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(54) Machine for muscle training with progressive resistance

(57) The invention concerns a machine (1) for muscle training, comprising a bearing structure (2), to which a barbell (10) is slidingly connected and can move vertically downward as a consequence of the application of a force and is connected to a plurality of elastic elements (8), which, as a consequence of the downward movement of said barbell (10), are loaded with elastic energy and tend to take it back to its starting position, said elastic elements (8) being progressively engaged in an amount proportional to the distance covered from said barbell (10) in its downward movement, until the elastic energy they accumulate is sufficient for counterbalancing the force working on said barbell (10).

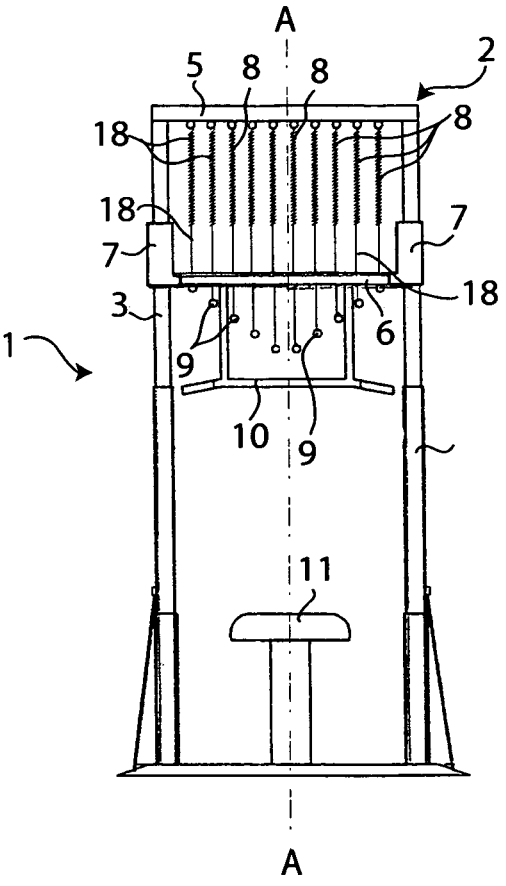

Fig. 1

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Description

[0001] The present invention concerns a machine for muscle training without a substantial application of active strain by the user.

[0002] In particular, the machine for muscle training according to the present invention differs from the machines for muscle training of the prior art because, instead of aiming to the shaping of muscle masses through the application of strains, such as those needed for weight lifting, applies the studies that put in evidence the importance of the elastic relaxation of the muscles.

[0003] According to the classic concept of physical exercise, in order to reach the best physical shape the exercised muscle strain has always been considered as fundamental, thus constraining the athletes to reshape their muscles up to hypertrophy, with exceptional contractile strength, aiming at overreaching records more and more prestigious in the different recreational and professional sport activities.

[0004] This traditional concept of physical exercise was disputed for the first time by Professor Pietro Cignolini in his textbook "Kinesis", where he defined the traditional model as "physical exercise for brutes" and contested its anti-physiological drift, non-devoid of risks, since together with hypertrophy of the muscles directly involved by the kind of sport activity, it determines hypertrophy of muscle fibres, heart and other organs, with consequent disproportion between fleshy mass and the caliber of capillary curves, and the possibility of unhappy results. In its studies, Professor Cignolini, instead of favouring the muscle power focusing on the contraction, proclaimed the importance of the elastic relaxation, which mainains the movement in the body.

[0005] Starting from these premises, Professor Cignolini realised a machine for muscle training constituted by a crossbar, at the two ends of which two handles were applied, by means of springs made up of steel. Standing beneath the handles and clinging thereto with the arms stretched it was possible, allowing the body to fall downward (i.e. allowing the legs to bend without sustaining the body and without countervailing the gravity anymore), to subject the springs to a tensile force directed downward causing their stretching (and consequently their loading). By conveniently sizing the springs, their stretching was such to entail the interruption of the fall of the body at the moment in which the legs of the user were completely bent and the pelvis was almost in proximity of the heels. In such a position, the system constituted by the machine and the body of the user was ready for the movement back. In fact, thanks to the spring loading occurred during the step of falling downward, the springs linking the handles to the crossbar cumulated enough energy to call back upward the body of the user, taking it back to its starting position. The repetition of such a movement for some minutes time proved to be, according to the studies carried out, sufficient to ensure a beneficial effect to the user, thanks to the periodicity of muscle stretching and retraction induced by the machine downgrading and upgrading movement.

[0006] The basis of the physical exercise without strain conceived by Professor Cignolini is therefore completely to be identified in the sinergy between the springs of the machine and muscle "springs" (i.e. the muscle physiological elastic capacity). According to the studies carried out, this kind of physical exercise without strain proved to be particularly useful to prevent and cure backache, osteoporosis and other arthrosic and rheumatic pathologies, even the urinary incontinence.

[0007] The proposed machine for muscle training proved to be particularly important because it was addressed not only to amateur or professional athletes, as the machines for physical exercise previously known, but also to those persons that, due to health or age problem, do not have anymore the necessary muscle tone for using machines for muscle training of the traditional kind, but also to persons having no time to dedicate to a physical activity of the traditional type, requiring prolonged exertions in specific environments (such as gyms).

[0008] Nevertheless, a problem with this kind of machine for muscle training is its reduced adaptability to the different type of users. In fact, according to the different weight of the users, the proposed machine for muscle training needs to adapt proportionally, which can be made only by modifying the number and/or length of the springs used.

[0009] It is an aim of the present invention to provide for a machine for muscle training without substantial application of active strain by the user, capable to automatically adapt to the different physical characteristic of the user.

[0010] It is therefor a specific object of the present invention a machine for muscle training, comprising a bearing structure, to which a barbell is slidingly connected and can move vertically downward as a consequence of the application of a force and is connected to a plurality of elastic elements, which, as a consequence of the downward movement of said barbell, are loaded with elastic energy and tend to take it back to its starting position, said elastic elements being progressively engaged in an amount proportional to the distance covered from said barbell in its downward movement, until the elastic energy they accumulate is sufficient for counterbalancing the force working on said barbell.

[0011] Preferably, according to the invention, said elastic elements are fastened each by means of one extremity to said bearing structure and present each a tie rod at the opposed extremity, having a beat element, said tie rods being divided in couples of tie rods having different lengths, the tie rods of each couple being arranged on elastic elements that are symmetrical with respect to the central vertical axis of the machine, in its movement said barbell engaging one couple at a time of said elastic elements, when it enters in contact with the beat elements of the respective tie rods.

[0012] Further, according to the present invention, said

barbell can be integral with a mobile crossbar, slidingly coupled with said bearing structure and provided with openings having such a size to allow the sliding inside of said tie rods, not of said beat elements.

[0013] Moreover, according to the invention, said bearing structure preferably comprises two vertical rods, fastened at a base, said mobile crossbar being provided at its extremities with two tubes free to slide along said vertical rods, which, preferably, are telescopic.

[0014] The machine for muscle training according to the present invention can comprise a fixed crossbar upperly connecting said vertical rods and to which the upper extremity of said elastic elements are fastened.

[0015] Finally, according to the invention, said elastic elements can be constituted by a plurality of springs and the machine can comprise a seat that can be adjusted in height.

[0016] The present invention will now be described, for illustrative, non limitative purposes, according to its preferred embodiment, with particular reference to the figures of the enclosed drawings, wherein

Figure 1 shows a skematic front view of the machine for muscle training according to the present invention, and

Figure 2 shows a skematic lateral view of the machine of Figure 1.

[0017] Reference being made to the figures, the machine for muscle training without substantial application of active strain by the user according to the present invention is referred to with the numerical reference 1, and is constituted of a bearing structure 2 composed of two vertical rods 3 of the telescopic type, fastened to a base 4. Upperly, the vertical rods 3 are connected to one another by means of a fixed crossbar 5.

[0018] Further, between the two vertical rods 3 is provided a mobile crossbar 6, the extremities of which are fastened to two tubes 7 each being free to slide along one of the vertical rods 3.

[0019] A plurality of couples of springs 8 are fastened to the fixed crossbar 5, in a position symmetrical with respect to a central simmetry axis A-A, the upper extremity of the springs 8 being fastened to the fixed crossbar 5 and the opposite extremity being free and hanging vertically beneath the upper extremity because of the force of gravity. At the extremity of each couple of springs 8, tie rods 18 are applied, having different length with respect to those of the springs of other couples. Further, all the tie rods 18 pass through correspondent openings of the mobile crossbar 6 and have a beat element 9, with dimensions greater than those of the openings, at their lower extremity.

[0020] Below the mobile crossbar 6 a barbell 10 is fastened. A seat 11 that can be adjusted in height is further fastened to the base 4, in a central position with respect to said two vertical rods 3 and below the barbell 10.

[0021] The machine for muscle training without substantial application of active strain by the user allow the user, after adjusting the height of the seat 11 and, adjusting the vertical rods telescopic 3, the height of the upper crossbar 5, to stand beneath the barbell 10, grab it with the hands (the arms being stretched) and allowing the body to fall downward thus seating on the seat 11. During its downward movement, the system constituted by the barbell 10 and the mobile crossbar 6 integral with it engages with an increasing number of springs 8. In fact, going downward, the openings of the mobile crossbar 6 allow the tie rods 18 to freely slide inside until they engage with the respective beat elements 9. Because of the different length of the tie rods 18, the downward movement of the system constituted by the barbell 10 and the crossbar 6 will be opposed by a progressively increasing number of springs 8, in this way adapting to the weight of the user.

[0022] As previously said, during the lowering step of the mobile crossbar 6, the involved springs 8 accumulate energy, turning out to be sufficient to take back upward the body of the user in the following step of going back upward, in order to take it back in the starting position. In this way the machine for muscle training without a substantial application of strain is able to ensure the periodicity of muscle stretching and retraction induced by the downgrading and upgrading movement of the barbell 10. In particular, as previously said, the body of the user undergoes the action of stretching and retraction without the need for applying substantially any kind of strain.

[0023] According to a preferred embodiment of the invention, the internal surface of the two tubes 7 sliding along the respective vertical rod 3 is made up of a plastic material having a low friction coefficient, such as nylon®.

[0024] Further, it is possible to provide for a telescopic carter made up of aluminium or other material to protect the springs 8, the carter being able to extend and shorten as a function of the stretching of the springs 8, to ensure they are always coated.

[0025] It comes out to be evident that the machine for muscle training without substantial application of active strain by the user is able to automatically adapt its elastic action as a function of the weight of the user, with no need for the user to change the number of springs to be used. In fact, the number of interested springs is determined by the weight of the user, who only has to adjust the height of the bearing structure 2 and the seat 11 as a function of his own. In fact, the system constituted by the barbell 10 and the mobile crossbar 6 will continue to go downward until a sufficient number of springs 8 will be involved so to generate a return force that is sufficient with respect to the weight of the user.

[0026] The present invention was described for illustrative non limitative purposes, according to preferred embodiments, but it is to be understood that any change and/or modification can be made by the skilled in the art without escaping from the corresponding scope of protection, as defined in the enclosed claims.

Claims

1. Machine (1) for muscle training, comprising a bearing structure (2), to which a barbell (10) is slidingly connected and can move vertically downward as a consequence of the application of a force and is connected to a plurality of elastic elements (8), which, as a consequence of the downward movement of said barbell (10), are loaded with elastic energy and tend to take it back to its starting position, said machine being **characterised in that** said elastic elements (8) are progressively engaged in an amount proportional to the distance covered from said barbell (10) in its downward movement, until the elastic energy they accumulate is sufficient for counterbalancing the force working on said barbell (10).

2. Machine (1) for muscle training according to claim 1, **characterised in that** said elastic elements (8) are fastened each by means of one extremity to said bearing structure (2) and present each a tie rod (18) at the opposed extremity, having a beat element (9), said tie rods (18) being divided in couples of tie rods having different lengths, the tie rods (18) of each couple being arranged on elastic elements (8) that are symmetrical with respect to the central vertical axis of the machine (1), in its movement said barbell (10) engaging one couple at a time of said elastic elements (8), when it enters in contact with the beat elements (9) of the respective tie rods (18).

3. Machine (1) for muscle training according to claim 2, **characterised in that** said barbell (10) is integral with a mobile crossbar (6), slidingly coupled with said bearing structure (2) and provided with openings having such a size to allow the sliding inside of said tie rods (18), not of said beat elements (9).

4. Machine (1) for muscle training according to claim 3, **characterised in that** said bearing structure (2) comprises two vertical rods (3), fastened to a base (4), said mobile crossbar (6) being provided at its extremities with two tubes (7) free to slide along said vertical rods (3).

5. Machine (1) for muscle training according to claim 4, **characterised in that** said vertical rods (3) are telescopic.

6. Machine (1) for muscle training according to any of claims 4-5, **characterised in that** it comprises a fixed crossbar (5) upperly connecting said vertical rods (3) and to which the upper extremity of said elastic elements (8) are fastened.

7. Machine (1) for muscle training according to any of the previous claims, **characterised in that** said elastic elements (8) are constituted by a plurality of springs.

8. Machine (1) for muscle training according to any of the previous claims, **characterised in that** it comprises a seat (11) that can be adjusted in height.

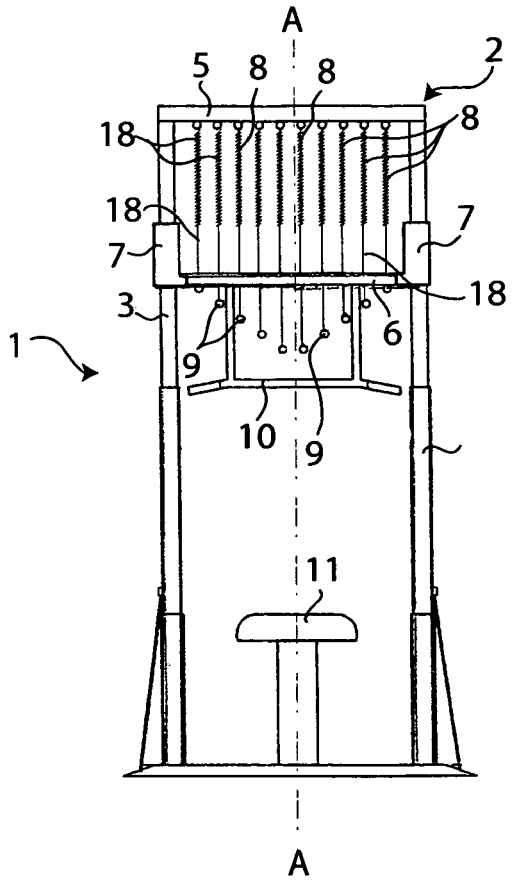

Fig. 1

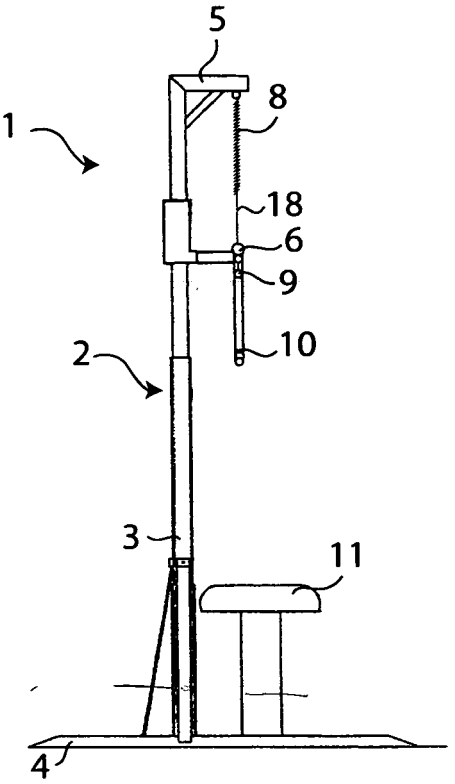

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5534

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 1 698 831 A (HARRY TITUS WEIMAR) 15 January 1929 (1929-01-15) * sentence 6 - sentence 34; figures * * sentence 81 - sentence 110 *	1,7,8	INV. A63B23/12 A63B21/055
Y	US 3 640 529 A (KANE JOHN F) 8 February 1972 (1972-02-08) * column 2, line 25 - line 51 * * column 4, line 41 - line 66; figures 6,8 *	1,7,8	
A	US 2004/176227 A1 (ENDELMAN KEN [US]) 9 September 2004 (2004-09-09) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 November 2006	Lundblad, Hampus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 42 5534

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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15-11-2006

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US 3640529 A	08-02-1972	NONE	
US 2004176227 A1	09-09-2004	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82