Feb. 7, 1939. H. J. MARLOWE 2,145,940

EXERCISING MACHINE

Filed Feb. 8, 1937 2 Sheets-Sheet 1

Fig. 1.

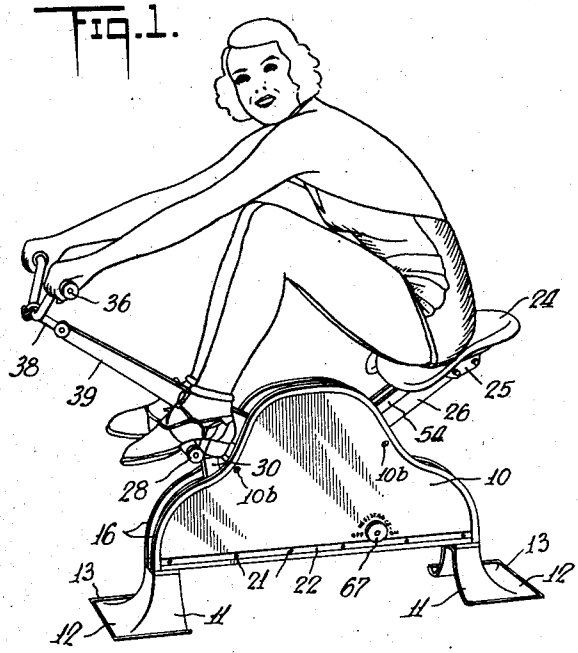
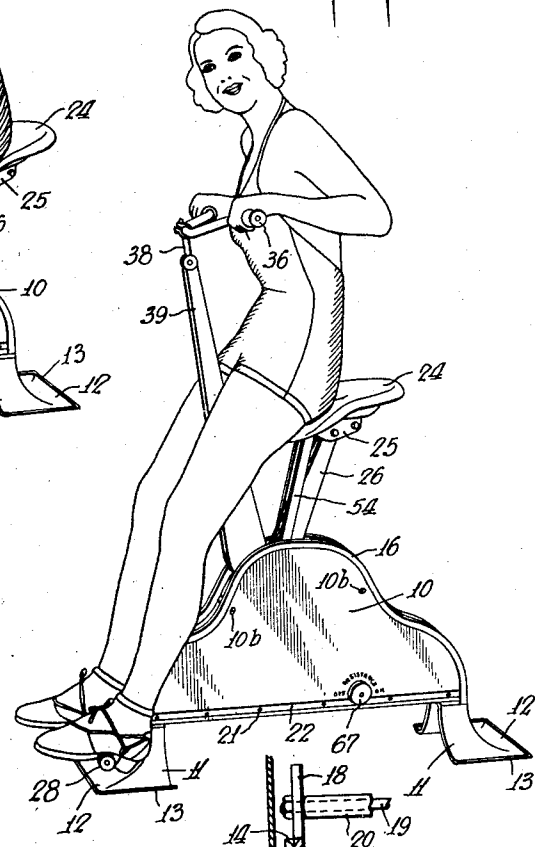


Fig. 2.



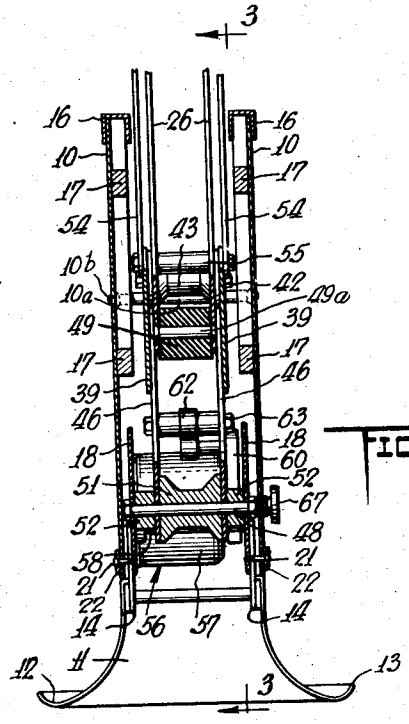


Fig. 4.

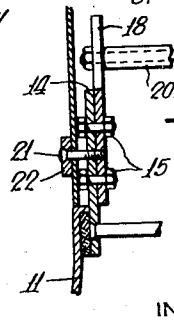


Fig. 5.

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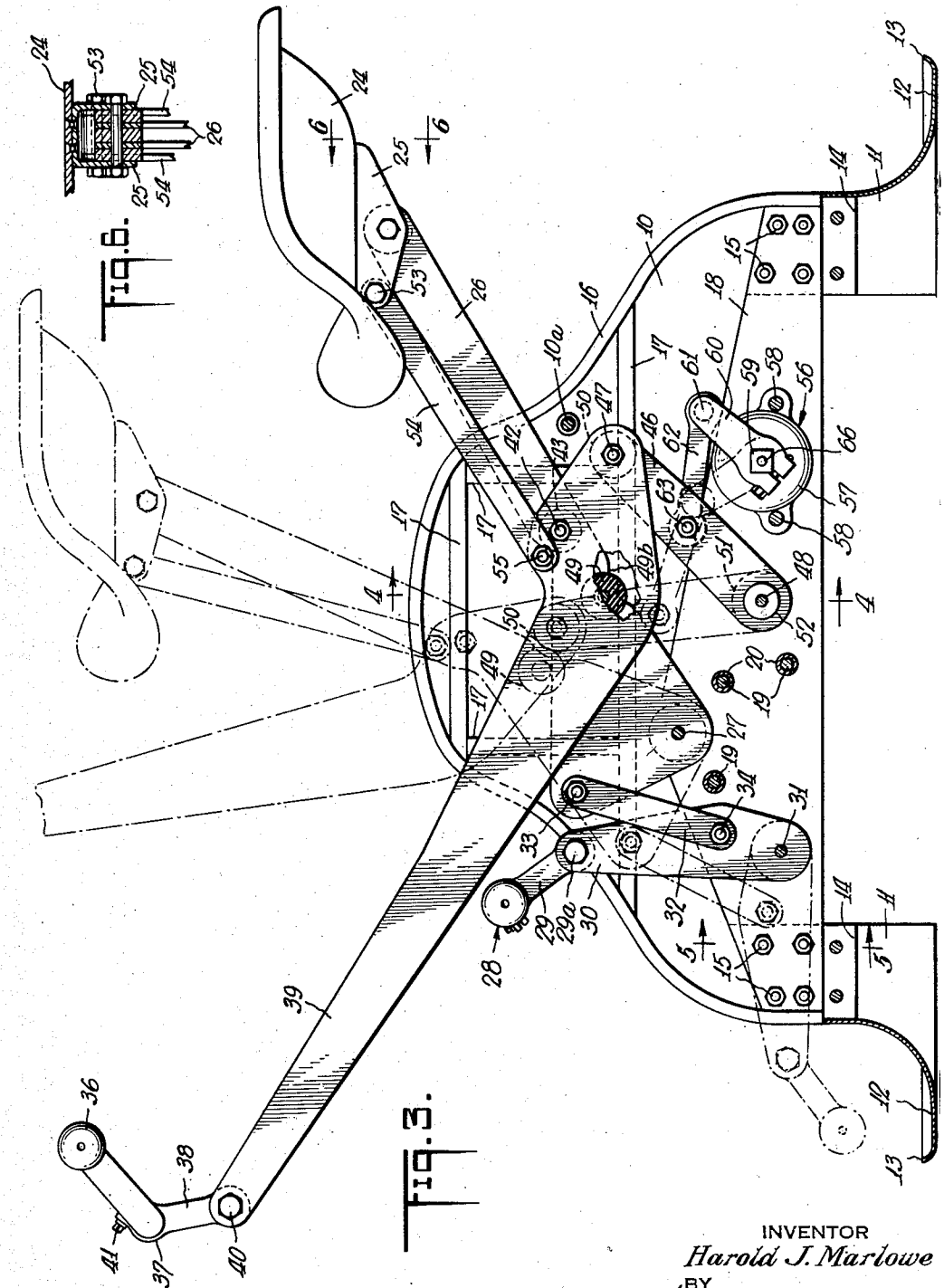


Fig. 6.

Fig. 3.

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EXERCISING MACHINE

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16 Claims. (Cl. 272—72)

My present invention is concerned with gymnastic exercising machines, and has among its objects to provide a simple and rugged apparatus, which serves effectively to exercise those muscles commonly used in operating a rowing machine.

An object of the invention is to provide a machine of the above type, which affords all of the advantages of a rowing machine, and other advantages as well, but with considerable economy of floor space.

Another object is to provide a device of the above type, by which the rhythmic movements of the feet, hands, and body of the user are effected without resort to transmission mechanism of the type that might become jammed or that might require lubrication service.

Another object is to provide a compact machine of the above type, smooth and silent in operation, the resistance of which may be readily adjusted through a wide range.

Another object is to provide a machine of the above type by which the user during normal operation thereof alternates from a crouched sitting position in which the trunk and arms are stretched forwardly, and the legs bent upwardly, to a substantially upright position with the arms bent inwardly towards the body.

In a practical embodiment of the invention a supporting frame has movably mounted thereon a seat, a handle bar and a reciprocating pedal. The three movable elements are interrelated by linkage in protected position within the frame, and are so disposed that an impulse applied by the user on any one of said movable members will cause the three members to move in a predetermined cycle relative to each other. The structure also includes adjustable resistance means preferably in the form of a hydraulic dash-pot connected to the linkage and thereby controlling the resistance to movement of each of the three movable elements of the machine referred to.

In the accompanying drawings in which is shown one or more of various possible embodiments of the several features of the invention,

Fig. 1 is a perspective view of the machine, shown in the process of being operated, and in one of the extreme exercising positions,

Fig. 2 is a view similar to Fig. 1, but showing the machine in its other extreme operating position,

Fig. 3 is a view in vertical section on a larger scale, taken just behind one of the frame pieces of the chassis on line 3—3 of Fig. 4,

Fig. 4 is a section taken on line 4—4 of Fig. 3,

Fig. 5 is a section taken on line 5—5 of Fig. 3, and

Fig. 6 is a section on line 6—6 of Fig. 3.

Referring now to the drawings, the machine comprises a chassis or frame, which in a preferred embodiment includes a pair of similar parallel side frame plates 10, made of thin sheet metal, and rigidly secured together in spaced relationship by any suitable means as for instance, cross pins 10a fastened to said plates by machine screws 10b. These frame plates 10 are supported at their ends respectively on legs 11, preferably stamped from sheet metal, and provided with horizontal comparatively large feet 12, having upturned edges 13 to prevent injury to the floor or rug on which the machine stands. These legs 11 are provided at their upper ends with extensions, shown in the form of plates 14, welded or otherwise secured to said legs, and spaced inwardly from the side plates 10. Secured to the inner sides of these extension plates 14 by any suitable means, such as bolts 15, and forming part of the frame structure is a pair of spaced bearing plates 18 in which are journalled the pivot pins of the various levers of the linkage mechanism, as will be more fully set forth hereinafter. These bearing plates 18 are cross braced, by any suitable means as for instance the bolts 19 passing through spacer sleeves 20.

The side plates 10 are shown fastened to the bearing plates 18 and the extension plates 14 by machine screws 21 passing through metal bars 22 on the outer sides of said plates 10 and may be reenforced and braced by a series of metal bars 17, welded or otherwise secured to the inner faces thereof. The upper edges or otherwise exposed raw edges of the frame plates 10 and the ends of bars 17 are preferably embraced by channels 16.

The machine includes a seat 24, preferably of metal, which may be more or less similar to the conventional bicycle or motor cycle seat. This seat 24 is provided at its bottom with a pair of spaced fins 25, to which is pivotally connected the upper end of a lever bar 26, the lower end of which is pivotally connected to the bearing plates 18 by means of a pivot pin 27 journalled in said plates. This seat supporting lever bar 26 is shown of composite construction, and comprises a pair of similar thin metal plates, rigidly held in parallel relationship at its pivot ends.

The machine is also provided with a pedal 28 shown in the form of a cross piece, which is preferably covered with resilient material such as rubber, and which is long enough to permit both

feet of the user to conveniently rest thereon at the same time. This pedal 28 is centrally connected to one end of a rod 29, the other end of which is releasably connected by a bolt 29a to the outer end of a lever arm 30, the inner end of which is pivoted at 31 to the bearing plate 18. By adjusting the angular position of the rod 29 with respect to the arm 30, the desired adjustment in accordance with the leg length of the user may be made.

The lever arm 30 is shown of built-up construction similar to that of the seat supporting bar 26, and its angular movement about its pivot point 31 is transmitted to said bar 26 through the medium of a link 32. This link 32 is shown with its ends straddling the bar 26 and arm 30 to which it is pivotally connected at 33 and 34 respectively.

The apparatus is also provided with a handle bar 36 which may be similar to that of the ordinary bicycle or motor cycle, and which is centrally clamped in a collar 37 at the upper end of a rod 38, the lower end of which is releasably connected to the outer end of a supporting bar 39 by suitable fastening means such as the bolts 40. The collar 37 has the usual clamping screws 41, so that by adjusting the angular position of the rod 38 with respect to the handle supporting bar 39, and of the handle bar 36 with respect to said rod 38, the desired adjustments in accordance with the arm length of the user may be made.

The handle supporting bar 39 is shown of built-up construction, similar to that of the seat supporting bar 26, and has its lower end preferably straddling the bar 26 and pivotally connected to said bar 26 by means of a pivot pin 42, shown encircled by a spacer sleeve 43 between the side pieces of said bar 26.

In order to effect the angular movement of the handle supporting bar 39 about the pivot pin 42, in coordination with the pedal arm 30 and the seat supporting bar 26, the lower end of said bar 39 is pivotally connected to the upper end of a lever arm 46 by a pivot pin 47 spaced from the pivot pin 42, the lower end of this arm 46 being pivotally supported on the bearing plates 18 by the pivot pin 48. This lever arm 46 is shown of built-up construction, with its upper end straddled by the lower end of the bar 39. Spacer sleeves 50 and 51 are shown disposed between the side pieces of the lever arm and around the pivot pins 47 and 48 respectively. Suitable spacing blocks 52 are preferably interposed between the outer sides of the lever arm 46 and the bearing plates 18, to hold the linkage of the machine centrally between the frame plates 10.

The link connection between the pivot pin 42 and the pivot pin 48 is similar to that of a toggle joint, and effects angular movement of the handle supporting bar 39 about the pivot pin 42 in coordination with the movement of the seat supporting bar 26 about the pivot pin 27. These bars 26 and 39 will be limited from moving beyond the extreme position shown in dot and dash lines in Fig. 3 by the abutting of the spacer sleeve 50 against a bumper stop 49, preferably made of resilient material such as rubber, and secured between the opposite opposed side plates of the bar 26 by any suitable means, as for instance pin 49a. These side plates of the bar 26 are preferably cut away at 49b so that the sleeve 50 will come into interengagement with the stop 49 without striking a metallic part of said bar. In this stop engaging position of the sleeve 50 the pivot pin 47 will be slightly to the right of the line joining the two pivot pins 42 and 48.

In order to prevent tilting of the seat 24 as it swings into the position shown in dot and dash lines in Fig. 1, the seat fins 25 are pivotally connected by pivot pin 53 to one end of a link 54, shown of built up construction, the other end of which is pivotally connected to the lower end of the handle supporting bar 39 by a pivot pin 55. This link 54 is shown straddled at its upper end by the fins 25, and straddling at its lower end the handle supporting bar 39, and in conjunction with the seat supporting bar 26 forms a parallel motion linkage, which serves to assure substantially a translational movement of the seat 24 parallel to itself.

In order to resist the relative displacement of the various moving parts of the machine, there is provided a hydraulic dash pot 56, which may be of any well known construction such as that of the "Houdaille" shock absorber. In a specific form shown this dash pot includes the usual fluid cylinder 57 connected to the bearing plates 18 by suitable fastening means such as the bolts 58, and an operating shaft 59 extending from said cylinder and fixed to the one end of a crank arm 60. The other end of the crank arm 60 is pivotally connected at 61 to one end of a link 62, the other end of which is pivotally connected to the intermediate portion of the arm 46 by a pivot pin 63 shown passing through a spacer sleeve 64 intervening between the opposed side pieces of said arm.

Threaded centrally through the shaft 59 is the usual valve spindle 66, which extends through one of the frame plates 10, and which has connected to its outer end a suitable turning handle 67. The amount of resistance imparted by the dash pot mechanism 56 to the link work of the machine is regulated by turning this spindle 66, which in turn controls the opening or closing of a valve port (not shown) in the interior of the dash pot cylinder 57.

In operation of the machine it may be briefly noted that the user sits on seat 24, places both feet on the pedal 28, and grasps the handle bar 36 as shown in Fig. 1. At this stage the bars 26 and 39 will extend substantially 45° with the horizontal, the seat 24 and the handle bar 36 will be substantially at the same level, and the pedal 28 will be close to the underside of said bar 39 so that the user will be crouched substantially in rowing posture with the trunk and arms outstretched forwardly and the legs bent upwardly as shown in Fig. 1. In this extreme position of the operating members of the machine the link 32 will be in dead center position with respect to the pedal arm 30 (that is, the three points 31, 33, and 34 will be in alignment) so that the transmission linkage will be self limited against movement beyond this extreme position.

The user then pushes on the pedal 28 and pulls backward on the handle bar 36. This causes the arm 30, with its attached pedal 28, to swing in counterclockwise direction about the pivot pin 31, from a substantially vertical position to a substantially horizontal position shown in dot and dash lines in Fig. 3.

The depressing movement of the pedal 28 causes the counterclockwise rotation of the seat supporting bar 26 about the pivot pin 27 through the link 32, until the seat 24 reaches the position shown in dot and dash lines. At the same time the toggle joint connection between the pivot pins 42 and 48 causes the handle support-

ing bar 39 to swing in a clockwise direction about the pivot pin 42 and towards the seat 24, until the sleeve 50 engages the bumper stop 49 thereby limiting further movement of the moving parts of the machine. The counterclockwise movement of the arm 46 about the pivot pin 48 is resisted by the hydraulic dash pot device 56, this resistance by virtue of their interconnection being imposed upon the other moving parts of the machine.

When the moving parts of the machine reach the substantially vertical dotted position shown in Fig. 3, the user will be in the upright posture shown in Fig. 2 with the legs downwardly outstretched and the arms bent inwardly. To return to the position shown in Fig. 1 the user merely relaxes on the seat 24, and releases or reduces the foot pressure on the pedal 28. The weight of the user on the seat 24 causes the seat supporting bar 26 to rotate in a clockwise direction about the pivot pin 27 into the original position shown in Figs. 1 and 3, and causes the concurrent upward swinging movement of the pedal 28, and the forward swinging of the handle supporting bar 39 away from the seat supporting bar 26, all of these movements being resisted by the hydraulic dash pot device 56. During this return movement the user enjoys a comparatively long period of relaxation since no affirmative effort is applied.

By the use of this machine, various leg, arm, back and stomach muscles are exercised by vigorous stretching and bending with alternations of affirmative physical efforts and relaxation with all the benefit of a rowing machine, and further benefit similar to those derived from bending down exercises.

If the user wants to adjust the extent of physical effort necessary to operate the machine, all that is necessary is to turn the control handle 67 of the hydraulic dash pot device 56 to impose the desired resistance.

The machine is seen to be perfectly safe with its link work guarded between the frame plates where it cannot come into injurious contact with the user.

Although the mechanism is comparatively light it is yet strong and rigid enough effectively to withstand vigorously applied exercising strain. The machine is small and compact. It requires no lubrication. It is neat and attractive in appearance.

The use of an adjustable hydraulic dash pot device 56 rather than of a spring for imposing resistance upon the machine, results in compactness and low cost, greater ease and noiseless and smooth operation without the clatter or squeak of a spring.

Although the members of the link work have been shown of built-up construction, which is not only strong and rigid, but also light and inexpensive, it must be understood that as far as certain aspects of the invention are concerned, said members may be respectively made of one piece, and may be stamped in the form of channels.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative, and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An exercising machine comprising a handle, a seat, an oscillatory pedal, and means interlinking the latter with one of the former to effect alternate movements of said seat and said handle towards and away from each other concurrent with an oscillatory movement of the pedal.

2. An exercising machine comprising a frame structure, a seat, a bar connected at one end to said seat and pivotally connected to said frame structure near the other end, a pedal arm pivotally connected to the frame structure, and a link pivotally connected between said bar and said pedal arm, and effecting the coordinated angular movements of said pedal and said bar about their pivotal connections.

3. An exercising machine comprising a frame structure, operating parts including a moving pedal, and a transmission interconnecting said parts, and including a fixed pivot, and a link element having moving pivots near its opposite ends in one of the extreme positions of said parts, said moving pivots being in alignment with said fixed pivot to limit movement of the parts when the direction of thrust application reaches the line joining said pivots.

4. An exercising machine comprising a frame structure, a pedal lever having a pivot supported on said structure, a seat carrying bar pivotally supported directly on said frame structure, and a link pivotally connected between said lever and said bar, said link when it reaches alignment with said pivot inherently limiting the lever and bar against further movement.

5. An exercising machine comprising a frame structure, operating parts including a moving pedal, a transmission interconnecting said parts, and self-limiting in one extreme position of said parts, and a stop for limiting the movement of said parts in the other extreme position.

6. An exercising machine comprising a frame structure, operating parts including a moving pedal, a transmission interconnecting said parts, and self-limiting in one extreme position of said parts, and a moving stop for limiting the movement of said parts in the other extreme position.

7. An exercising machine comprising a frame structure, operating parts including a moving pedal, a transmission interconnecting said parts, and self-limiting in one extreme position of said parts, and a moving resilient bumper stop for limiting the movement of said parts in the other extreme position.

8. An exercising machine comprising a frame structure, operating parts including a moving pedal, a transmission interconnecting said parts, and a movable stop adapted to engage one of the movable operating parts for limiting the movements of said parts in one of the phases of their operating cycle.

9. An exercising machine including operating members adapted to respectively engage various parts of a user's body, and means for effecting the coordinated movement of said members towards an extreme position upon impulse imparted to one of said members and including a pair of movable elements, adapted to abut when said

members reach said extreme position to limit said members against further movement.

10. An exercising machine including operating members adapted to respectively engage various parts of a user's body, a link work for effecting coordinated movement of said members towards an extreme position upon impulse imparted to one of said members, and including a pair of movable elements, and a stop carried by one of said elements and adapted to engage the other element when said members reach said extreme position for limiting said members against further movement.

11. An exercising machine including a frame structure, a bar pivotally supported on said frame structure, a second bar pivotally connected to said first bar, and a toggle connection between said second bar and said frame structure for effecting angular movement of said second bar coordinately with said first bar, said toggle connection having a floating pivot abutting said first bar to limit movement of said bars in one extreme position of said bars.

12. An exercising machine comprising a frame structure, a seat supporting bar pivotally connected to said structure, a handle supporting bar pivotally connected to said seat supporting bar, a pedal lever pivoted to said frame structure, a link between said pedal lever and said seat supporting bar for swinging said latter bar about its pivotal connection upon a swinging movement of said pedal lever, and linkage connected to said handle supporting bar for swinging the latter about its pivotal connection with said seat supporting bar, upon said movement of said pedal lever.

13. An exercising machine comprising a frame structure, a seat supporting bar pivotally connected to said frame structure, a handle supporting bar pivotally connected to the other bar, said bars diverging upwardly, a pedal lever pivotally connected to said frame structure, a transmission linkage between said pedal lever and the lower end of said seat supporting bar, for effecting concurrent movement of said latter bar and said lever, and linkage means connected to the lower end of said handle supporting bar for effecting an angular movement of said latter bar by the angular movement of said seat supporting bar.

14. An exercising machine comprising a frame structure, a long seat supporting bar, a long handle supporting bar, one of said bars being pivotally connected to said frame structure and to the other bar, and means for moving said bars alternately from positions substantially at 45° with the horizontal, to substantially vertical positions.

15. An exercising machine comprising a pedal, a long seat supporting bar, a long handle supporting bar, means for pivotally supporting said bars for relative angular movement, and means for alternately moving said bars from oppositely inclined positions substantially at 45° with the horizontal, to substantially vertical positions upon pedalling operation.

16. An exercising machine comprising a frame structure having a pair of parallel spaced frame plates, members on the outside of said plates adapted to be engaged by various parts of the user's body, a transmission substantially concealed between said frame plates for effecting coordinated cyclic exercising movements of said members, a hydraulic device supported on said frame structure between said frame plates for resisting the relative movements of said members, and an adjusting member for said device extending through one of said frame plates to the outside thereof.

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