implement (60) and/or of said support member (40), the instantaneous velocity of every said implement (60) and/or of said support member (40), an instantaneous traction effort exercised on each said implement (60) and/or a thrust exercised on said support member (40).

6. A machine according to any one of claims 3-5, **characterised in that** said programmable logic device (82) is suitable to enable, in use, said dynamic balancing of the resisting actions of said load unit (52) and further load unit (54) to set up training paths in which distinct regions of a user's body, associated respectively to each said implement (60) and/or to said support member (40) can be stressed in different percentages, definable at will.

7. A machine according to any one of the preceding claims, **characterised in that** said guide (20) presents a first end (22); said further load unit (54) comprising a fastening device (72) (90) associated with said support member (40) to hinder its displacements from said first end (22) along the said guide (20).

8. A machine according to any one of the preceding claims, **characterised in that** said first end (22) is provided with an abutment member (24) positioned between said support member (40) and said load means (50); said abutment member being usable to contrast statically said thrust exercised on said support member (40).

9. A machine according to any one of claims 1-7, **characterised in that** said first end (22) is provided with an abutment member (24) positioned on the same side as said load means (50) relative to said support member (40); said abutment member (24) being usable to contrast statically said thrust imposed on said support member (40).

10. A machine according to any one of the preceding claims, **characterised in that** at least one of said load unit (52) and further load unit (54) is of the gravitational type.

11. A machine according to any one of claims 1-9, **characterised in that** at least one of said load unit (52) and further load unit (54) is of the mechanical type with variation of friction between respective moving parts.

12. A machine according to any one of claims 1-9, **characterised in that** at least one of said load unit (52) and further load unit (54) is of the fluidodynamic type.

13. A machine according to claim 12, **characterised in that** at least one of said load unit (52) and further load unit (54) comprises a blade rotor rotating in air, water or oil.

14. A machine according to any one of claims 1-9, **characterised in that** at least one of said load unit (52) and further load unit (54) is of the electromagnetic type.

15. A machine according to claim 14, **characterised in that** said load unit (52) comprises a first electromagnetic dissipating device (56).

16. A machine according to claim 15, **characterised in that** said first dissipating device (56) comprises an electromagnetic brake (57).

17. A machine according to any one of claims 1-9 and 11-16, **characterised in that** said further load unit

(54) comprises a second electromagnetic dissipating device (56).

18. A machine according to claim 17, **characterised in that** said second dissipating device (56) comprises an electromagnetic brake (57).

19. A machine according to any one of the preceding claims, **characterised in that** said implement (60) comprises a handlebar (60) and said support member (40) comprises a seat (40) for a user.

20. A machine according to any one of the preceding claims, **characterised in that** said traction device (70) comprises a flexible member (70).

21. A machine according to any one of the preceding claims, **characterised in that** said fastening device (72) comprises a further flexible member (72).

22. A machine according to any one of claims 7-21, **characterised in that** said fastening device (90) comprises a linear actuator (90).

23. A machine according to claim 22, **characterised in that** said linear actuator (90) comprises a linear electric motor in which a respective cursor (94) is rigidly connected to said seat (40), and a respective stator (92) is associated to said guide (20).

24. A rowing machine according to any one of the preceding claims, **characterised in that** said guide (20) is rigidly connected to said frame (10) in releasable fashion to enable the reduction of the bulk on the ground following use, and **in that** said further load unit (54) is mechanically distinct from said load unit (52).

25. A rowing machine according to any one of preceding claims, **characterised in that** said guide (20) is hinged to said frame (10) to enable the reduction of the bulk on the ground following use, and **in that** said further load unit (54) is mechanically distinct from said load unit (52).

Patentansprüche

1. Gymnastikgerät (1), umfassend einen Rahmen (10) in Zusammenhang mit einer Führung (20), die sich entlang einer gegebenen Richtung (30) erstreckt, um ein Stützelement (40) auf frei gleitende Weise zu tragen; Belastungsmittel (50), die von dem Rahmen (10) gestützt werden und wenigstens eine Belastungseinheit (52) und wenigstens ein Arbeitsgerät (60) umfassen, das über eine Zugvorrichtung (70) mit der Belastungseinheit (52) verbunden ist; wobei das Belastungsmittel (50) eine weitere Belastungseinheit (54) in Zusammenhang mit dem Stützelement (40) umfasst, um eine Mobilität des Stützelements (40) entlang der Führung (20) festzusetzen, um separat steuerbare Aktionen an bestimmten Körperregionen eines Benutzers zu trainieren; **dadurch gekennzeichnet, dass** die Belastungseinheit (52) und die weitere Belastungseinheit (54) mechanisch oder elektronisch gekoppelt sind, und dass das Gerät (1) ferner eine Regulierеinheit (80) in Zusammenhang mit dem Belastungsmittel (50) umfasst, die den dynamischen Ausgleich der Belastungseinheit (52) und der weiteren Belastungseinheit (54) gestattet, wodurch im Gebrauch ihre jeweiligen Widerstandsaktionen an den bestimmten Körperregionen des Benutzers dynamisch ausgeglichen werden können.

2. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** es ein Reguliermittel (80) im Zusammenhang mit dem Belastungsmittel (50) umfasst, um im Gebrauch die Widerstandsaktionen zu regulieren, die auf das Arbeitsgerät (60) und/oder auf das Stützelement (40) ausgeübt werden.

3. Gerät nach Anspruch 2, **dadurch gekennzeichnet, dass** das Reguliermittel (80) wenigstens eine programmierbare Logikvorrichtung (82) umfasst.

4. Gerät nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** das Reguliermittel (80) wenigstens eine Vorrichtung (66) zur sofortigen Messung von dynamischen Parametern, die jedem Arbeitsgerät (60) und/oder dem Stützelement (40) entsprechen, zur Einstellung von Trainingsprofilen auf Grundlage von aktuellen oder durchschnittlichen Betriebsdaten, kombiniert in Echtzeit mit vorgegebenen voreingestellten und/oder vorbestimmten Parametern, umfasst.

5. Gerät nach Anspruch 4, **dadurch gekennzeichnet, dass** die dynamischen Parameter alternativ oder in Kombination Informationen über die momentane Position jedes Arbeitsgeräts (60) und/oder des Stützelements (40), die momentane Geschwindigkeit jedes Arbeitsgeräts (60) und/oder des Stützelements (40), eine momentane Zugkraft, die auf jedes Arbeitsgerät (60) ausgeübt wird und/oder ein Schub, der auf das Stützelement (40) ausgeübt wird, umfassen.

6. Gerät nach einem der Ansprüche 3-5, **dadurch gekennzeichnet, dass** die programmierbare Logikvorrichtung (82) geeignet ist, im Gebrauch das dynamische Ausgleichen der Widerstandsaktionen der Belastungseinheit (52) und der weiteren Belastungseinheit (54) zu ermöglichen, um Trainingspläne einzustellen, in denen bestimmte Körperregionen des Benutzers, jeweils im Zusammenhang mit jedem Arbeitsgerät (60) und/oder mit dem Stützelement (40),

zu unterschiedlichen Prozenten, die beliebig definierbar sind, belastet werden können.

7. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Führung (20) ein erstes Ende (22) aufweist; wobei die weitere Belastungseinheit (54) eine Befestigungsvorrichtung (72) (90) im Zusammenhang mit dem Stützelement (40) umfasst, um ihre Verschiebung vom ersten Ende (22) entlang der Führung (20) zu verhindern.

8. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Ende (22) mit einem Anschlagelement (24) ausgestattet ist, das zwischen dem Stützelement (40) und dem Belastungsmittel (50) angeordnet ist; wobei das Anschlagelement (24) verwendet werden kann, um dem auf das Stützelement (40) ausgeübten Schub statisch entgegenzuwirken.

9. Gerät nach einem der Ansprüche 1-7, **dadurch gekennzeichnet, dass** das erste Ende (22) mit einem Anschlagelement (24) ausgestattet ist, das auf derselben Seite wie das Belastungsmittel (50) bezüglich des Stützelements (40) angeordnet ist; wobei das Anschlagelement (24) verwendet werden kann, um dem auf das Stützelement (40) ausgeübten Schub statisch entgegenzuwirken.

10. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** wenigstens die Belastungseinheit (52) und/oder die weitere Belastungseinheit (54) vom Schwerkraft-Typ sind.

11. Gerät nach einem der Ansprüche 1-9, **dadurch gekennzeichnet, dass** wenigstens die Belastungseinheit (52) und/oder die weitere Belastungseinheit (54) vom mechanischen-Typ mit variierender Reibung zwischen jeweiligen beweglichen Teilen sind.

12. Gerät nach einem der Ansprüche 1-9, **dadurch gekennzeichnet, dass** wenigstens die Belastungseinheit (52) und/oder die weitere Belastungseinheit (54) vom fluiddynamischen-Typ sind.

13. Gerät nach Anspruch 12, **dadurch gekennzeichnet, dass** wenigstens die Belastungseinheit (52) und die weitere Belastungseinheit (54) einen Schaufelrotor umfassen, der in Luft, Wasser oder Öl rotiert.

14. Gerät nach einem der Ansprüche 1-9, **dadurch gekennzeichnet, dass** wenigstens die Belastungseinheit (52) und/oder die weitere Belastungseinheit (54) vom elektromagnetischen-Typ sind.

15. Gerät nach Anspruch 14, **dadurch gekennzeichnet, dass** die Belastungseinheit (52) eine erste elektromagnetische Dissipationsvorrichtung (56) umfasst.

16. Gerät nach Anspruch 15, **dadurch gekennzeichnet, dass** die erste Dissipationsvorrichtung (56) eine elektromagnetische Bremse (57) umfasst.

17. Gerät nach einem der Ansprüche 1-9 und 11-16, **dadurch gekennzeichnet, dass** die weitere Belastungseinheit (54) eine zweite elektromagnetische Dissipationsvorrichtung (56) umfasst.

18. Gerät nach Anspruch 17, **dadurch gekennzeichnet, dass** die zweite Dissipationsvorrichtung (56) eine elektromagnetische Bremse (57) umfasst.

19. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Arbeitsgerät (60) eine Lenkstange (60) umfasst und das Stützelement (40) einen Sitz (40) für einen Benutzer umfasst.

20. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Zugvorrichtung (70) ein flexibles Element (70) umfasst.

21. Gerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Befestigungsvorrichtung (72) ein weiteres flexibles Element (72) umfasst.

22. Gerät nach einem der Ansprüche 7-21, **dadurch gekennzeichnet, dass** die Befestigungsvorrichtung (90) einen Linearantrieb (90) umfasst.

23. Gerät nach Anspruch 22, **dadurch gekennzeichnet, dass** der Linearantrieb (90) einen linearen Elektromotor umfasst, wobei ein jeweiliger Cursor (94) starr mit dem Sitz (40) verbunden ist, und ein jeweiliger Stator (92) mit der Führung (20) in Verbindung steht.

24. Rudergerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Führung (20) auf lösbare Weise starr mit dem Rahmen (10) verbunden ist, um die Reduzierung der Masse auf dem Boden nach dem Gebrauch zu ermöglichen, und dass sich die weitere Belastungseinheit (54) mechanisch von der Belastungseinheit (52) unterscheidet.

25. Rudergerät nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Führung (20) an den Rahmen (10) angelenkt ist, um die Reduzierung der Masse auf dem Boden nach dem Gebrauch zu ermöglichen, und dass sich die weitere Belastungseinheit (54) mechanisch von der Belastungseinheit (52) unterscheidet.

Revendications

1. Machine de gymnastique (1) comprenant un bâti (10) associé à un guide (20) s'étendant le long d'une direction donnée (30) pour porter un élément de support (40) d'une manière librement coulissante ; des moyens de charge (50) supportés par ledit bâti (10) et comprenant au moins une unité de charge (52) et au moins un instrument (60) associé à ladite unité de charge (52) au moyen d'un dispositif de traction (70) ; lesdits moyens de charge (50) comprenant une unité de charge supplémentaire (54) associé audit élément de support (40) pour conditionner sa mobilité le long dudit guide (20) afin d'exercer des actions séparément contrôlables sur des régions distinctes du corps d'un utilisateur ; **caractérisée par le fait que** ladite unité de charge (52) et ladite unité de charge supplémentaire (54) sont couplées mécaniquement ou électroniquement, et **par le fait que** ladite machine comprend en outre une unité de régulation (80) associée auxdits moyens de charge (50) et permettant l'équilibrage dynamique de ladite unité de charge (52) et de ladite unité de charge supplémentaire (54) permettant ainsi, en utilisation, l'équilibrage dynamique de leurs actions de résistance respectives sur lesdites régions distinctes du corps d'un utilisateur.

2. Machine selon la revendication 1, **caractérisée par le fait qu'**elle comprend des moyens de régulation (80) associés auxdits moyens de charge (50) pour réguler, en utilisation, des actions de résistance exercées sur ledit instrument (60) et/ou ledit élément de support (40).

3. Machine selon la revendication 2, **caractérisée par le fait que** lesdits moyens de régulation (80) comprennent au moins un dispositif logique programmable (82).

4. Machine selon la revendication 2 ou 3, **caractérisée par le fait que** lesdits moyens de régulation (80) comprennent au moins un dispositif (66) pour la mesure instantanée de paramètres dynamiques correspondant à chaque instrument précité (60) et/ou audit élément de support (40) pour le réglage de profils d'entraînement sur la base de données de fonctionnement actuelles ou moyennes combinées en temps réel à des paramètres donnés prédéfinis et/ou prédéterminés.

5. Machine selon la revendication 4, **caractérisée par le fait que** lesdits paramètres dynamiques comprennent, en alternance ou en combinaison, des informations concernant la position instantanée de chaque instrument précité (60) et/ou dudit élément de support (40), la vitesse instantanée de chaque instrument précité (60) et/ou dudit élément de support (40), un effort de traction instantané exercé sur chaque instrument précité (60) et/ou une poussée exercée sur ledit élément de support (40).

6. Machine selon l'une quelconque des revendications 3 à 5, **caractérisée par le fait que** ledit dispositif logique programmable (82) est approprié pour permettre, en utilisation, ledit équilibrage dynamique des actions de résistance de ladite unité de charge (52) et de ladite unité de charge supplémentaire (54) pour configurer des trajectoires d'entraînement dans lesquelles des régions distinctes du corps d'un utilisateur, associées respectivement à chaque instrument précité (60) et/ou audit élément de support (40), peuvent être contraintes dans différents pourcentages, pouvant être définis à volonté.

7. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit guide (20) présente une première extrémité (22) ; ladite unité de charge supplémentaire (54) comprenant un dispositif de fixation (72) (90) associé audit élément de support (40) pour gêner ses déplacements depuis ladite première extrémité (22) le long dudit guide (20).

8. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ladite première extrémité (22) comporte un élément de butée (24) positionné entre ledit élément de support (40) et lesdits moyens de charge (50) ; ledit élément de butée étant apte à être utilisé pour s'opposer de façon statique à ladite poussée exercée sur ledit élément de support (40).

9. Machine selon l'une quelconque des revendications 1 à 7, **caractérisée par le fait que** ladite première extrémité (22) comporte un élément de butée (24) positionné sur le même côté que lesdits moyens de charge (50) par rapport audit élément de support (40) ; ledit élément de butée (24) étant apte à être utilisé pour s'opposer de façon statique à ladite poussée imposée sur ledit élément de support (40).

10. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait qu'**au moins une parmi ladite unité de charge (52) et ladite unité de charge supplémentaire (54) est du type gravitationnel.

11. Machine selon l'une quelconque des revendications 1 à 9, **caractérisée par le fait qu'**au moins une parmi ladite unité de charge (52) et ladite unité de charge supplémentaire (54) est du type mécanique avec variation de frottement entre des parties mobiles respectives.

12. Machine selon l'une quelconque des revendications

1 à 9, **caractérisée par le fait qu'**au moins une parmi ladite unité de charge (52) et ladite unité de charge supplémentaire (54) est du type fluidodynamique.

13. Machine selon la revendication 12, **caractérisée par le fait qu'**au moins une parmi ladite unité de charge (52) et ladite unité de charge supplémentaire (54) comprend un rotor à pales tournant dans de l'air, de l'eau ou de l'huile.

14. Machine selon l'une quelconque des revendications 1 à 9, **caractérisée par le fait qu'**au moins une parmi ladite unité de charge (52) et ladite unité de charge supplémentaire (54) est du type électromagnétique.

15. Machine selon la revendication 14, **caractérisée par le fait que** ladite unité de charge (52) comprend un premier dispositif de dissipation électromagnétique (56).

16. Machine selon la revendication 15, **caractérisée par le fait que** ledit premier dispositif de dissipation (56) comprend un frein électromagnétique (57).

17. Machine selon l'une quelconque des revendications 1 à 9 et 11 à 16, **caractérisée par le fait que** ladite unité de charge supplémentaire (54) comprend un second dispositif de dissipation électromagnétique (56).

18. Machine selon la revendication 17, **caractérisée par le fait que** ledit second dispositif de dissipation (56) comprend un frein électromagnétique (57).

19. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit instrument (60) comprend un guidon (60) et ledit élément de support (40) comprend un siège (40) pour un utilisateur.

20. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit dispositif de traction (70) comprend un élément souple (70).

21. Machine selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit dispositif de fixation (72) comprend un élément souple supplémentaire (72).

22. Machine selon l'une quelconque des revendications 7 à 21, **caractérisée par le fait que** ledit dispositif de fixation (90) comprend un actionneur linéaire (90).

23. Machine selon la revendication 22, **caractérisée par le fait que** ledit actionneur linéaire (90) comprend un moteur électrique linéaire dans lequel un curseur respectif (94) est relié de manière rigide audit siège (40), et un stator respectif (92) est associé audit guide (20).

24. Machine de rameur selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit guide (20) est relié de manière rigide audit bâti (10) de façon amovible pour permettre la réduction de l'encombrement au sol suivant l'utilisation, et **par le fait que** ladite unité de charge supplémentaire (54) est mécaniquement distincte de ladite unité de charge (52).

25. Machine de rameur selon l'une quelconque des revendications précédentes, **caractérisée par le fait que** ledit guide (20) est articulé audit bâti (10) pour permettre la réduction de l'encombrement au sol suivant l'utilisation, et **par le fait que** ladite unité de charge supplémentaire (54) est mécaniquement distincte de ladite unité de charge (52).

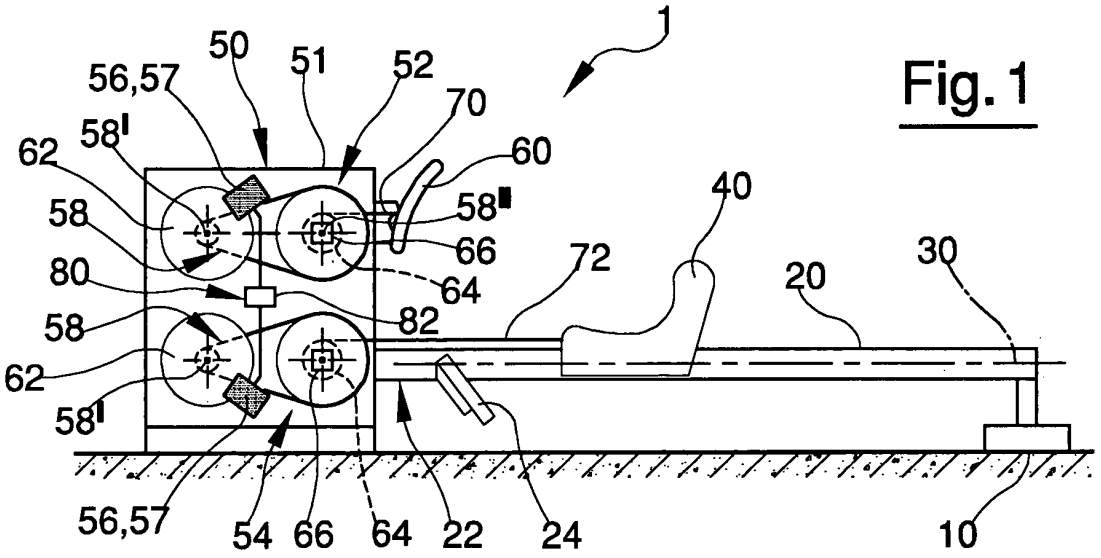

Fig. 1

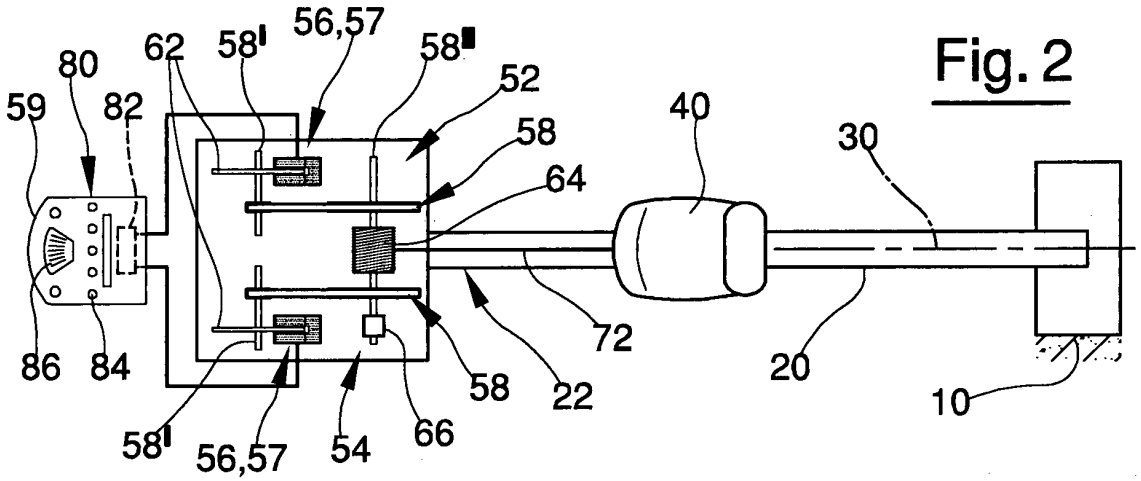

Fig. 2

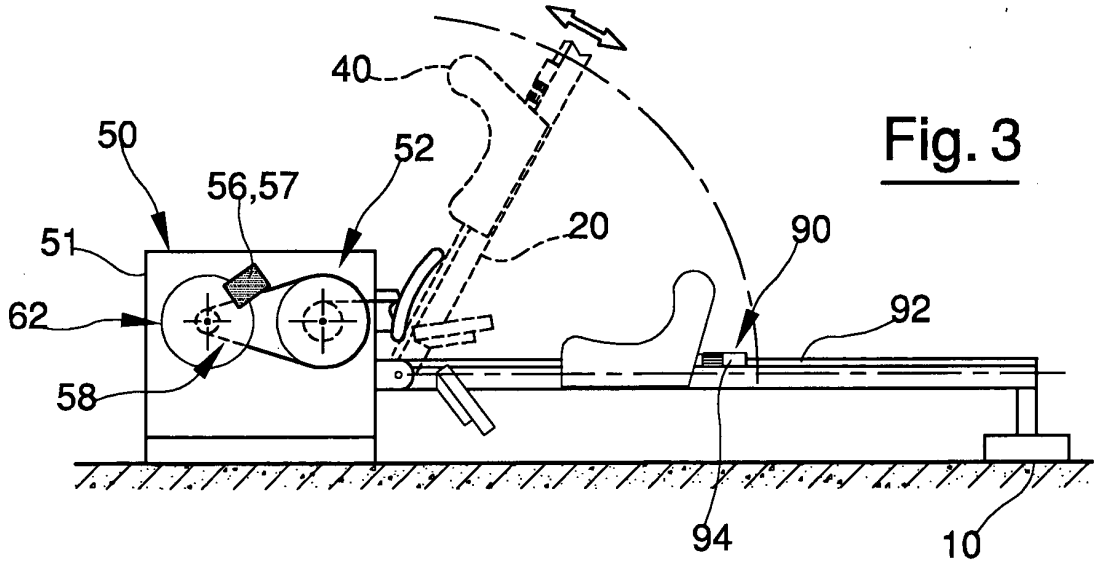

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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