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(54) Gymnastic apparatus for exercising abdominal muscles

(57) A gymnastic apparatus for sports exercise, comprising a supporting frame (2), a backrest (3) which is provided with at least one portion (4) for contact with the back of a user during exercise and is supported by the frame so that it can oscillate between an initial configuration and a final configuration, a seat (5) which is supported by the frame in front of the contact portion and below it, and contrast elements (6) which are associated with the backrest and are suitable to apply an action that contrasts the oscillation of the backrest between the initial configuration and the final configuration, the backrest (5) being pivoted to the frame in front of the plane of arrangement of the contact portion.

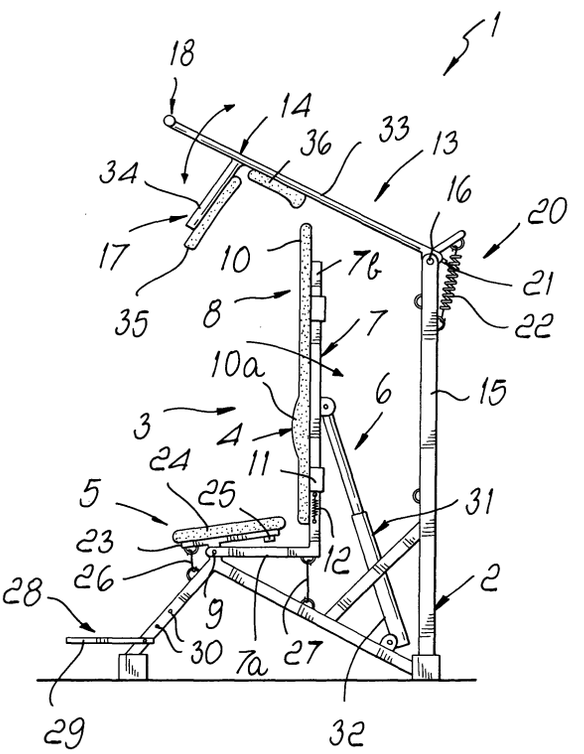

Fig. 1

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Description

[0001] The present invention relates to a gymnastic apparatus for exercising abdominal muscles.

[0002] Methods for toning abdominal muscles are currently known; some entail performing exercises performed without apparatus or by using weights, and others entails performing predefined movements with the aid of gymnastic apparatuses.

[0003] These gymnastic apparatuses are substantially constituted by a frame for supporting a seat and a backrest for supporting a user and contrasting means that are applied to the rear of the backrest and act in a substantially fixed direction.

[0004] The lower portion of the backrest is hinged to the frame, so that the back can move alternately between an initial configuration, in which it is vertical, and a final configuration, in which it is reclined backward.

[0005] The user, by resting his hands against a fixed support, flexes his back, applying a force to the backrest that tends to make it rotate backward about its pivoting axis.

[0006] This rotation is contrasted by the contrast means, which are generally constituted by elastic elements that react to their own deformation according to linear rules, or by weights arranged at a certain height, which contrast the variation of their potential energy.

[0007] These known types of apparatus are not free from drawbacks, including the fact that they do not allow to follow correctly the flexing of the backbone at the point of contact with the backrest and accordingly do not allow selective toning of the abdominal rectus muscles.

[0008] Moreover, the difference between the extent of the movements performed by the backrest and by the backbone causes the onset of pressures on the backbone, at the lumbar region, which often produce unpleasant and sometimes painful sensations.

[0009] The aim of the present invention is to eliminate the drawbacks noted above of known apparatuses, by providing a gymnastic apparatus for exercising abdominal muscles that allows to achieve selective toning of the rectus abdominal muscles without requiring the intervention of the other muscles and without discharging dangerous pressures onto the backbone.

[0010] Within this aim, an object of the invention is to provide an apparatus that allows even users who have limited motor coordination to perform very intense exercises easily and without danger of traumas.

[0011] Another object of the present invention is to provide an apparatus that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has relatively low cost.

[0012] This aim and these and others objects are all achieved by the present gymnastic apparatus for exercising abdominal muscles, which comprises a supporting frame, a backrest which is provided with at least one portion for contact with the back of a user during exercise and is supported by said frame so that it can oscillate between an initial configuration and a final configuration, a seat which is supported by said frame in front of said contact portion and below it, and contrast means which are associated with said backrest and are suitable to apply an action that contrasts the oscillation of said backrest between the initial configuration and the final configuration, characterized in that said backrest is pivoted to the frame in front of the plane of arrangement of said contact portion.

[0013] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of some possible preferred but not exclusive embodiments of a gymnastic apparatus for exercising abdominal muscles, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic side view of a first embodiment of a gymnastic apparatus for exercising abdominal muscles, according to the invention;
Figure 2 is a schematic side view of the apparatus of Figure 1, in a first step of the exercise of a user;
Figure 3 is a schematic side view of the apparatus of Figure 1, in a second step of the exercise of the user;
Figure 4 is a schematic side view of a second embodiment of the apparatus according to the invention;
Figure 5 is a schematic axonometric view of a third embodiment of the apparatus according to the invention;
Figure 6 is a schematic side view of a fourth embodiment of the apparatus according to the invention.

[0014] With reference to the figures, the reference numeral 1 generally designates a gymnastic apparatus for exercising abdominal muscles.

[0015] The apparatus 1 comprises a supporting frame 2, a backrest 3 provided with at least one portion 4 for contact with the back of a user U during exercise which is supported by the frame 2 so that it can oscillate between an initial configuration, in which it is substantially vertical, and a final configuration, in which it is reclined backward.

[0016] The apparatus 1 further comprises a seat 5 that cooperates with the backrest 3 for the support of the user U and is supported by the frame 2 in front of the contact portion 4 and below it.

[0017] Finally, the apparatus 1 is provided with contrast means 6, which are associated with the backrest 3 and are suitable to contrast the oscillation of the backrest from the initial configuration to the final configuration.

[0018] The backrest 3 is pivoted to the frame 2 in front of the plane of arrangement of the contact portion 4, the front portion of the apparatus 1 being understood as the one from which the user accesses it.

[0019] It is noted that the backrest 3 must be pivoted at least at the region where the hip of the user U is located during exercise or, better still, slightly further forward.

[0020] In this manner, the circular arc traced by the backrest 3 about its fulcrum during execution of the exercise causes a downward translational motion of the contact portion 4 that can be likened to the downward motion of the part of the back of the user U that initially rests on said portion, so that the backrest 3, by rotating, follows the movement of the user U.

[0021] The user U acts at the contact portion 4 with a distributed pressure that produces a resulting force that overcomes the action of the contrast means 6.

[0022] The backrest 3 is constituted by a framework 7, which comprises a first portion 7a and a second portion 7b, which are arranged in an L-shaped configuration and are mutually rigidly associated, and by means 8 for supporting the back of the user U, which form the contact portion 4 and are associated with the second portion 7b.

[0023] The first portion 7a protrudes forward from the second portion 7b, at the lower end thereof, and is pivoted to the frame 2 by means of a first pivot 9, which is arranged horizontally and is supported by the frame.

[0024] The framework 7, which is pivoted at the first pivot 9 and is subjected to the action applied by the contrast means 6 and to the force applied by the user U, behaves like a lever.

[0025] The supporting means 8 are constituted by a padded element 10, which is associated with the second portion 7b at the front and is provided with an enlarged portion 10a located at the contact portion 4.

[0026] Conveniently, the padded element 10 can be mounted so that it can move on the second portion 7b, for example by means of a plurality of sliders 11 that are slidingly associated with the sides of said portion and cooperate with a pair of return springs 12, only one of which is visible in the figures, the lower end of each spring being associated with the second portion 7b, the upper end being associated with one of the sliders 11.

[0027] The sliding of the padded element 10 with respect to the second portion 7b allows to avoid unpleasant friction between the back of the user U and said padded element.

[0028] As an alternative, as shown in Figure 5, the padded element 10 can be fitted so that it is rigidly coupled to the second portion 7b.

[0029] Finally, it is possible to provide additional embodiments, in which the padded element 10 has a uniform thickness and the expanded region 10a that forms the contact portion 4 is constituted by a cushion that can be arranged at various heights so as to adapt to users U of different heights.

[0030] Advantageously, the apparatus 1 comprises reference means 13 for the shoulders of the user U that are suitable to follow their downward motion and prevent their forward motion while exercising.

[0031] The reference means 13 comprise two arms 14, which are arranged on opposite sides of the backrest 3 and above the seat 5, at a distance from the seat that allows them to be placed on the shoulders of the user U who rests on said seat.

[0032] The frame 2 is provided, at the rear, with a frame 15 for supporting the arms 14.

[0033] The arms 14 are associated, at the rear, with the frame 15 by means of a second pivot 16, which is arranged horizontally and is supported by the frame and can oscillate between a raised configuration and a lowered configuration, passing through an intermediate configuration.

[0034] Each arm 14 is associated with a supporting element 17, which must be kept in contact with the front part of the shoulders of the user U in the intermediate and lowered configurations.

[0035] At the front end, the arms 14 are associated with grip means 18 for engagement on the part of the user U.

[0036] In the particular embodiments shown, the two arms 14 are connected at the rear by a cross-member 19 that is associated with the second pivot 16.

[0037] The reference means 13 comprise means 20 for limiting the oscillation of the arms 14.

[0038] The limiting means 20 comprise a plurality of elements 21 that protrude backward from the cross-member 19 and which, by abutting against the frame 15, prevent an excessive opening of the arms 14 and therefore the overturning of the apparatus 1, and two return springs 22, which are arranged at the opposite ends of the cross-member 19 and in which the upper end is associated with the arms 14 and the lower end is associated with the frame 15.

[0039] The return springs 22, when the arms 14 are in the lowered configuration, are arranged so as to apply a negligible moment with respect to the second pivot 16, so that the user U can keep them in said configuration without contracting the muscles of the upper part of the truck and of the upper limbs.

[0040] Conveniently, the seat 5 is supported by the frame 2 so that it can oscillate between an inactive configuration and a stroke end configuration, passing through a starting configuration.

[0041] The region where the seat 5 is pivoted to the frame 2 is preferably arranged in front of the center of gravity of the seat, so that it spontaneously tends to rotate backward.

[0042] In the particular embodiments shown, the seat 5 is pivoted about the first pivot 9 together with the backrest 3, but it is possible to provide independent rotation axes for the two elements.

[0043] Further embodiments of the invention are also possible in which the seat 5 is rigidly coupled to the backrest 3.

[0044] The seat 5 comprises a secondary frame 23, which is pivoted in a lower region to the frame 2 and supports a seat element 24, which is padded and pro-

trudes upward with respect to the first portion 7a.

[0045] The seat 5 further comprises means 25 for the abutment of the secondary frame 23 on the first portion 7a; said means are associated in a lower region with the lower part of said secondary frame, which has a larger transverse dimension than the first portion 7a, so as to rest on it in the starting and stroke end configurations.

[0046] The backrest 3 has, at the first portion 7a, means for engaging the seat 5, which are not shown in the figures and are suitable to drag the seat in rotation rigidly with the backrest proximate to the final configuration.

[0047] In the inactive configuration, the seat 5 is tilted forward with respect to a horizontal plane and is kept in this position by a removable retainer 26.

[0048] In the starting and stroke end configurations, the seat 5 is arranged so as to rest on the first portion 7a of the backrest 3, respectively, in the initial and final configurations.

[0049] The backrest 3 is associated with a removable block 27, which maintains it in the initial configuration and can preload the contrast means 6.

[0050] The retainer 26 and the blocking element 27 must be removed by the user U before starting to exercise.

[0051] The apparatus 1 comprises adjustable supports 28 for the feet of the user U, which can be arranged differently according of the height of the user.

[0052] The adjustable supports 28 are constituted by two supporting elements 29, which can be fixed at slots 30 formed at various heights in the lower part of the frame 2 and protrude laterally to the frame.

[0053] If the user U is tall enough, the supports 29 are not used and the feet are kept in contact with the ground.

[0054] The contrast means 6 can, for example, be interposed between the backrest 3 and the frame 2.

[0055] In a first embodiment of the invention, shown in Figures 1, 2 and 3, the contrast means 6 comprise at least one compression-contrasting means 31, in which a first end is articulately associated with the frame 2 and a second end is articulately associated with the framework 7 and is arranged above the preceding one.

[0056] In the particular embodiment shown, the element 31 is constituted by a helical compression spring, not shown in the figures, which is inserted in a tubular and telescopic body 32, but it is possible to provide for the use of a gas-assisted compression spring or of any elastic body that offers a certain resistance to its deformation by compression, as a replacement of, or in addition to, the compression spring accommodated in the body 32.

[0057] In Figure 1, the apparatus 1 is shown with the backrest 3 in the initial configuration, the seat 5 in the inactive configuration, and the arms 14 in the raised configuration.

[0058] In Figure 2, the apparatus 1 is shown with the backrest 3 again in the initial configuration, the seat 5 in the starting configuration, and the arms 14 in an intermediate configuration.

[0059] In Figure 3, the apparatus 1 is shown with the backrest 3 in the final configuration, the seat 5 in the stroke end configuration, and the arms 14 in the lowered configuration.

[0060] It should be noted that the posture of the user U during exercise is such that the axis A that connects the articulation of the shoulder to the articulation of the hip is always substantially vertical.

[0061] The arms 14 are constituted by elongated elements 33, and the supporting elements 17 are formed by protrusions 34 that protrude downward and support padded cushions 35 at the rear.

[0062] The elongated elements 33 have, in a lower region, padded elements 36 that are designed to rest against the shoulders of the user U when the arms 14 are in the intermediate and lowered configurations.

[0063] The rear part of the padded elements 36 is shaped so as to allow correct positioning of the shoulders of the user U with respect to the backrest 3.

[0064] In a second embodiment, shown in Figure 4, the contrast means 6 comprise a traction-contrasting element, which is constituted by a helical traction spring 37, in which a first end is articulately associated with the frame 2 and a second end is articulately associated with the framework 7 and is arranged below the preceding one.

[0065] It is possible to provide, in addition to the spring 37 or as an alternative thereto, for the use of a gas-assisted traction spring, of an elastic band, of a coiled spring or of any elastic body that offers a certain resistance to its deformation by traction.

[0066] In a third embodiment of the invention, shown in Figure 5, the framework 7 is provided with an elongated tab 38 that protrudes to the rear thereof and fits within the frame 15, which is shaped like an inverted letter U.

[0067] The contrast means 6 have a plurality of traction-contrasting elements, which are constituted by respective elastic bands 39, each of which has a first end that is associated with the frame 15 and a second end that is associated with the tab 38 and is arranged below the preceding one.

[0068] As an alternative, the elastic bands 39 might be arranged laterally to the backrest 3 or in front of it.

[0069] The arms 14 are constituted by S-shaped elements 40, which have a rear portion that is curved upward, a front portion that is curved downward, and an intermediate connecting portion.

[0070] The supporting elements 17 are formed monolithically with the shaped elements 40 and are constituted by their intermediate portions.

[0071] The contoured elements 40 are provided with padded elements 41, which facilitate the correct positioning of the user U.

[0072] In a fourth embodiment of the invention, shown in Figure 6, the contrast means 6 are constituted by a first lever 42, in which one end is articulated at the rear

to the second portion 7b and the opposite end is arranged below the preceding one and is articulated to a second lever 43, which is rotatably supported by the frame 2 about a third pivot 44 and is arranged below the seat 5.

[0073] The contrast means 6 further comprise a heavy body 45, constituted for example by a pack of gym weights, which is associated with the free end of the second lever 43 by means of a cable 46 that is supported by a set of pulleys 47.

[0074] The heavy body 45, due to its own weight, tends to contrast the rotation of the second lever 43 about the third pivot 44, which is actuated by the force applied by the user U during the oscillation of the backrest 3 from the initial configuration toward the final configuration.

[0075] The levers 42 and 43 can be adjustable in length, so as to vary the intensity of the exercise performed.

[0076] The figure illustrates with dashed lines two levers 42a and 43a, whose lengths are different with respect to the preceding ones and protrude from the frame 15.

[0077] In an alternative embodiment of the apparatus according to the invention, not shown in the figures, the contrast means 6 can be applied directly to the backrest 3; in this case, the framework 7 can be associated with a protrusion that protrudes at the front or laterally thereto and is optionally provided with supports for the feet of the user U and to which the contrast means 6 are applied, the contrast means being constituted by one or more weights, such as for example conventional disk-shaped weights, arranged on the opposite side of the contact portion 4 with respect to the first pivot 9.

[0078] Finally, it is noted that the various solutions shown by way of example for providing the contrast means 6 can be mutually combined in order to obtain further embodiments of the apparatus 1.

[0079] The operation of the invention is as follows: the user U, after removing the retainer 26 and the block 27, rests on the seat 5, which under the action of the weight of the user rotates backward about the first pivot 9 until it rests against the first portion 7a, moving to the initial configuration.

[0080] The user U slides on the seat 5 and positions himself correctly so that the region of the dorsolumbar articulation of the backbone is arranged at the contact portion 4.

[0081] The forward movement of the shoulders of the user U is blocked by the supporting elements 17, while the positioning of the seat 5 on the first portion 7a allows the user U to maintain the correct retroversion of the pelvis.

[0082] In order to overcome the action applied by the contrast means 6, the user U must contract the abdominal rectus muscles, flexing his backbone so as to apply sufficient force.

[0083] Depending on the relative position of the point of application of the force of the contrast means 6 to the backrest 3 and of the contact portion 4, the framework 7 acts as a second- or third-class lever, diversifying the intensity of the physical effort required to perform exercising.

[0084] Once the final configuration of the backrest 3 has been reached, the user U must perform an opposite movement, contrasting the return force applied by the contrast means 6 to return the backrest to the initial configuration.

[0085] In practice it has been found that the described invention achieves the intended aim and objects.

[0086] In particular, the contraction that the user is required to perform during exercise (first a concentric isotonic contraction, then an isometric one, then finally an eccentric isotonic one) allows to perform a complete workout of the abdominal rectus muscles while keeping the other muscles relaxed.

[0087] Finally, the contrast means used in the apparatus according to the invention, by being movable with respect to the backrest, perform their action without hindering the movement of the user.

[0088] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0089] All the details may further be replaced with other technically equivalent ones.

[0090] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0091] The disclosures in Italian Patent Application No. MO2002A000160 from which this application claims priority are incorporated herein by reference.

[0092] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A gymnastic apparatus for exercising abdominal muscles, comprising a supporting frame, a backrest which is provided with at least one portion for contact with the back of a user during exercise and is supported by said frame so that it can oscillate between an initial configuration and a final configuration, a seat which is supported by said frame in front of said contact portion and below it, and contrast means which are associated with said backrest and are suitable to apply an action that contrasts the oscillation of said backrest between the initial configuration and the final configuration, **characterized in that** said backrest is pivoted to said frame in front

of the plane of arrangement of said contact portion.

2. The apparatus according to claim 1, **characterized in that** it comprises reference means for the shoulders of said user, which are adapted to stop their advancement and allow their downward movement during exercise.

3. The apparatus according to one or more of the preceding claims, **characterized in that** said seat is associated with said frame so that it can oscillate between an inactive configuration and a stroke end configuration, passing through a starting configuration.

4. The apparatus according to one or more of the preceding claims, **characterized in that** said backrest comprises a framework that is provided with a first portion and a second portion which are mutually substantially oblique and rigidly coupled, the first portion protruding forward with respect to the second portion and being associated with the frame, and means for supporting the back of said user, which are associated in front of said second portion, said means being suitable to form the contact portion.

5. The apparatus according to one or more of the preceding claims, **characterized in that** said supporting means comprise a padded element that is provided with an expanded region arranged at said contact portion.

6. The apparatus according to one or more of the preceding claims, **characterized in that** said supporting means are mounted so that they can slide along said second portion.

7. The apparatus according to one or more of the preceding claims, **characterized in that** said backrest is provided with means for engaging said seat, which are suitable to drag it in rotation rigidly with said backrest at least proximate to said final configuration.

8. The apparatus according to one or more of the preceding claims, **characterized in that** in the inactive configuration said seat is substantially inclined forward with respect to a horizontal plane and **in that** in the starting and stroke end configurations it rests on the first portion of said backrest in the initial and final configurations, respectively.

9. The apparatus according to one or more of the preceding claims, **characterized in that** said reference means comprise at least one arm that is arranged above said seat and is associated with said frame so that it can oscillate between a raised configuration and a lowered configuration, passing through an intermediate configuration, and is provided with at least one supporting element that is suitable to be kept in contact in front of the shoulders of said user in the intermediate and lowered configurations.

10. The apparatus according to one or more of the preceding claims, **characterized in that** said arm is associated with grip means for engagement by said user.

11. The apparatus according to one or more of the preceding claims, **characterized in that** said arms are two and are arranged laterally with respect to said backrest.

12. The apparatus according to one or more of the preceding claims, **characterized in that** said contrast means are interposed between said frame and said backrest.

13. The apparatus according to one or more of the preceding claims, **characterized in that** said contrast means comprise at least one element that contrasts compression and has a first end that is associated with said frame and a second end that is articulately associated with said backrest, the first end being arranged at a substantially lower level than the second end.

14. The apparatus according to claim 13, **characterized in that** said compression-resistant element is constituted alternately by a helical compression spring, by a gas-assisted compression spring, by an elastic body that is deformable by compression, or the like.

15. The apparatus according to one or more of the preceding claims, **characterized in that** said contrast means comprise at least one element that contrasts traction and has a first end that is articulately associated with said frame and a second end that is articulately associated with said backrest, the first end being arranged at a substantially higher level than the second end.

16. The apparatus according to one or more of the preceding claims, **characterized in that** said backrest comprises a protruding tab and **in that** said traction-contrasting element has a first end that is articulately associated with said frame and a second end that is articulately associated with said tab and is arranged below said first end.

17. The apparatus according to one or more of claims 15 and 16, **characterized in that** said traction-contrasting element is constituted by a helical traction

spring, an elastic traction band, a gas-assisted traction spring, a coiled spring, and an elastic body that is deformable by traction, or the like.

18. The apparatus according to one or more of the preceding claims, **characterized in that** said contrast means comprise a first lever, in which a first end is associated with said backrest and an opposite end is arranged below said first end and is articulated to a second lever, which is rotatably supported by said frame, and at least one heavy body, which is associated with said second lever and is suitable to contrast its motion during the oscillation of said backrest from the initial configuration toward the final configuration.

19. The apparatus according to one or more of the preceding claims, **characterized in that** said contrast means comprise at least one weight, which is associated with said backrest on the opposite side with respect to said contact portion relative to the region where said backrest is pivoted to said frame.

20. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises adjustable supports for the feet of said user.

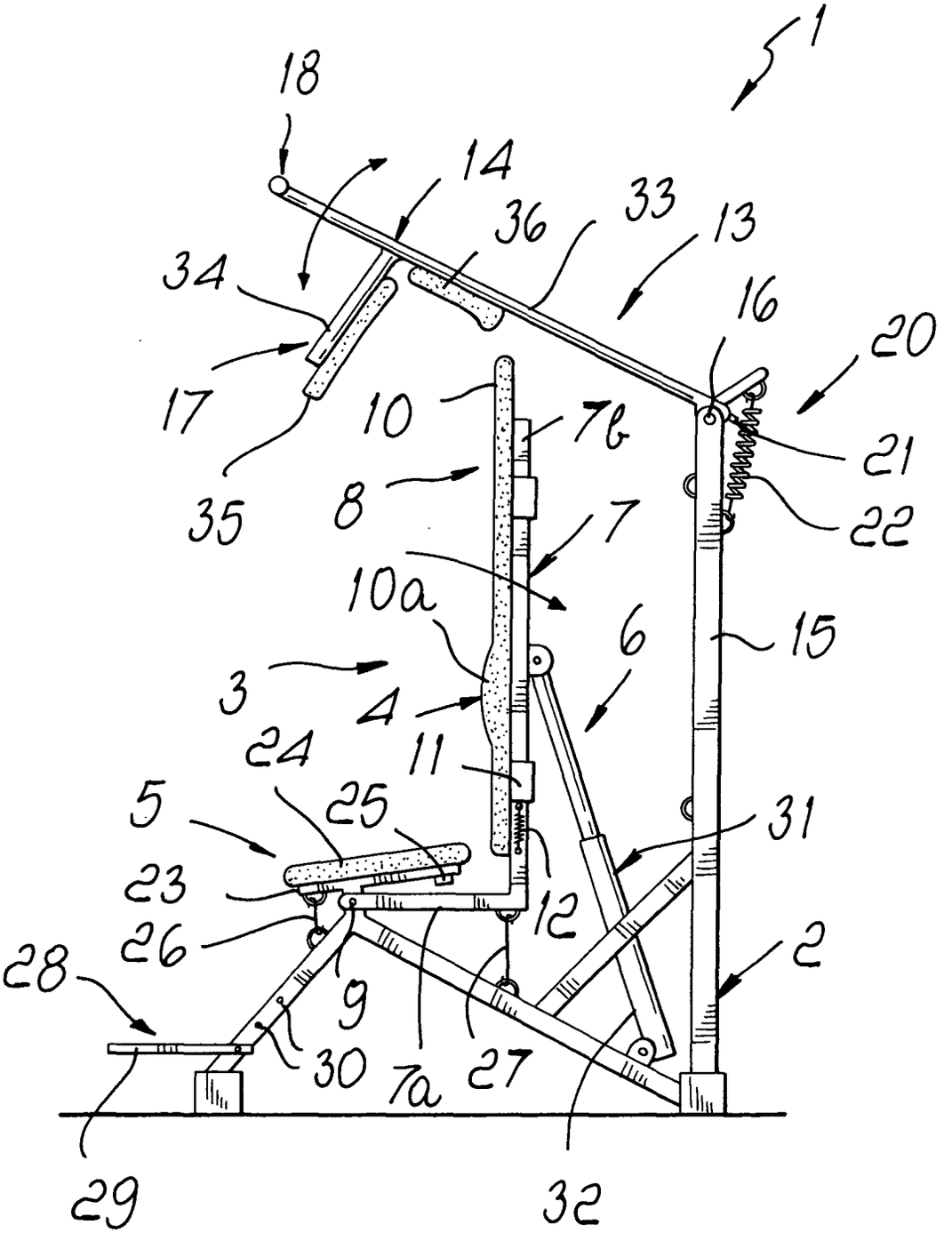
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Fig. 1

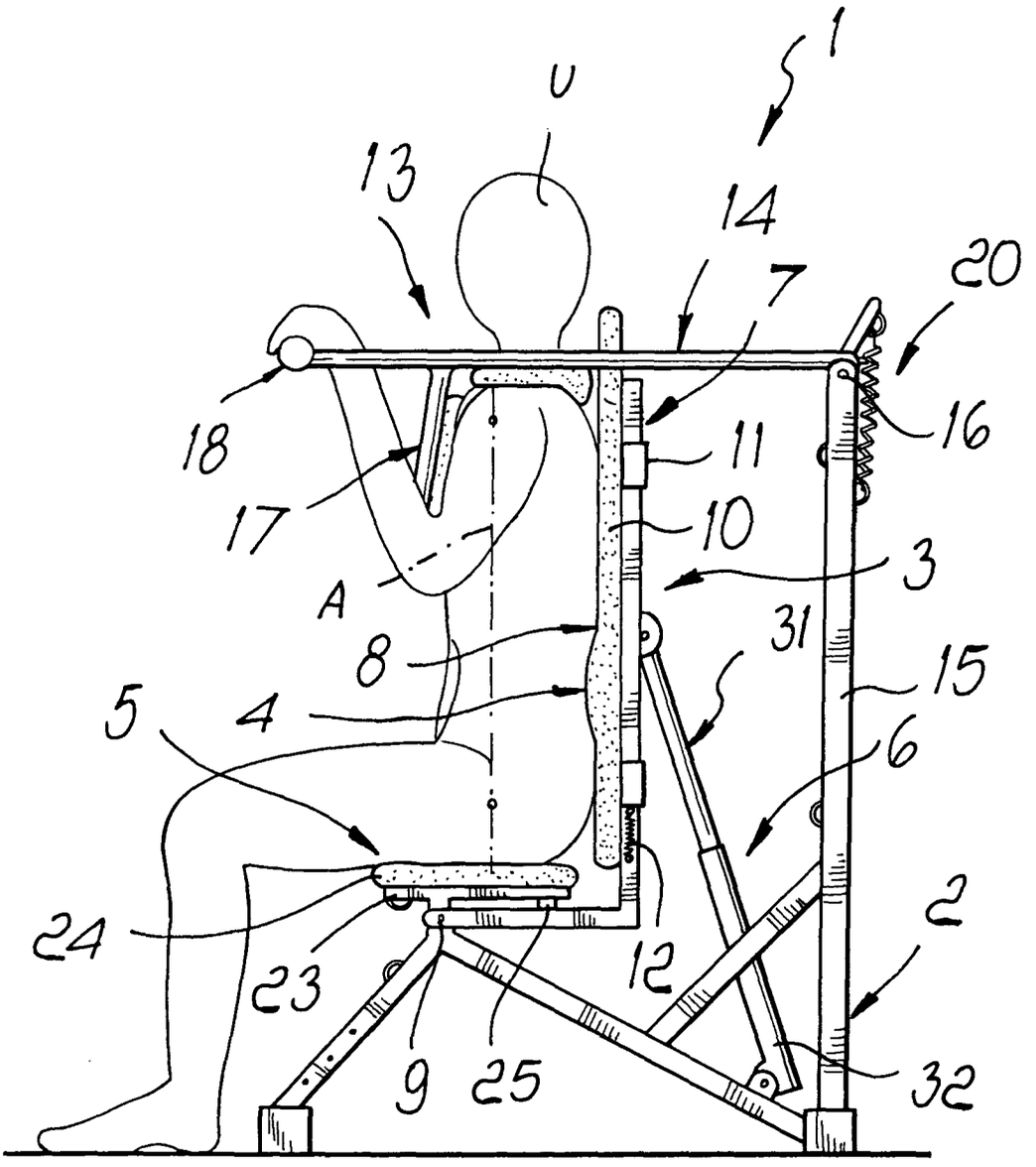

Fig. 2

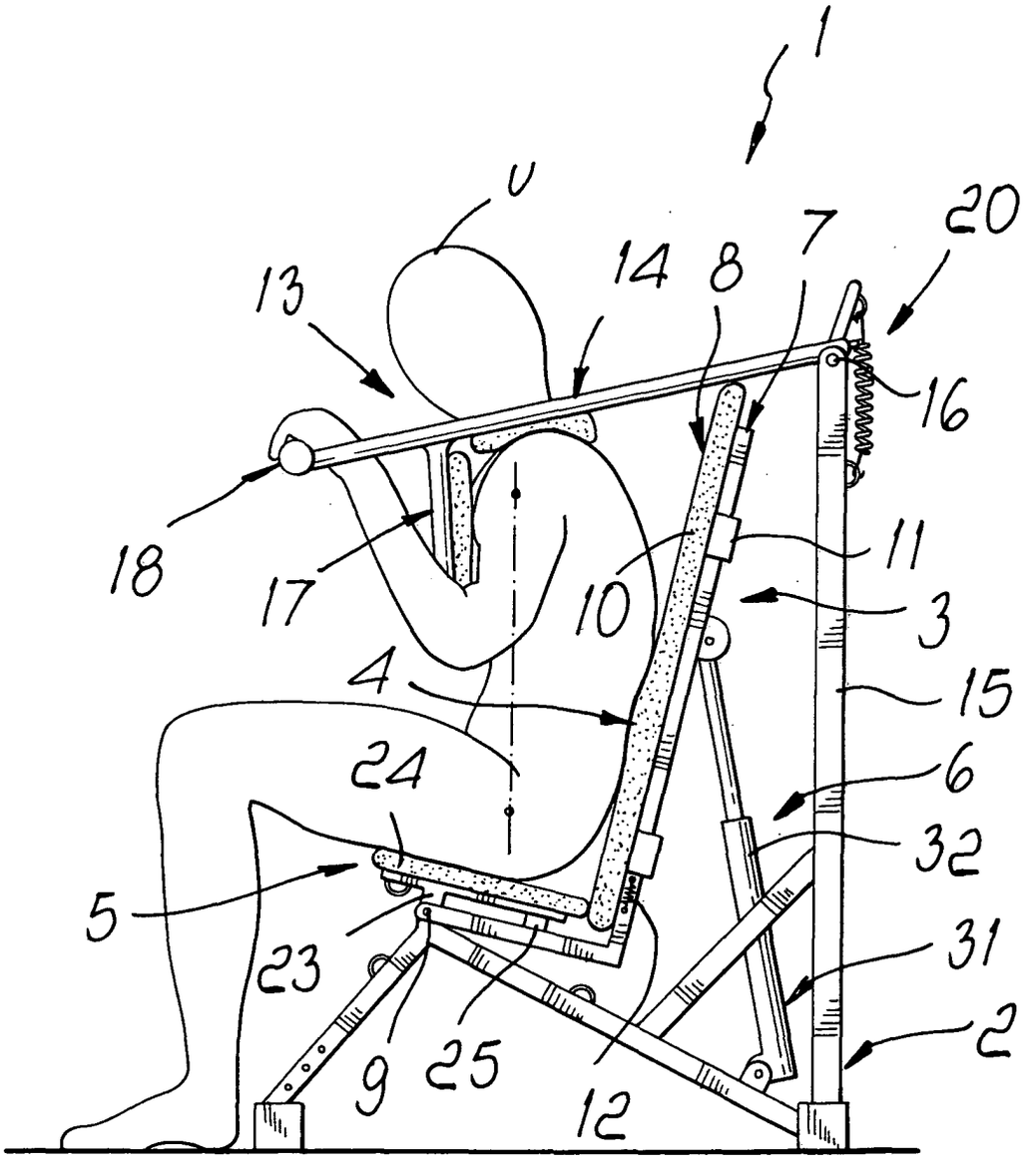

Fig. 3

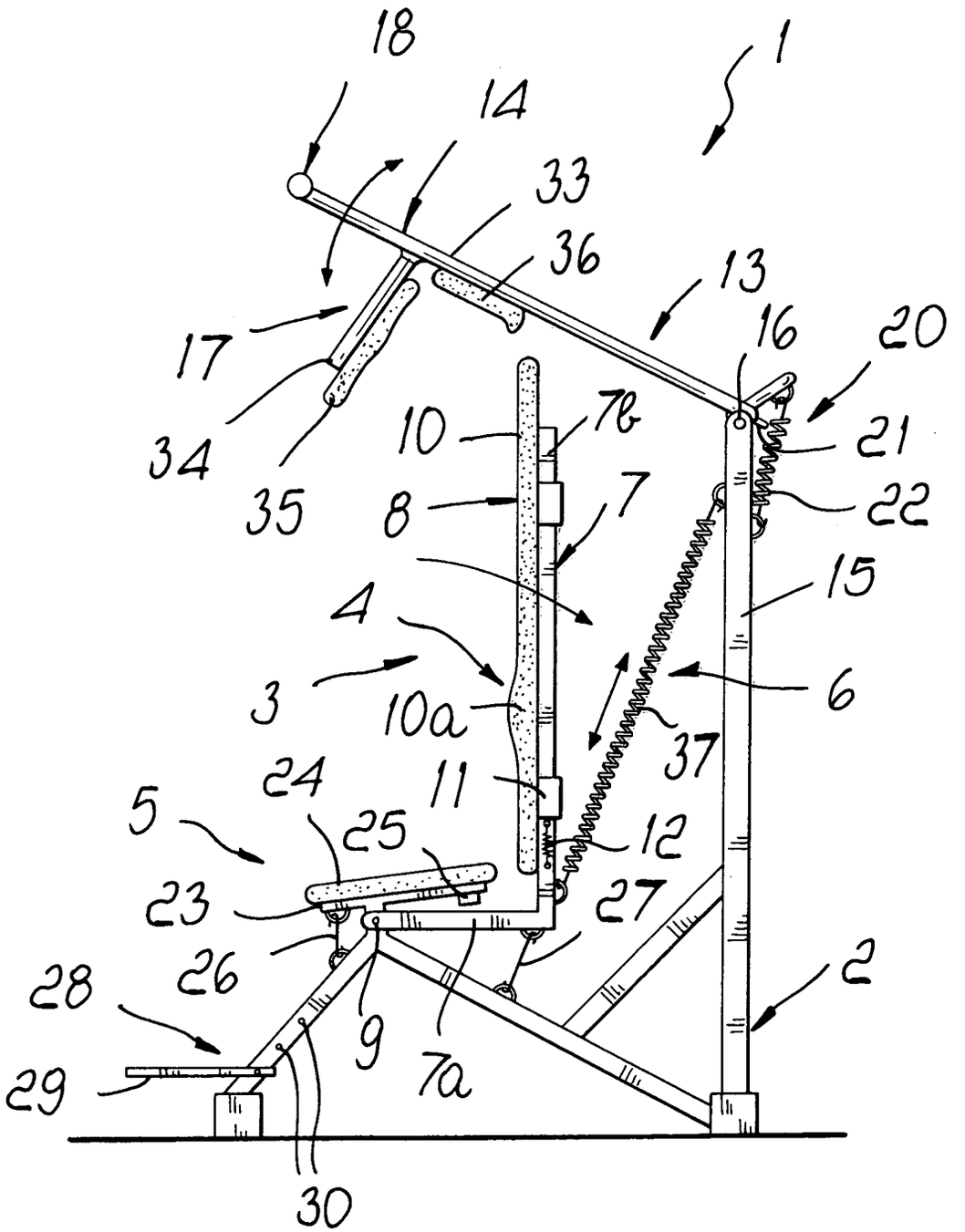
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Fig. 4

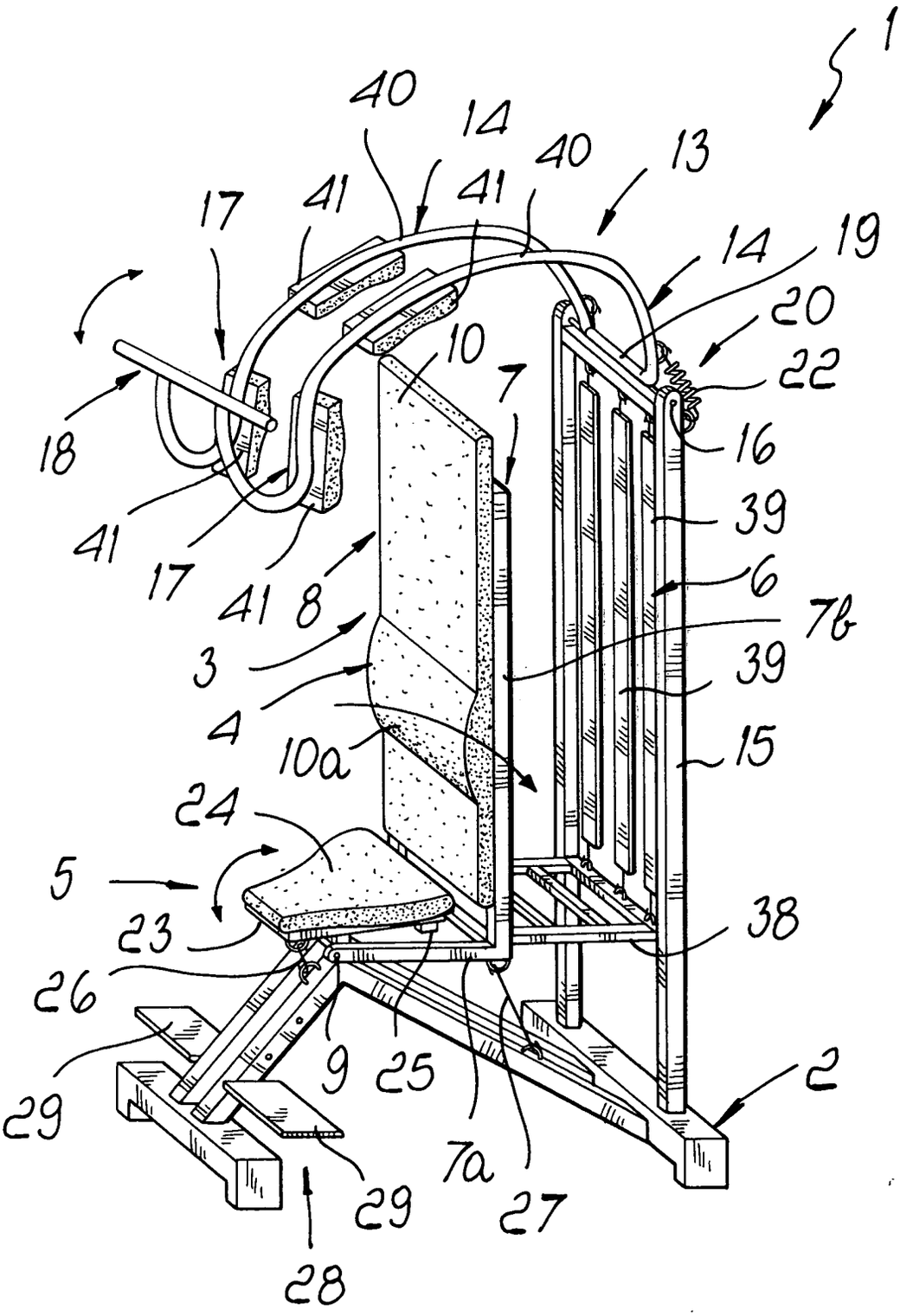
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Fig. 5

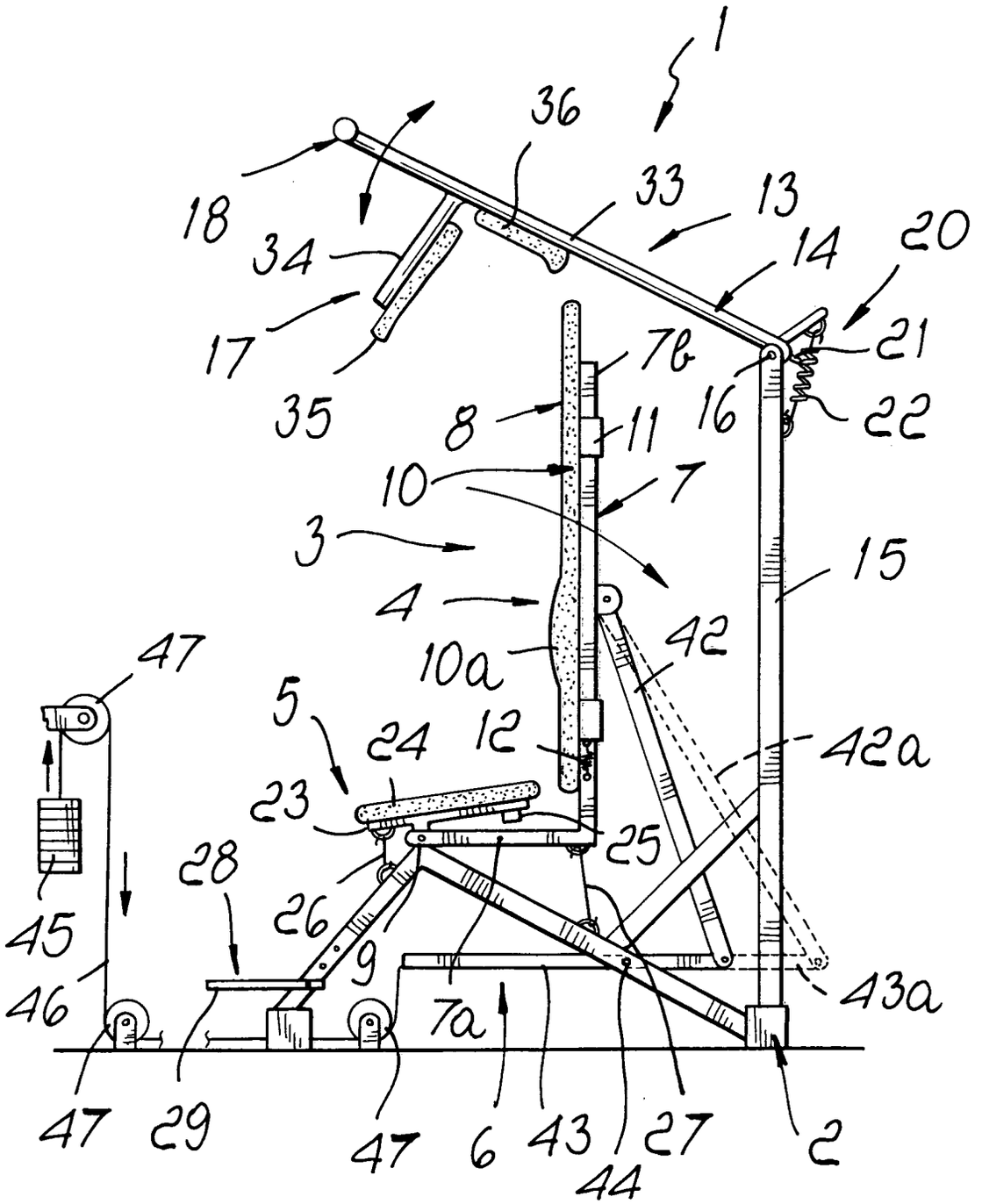
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Fig. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 2249

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 902 008 A (JONES ARTHUR) 20 February 1990 (1990-02-20) * the whole document *	1-20	A63B23/02
A	US 5 624 361 A (LAI SHU-CHIUNG) 29 April 1997 (1997-04-29) * figure 3 *	12-18	
A	US 5 669 865 A (GORDON TRACE O) 23 September 1997 (1997-09-23) * the whole document *	5,7-11, 20	
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