

[54] **EXERCISING APPARATUS**
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[57] **ABSTRACT**

Exercising apparatus having a frame which supports a seat and a pair of handle bars. A bicycle-type pedal mechanism is mounted on the frame to be operated by a person occupying the seat and normally steadying himself in a substantially upright position by holding the handle bars. The seat is mounted on the frame for side to side rocking movement about an axis extending longitudinally of the frame. A connecting rod and associated drive-transmitting parts connect the pedal mechanism to the seat so that the pedal action imparts a rocking motion to the seat which requires the user of the apparatus to exercise his body in the region of the pelvis to match the movement of the seat.

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3 Claims, 11 Drawing Figures

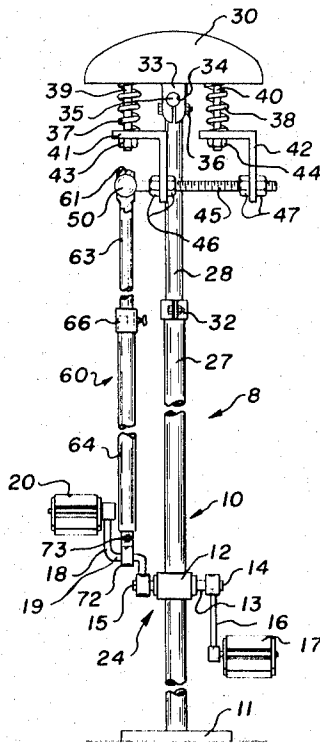


Fig. 1.

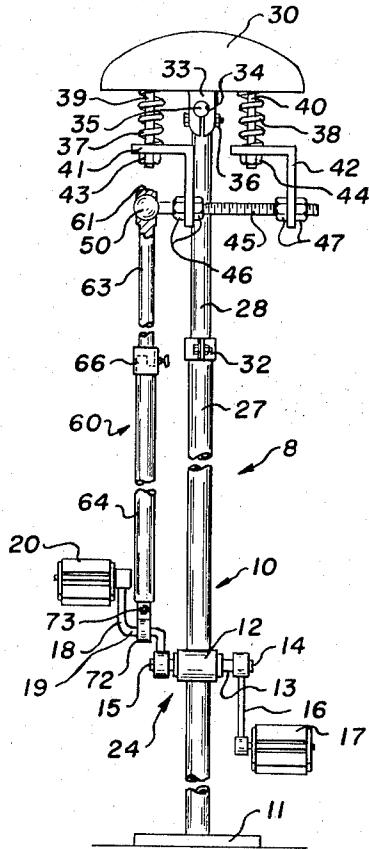


Fig. 2.

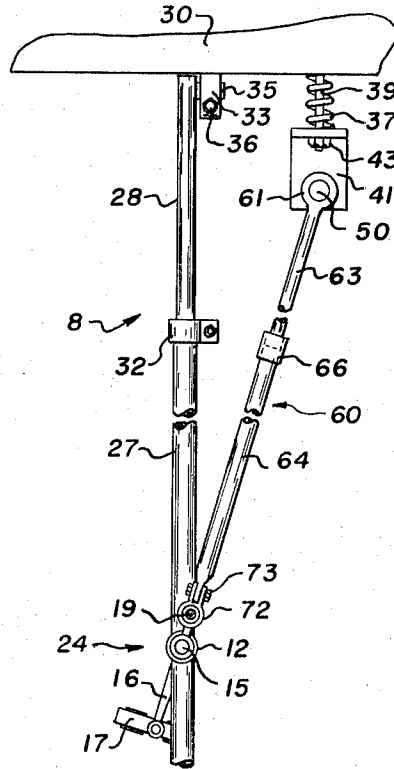


Fig. 3.

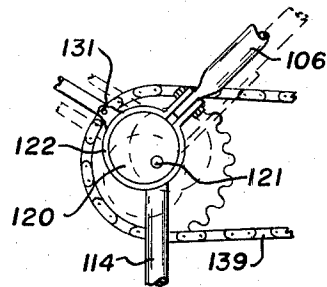
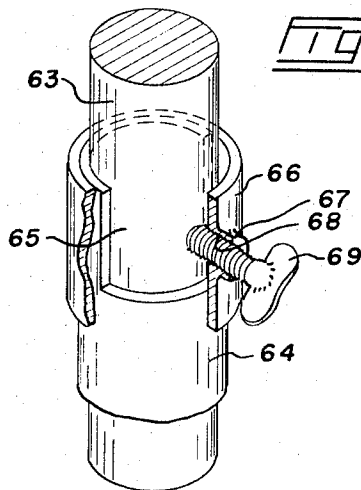
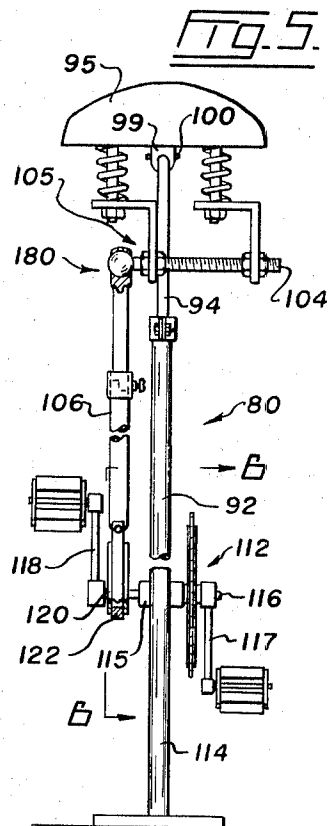
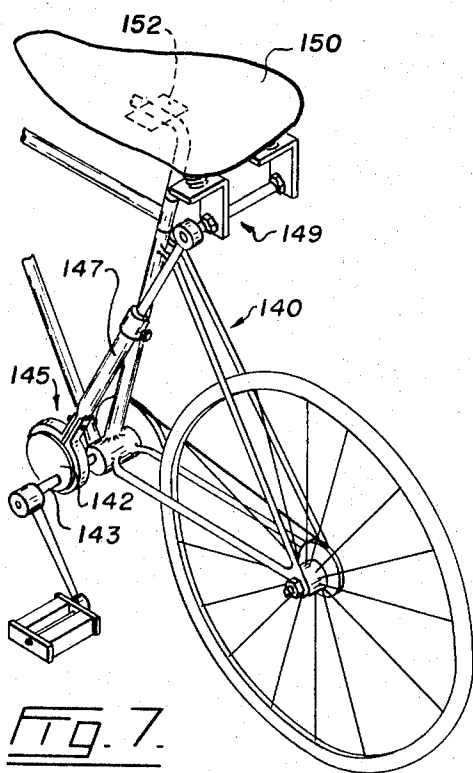
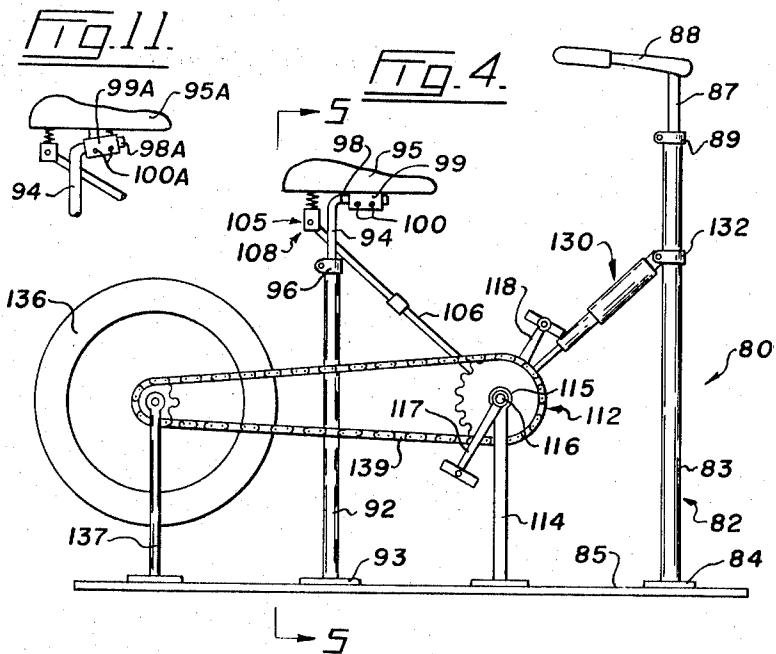


Fig. 6.

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FIG. 8.

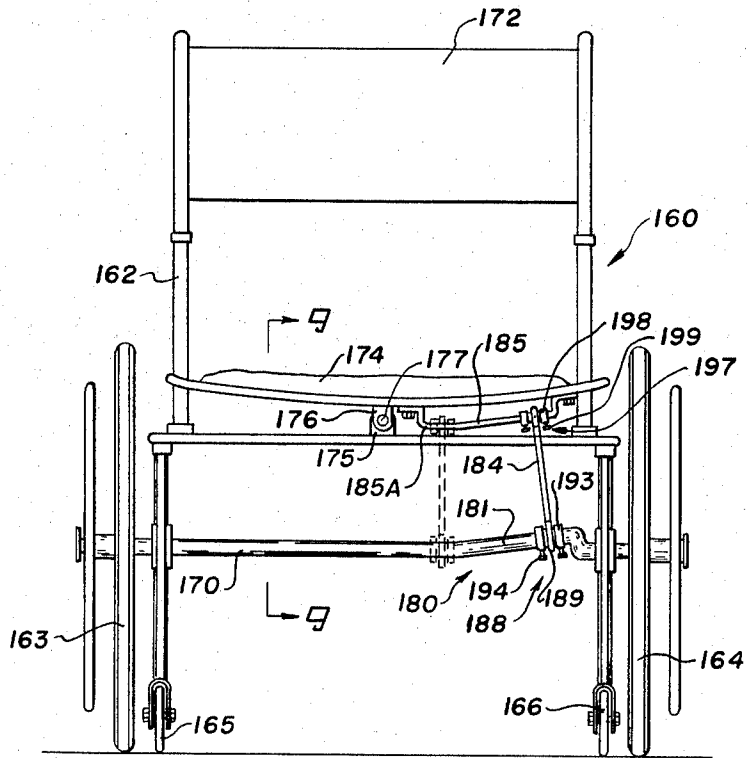


FIG. 9.

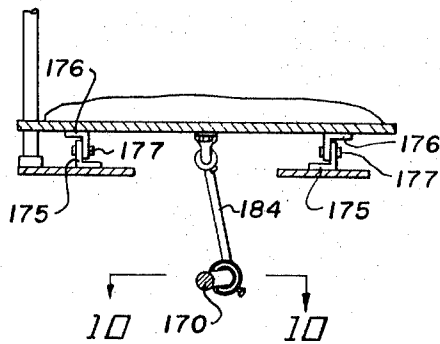
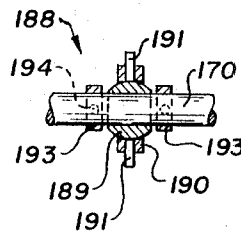


FIG. 10.



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EXERCISING APPARATUS

This invention is concerned with exercising apparatus; in particular it is concerned with apparatus in which the user is obliged to bend his spine laterally in an attempt to maintain an upright position. It is observed that such an exercise, besides resulting in working of the muscles of the trunk, also results in a beneficial activation of the contents of the abdominal cavity.

From one aspect according to this invention there is provided exercising apparatus which has a frame and a seat pivoted to the frame to be rockable from side to side, rotary drive means is provided and a connector is extended between the drive means and a part of the seat spaced from the axis about which the seat is pivotable so that rotation of the drive means results in the seat being rocked from side to side and the person using the apparatus is obliged to curve his spine laterally in an attempt to maintain an upright attitude. The connector is desirably rotatably mounted upon an eccentric element secured to the drive means such as a cam or a crank.

It is also envisaged that the apparatus of this invention may be embodied in a stationary exerciser similar to a bicycle type exerciser, or it may be a movable apparatus such as a wheelchair or a more or less conventional bicycle.

If the exerciser is embodied in a stationary apparatus, the device in its simplest form may comprise a post or other base with a seat pivoted to it and a pedal driven crank or cam with a connecting rod extending between the crank and the seat to cause, upon rotation of the crank or cam, the seat to be rocked about its pivotal connection to the post. It is to be appreciated that the connecting rod will be connected to the seat at a position spaced from the pivotal connection of the seat to the post and there may be a lever or the seat itself may constitute a lever through which the force imparted by the connecting rod works to pivot the seat.

In a more complex stationary device, the apparatus may comprise a bicycle type exerciser in which the person using the apparatus not only derives the benefits of the exercise herein described but also may work against the retarding force on the bicycle such as a friction device or a compressible piston and cylinder.

In a wheelchair arrangement, it is convenient to arrange that rotation of the ground wheels of the chair cause the cam or crank on the shaft of the wheel to rotate and to connect that cam or crank through a connecting rod which is rotatable upon it to the seat or to a lever attached to the seat so that as the ground wheels turn the seat is rocked from side to side. It is considered particularly beneficial to arrange that the back of the wheelchair be fixed so that it does not move with the seat in this way to restrain the upper part of the spine of the person sitting in the seat but to cause the lower part of the spine to move thus inducing movement of the spine rather than tilting of the whole body. Conveniently the connecting rod is arranged to be adjustable so that the degree of pivoting caused by movement of the chair is variable from no movement at all to a greater or lesser degree of movement.

In a travelling bicycle type exerciser the base of the apparatus will be constituted by the wheeled frame of the bicycle and the rotary drive seat can conveniently be the pedal shaft although clearly it could be the wheel axle.

In drawings which illustrate preferred embodiments of the invention;

FIG. 1 is a rear end view of a fixed exerciser according to this invention,

FIG. 2 is a side view of the apparatus in FIG. 1,

FIG. 3 is a perspective view of a detail of the apparatus in FIG. 1,

FIG. 4 is a side view of another embodiment of this invention,

FIG. 5 is a vertical section taken on the line 5—5 of FIG. 4,

FIG. 6 is a section taken on the line 6—6 of FIG. 5,

FIG. 7 is a perspective view of a portion of another embodiment of the invention,

FIG. 8 is a front elevational of still another embodiment of the invention,

FIG. 9 is a vertical section taken on the line 9—9 of FIG. 8,

FIG. 10 is a horizontal section taken on the line 10—10 of FIG. 9, and

FIG. 11 is a detail view of a modified seat mounting.

The embodiment of the exercising apparatus generally indicated at 8 and shown in FIGS. 1, 2 and 3 comprises a frame or post 10 which is secured to the floor by a base plate 11 so as to be rigidly supported in the upright position.

Spaced an appropriate distance above the base plate 11, and mounted on the post 10, is a bearing 12 within which a transverse shaft 13 is journaled, the shaft having end portions 14 and 15 projecting on opposite sides of said bearing. On the end portion 14 of the shaft 13 there is non-rotatably secured a pedal arm 16 and a pedal 17 is secured to the pedal arm in conventional fashion.

The end portion 15 of the shaft which projects from the opposite side of the bearing 12 is non-rotatably fitted with a pedal arm 18 having a portion formed into a crank 19. A pedal 20 is mounted on the pedal arm 18. Thus the apparatus 8 is provided with a rotary drive generally indicated at 24 which includes the eccentric element or crank 19.

Post 10 is formed of a lower tube 27 and a telescoping upper rod 28 and a seat 30 is mounted on the upper end of said rod. The height of the seat 30 above the base plate 11 can be adjusted by opening a clamping ring 32 on the upper end on the tube 27 and by sliding the rod 28 in or out as required before retightening said clamping ring.

The connection between the seat 30 and the rod 28 is made through a bracket 33 which has a cylindrical bearing surface 34 within which is received an axle 35 secured to the upper end of the rod. The two parts of the split bracket 33 are interconnected by a clamping bolt 36 which normally is adjusted to permit the seat 30 to rock freely on the axle 35.

The seat 30 is of the bicycle saddle kind and has conventional helical springs 37 and 38 secured to the underside thereof. Coaxially with the springs 37 and 38 are bolts 39 and 40 respectively and L-shaped brackets 41 and 42 are secured to those bolts by means of nuts 43 and 44.

The vertical limbs of the brackets 41 and 42 have aligned holes through which a threaded bar 45, which constitutes a lever in the manner described hereinafter, is passed. Nuts 46 secure the lever 45 to bracket 41 and similar nuts 47 secure said lever to the brackets 42. The lever 45 terminates in a ball 50. Extending between the

lever 45 and the crank 19 is a connecting rod 60 which is provided at the upper end thereof with a socket 61. The ball 50 is rotatably mounted in the socket 61 and thus the rod 60 is operatively connected to the seat 30 by means of the lever 45 and associated parts to effect a universal connection between the seat and the connecting rod.

The connecting rod 60 is formed of an upper rod 63 which is slidably received within a lower tube 64. The upper edge of the lower tube 64 has a cut-away portion 65, see FIG. 3, and a collar 66 is firmly secured to the tube end to encircle this cut-away portion. A boss 67 is formed on the portion 66 and is provided with a screw-threaded opening 68 in which a wing bolt 69 is located, the bolt projecting through the portion 65 to engage the rod 63. In this way the rod 63 can be adjusted telescopically within the tube 64 and can be clamped in any position by turning the wing bolt 69 whereby to accommodate variations in the height of the seat 30 above the base plate 11.

Additionally the length of the connecting rod 60 can be varied to accommodate lengthwise adjustment of the lever 45 within the L-shaped brackets 41 and 42. By adjusting the position of the lever 45 whereby to locate the ball 50 a selected distance from the bracket 41, the degree to which the seat 30 is rocked from side to side can be varied to suit the individual using the exercising apparatus 8.

The tube 64 forming the lower part of the connecting rod 60 is secured to the crank 19 of the pedal arm 18 by means of a clamp 72 to which the lower end of the tube is pivotally secured by means of a rivet or other pin 73.

In the operation of the exercising apparatus 8, the user sits on the seat 30 with his feet on the pedals 17 and 20 and operates the rotary drive 24 to rock the seat from side to side. In order to maintain his balance and keep his head and chest upright as is desirable the user is forced to move his pelvis with the seat 30 and this exercises the waist and leg muscles as well as having beneficial effect on the internal organs.

The apparatus 8 can readily be converted to a normal exercising machine by loosening the wing bolt 69 to disconnect the tube 64 from the rod 63 so that these two parts are free to telescope one within the other. The clamping bolt 36 is then tightened to lock the seat 30 against rocking movement about the axle 35 whereupon the apparatus 8 can be pedalled in the manner of a conventional exercising machine.

The embodiment of the invention illustrated in FIGS. 4 and 5 is a stationary bicycle type exerciser. This exercising apparatus which is generally indicated by the numeral 80 comprises a frame 82 having a tubular post 83 which is secured to the floor by a base plate 84 and platform 85. A rod 87 is telescopically received in the upper end of the post 83 and handle bars 88 are fitted to this extension. The handle bars 88 are adjustable as to height by virtue of a clamping ring 89 which secures the rod 87 within the post 83.

A second post 92 is secured to a base plate 93 in a position spaced from the post 83. At the upper end of post 92, a telescoping rod 94 supports a seat 95. The seat 95 is made vertically adjustable by means of a clamping ring 96 which locks the rod 94 to the post 92. Upper end 98 of the rod 94 is bent to be horizontal or nearly so and is received within a cylindrical split bearing 99 secured to the underside, of the seat 95. Thus

the seat 95 is rockably mounted on the rod 94 for side to side movement. Clamping bolts 100 extend through to bearing 99 to permit the seat 95 to be locked in a horizontal position if desired.

A transverse lever 104 is operatively connected to the seat 95 by means generally indicated at 105, which connecting means may be of the same construction as used on the apparatus 8. Lever 104 is connected to a rod 106 by a ball and socket joint generally indicated at 108.

Apparatus 80 is provided with a rotary drive generally indicated at 112. As shown in FIGS. 4 and 5, the apparatus 80 has a third post 114 and the rotary drive 112 is carried by this post. The third post 114 supports a bearing 115 which journals a transverse shaft 116 upon which pedal arms 117 and 118 are secured in conventional fashion. The shaft 116 carries an eccentric element or cam 120 to which the lower end of the connecting rod 106 is secured by means of a pin 121 and a collar 122. It will be appreciated that, as the pedal arms 117 and 118 are turned and the connecting rod 106 is reciprocated, the seat 95 is caused to rock about the axis of the bearing 99. Thus, the same beneficial exercise can be obtained from the apparatus 80 as is derived from use of the apparatus 8.

The connecting rod 106 is constructed of telescoping parts which are adjustable as to length to accommodate different seat heights in the manner described with reference to the embodiments in FIGS. 1, 2 and 3. Also the parts of the rod 106 can be disconnected to permit relative movement of the rod parts and the seat 95 can be fixed in a horizontal position by tightening the clamping bolts 100.

It is thought convenient that the apparatus 80 be provided with a damping piston and cylinder unit 130 against which the user of the apparatus can exert himself in turning the pedals. The unit 130 is pivotally connected as at 132 (FIG. 4) to the post 83 and is similarly connected as at 131 (FIG. 6) to the collar 122 which is rotatably mounted on the cam 120.

Additionally it is considered desirable to mount a partially braked fly wheel 136 on a post 137 and to connect the flywheel through a sprocket and chain drive 139 to the shaft 116 whereby said flywheel is driven by rotation of the pedals. Also the pedals 117 and 118 may be mounted on the transverse shaft 116 to be angularly adjusted relatively thereto and in this way can vary the exercise obtained by the user of the apparatus.

In FIG. 7 there is illustrated still another embodiment of the present invention, this apparatus 140 being a wheeled bicycle. The bicycle apparatus 140 is largely of conventional construction except that it has a cam 142 fitted to a shaft 143 of the rotary drive means 145 thereof. A connecting rod 147 operatively connects the cam 142 to connecting means 149 carried by a seat 150. The seat 150 is secured as at 152, and in the same manner as is shown in FIG. 5 for example, so that it can rock from side to side as the bicycle is pedalled along the road.

When the apparatus 140 is pedalled along somewhat in the manner of a conventional bicycle, the rider is required not only to keep his balance but also to maintain the upper part of his body in a substantially vertical position and in order to do this he must move his pelvis with the laterally rocking seat. This exercises the leg and waist muscles as before and at the same time the

rider receives the normal stimulation of the forward motion experienced when riding a bicycle.

Should the rider tire from the additional exercise supplied by the rocking motion of the seat 150 it is a simple matter to disconnect the two parts of the connecting rod 147 so that no drive is transmitted thereby. The seat 150 is then locked in the normal horizontal position of use by the means 152 whereupon the exercising apparatus 140 is converted to a conventional bicycle.

Referring now to the embodiment of the invention shown in FIG. 8, the numeral 160 indicates an exercising apparatus in the form of a wheelchair. The wheelchair apparatus 160 comprises a frame 162 mounted on ground engaging wheels 163 and 164 as well as castor wheels 165 and 166. A transversely extending axle shaft 170 is journaled in the frame 162 and the wheels 163 and 164 are suitably mounted on the ends of this shaft so that the chair can be maneuvered while the shaft is being rotated. The frame 162 is provided with a fixed backrest 172 and a rockingly mounted seat 174. The frame 160 and the seat 174 have overlapping hinge plates 175 and 176, see particularly FIG. 9, these plates being interconnected by longitudinally aligned hinge pins 177 whereby the seat can rock from side to side.

Apparatus 160 includes a rotary drive generally indicated at 180 and having an eccentric element which consists of a crank 181 formed on the shaft 170. A rod 184 normally connects the cranked portion 181 of the shaft to a bracket 185 secured to the underside of the seat 174. Rod 184 is universally connected as at 188 to the crank 181 and to provide such a connection said shaft is fitted with a slidably and rotatably mounted ball 189, see particularly FIG. 10. A ring 190 formed on the lower end of the connecting rod 184 encloses the ball 189 and this ring is secured to said ball by means of pivot pins 191. The ball 189 is free to rotate about the shaft 170 and the rod 184 can pivot relative to said ball and this forms the universal connection 188. In order to secure the connection 188 in a selected position on the shaft 170, a pair of collars 193 are mounted on the shaft one on either side of the ball 189. Clamping bolts 194, see particularly FIG. 8, fix the slidably mounted collars 193 to the shaft 170.

An identically constructed universal connection 197 (FIG. 8) secures the opposite end of the rod 184 to the bracket 185. A pair of collars 198 fitted with clamping bolts 199 hold the connection 197 in a selected position on the bracket 185.

It will be noticed that the bracket 185 is disposed parallel to the crank 181 and that both these members are spaced to one side of the hinge pins 177 which secure the seat 174 to the horizontal members of the frame 160. When the connecting rod 184 is positioned at the extreme right (FIG. 8), the maximum throw of the crank 181 is used and as the wheelchair apparatus 160 is wheeled along, the seat 174 is tilted from side to side. The seat occupant once again is required to swivel his pelvis with the seat 174 and, in doing so, performs the same beneficial exercise as before. The effective throw of the crank 181 can be decreased by moving the connecting rod 184 to the left (FIG. 8), this being done by adjustment of the collars 193 and 198, and thus the degree to which the seat 174 is tilted or rocked from side to side can be varied to suit the individual using the wheelchair apparatus 160. If it is considered desirable that the seat 174 remain stationary, the rod 184 is

moved inwardly or off the crank 181 entirely and on to the straight portion 185A of the bracket 185.

It is to be appreciated that with the embodiments of the invention illustrated herein the user is obliged to curve the spine laterally to maintain an upright attitude as the seat rocks. This action is one which not only exercises the muscles of the trunk but also causes the contents of the abdominal cavity alternatively to be compressed and extended in a beneficial manner. Such an exerciser is considered to be extremely useful to people in sedentary occupations and it is considered that the invention may find application in for example office chairs where the rotary drive to the seat could take the form of a small motor.

The backrest 172 has been described as being fixedly secured to the frame 162 and this is an important feature of the wheelchair apparatus 160. A person using the apparatus 160 for exercise may lean forward slightly to clear the backrest 172 but, if he wants to exert an even greater effort, he can press rearwardly against the backrest so that he must keep the upper part of his body stationary. The head and shoulders then will have little tendency to sway from side to side and only movements of the waist and pelvis will be made to follow the side to side rocking motion of the seat 174. A similar fixed backrest can quite readily be incorporated into the other embodiments of the invention.

The seats of the four embodiments of the exercising device have been shown mounted for rocking movement about a horizontal axis extending longitudinally of the exercisers and lying in a generally vertical plane but it will be noted said axis does not have to be truly horizontal. In FIG. 11 for example, seat 95A is shown to be rockingly mounted on upper end 98A of the rod 94, this rod end being upwardly inclined at a slight angle to the horizontal. The generally horizontal seat 95A is provided with a split bearing 99A which is fitted with clamping bolts 100A as before, the remainder of apparatus being constructed as previously described for the embodiment shown in FIGS. 4, 5 and 6. Similarly, the other three embodiments can have their seats tilted from the horizontal to change the seat action.

As the seat 95A is rocked from side to side in the above described manner, the tilted position of the rod end 98A causes a slight turning movement of said seat. The person occupying the seat 98A is required to turn his pelvis for and aft to some extent as he moves it up and down with the side to side motion of the seat and this additional body movement increases the benefits derived from use of the apparatus.

I claim:

1. Exercising apparatus comprising a frame, a seat pivoted to the frame for side to side rocking movement, a bicycle-type pedal drive mounted on the frame including a rotatable shaft extending transversely of said frame, an element rotatable with the shaft and eccentric thereto, a connecting rod, first means pivotally connecting one end of the connecting rod to the seat and including lever means, and second means pivotally connecting an opposite end of the connecting rod to the eccentric element whereby a person seated on the seat and pedalling the pedal drive with his feet causes said seat to rock from side to side, said lever means including adjustment means to vary the effective length of said lever means to vary the extent to which the seat is rocked from side to side upon rotation of the shaft.

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2. Exercising apparatus as claimed in claim 1, in which said connecting rod includes two interconnected elements secured together to permit disengagement of the seat from the pedal drive.

3. Exercising apparatus comprising a frame, a seat pivoted to the frame for side to side rocking movement, a bicycle-type pedal drive mounted on the frame including a rotatable shaft extending transversely of said frame, an element rotatable with the shaft and eccentric thereto, a connecting rod, first means pivotally connecting one end of the connecting rod to the seat, and second means pivotally connecting an opposite end

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of the connecting rod to the eccentric element whereby a person seated on the seat and pedalling the pedal drive with his feet causes said seat to rock from side to side, said first means including a lever extending transversely of the frame, said lever being adjustable to change the effective length thereof and thereby vary the extent to which the seat is rocked from side to side upon rotation of the shaft, and said connecting rod including two telescopically interconnected elements releasably secured together to permit disengagement of the seat from the pedal drive.

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