

[54] **MOVABLE WEIGHT TYPE EXERCISING**

[76] Inventor: **Richard I. Proctor**, 3201 Orange Grove Avenue, North Highlands, Calif. 95660

[22] Filed: **Dec. 20, 1971**

[21] Appl. No.: **209,765**

[52] U.S. Cl. **272/81, 272/58, 272/62**

[51] Int. Cl. **A63b 21/06, A63b 21/10**

[58] Field of Search **272/81, 79 R, 80, 272/DIG. 4, 58, 62, 83 R, 83 A**

[56] **References Cited**

UNITED STATES PATENTS

332,989	12/1885	Benedict	272/81
372,272	10/1887	Murphy	272/81
382,440	5/1888	Sanchez	272/81
3,346,256	10/1967	White	272/81
3,647,209	3/1972	La Lanne	272/81
3,397,884	8/1968	Blasi	272/83 R

Primary Examiner—Richard C. Pinkham

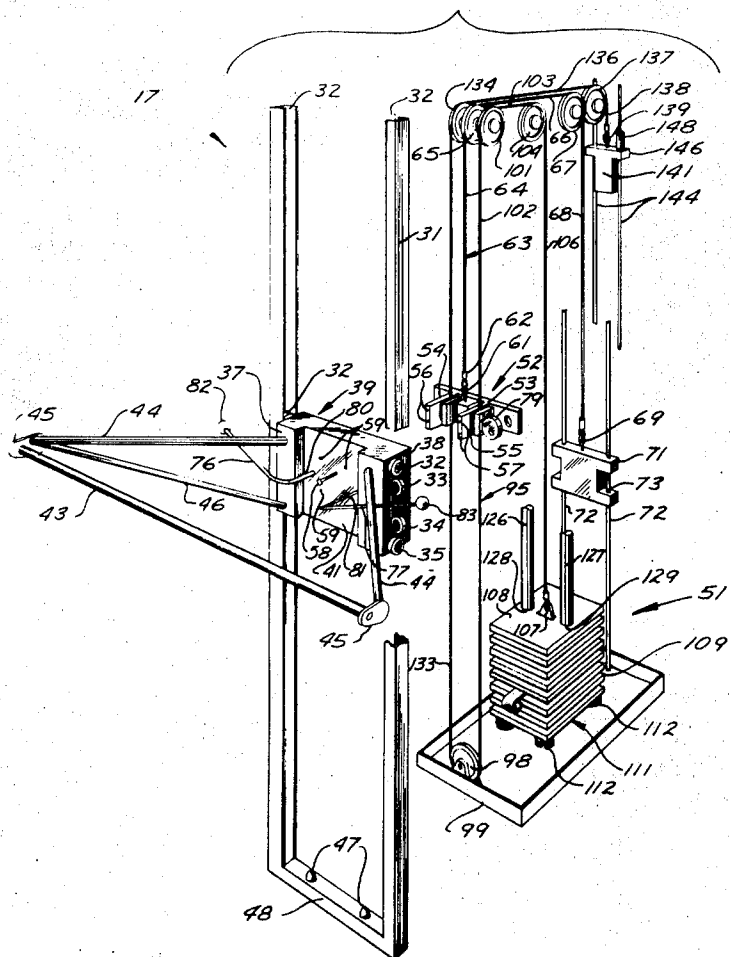
Assistant Examiner—William R. Browne

Attorney—Robert G. West et al.

[57] **ABSTRACT**

A vertically elongated framework encloses a stacked array of metal plates selectively attachable in any desired quantity to the lower end of a wire cable passing around an arrangement of pulleys which afford an oppositely moving, adjacent pair of vertical cable runs. A carriage, including a horizontal bar, is vertically movable on the framework and includes a pair of cable clamping mechanisms enabling the user of the machine to connect the carriage to a predetermined one of the two oppositely moving vertical cable runs, thereby providing weight resistance to the horizontal bar either in an upward or a downward direction. By clamping both cable runs concurrently the horizontal bar is immobilized at any desired elevation and can be used as a chinning bar, ballet bar or support for auxiliary equipment.

10 Claims, 11 Drawing Figures



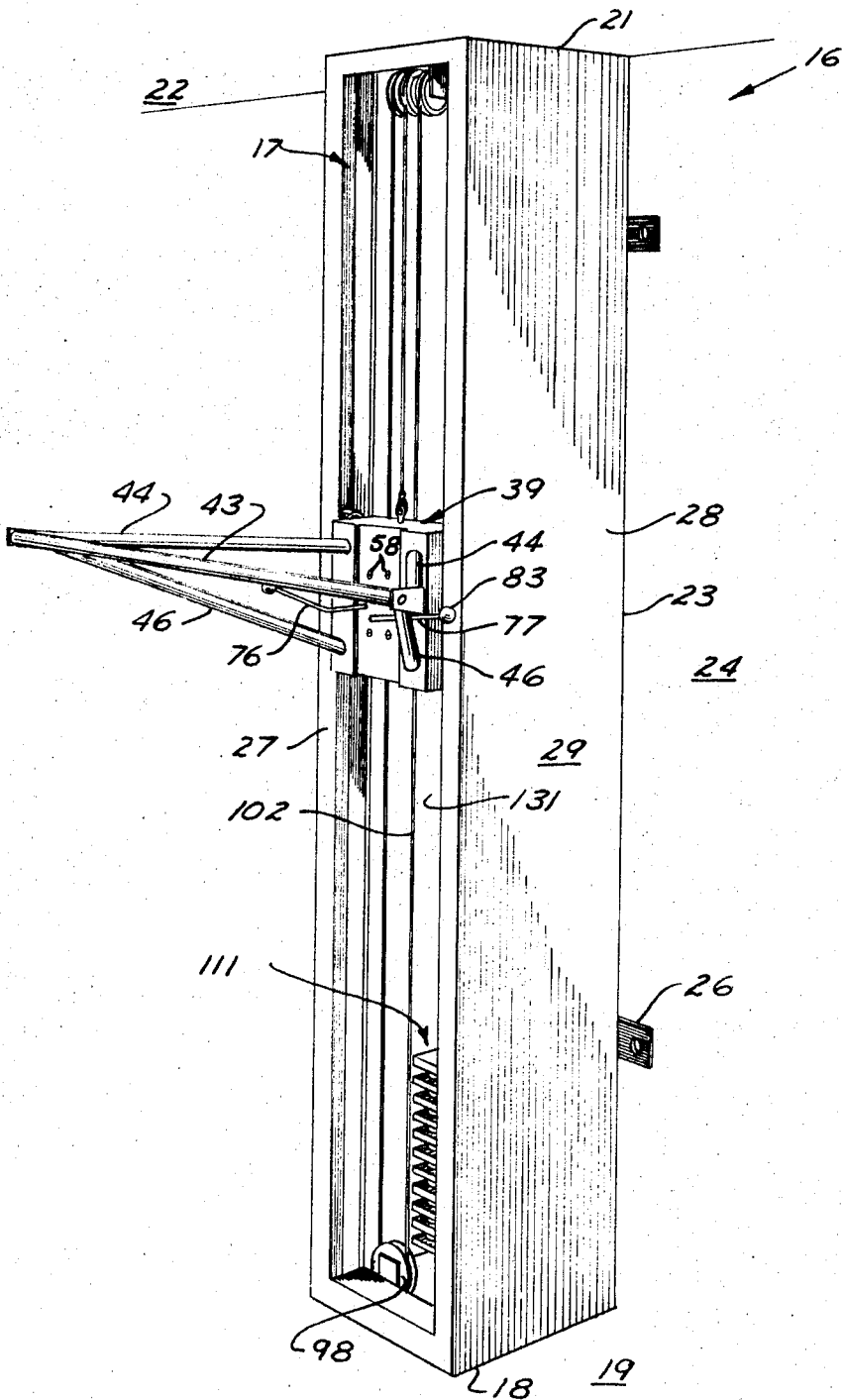
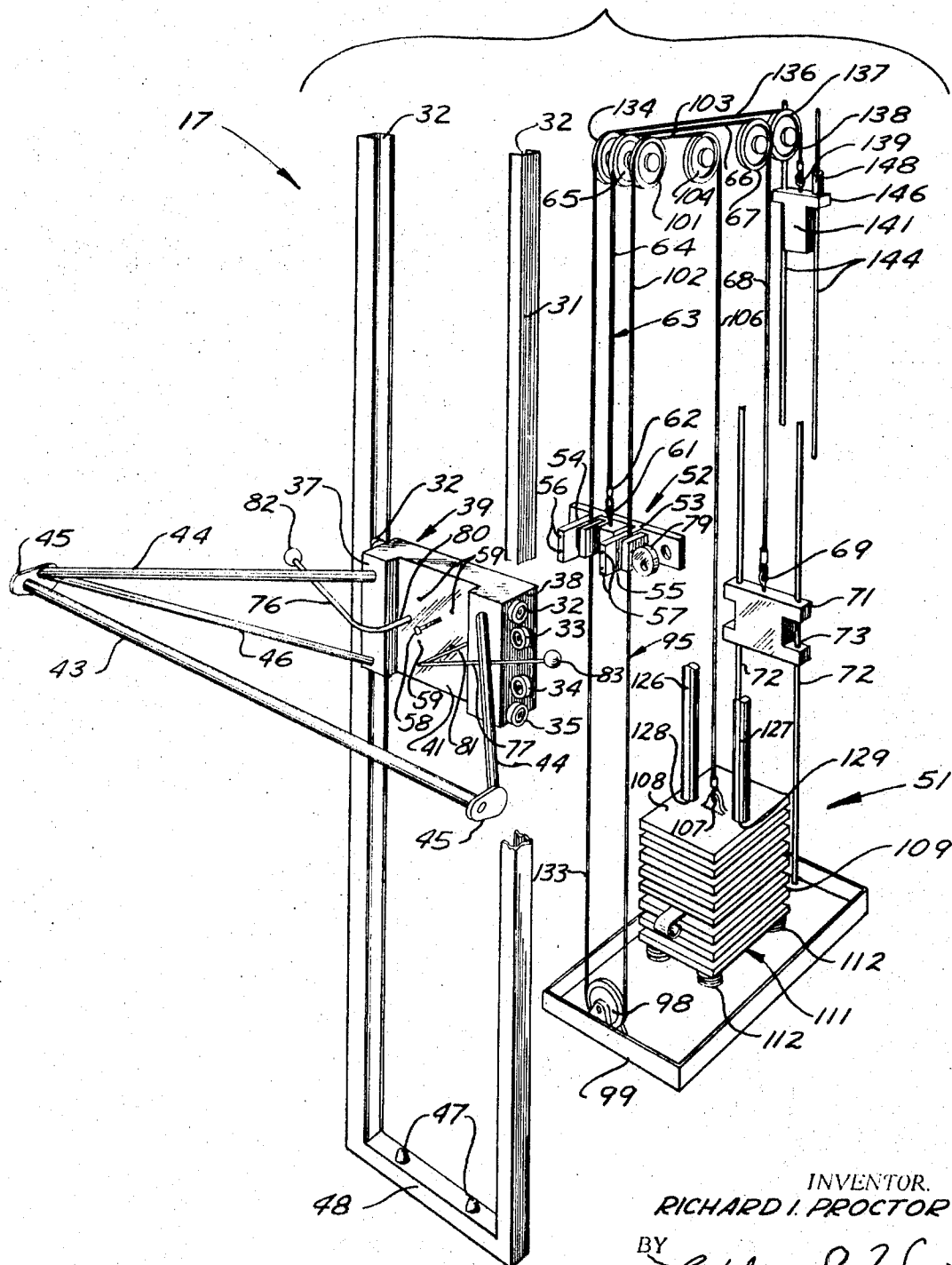


Fig - 1

INVENTOR.
RICHARD I. PROCTOR
BY
Lothrop & West
ATTORNEYS

Fig 2



INVENTOR.
RICHARD I. PROCTOR
BY
Lothrop & West
ATTORNEYS

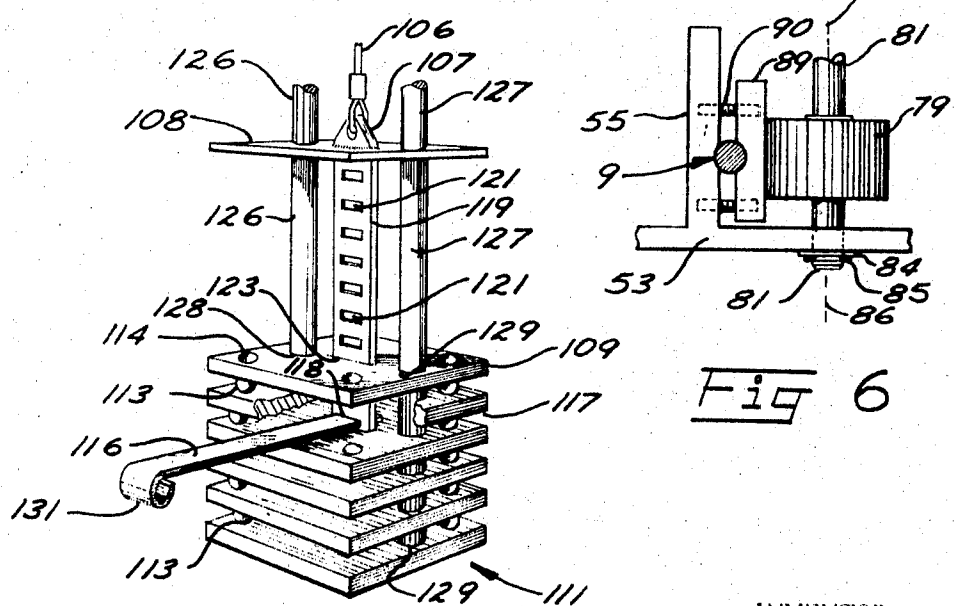
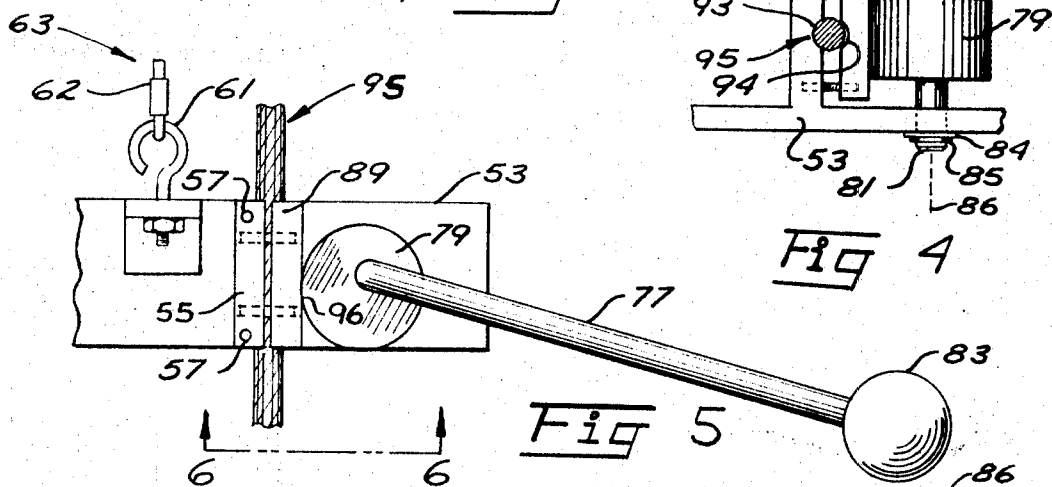
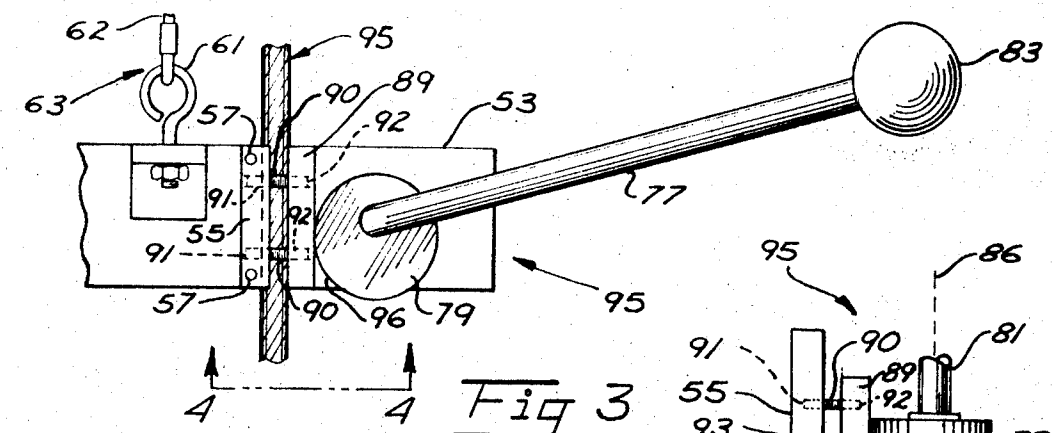
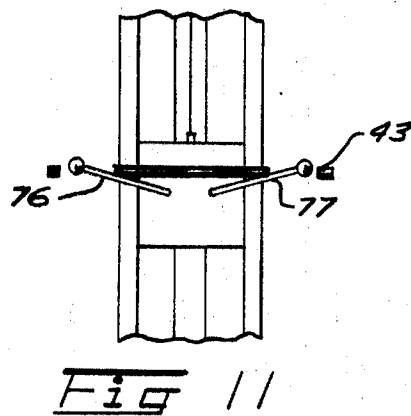
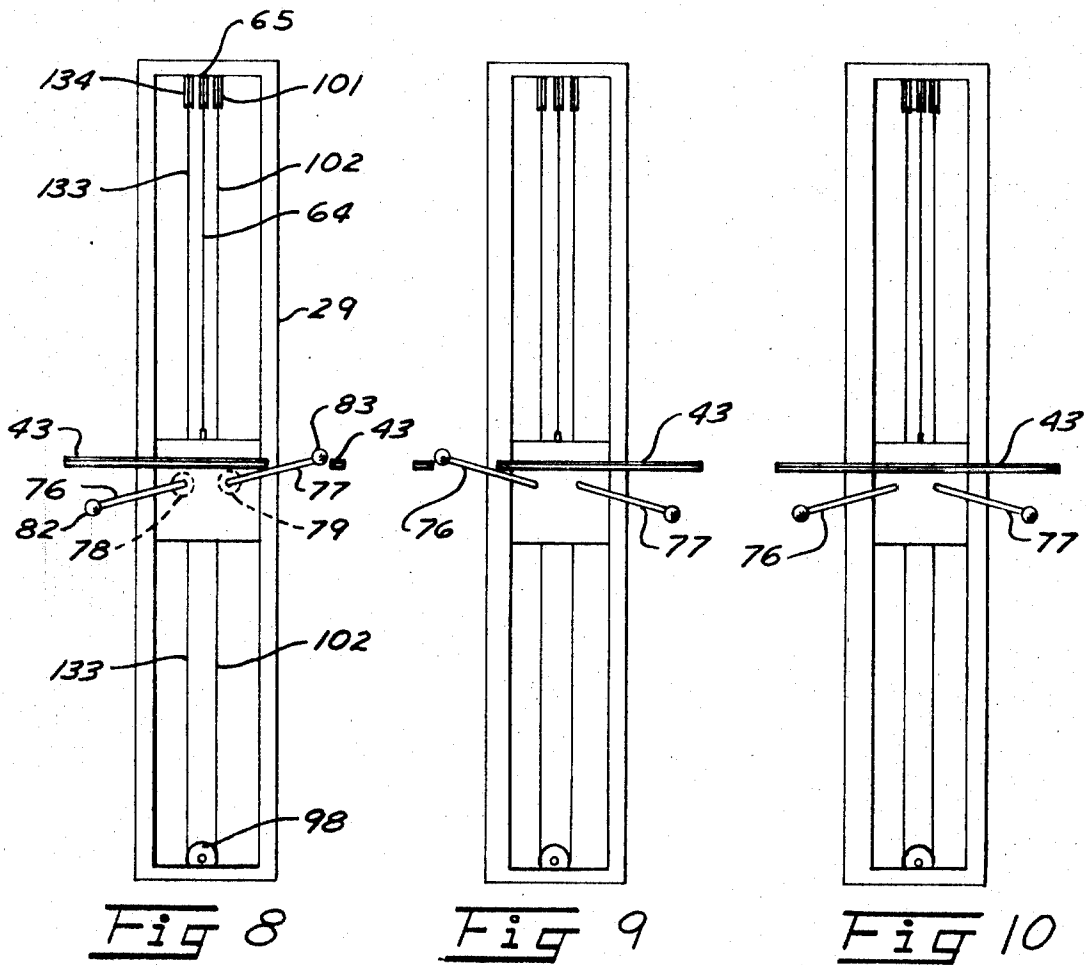


Fig 7

INVENTOR.
 RICHARD I. PROCTOR
 BY
Lothrop & West
 ATTORNEYS



INVENTOR.
 RICHARD I. PROCTOR
 BY
Lothrop & West
 ATTORNEYS

MOVABLE WEIGHT TYPE EXERCISING

The invention relates to improvements in multi-purpose exercise machines of the weight lifting type.

The market place as well as the patent literature are replete with exercise machines involving the lifting of weights in opposition to muscular effort. For the most part, however, the prior devices have been restricted in their application to limited groups of muscles, with several different individual machines being required to exercise substantially all muscles.

It is therefore an object of the invention to provide a machine which provides in a single unit the facilities of several different body conditioning machines.

It is another object of the invention to provide an exercise machine which is compact, and versatile yet is relatively inexpensive, both with respect to original acquisition and maintenance costs.

It is yet another object of the invention to provide an exercise machine which is not only safe to use but which is also secure against theft of the movable elements, such as the weights.

It is a further object of the invention to provide an exercise machine in which dynamic resistance of any desired amount is provided either in an upward or in a downward direction, and in which static or isometric resistance is also afforded.

It is still a further object to provide an exercise machine in which a horizontal bar member can be immobilized to afford either a chinning bar, a ballet bar.

It is yet a further object to provide an exercise machine which operates smoothly and quietly owing to its counterbalancing and cable tensioning features.

It is still another object of the invention to provide an exercise machine which affords a wide range of resistance levels, suitable for a beginner to an advanced athlete, and which is adjustable for all heights.

It is another object of the invention to provide a generally improved exercise machine.

Other objects, together with the foregoing, are attained in the embodiment described in the following description and shown in the accompanying drawings, in which:

FIG. 1 is a front perspective view showing the carriage and attendant exercise bar at about mid-height;

FIG. 2 is a fragmentary, exploded, perspective view, the housing being removed to disclose the interior structure;

FIG. 3 is a fragmentary front elevational view, to an enlarged scale, of the cable clamping mechanism, showing the lever and the cable clamping blocks in open, i.e. released position;

FIG. 4 is a fragmentary sectional view taken on the line 4—4 in FIG. 3;

FIG. 5 is a view comparable to FIG. 3 but with the lever and the cable clamping blocks in closed, i.e. clamping, position;

FIG. 6 is a fragmentary sectional view taken on the line 6—6 in FIG. 5;

FIG. 7 is a fragmentary perspective view, to an enlarged scale, of the adjustable weight member;

FIG. 8 is a diagrammatic, front elevational view showing the attitude of the clamping levers when the user wishes to exert muscular effort upwardly on the exercise bar in opposition to weight resistance, portions of the bar being broken away to reveal the full length of the lever;

FIG. 9 is a view comparable to FIG. 8, but showing the attitude of the clamping levers when resistance to downward movement of the exercise bar is desired;

FIG. 10 shows the lever positions when the exercise bar is immobilized, as for chinning, or the like; and,

FIG. 11 shows the lever positions when the carriage is freely movable and in "floating" condition.

While the exercise machine of the invention is susceptible of numerous physical embodiments, depending upon the environment, and requirements of use, substantial numbers of the herein shown and described embodiment have been made, tested and used, and all have performed in an eminently satisfactory manner.

The exercise machine of the invention, also sometimes termed a conditioning unit, generally designated by the reference numeral 16, comprises a vertically elongated frame 17 extending from a lower end 18, ordinarily supported on a floor 19, to an upper end 21 conveniently located adjacent a ceiling 22. The back side 23 of the machine preferably abuts a wall 24 to which brackets 26 are affixed, thereby affording further stability to the structure and security against unauthorized removal of the unit.

The front side 27 of the apparatus extends outwardly into the exercise room and is partially open, whereas the two lateral sides 28 are preferably enclosed by side panels 29, in the interests of safety and security.

Inclusive of the frame 17, as appears most clearly in FIG. 2, is a spaced pair of vertical channels 31 with their grooves 32 facing toward each other to form opposed tracks within which are movable a plurality of rollers 32, 33, 34 and 35, rotatably mounted on each side block 37 and 38 of a carriage 39 vertically translatable in the tracks 32. Connecting the two side blocks 37 and 38 is a cross-beam 41 affording dimensional stability to the carriage so that an exercise bar 43, or horizontal bar, can be rigidly affixed to the carriage. Tie rods 44 and struts 46 are mounted on end brackets 45 which, in turn, support the exercise bar 43. The rods and struts are themselves rigidly secured, as by welding, to the side blocks 37 and 38 of the carriage 39.

Resilient bumpers 47 mounted on a cross-channel 48 spanning the lower ends of the vertical channels 31 cushion the weight of the carriage 39 in lowermost carriage position.

Attaching the carriage 39 to the weight system, generally designated by the reference numeral 51, is a connecting member 52 comprising a transverse rear plate 53 having mounted thereon a spaced pair of fore and aft fastening blocks 54 and 55, or plates, each block including a pair of drilled and tapped openings 56 and 57 on the forward edge of the block to receive a total of four machine screws 58 extending through four openings 59 in the transverse carriage beam 41 (see FIG. 2).

Vertical translation of the carriage 39 is thus accompanied by vertical movement of the connector 52, which, in turn, is attached by an eye bolt 61 to the adjacent end 62 of a counterbalance cable 63.

The cable 63 includes a vertical run 64 passing over a top front pulley 65, appropriately mounted on the top front of the frame, a horizontal run 66 extending rearwardly from the pulley 65, and passing over a top rear pulley 67 carried on the frame, and a vertical run 68 connected at its lower end to an eye bolt 69 mounted on a weight 71 counterbalancing the sum of the weights of the exercise bar structure, the carriage 39 and the connector mechanism 52. The counterweight 71 is

constrained to move vertically by a spaced pair of vertical bars 72 having their ends mounted on the top of the frame and the bottom of the frame and extending through vertical passageways 73 formed on each lateral side of the counterweight 71.

As a result of the counterbalancing structure, the carriage can be made to "float" so that it will remain in any vertical "base" position in which the user places it. A minimum of effort is required to shift the carriage to the desired vertical location since, in substance, only the rolling friction of the guide rollers 32 - 35 on each side of the carriage need be overcome.

When it is desired, however, to impose weight on the carriage structure so that any movement of the carriage away from "base" position is resisted, it is only necessary for the user to move one or the other of a pair of lever arms 76 and 77 in the appropriate direction, as will subsequently be described.

As appears most clearly in FIGS. 2 - 6 and 8, movement of the lever arms 76 and 77 effects corresponding movement of a pair of eccentric cams 78 and 79 respectively, mounted adjacent the inner ends of the respective lever shafts 80 and 81. Thus, by grasping the appropriate one of the lever handle knobs 82 or 83, and swinging the attendant lever arm between either of the two extreme positions, as shown most clearly in FIGS. 3 and 5, the carriage structure 39 can readily be connected to or disconnected from the weight system 51.

The construction and operation of both of the lever and cam mechanisms are substantially identical except for their being in mirror symmetry. A description of one will therefore serve to describe the other.

With particular reference to FIGS. 8 - 11, it will be noted that the rotational fore and aft axes of the lever shafts 80 and 81 are located somewhat below the elevation of the exercise bar 43; and the lever handle grips 82 and 83 project laterally from the cabinet side wall 29. As a result, the levers are conveniently arranged for ready manipulation by the user.

By gripping the handle 83 and moving it downwardly from the upper position shown, for example, in FIGS. 1-3, the lever arm 77 rotates the fore and aft lever shaft 81, the shaft 81 being journaled adjacent its outer end in the carriage beam 41 and at its inner end in the connector plate 53, being there restrained against forward movement by washer 84 and snap ring 85 (see FIGS. 4 and 6). Rotational movement of the lever shaft 81 about its axis of rotation 86 is accompanied by angular movement of the eccentric cam 79 mounted on the lever shaft 81.

In open position (see FIGS. 3 and 4) the cam 79 bears lightly against the face of a movable clamping block 89 urged away from the fore and aft fastening plate 55 by a plurality (e. g. four) compression springs 90 lodged at each end in blind holes 91 and 92 in the plate 55 and the clamping block 89 respectively, and spanning the distance between the plate and the block.

Oppositely facing arcuate grooves 93 and 94, respectively, in the fastening plate 55 and the clamping block 89 partially encompass a cable 95. In open position of the clamping mechanism, the compression springs 90 bias the clamping block 89 away from the fastening plate 55 so that the clamping mechanism slides freely with respect to the cable 95.

However, when the lever 77 is turned down to the position shown in FIGS. 5 and 6, the cam lobe 96, or eccentric throw, is sufficient to urge the clamping block

89 toward the plate 55 and into tight clamping engagement with the interposed cable 95, thereby connecting the carriage 39 to the cable 95.

In order to release the carriage 39, the lever movement is reversed; and as the cam lobe 96 is moved away from the clamping block 89, the compression springs 90 causes relative opening movement to occur between the plate 55 and the clamping block 89, thereby freeing the cable 95.

As most clearly appears in FIG. 2, the wire cable 95 comprises several different runs. The particular run just described in connection with the fastening plate 55 and the clamping block 89 extends vertically between a lower front pulley 98 mounted on the front wall of a bottom frame pan 99 and a first top front pulley 101 mounted adjacent the upper end of the frame, this front vertical portion of the cable 95 being designated by the reference numeral 102.

The upper end of the cable run 102 passes over the pulley 101 and leads horizontally and rearwardly toward the top rear of the frame over a cable run 103, thence over a top pulley 104 and vertically downwardly on a cable run 106 secured at the lower end to an anchor 107 upstanding from the top plate 108 of a vertically stacked array of metal plates 109, all of the plates being collectively termed a weight member 111. The top plate 108 is conveniently smaller in thickness and mass than the subjacent plates 109.

Each of the plates 109 is substantially identical in weight so that the user, knowing the fixed mass of the top plate 108 (e. g. 5 pounds), can readily determine how many plates 109 to add or remove in order to provide a desired resistive weight.

The bottom one of the plates 109 is supported on a plurality of compression springs 112, and each plate is provided with a plurality of corner legs 113, economically formed by a punch press, the downwardly displaced metal at each leg leaving a corresponding corner depression 114 in the plate, to assist in nesting.

The equal legs 113 result in an equal, predetermined, vertical spacing, or opening, between adjacent plates, thereby providing access to a blade 116 (see FIG. 7) horizontally introduced into the particular space 117 desired, thence inserted into the corresponding aperture 118 in a vertical tongue 119 depending from the center of the top plate 108.

The tongue 119 includes a plurality of vertically spaced apertures 121, of which aperture 118 is one. Each aperture 121 is arranged so that it registers with one of the inter-plate openings, of which opening 117 is an example, corresponding to the aperture 118.

The tongue 119 extends downwardly through central slots 123 in the plates; and vertical plate alignment is facilitated by a spaced pair of vertical guide bars 126 and 127, loosely passing through corresponding bores 128 and 129 in the plates. The outer end of the blade 116 is recurved to form a convenient handle 131.

As appears most clearly in FIGS. 2 and 7, let it be assumed that the user wishes to exercise with a weight resistance of 25 pounds. If the top plate 108 weighs 5 pounds and each of the plates 109 weighs ten pounds, it can be seen that by inserting the blade 116 into the aperture 118 of the tongue 119, as appears in FIG. 7, the cable portion 106 will lift the top plate 108 plus two of the subjacent plates 109, for a total of 25 pounds, when the cable is translated upwardly.

The upward movement of the cable portion 106 in FIG. 7, in other words, will lift the top plate 108, the tongue 119 and the horizontal blade 116, thereby supporting the two superposed plates 109, while the plates below the blade will remain in place.

In the blade position shown in FIG. 2, on the other hand, the effective weight resistance will total 45 pounds since the blade is inserted below the top plate 108 of 5 pounds and four subjacent plates 109 of 10 pounds each.

As will be realized, the weights given herein are only by way of example. Any appropriate arrangement of weight masses can be utilized.

It will also be noted that unlike barbells, or dumbbells, which are individually separated and movable from place to place, the weights herein are not subject to being stolen since they are secured against removal by the guide bars 126 and 127.

A vertical opening 131 in the front of the cabinet (see FIG. 1) affords access to the collective weight member 111 so that the blade 116 (not visible in FIG. 1) can readily be placed in the desired location by reaching through the opening.

As can be seen most clearly in FIG. 2, upward vertical movement of the cable run 106 results in lifting the collective weight member 111 against the force of gravity. Owing to the directional reversal effected by passing the cable over the top pulleys 101 and 104, it can be seen that downward vertical movement of the cable run 102 is opposed by the mass of the weight member 111.

Consequently, by clamping the carriage 39 to the vertical cable run 102, by moving the right hand lever 77 downwardly into locked position (FIGS. 5 and 6); and with the carriage previously located in a desired "base" position, subsequent downward movement of the exercise bar 43 under muscular urgency of the user will be resisted by the particular mass selected by suitable positioning of the blade 116, as previously explained.

If, on the other hand, it is desired to oppose upward movement of the exercise bar 43, the right hand lever 77 is returned to upward, open position; whereas the left hand lever 76 is moved down to locked position. The left hand lever 76 causes the cam 78 to urge its corresponding left-hand clamping block into secure engagement with the vertical cable run 133 extending vertically upwardly from the bottom front pulley 98 to an upper left, front pulley 134. The pulley 98, in other words effects a second change in vertical direction so that the cable 133 moves in the same direction and partakes of the same weight elevating characteristics as cable run 106 connected directly to the weight member 111.

From the pulley 134 the cable extends rearwardly on a horizontal run 136 and passes over a rear top pulley 137, thence downwardly on a short vertical run 138 and terminates at an eye-bolt 139 in a weight 141. The weight 141 affords a constant tension on the entire cable length extending to the weight member 111, thereby keeping the cable moderately taut at all times and obviating loops and coils in the cable.

A pair of vertical guide rods 144 passes loosely through openings in lateral ears 146 on the tension weight 141, and a limit stop member 148 mounted on one of the rods 146 prevents upward movement of the weight 141 beyond the desired location.

With particular reference to FIGS. 8-11, the versatility of the machine in providing a wide range of exercises is illustrated.

FIG. 11 shows both levers in upper position, corresponding to free, or "floating" position of the carriage, enabling the user readily to locate the exercise bar at the desired elevation.

FIG. 10, on the other hand, shows both runs 102 and 133 of the cable in clamped position, thereby immobilizing the carriage structure 39. With the carriage immobilized and in a position near the top of the cabinet, the exercise bar 43 can be used as a horizontal chinning bar. With the immobilized exercise bar 43 in an intermediate location, as in FIGS. 8-11, for example, the bar 43 can be used as a ballet bar. By moving the exercise bar 43 downwardly, to within a foot or two from the floor 19, and there immobilizing the bar, auxiliary equipment (not shown) such as an inclined sit-up board, or a horizontal bench, can be supported at one end on the bar 43.

Lastly, and of major importance, is the flexibility afforded by the combination of first placing the exercise bar 43 in a "base" position, depending upon the exercise to be performed, followed by selectively activating either the left hand lever 76 or the right hand lever 77 so as to impose a weight resistance on the bar either in an upward or in a downward direction, in opposition to muscular urgency.

Thus, by arranging the levers 76 and 77 in various selected attitudes after first locating the exercise bar 43 at predetermined "base" elevations, a wide variety of exercises can be performed, as will now be explained:

By first placing the exercise bar 43 in "base" position at about shoulder height and rotating the clamping lever 76 into locked position while lever 77 is left in open position (as the levers appear in FIG. 8), the user can perform an exercise widely known as a Military Press wherein the user faces the bar and grasps the bar with the palms facing away from the shoulders. The arms are then raised to full height above the head, the movement being resisted by the weights, and thereby exercising the arm and shoulder muscles.

By backing up to the bar with the back of the neck adjacent the bar and reaching back over the shoulders to grasp the bar with the palms facing upwardly, a Triceps Exercise can be performed by straightening the arms upwardly while encountering resistance of the weights.

With the same lever arrangement as in FIG. 8, but with variant "base" positions of the bar 43, numerous other well known exercises, such as the Upright Row, Bent Over Row, Two Arm Curl, Side Bend, Supine Press, Leg Press, Seated Press, Dead Lift, Seated Squat, Half Squat and Calf Raise can be performed.

With the opposite lever arrangement, as shown in FIG. 9, and with different "base" positions of the bar, still other groups of muscles can be conditioned. Inclusive of the exercises performed with the lever arrangement of FIG. 9 are Pull Down Behind Neck and Front Pushdowns.

It can therefore be seen that I have provided in a single compact unit, a body conditioning machine which provides a wide range of exercises to persons of all size, strength and degree of skill.

What is claimed is:

1. An exercise machine comprising:

- a. a vertically elongated frame extending between an upper end and a lower end and including a front side, a rear side and a pair of lateral sides;
- b. a first means translatably mounted on said front side of said frame for vertical movement between an upper position and a lower position, said first means comprising a carriage;
- c. a second means attachable to said carriage for urging said carriage in a vertical upward direction;
- d. an exercise bar mounted on said carriage, said bar being capable of being gripped and urged by muscular effort in a vertical direction; and,
- e. a third means for releasably connecting said second means to said carriage, said second means comprising a fourth means for varying the force to be overcome by a user when the carriage is attached to the second means and said carriage is moved vertically up or down by a user acting on the exercise bar.

2. An exercise machine as in claim 1 wherein said weight means includes a plurality of pulleys rotatably mounted on said frame adjacent said upper end and said lower end; a weight member comprising a plurality of vertically stacked plates located adjacent said lower end of said frame; a cable connected at one end to said weight member, the intermediate portion of said cable being carried on said pulleys for movement of said cable in dependence upon the movement of said weight member; and cable tensioning means carried on said frame and connected to the other end of said cable for maintaining tautness in said cable.

3. An exercise machine as in claim 2 wherein said weight member includes means for selectively adding or removing plates to attain the desired mass of said weight member.

4. An exercise machine as in claim 3 wherein said third means comprises two pairs of clamping blocks mounted on said carriage and straddling said cable in said intermediate portion thereof, said pair of blocks being relatively movable toward and away from each other between a first cable releasing position and a second cable clamping position; and sixth means on said carriage for urging said cable clamping blocks between said first cable releasing position and said second cable clamping position.

5. An exercise machine as in claim 4 wherein said plurality of pulleys includes a first pulley rotatably mounted on said upper end of said frame above said stacked plates, a second pulley rotatably mounted on said upper end of said frame above said carriage, a third pulley rotatably mounted on said lower end of said frame below said carriage, a fourth pulley rotatably

ably mounted on said upper end of said frame above said carriage and horizontally spaced from said second pulley, and a fifth pulley rotatably mounted on said upper end of said frame and adjacent the rear side of said frame, said cable extending upwardly from said weight member and passing over said first and second pulleys, thence downwardly adjacent said carriage and around said third pulley, thence upwardly adjacent said carriage and passing over said fourth and fifth pulleys to said fifth means.

6. An exercise machine as in claim 5 wherein said fifth means includes a vertically movable weight positioned below said fifth pulley for tensioning said cable; and seventh means on said frame in the path of said weight for limiting the extent of upward movement of said weight.

7. An exercise machine as in claim 5 wherein said clamping means comprises one pair of said pairs of clamping blocks straddling the portion of said cable extending between said second pulley and said third pulley, and another of said pair of said pairs of clamping blocks straddling the portion of said cable extending between said third pulley and said fourth pulley; said camming means comprising a pair of cams, and each of said pairs of clamping blocks is engaged by one cam of said pair of cams.

8. An exercise machine as in claim 7 further including means carried on same frame and connected to said carriage for counterbalancing the weight thereof.

9. An exercise machine as in claim 2 including a pair of spaced vertical rods projecting upwardly from said lower end of said frame and extending through corresponding apertures in each of said vertically stacked plates to effect vertical alignment thereof, each of said plates including a plurality of legs of substantially uniform height to separate each of said plates by a substantially uniform gap; a vertical tongue extending from the lower end of said frame below said plates upwardly through corresponding slots in said plates, said vertical tongue having formed therein a plurality of horizontal openings in registry with said gaps between said plates; and, a blade capable of being inserted horizontally into a selected one of said gaps between said plates and through a corresponding one of said openings, the upper end of said tongue being attached to said one end of said cable, said cable being capable of lifting said tongue and all of the plates superposed above said blade.

10. An exercise machine as in claim 9 including means on said lower end of said frame below said plates for cushioning a load thereon.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,746,338 Dated July 17, 1973
Inventor(s) Richard I. Proctor

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

At all occurrences the title should read -- Movable Weight Type Exercising Machine --. Column 1, line 30, "chinning bar," should read -- chinning bar or --. Claim 1, element c, second line, delete "upward". Claim 2, line 2, "weight" should read -- second --; line 10, "cable tensioning" should read -- fifth Claim 7, line 2, "clamping" should read -- third --; line 8, "camming" should read -- sixth --.

Signed and sealed this 5th day of november 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents