

[54] **SITU APPARATUS FOR PHYSICAL EXERCISE WITH PEDAL ACTION**

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[52] U.S. Cl. **272/73, 272/33 B, 272/79 R**

[51] Int. Cl. **A63b 21/00**

[58] Field of Search..... **272/71, 72, 73, 33 R,**
272/33 B

[56]

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[57]

ABSTRACT

In situ apparatus for exercising in which an operator grips suitable handles and actuates pedals while the angle of the body of the operator relative to a stationary frame varies continuously during each cycle. An upstanding arm is pivotally mounted on the frame. The operator actuated pedals are located on one end of the arm. Suitable linkages connect the pedals with the frame so that actuation of the pedals causes the angle of the arm to vary continuously. This arm supports the user such that when the angle of the arm with respect to the frame varies continuously, the angle of the operator with respect to the frame also varies continuously.

10 Claims, 9 Drawing Figures

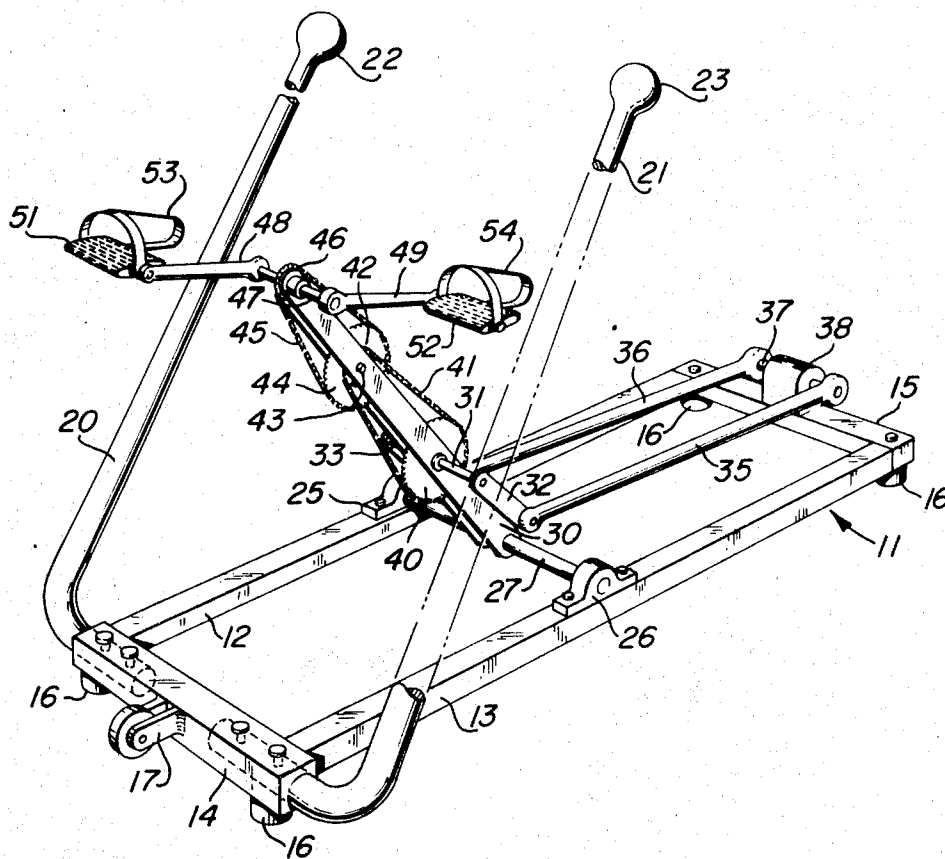


FIG. 1

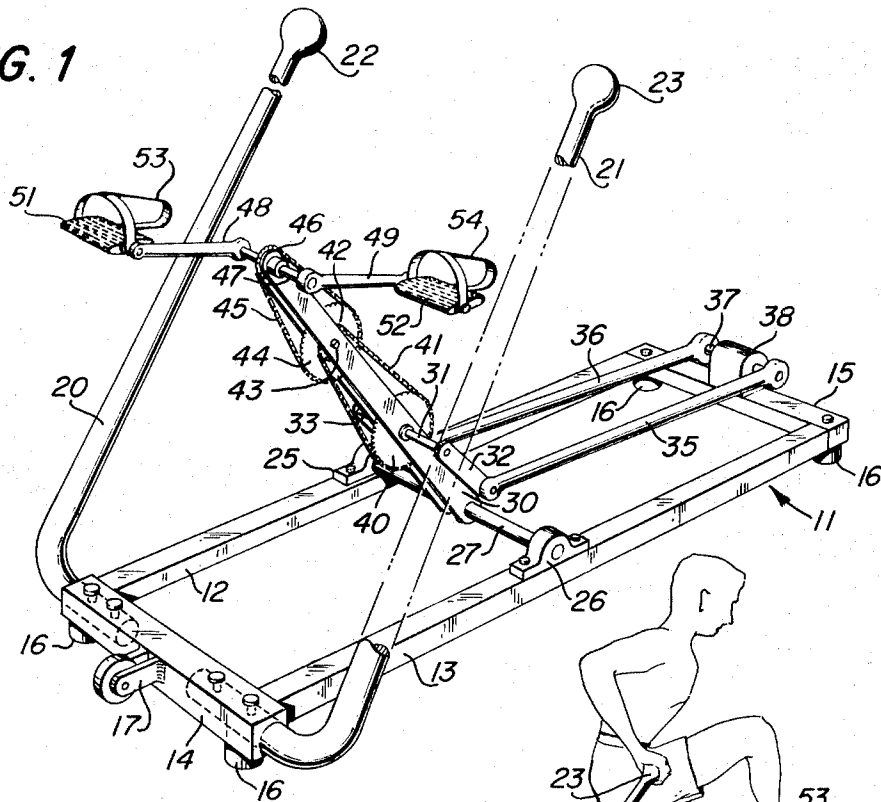


FIG. 2

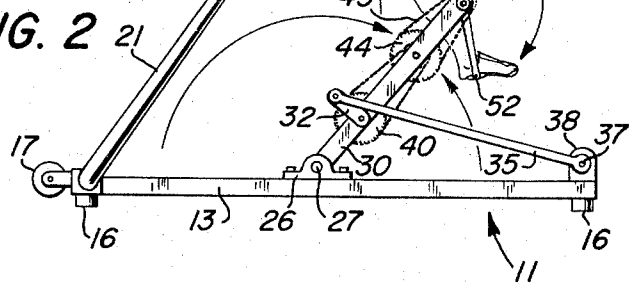
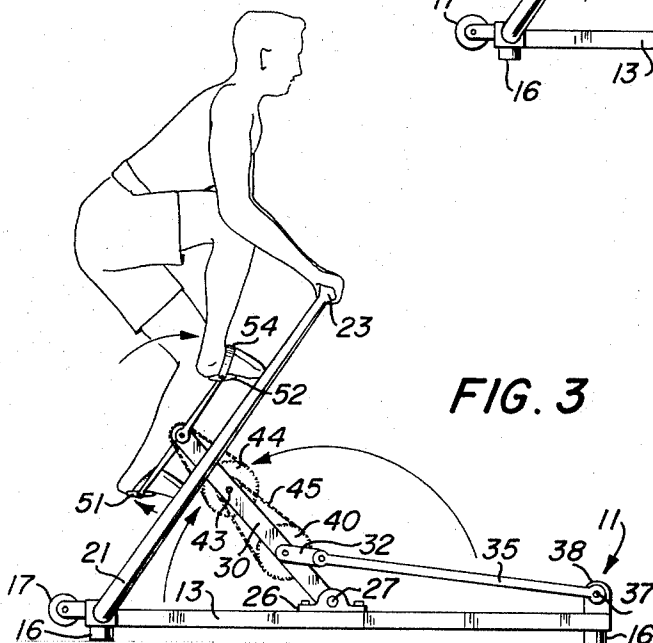


FIG. 3



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FIG. 4

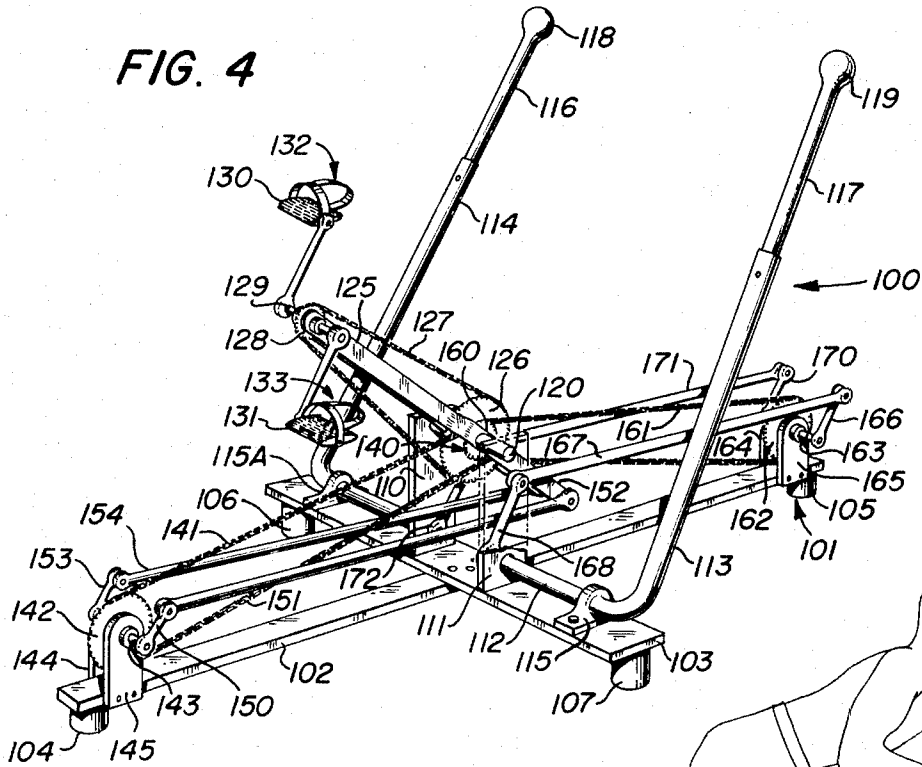


FIG. 5

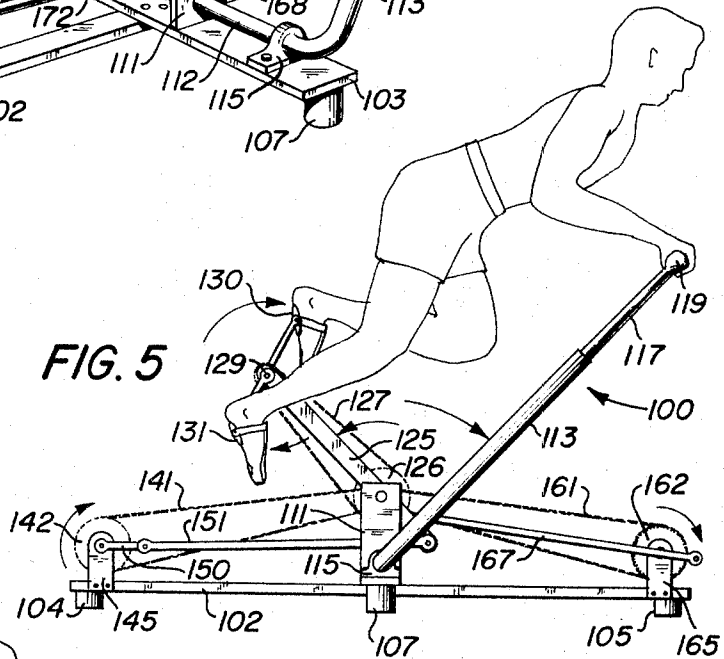
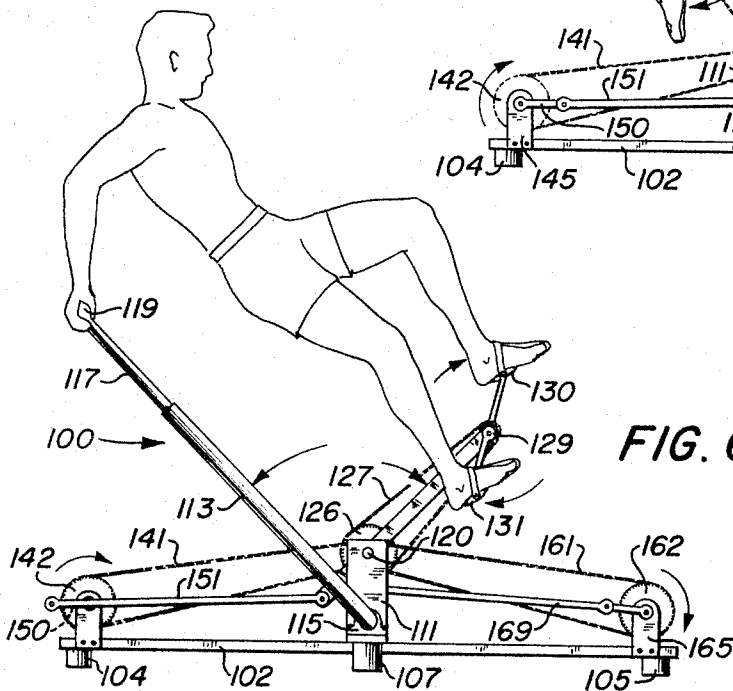


FIG. 6



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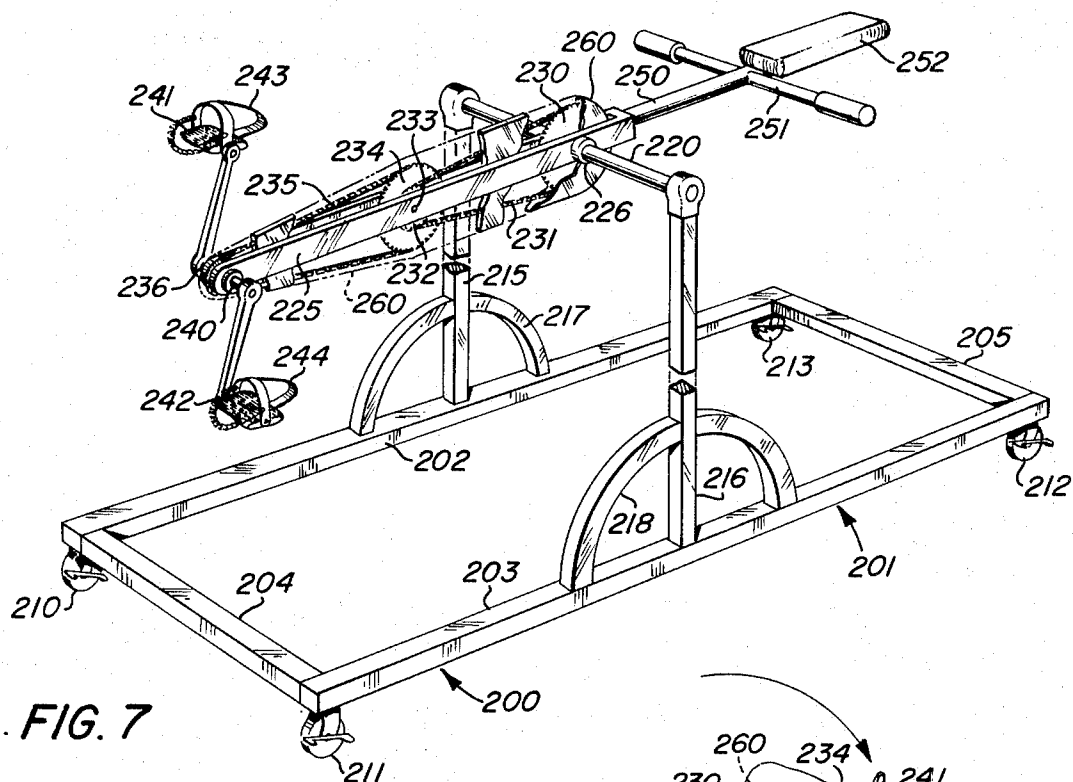


FIG. 7

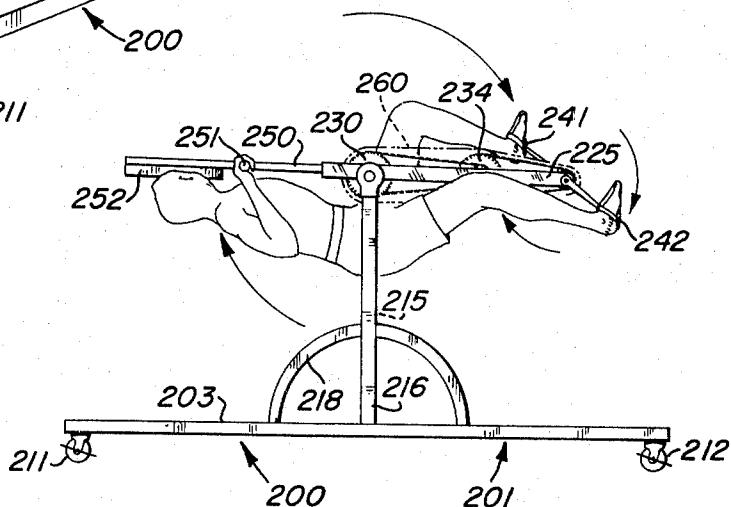


FIG. 8

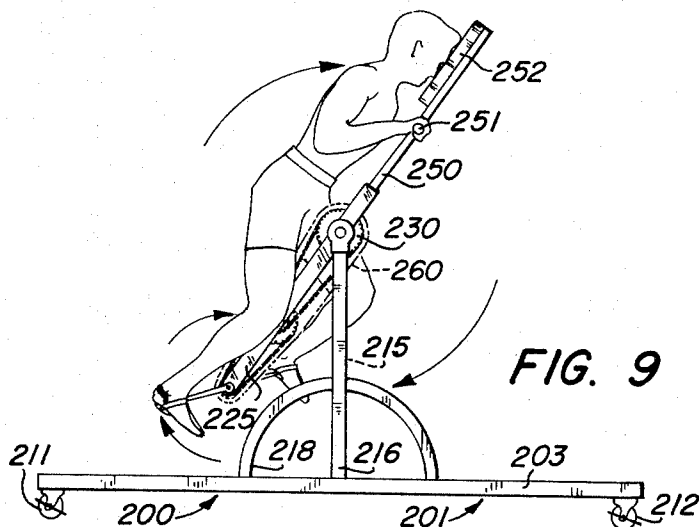


FIG. 9

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SITU APPARATUS FOR PHYSICAL EXERCISE WITH PEDAL ACTION

BACKGROUND OF THE INVENTION

The present invention relates in general to apparatus for exercising and more particularly to in situ apparatus for physical exercise with a pedal action.

Heretofore, apparatus for exercising with a pedal action were suitable for leg and abdomen muscles. The physical activity of other muscles in the body, other than the heart muscles, were somewhat limited and restricted. In such apparatus, the operator generally occupied a seating position.

SUMMARY OF THE INVENTION

Apparatus for exercising in which an operator grips suitable handles and actuates pedals while the angle of the body of the operator varies continuously during each cycle relative to a stationary frame resting on a supporting surface.

By virtue of the apparatus of the present invention, an operator employs his feet and hands to support his body and the body moves continuously through varied angular positions relative to a stationary frame during each cycle. The operator is capable of supporting his body-weight through all of these angles, since there is no seat on which to rest. Thus, the apparatus provides for thorough exercising of most large and small muscles simultaneously. As a consequence thereof, the operator realizes better muscular coordination, greater endurance and stamina.

Patents issued to applicant on apparatus for physical exercise are U.S. Pat. Nos. 3,572,701 and 3,589,720. The apparatus therein disclosed and claimed employ reciprocating carriages for hand and feet support.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an apparatus for exercising embodying the present invention with stationary hand supports.

FIGS. 2 and 3 are diagrammatic illustrations of the apparatus shown in FIG. 1 in use.

FIG. 4 is a perspective view of a modification of the apparatus shown in FIG. 1 with oscillating hand supports.

FIGS. 5 and 6 are diagrammatic illustrations of the apparatus shown in FIG. 4 in use.

FIG. 7 is a perspective view of a further modification of the apparatus shown in FIG. 1 with a gyrating body action.

FIGS. 8 and 9 are diagrammatic illustrations of the apparatus shown in FIG. 7 in use.

PREFERRED EMBODIMENTS OF THE INVENTION

Illustrated in FIG. 1 is an in situ apparatus 10 for exercising embodying the present invention, which comprises a suitable horizontal frame 11. The frame 11 includes longitudinal, parallel member 12 and 13 interconnected by transverse end members 14 and 15. Suitable rubber legs 16 depend from the frame 11 to support the frame 11 on a suitable supporting surface. For moving the apparatus 10, when not in use, a suitable wheel 17 extends outwardly from the member 14, whereby the frame 11 can be moved to a vertical position about the member 14 and the apparatus while in

the vertical position will be supported by the wheel 17 for movement.

Fixed to the frame 11 by attachment to the member 14 are upstanding, transversely spaced hand supports 20 and 21. At the end of the supports 20 and 21 are fixed spheroids 22 and 23 to be gripped by an operator. The transverse space between the hand grip balls 22 and 23 is suitable to accommodate an operator therebetween.

Mounted on the frame 11 by attachment to the longitudinal members 12 and 13 intermediate the respective ends thereof are upstanding bearings 25 and 26. A transverse shaft 27 is journaled by the bearings 25 and 26 for rotation.

An arm 30 is fixedly attached at its lower end to the shaft 27 intermediate the ends thereof for movement therewith. Intermediate the ends of the arm 30 is disposed a shaft 31. The shaft 31 is received by a suitable transversely disposed opening in the arm 30 for rotation therein. At one end of the shaft 31 is fixed an arm 32 and at the other end of the shaft 31 is fixed an arm 33. The opposite end of the arm 32 is pivotally attached to a tie rod 35. In a like manner, the opposite end of the arm 33 is pivotally attached to a tie rod 36. The other end of the tie rod 35 is fixed to one end of a shaft 37 and the other end of the tie rod 36 is fixed to the other end of the shaft 37. A block 38 mounts the shaft 37 to the transverse member 15 of the frame 11. Thus, the arm 30 is pivotal about the axis of the shaft 27 for fore and aft movement relative to the frame 11.

Mounted on the shaft 31 for rotation therewith is a sprocket 40 and trained around the sprocket 40 is an endless chain 41. The chain 41 is also trained around a sprocket 42. The sprocket 42 is fixed to a shaft 43 for rotation therewith and is located at one side of the arm 30 inwardly thereof. A sprocket 44 is also fixed to the shaft 43 for rotation therewith, and is located adjacent the sprocket 42. A chain 45 is trained around the sprocket 44 and is also trained around a sprocket 46. The sprocket 46 is fixed to a shaft 47, for rotation therewith. The shaft 47 is received by a transverse opening in the upper end of the arm 30 for rotation therein. Oppositely directed arms 48 and 49 are fixed to opposite ends of the shaft 47 for carrying suitable transversely disposed foot pedals 51 and 52, respectively. Suitable straps 53 and 54 are attached to the foot pedals 51 and 52, respectively.

An operator grips the balls 22 and 23 for support and then places his feet on the pedals 51 and 52 within the straps 53 and 54. He thereupon actuates the foot pedals with a rotary motion to rotate the shaft 47. As a consequence thereof, the sprocket 46 rotates with the shaft 47 to drive the chain 45. The sprocket 44 is driven by the chain 45 to impart a rotary movement to the shaft 43. With the rotation of the shaft 43, the sprocket 42 rotates to cause the chain 41 to rotate the driven sprocket 40. This action results in the shaft 31 rotating to impart pivotal movement to the arms 32 and 33 about the pivotal connection with the tie rods 35 and 36. As a consequence thereof, the arm 30 rotates about the axis of the shaft 27. Thus, rotation of the pedals 51 and 52 in either direction results in the oscillating movement of the arm 30 while the hand support balls 22 and 23 remain stationary (FIGS. 2 and 3).

Illustrated in FIG. 4 is an apparatus 100 for physical exercise, which is a modification of the apparatus 10 shown in FIG. 1. The apparatus 100 comprises a hori-

zontal frame 101, which includes a longitudinally extending member 102 and a transverse member 103 fixed to the member 102. At one end of the member 102 is a rubber leg 104 and at the other end of the member 102 is a rubber leg 105. In a similar manner, at one end of the member 103 is a rubber leg 106 and at the other end of the member 103 is a rubber leg 107.

Fixed to the transverse member 103 are transversely spaced upstanding brackets 110 and 111. A shaft 112 is journaled in the brackets 110 and 111 for rotation. A pair of transversely spaced hand supports 113 and 114 are fixed to opposite ends of the shaft 112 for movement therewith and are journaled for pivotal movement by bearings 115 and 115A, respectively. The bearings 115 and 115A are mounted on the transverse member 103. Telescopically received by the hand supports 113 and 114 are adjustably positioned extension members 116 and 117, respectively. Hand gripped spheroids or balls 118 and 119 are fixed to the free ends of the extension members 116 and 117, respectively. Thus, the hand gripped balls are spaced apart a sufficient distance transversely to accommodate an operator and the hand supports 113 and 114 pivot relative to the frame 101 for an oscillating fore and aft movement.

Journalled by the brackets 110 and 111 above the shaft 112 for rotation is a shaft 120. Supported freely by the shaft 112 for rotation relative thereto is the intermediate portion of an upstanding arm 125. For imparting rotation to the shaft 120, a driven sprocket 126 is fixed to the shaft 120. Trained around the sprocket 126 is an endless drive chain 127. The chain 127 is also trained around a sprocket 128, which is fixed to a shaft 129. The shaft 129 is received by a transverse opening in the arm 125 for rotation. Oppositely directed pedals 130 and 131 are fixed to opposite ends of the shaft 129 and are rotatable about the axis of the shaft 129 through the pedaling action of the operator. Suitable straps 132 and 133 are attached to the pedals 130 and 131, respectively.

Thus, rotation of the pedals 130 and 131 causes rotation of the shaft 129, which rotates the drive sprocket 128. In turn, the drive sprocket 128 imparts a drive action to the chain 127 for rotating a driven sprocket 126. The driven sprocket 126 imparts rotation to the shaft 120. Mounted on the shaft 120 for rotation therewith is a sprocket 140. Trained around the sprocket 140 is an endless chain 141, which is also trained around a sprocket 142. The sprocket 142 is fixed to a shaft 143, which is journaled by upstanding bearings 144 and 145 for rotation. The bearings 144 and 145 are fixed to the longitudinal member 102 of the frame 101. Rotation of the sprocket 142 imparts rotation to the shaft 143.

Fixed to one end of the shaft 143 for rotation therewith is an arm 150. The other end of the arm 150 is pivotally connected to one end of a tie rod 151. At the opposite end of the tie rod 151 is fixed a shaft 152 that is joined to the lower end of arm 125 for imparting thereto an oscillating pivotal movement about the axis of the shaft 120. Fixed to the other end of the shaft 143 for rotation therewith is an arm 153. The other end of the arm 153 is pivotally connected to a tie rod 154. The other end of the tie rod 154 is fixed to the shaft 152. Thus, rotation of the sprocket 140 imparts rotation to the sprocket 142 through the chain 141. This action, in turn, rotates the shaft 143 to rotate the arms 150 and 153, and actuate the tie rods 151 and 154. As a conse-

quence thereof, the arm 125 pivots fore and aft about the axis of the shaft 120 in an oscillatory pivotal movement.

Also fixed to the shaft 120 for rotation therewith is a sprocket 160. Trained around the sprocket 160 is an endless chain 161, which is also trained around a sprocket 162. The sprocket 162 is fixed to a shaft 163 to impart rotation thereto. The shaft 163 is journaled by upstanding bearings 164 and 165 for rotation relative to the frame 101. The bearings 164 and 165 are mounted on the longitudinal member 102 of the frame 101.

Fixed to one end of the shaft 163 for rotation therewith is one end of an arm 166. The other end of the arm 166 is pivotally connected to one end of a tie rod 167. The other end of the tie rod 167 is pivotally attached to one end of an arm 168. The other end of the arm 168 is fixed to the shaft 112 to impart a rotary movement thereto. In a like manner, an arm 170 is fixed to the other end of the shaft 163 for rotation therewith. The other end of the arm 170 is pivotally attached to a tie rod 171. The other end of the tie rod 171 is pivotally attached to one end of an arm 172. The other end of the arm 172 is fixed to the shaft 112 to impart rotation thereto.

Thus, rotation of the sprocket 160 through the rotation of the shaft 120 imparts rotation to the sprocket 162 through the chain 161. This action causes rotation of the shaft 163, which, in turn, pivots the arms 166 and 170 to actuate the tie rods 167 and 171. The tie rods 167 and 171, in turn, impart a pivotal movement to the arms 168 and 172 about the axis of the shaft 112 to rotate the shaft 112. As a consequence thereof, the handle supports with the hand gripped balls 118 and 119 pivot about the axis of the shaft 112 for an oscillating movement in the fore and aft directions.

In use of the apparatus 100, an operator places his feet on the pedals 130 and 131 and grips the hand gripped balls 118 and 119. The operator then actuates the pedals 130 and 131 with a rotary motion which results in the fore and aft oscillatory movement of the hand supports 112 and 113 along with the hand gripped balls 118 and 119 and the oscillatory movement of the arm 125 along with the pedals 130 and 131 in the fore and aft directions (FIGS. 5 and 6). During the exercise cycle, the operator changes his body orientation from almost face-down posture to substantially a back-down posture.

Illustrated in FIG. 7 is an apparatus 200 for physical exercise, which is a further modification of the apparatus shown in FIG. 1. The apparatus 200 comprises a horizontal frame 201, which includes transversely spaced longitudinal members 202 and 203 interconnected by transverse members 204 and 205. At the junction of the members 202-203 are conventional self-locking casters 210-213.

Fixed to the longitudinal members 202-203 of the frame 201 intermediate the ends thereof are upstanding posts 215 and 216. Suitable braces 217 and 218 stabilize the posts 215 and 216. Extending between the posts 215 and 216 at the upper end thereof is a stationary horizontal rod 220. The rod 220 is fixed to the posts 215 and 216 and does not rotate relative thereto. The height of the posts 215 and 216 and the transverse space therebetween is suitable to accommodate an operator.

Supported by the rod 220 for rotation is one end of an arm 225. The arm 225 is fixed to a bearing sleeve 226 for rotation therewith and the sleeve is received by the rod 220 for free rotation. Also, fixed to the rod 220 in a sprocket 230. For convenience, the arm 225 is channel-shaped to receive the sprocket 230 centrally of the longitudinal sides thereof. An endless chain 231 is trained around the sprocket 230, which chain 231 is also trained around a sprocket 232. The sprocket 232 is fixed to a shaft 233, which is received by a transverse opening in the arm 225 for rotation relative thereto. Also fixed to the shaft 233 for rotation therewith is a sprocket 234. Trained around the sprocket 234 is a chain 235, which is also trained around a sprocket 236. The sprocket 236 is fixed to a shaft 240, which is received by a transverse opening in the other end of the arm 225 for rotation. The shaft 233 is located on the arm 225 between the shaft 240 and the bearing sleeve 226.

Oppositely directed foot pedals 241 and 242 are fixed to opposite ends of the shaft 240 for imparting rotation thereto in response to the pedaling action of an operator. Suitable heel straps 243 and 244 are attached to the foot pedals 241 and 242.

An operator rotating the pedals 241 and 242 about the axis of the shaft 240 imparts rotation to the shaft 240. Thereupon, the sprocket 236 rotates with the shaft 240 and causes the chain 235 to rotate the sprocket 234 and the shaft 233. The shaft 233, in turn, rotates the sprocket 232 to pull the chain 231 which is trained around the stationary sprocket 230. This action causes the entire arm 225 to rotate about the axis of the shaft 220. A suitable protective cover or shield 260 is attached to the arm 225 around the sprockets and chains to protect the operator.

Extending from the arm 225 and fixed thereto for rotation therewith is an extension member 250. The member 250 could be formed integrally with the arm 225. Fixed to the member 250 is a transversely disposed hand support 251. Also fixed to the extension member 250 beyond the hand support 251 is a suitable pad or cushion 252, which serves as a head support.

In using the apparatus 200, an operator (FIGS. 8 and 9) places his feet on the pedals 241 and 242, fastens heel-straps 243 and 244, grips the hand support 251 allowing his head to rest against the cushion 252. The operator then propels the pedals 241 and 242 causing the arm 225 with the pedals 241 and 242, the hand support 251 and the head cushion 252 to rotate about the axis of the shaft 220, thus changing his body orientation under the force of gravity. Supporting his body-weight in those various positions simulates the body-action offered by Horizontal Bar or Trapeze Exercises without prerequisite of special skills that most individuals do not possess.

I claim:

1. Apparatus for physical exercise comprising:

a frame;

a horizontally disposed rod supported by said frame;

an upstanding arm with the lower end thereof supported by said rod for pivotal movement;

a shaft carried by said arm intermediate the ends thereof;

pedal drive means supported by said arm at the upper end thereof and connected to said shaft for imparting rotation thereto; and

first linkage connected at one end thereof to said shaft and connected at the other end thereof to said frame, said first linkage being actuated by the rotation of said shaft for moving said arm about the axis of said rod as said shaft is rotated by said pedal drive means.

2. Apparatus as claimed in claim 1 and further comprising hand supports on said frame to be gripped by the hands of an operator, said hand supports being spaced apart to accommodate the operator.

3. Apparatus as claimed in claim 1 wherein said hand supports are fixed to said frame.

4. Apparatus as claimed in claim 1 and further comprising hand supports with the lower ends thereof supported by said rod for pivotal movement, said hand supports adapted to be gripped by an operator and are spaced apart to accommodate the operator.

5. Apparatus as claimed in claim 4 wherein said first linkage also is connected to said arm below said shaft and further comprising second linkage interconnecting said shaft, said frame and said hand supports for moving said hand supports about the axis of said rod in response to the activation of said pedal drive means.

6. Apparatus as claimed in claim 1 wherein said pedal drive means includes at least one chain and sprocket drive arrangement for rotating said shaft.

7. Apparatus as claimed in claim 5 wherein said pedal drive means includes a first chain and sprocket drive arrangement for rotating said shaft, and wherein said first linkage includes a second chain and sprocket drive arrangement activated by the rotation of said shaft and pivot arms connected to said second chain and drive arrangement and tie rods connected to said pivot arms for moving said arm about the axis of said rod in response to the activation of said pedal drive means, and wherein said second linkage includes a third chain and sprocket drive arrangement activated by the rotation of said shaft and pivot arms connected to said third chain and sprocket drive arrangement and tie rods connected to said pivot arms for moving said hand supports about the axis of said rod in response to the activation of said pedal drive means.

8. Apparatus for physical exercise comprising:

a frame;

a horizontally disposed rod supported by said frame;

an upstanding arm with the lower end thereof supported by said rod for pivotal movement;

a shaft carried by said arm intermediate the ends thereof;

pedal drive means supported by said arm at the upper end thereof and connected to said shaft for imparting rotation thereto; and

first linkage interconnecting said shaft and said frame for moving said arm about the axis of said rod in response to the activation of said pedal drive means, said first linkage includes pivot arms connected to said shaft and tie rods pivotally connected to said pivot arms.

9. Apparatus for physical exercise comprising:

a frame;

a horizontally disposed rod supported by said frame;

an upstanding arm with the lower end thereof supported by said rod for pivotal movement;

a shaft carried by said arm intermediate the ends thereof;

pedal drive means supported by said arm at the upper end thereof and connected to said shaft for impart-

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ing rotation thereto, said pedal drive means includes at least one chain and sprocket drive arrangement for rotating said shaft; and
 first linkage interconnecting said shaft and said frame for moving said arm about the axis of said rod in response to the activation of said pedal drive means, said first linkage includes pivot arms connected to said shaft and tie rods pivotally connected to said pivot arms.
 10. Apparatus for physical exercise comprising:
 a frame;
 a horizontally disposed rod supported by said frame;
 an upstanding arm with the lower end thereof supported by said rod for pivotal movement;
 a shaft carried by said arm intermediate the ends thereof;

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pedal drive means supported by said arm at the upper end thereof and connected to said shaft for imparting rotation thereto; and
 first linkage interconnecting said shaft and said frame for moving said arm about the axis of said rod in response to the activation of said pedal drive means, said pedal drive means includes a first chain and sprocket drive arrangement for rotating said shaft and said first linkage includes a second chain and sprocket drive arrangement activated by the rotation of said shaft and pivot arms connected to said second chain and sprocket drive arrangement and tie rods pivotally connected to said pivot arms for moving said arms about the axis of said rod in response to the activation of said pedal drive means.

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