

June 29, 1954

P. CURTIS

2,682,401

SWING TYPE PHYSICAL EXERCISER

Filed July 9, 1952

3 Sheets-Sheet 1

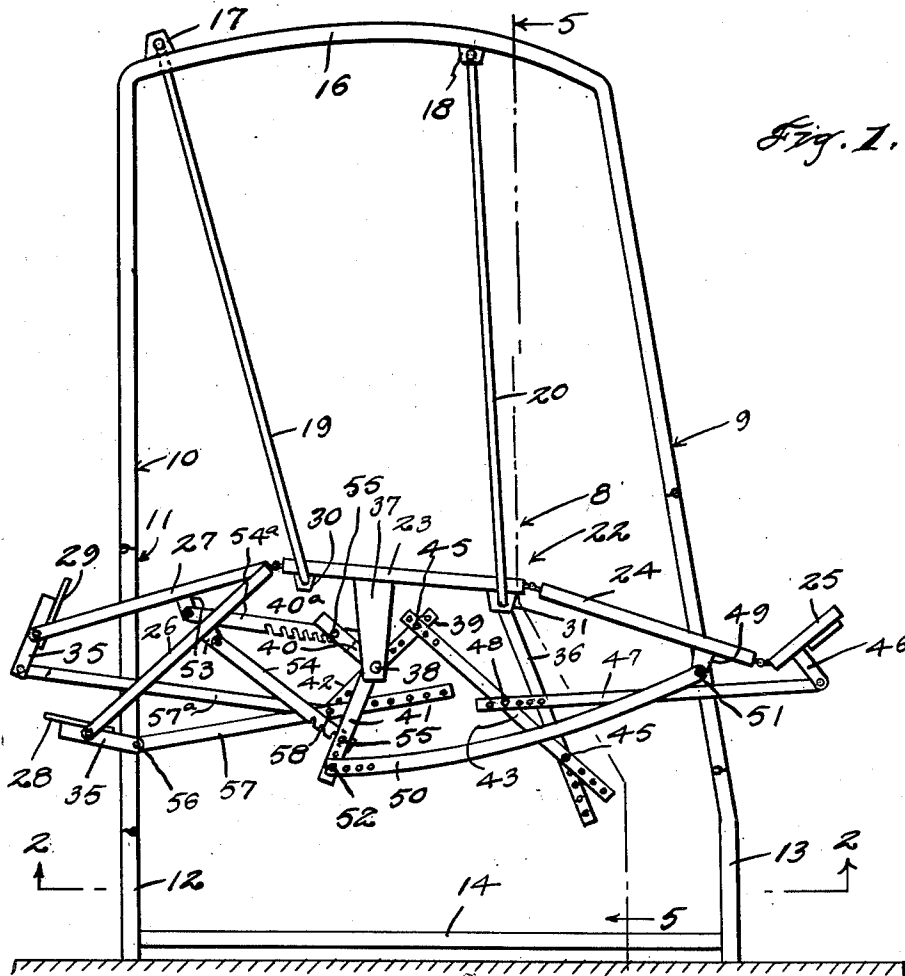


Fig. 1.

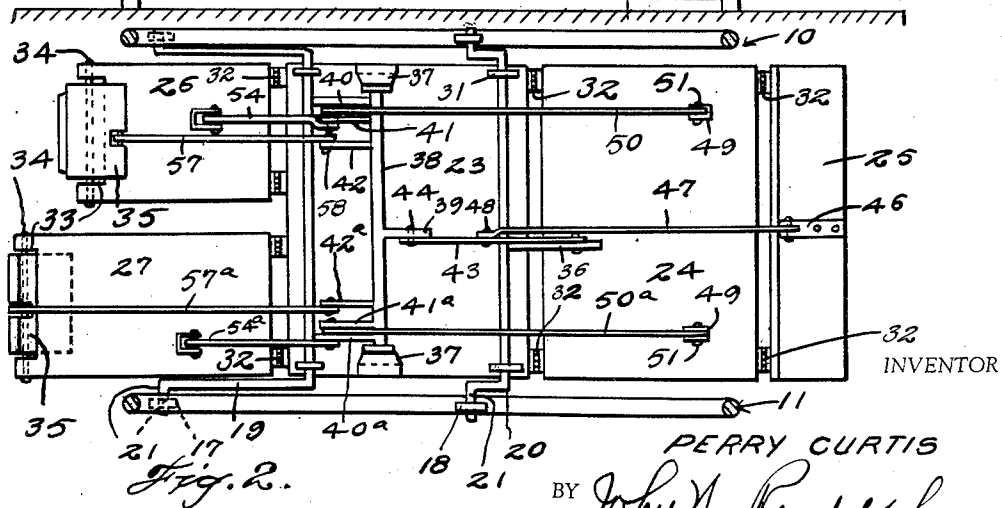


Fig. 2.

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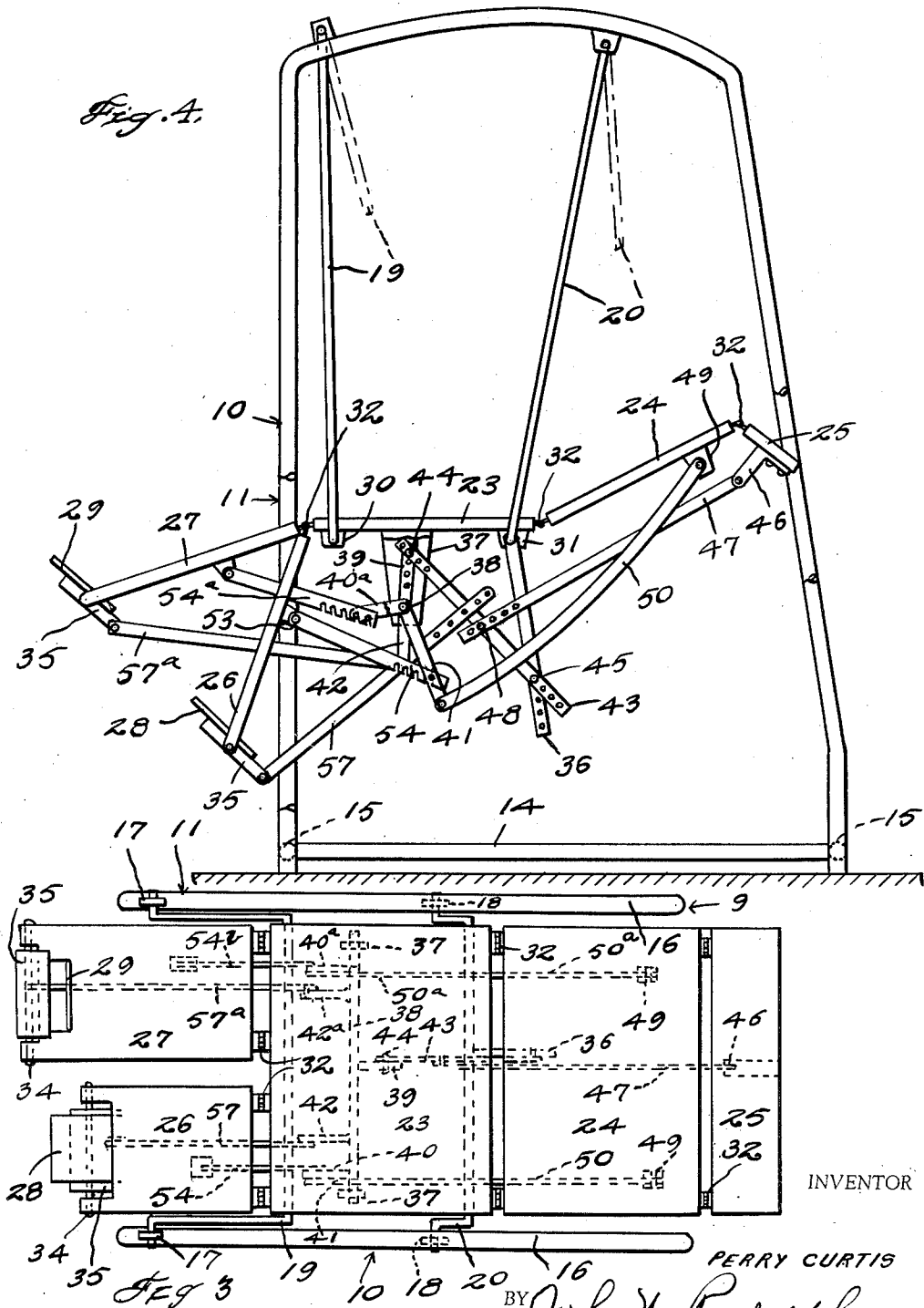
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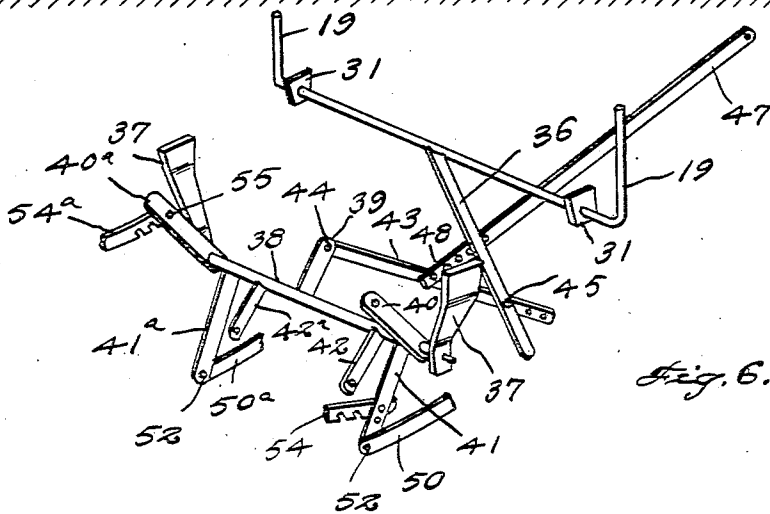
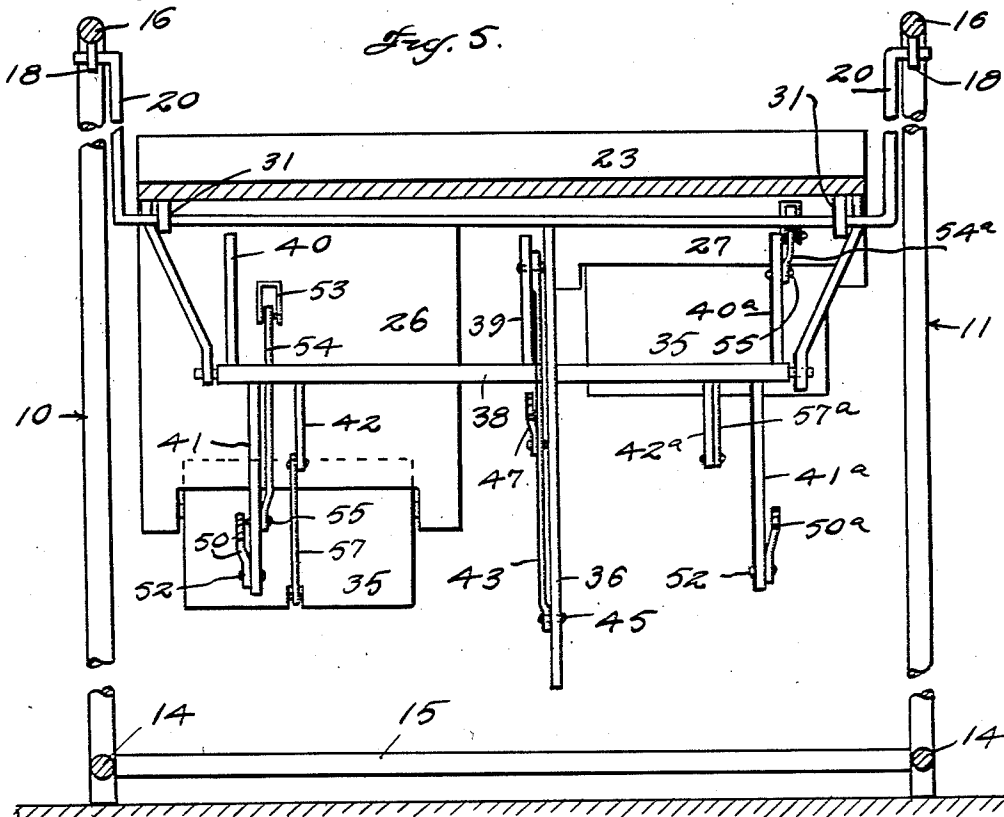
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3 Sheets-Sheet 3



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2,682,401

SWING TYPE PHYSICAL EXERCISER

Perry Curtis, Anaconda, Mont.

Application July 9, 1952, Serial No. 297,899

7 Claims. (Cl. 272-58)

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This invention relates to a novel construction of physical exerciser primarily adapted for use by persons too ill or infirm to stand on their feet but who are in need of muscular exercise, as for example during a convalescence period, to sufficiently strengthen the person to enable him or her to resume normal exercise.

More particularly, it is an aim of the present invention to provide a novel construction of swing or swing chair of relatively simple construction equipped with a novel ring and lever arrangement for imparting oscillating motion to a back rest, leg rests and other parts of the chair or occupant supporting structure.

Still a further object of the invention is to provide a swing type physical exerciser having adjustable link and lever means for varying the amount of movement imparted to different parts of the body supporting structure, in conformity with the type of exercise and the amount of exercise required for the user.

Still a further object of the invention is to provide a swing type physical exerciser including swingably supported hanger members by which the occupant supporting structure is suspended, one of which hanger members functions for actuating link and lever means to impart oscillation to movable elements of the body supporting structure.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view, partly broken away, showing the physical exerciser in one position of its movement;

Figure 2 is a horizontal sectional view thereof taken substantially along a plane as indicated by the line 2-2 of Figure 1;

Figure 3 is a top plan view thereof;

Figure 4 is a side elevational view, similar to Figure 1 but showing the swingably supported parts of the exerciser in another position of their movement;

Figure 5 is a fragmentary transverse vertical sectional view taken substantially along a plane as indicated by the line 5-5 of Figure 1, and

Figure 6 is a perspective view of the linkage means of the device.

Referring more specifically to the drawings, the swing type physical exerciser in its entirety is designated generally 8 and in the embodiment thereof as illustrated, includes a supporting frame, designated generally 9, composed of cor-

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responding arch shaped sides 10 and 11, the lower ends of the legs 12 and 13 of which are adapted to rest on a suitable supporting surface, as illustrated in Figure 1. The front and rear legs 12 and 13, respectively, of each of the sides 10 and 11 are connected adjacent their lower ends by a brace 14. The two front legs 12 and the two rear legs 13 of the frame sides 10 and 11 are likewise connected near their lower ends by cross braces 15, as best seen in Figure 5. The upper portions 16 of the frame sides 10 and 11 are each provided with a front bearing element 17 and a rear bearing element 18. A front hanger 19 is swingably supported at its upper end in the frame 9 by the bearing elements 17 and a rear hanger 20 is swingably supported in the frame 9 by the rear bearing elements 18. The hangers 19 and 20 are each substantially U-shaped and the legs thereof are provided with outturned terminal portions at their upper ends as seen at 21 which turnably engage the bearing elements 17 and 18.

The body supporting structure, designated generally 22 of the physical exerciser 8 includes a seat 23, a back rest 24, a head rest 25, two leg rests 26 and 27 and two foot rests 28 and 29. The seat 23 adjacent its ends and near its side edges is provided with depending bearing elements 30 and 31. The bottom, intermediate portion of the front hanger 19 is disposed beneath the front portion of the seat 23 and extends through and is journaled in the two front bearing elements 30. The intermediate bottom portion of the rear hanger 20 is similarly disposed beneath the rear end of the seat 23 and is journaled in the two rear bearing elements 31. The rear end of the seat 23 is connected to the forward or inner end of the back rest 24 by hinges 32. Additional hinges 32 connect the outer end of the back rest 24 to an inner end of the head rest 25 and other hinges 32 connect the forward end of the seat 23 to each of the leg rests 26 and 27 individually, at inner ends of said leg rests. The leg rests 26 and 27 are provided with notches 33 in their outer ends to receive the foot rests, portions of which are loosely disposed in said notches. Pins 34 extend transversely across the outer ends of the leg rests and transversely through the foot rests for pivotally connecting the foot rest 28 to the leg rest 26 and the foot rest 29 to the leg rest 27. The foot rests 28 and 29 are provided on their undersides with plates 35 which project from the inner or rear ends of said foot rests and from the undersides of the leg rests.

A lever 36 is fixed to and projects downwardly and rearwardly from the intermediate portion of the rear hanger and is disposed preferably at an angle slightly less than 180° to the plane of said hanger, as illustrated in Figure 1. A pair of transversely aligned hanger bearings 37 are fixed to and depend from the sides of the seat 23 intermediate of its ends. A shaft 38 is journaled adjacent its ends in the hanger bearings 37 substantially below the seat 23 and has a plurality of fixed lever arms projecting transversely therefrom and which are rigidly secured thereto, including a lever arm 39 which normally extends upwardly and rearwardly therefrom, a pair of lever arms 40 and 40a which normally extend upwardly and forwardly from the shaft 38, one adjacent each end thereof, a pair of downwardly extending lever arms 41 and 41a, disposed adjacent the lever arms 40 and 40a, respectively, and a pair of downwardly extending shorter lever arms 42 and 42a, which are disposed between the lever arms 41 and 41a and adjacent said lever arms 41 and 41a, respectively.

A rigid connecting link 43 is pivotally and adjustably connected adjacent one end thereof by a pivot pin 44 to the lever arm 39, said pivot pin connecting the link 43 and lever arm 39 at different distances from the outer ends of said lever arm 39 and from the adjacent end of the link 43. A pivot pin 45 connects the link 43 near its opposite end to the actuating lever 36 at different distances from the outer, lower end of the lever 36 and from the last mentioned, lower end of the link 43, which link is inclined downwardly and rearwardly from the arm 39.

A bifurcated ear 46 is secured to and projects from the underside of the head rest 25, intermediate of the ends thereof and is pivotally connected at its outer end to the rear end of a rigid link 47. The link 47 is connected adjacent its forward end by a pivot pin 48 to the intermediate portion of the link 43 and by means of which the link 47 may be connected at different distances from its forward end to different spaced portions of the link 43. The back rest 24 is provided with a pair of bifurcated lugs 49 which are secured to and project from its back side in transversely spaced relationship to one another and to which the rear ends of a pair of rigid links 50 and 50a are pivotally connected by pivot pins 51. The forward end of the link 50 is pivotally connected by a pivot pin 52 to the lever arm 41 and the forward end of the link 50a is similarly connected by another pivot pin 52 to the lever arm 41a, said pivot pins 52 connecting the links 50 and 50a to portions of the lever arms 41 and 41a spaced different distances from their outer ends and additionally connecting said lever arms to longitudinally spaced portions of the forward ends of the links 50 and 50a. The leg rests 26 and 27 have bifurcated lugs 53 fixed to and projecting from the undersides thereof. The lug 53 of the leg rest 26 is pivotally connected to the forward end of a rigid link 54, the rear end of which is pivotally connected by a pivot pin 55 to the lever arm 41, by means of which the link 54 may be connected different distances from the ends of the lever arm 41 and the lever arm can be connected to the link 54 at different distances from its rear end. A link 54a is pivotally connected at its forward end to the lug 53 of the leg rest 27 and is pivotally connected near its rear end by a second pivot pin 55 to the lever arm 40a at different distances from the outer end of said lever arm. The rear

end of the plate 35 of the foot rest 28 is pivotally connected by a pivot pin 56 to the forward end of a rigid link 57, the rear end of which is pivotally connected by a pivot pin 58 to the lever arm 42. A link 57a is pivotally connected at its forward end to the plate 35 of the foot rest 29 and at its rear end by a pivot pin 58 to the lever arm 42a. The pins 58 are adjustably connected to the links 57 and 57a and to the lever arms 42 and 42a to vary the throw of said lever arms and the effective lengths of the links.

The seat 23, back rest 24, head rest 25 and leg rests 26 and 27 may be of any desired construction, for example may include frames across which are stretched and secured upholstery tape or springs, not shown, on which suitable cushions, not shown, may be mounted, or said parts may be of solid construction. Assuming that the aforementioned parts and the hangers 19 and 20 are swung rearwardly, as seen in Figure 1, the back rest, head rest, leg rests and foot rests will assume substantially the positions as seen in Figure 1. As the hangers 19 and 20 and parts supported thereby are swung forwardly from their positions of Figure 1 toward their positions of Figure 4, the actuating lever 36 will swing downwardly in a clockwise direction exerting a thrust on the link 43 and lever arm 39 to cause the shaft 38 to turn counterclockwise as seen in Figures 1 and 4. A forward pull is thus exerted on the link 47 to cause the head rest 25 to swing downwardly relatively to the back rest 24 on its hinges 32. The rearward swinging movement of the lever arms 41 and 41a exerts a rearward thrust on the links 50 and 50a causing the back rest to be swung upwardly from its position of Figure 1 to its position of Figure 4. At the same time, the seat 23 swings to and beyond a horizontal position due to the fact that the lower end of the hanger 19 is swinging downwardly whereas the lower end of the hanger 20 swings upwardly as the hangers approach their positions of Figure 4. The forward movement of the parts from their positions of Figure 1 to their positions of Figure 4 causing counterclockwise turning of the shaft 38, as viewed in these figures, also exerts a pull on the link 54 due to the rearward swinging movement of the lever arm 41 to pull the leg rest 26 downwardly. However, as the link 54a is pivotally connected to the upper lever arm 40a said link is thrust forwardly by the forward swinging movement of the lever arm 40a to swing the leg rest 27 upwardly. The arms 42 and 42a also swing rearwardly to exert a rearward pull on the links 57 and 57a. As the leg rest 27 is moving upwardly, this will cause the link 57a to swing the foot rest 29 outwardly on its pivot 34 relatively to the leg rest. However, as the leg rest 26 is also swinging downwardly and as the throw of the lever arm 41 is greater than that of the lever arm 42, the link 57 will actually exert a forward thrust on the plate 35 of the foot rest 28 to swing said foot rest upwardly or inwardly of the leg rest 26. It will thus be seen that the leg rest 27 will swing in an arc above the level of the leg rest 26 when the parts are connected as illustrated and previously described. However, by attaching the link 54 to the lever arm 40, the leg rests 26 and 27 will remain coplanar in their swinging movement as will the foot rests 28 and 29, or by attaching the link 54 to the lever arm 40 and the link 54a to the lever arm 41a, the leg rests 26 and 27 may be reversed.

As the swingably mounted parts move rearwardly from their positions of Figure 4 to their

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positions of Figure 1, the actuating lever 36 swings counterclockwise to exert a pull on the lever arm 39 through the link 43 to turn the shaft 38 clockwise as seen in Figures 1 and 4, to reverse the action previously described and so that the back rest 24 will be swung downwardly, the head rest 25 will be swung upwardly, the leg rest 26 will be swung upwardly, the leg rest 27 will be drawn downwardly, the foot rest 28 will be swung outwardly and the foot rest 29 will be swung inwardly.

It will also be readily apparent that the frame 9 may be omitted and the hanger supporting bearings 17 and 18 secured to a supporting surface such as a ceiling for suspending the hanger and the parts supported thereby from an overhead support and without the use of the frame 9.

It will also be apparent that the effective lengths of the various links and lever arms may be varied by the pivot pins for varying the positions and extent of movement of the back rest, head rest, leg rests and foot rests.

As clearly illustrated in Figures 1 and 4, the journal members 17 and 18 are spaced a greater distance apart than the journal members 30 and 31 so that the lower end of one of the hangers will be swinging downwardly as the lower end of the other hanger is swinging upwardly to thereby increase the oscillatory movement of the seat 23 when swung forwardly and rearwardly with the hangers 19 and 20 to thus augment the movement of the parts which are hingedly supported by the seat and to increase the amount of exercise thus furnished the occupant of the apparatus 8. However, it will be understood that the journals 17 and 18 may be spaced the same distance apart as the journals 30 and 31 if it is not desired to thus increase the rocking movement of the seat 23 and the back rest and leg rests.

The exerciser 8 may be operated either by the occupant or by an attendant, depending upon the physical condition of the occupant. If the occupant has sufficient strength in his legs he can operate the exerciser by alternately pushing outwardly against the foot rests 28 and 29. If the occupant has sufficient strength in his arms he may operate the apparatus by alternately pushing and pulling on the legs of the rear hanger 20. The occupant can also operate the exerciser by a combination arm and leg operation as previously described, depending upon the strength of the arms and legs and the need for exercise thereof. As in the operation of a conventional swing, a constant pumping movement is not required. If the occupant is not physically able to operate the exerciser, an attendant may operate the apparatus while standing on either side thereof and manually engaging the adjacent legs of the hangers 19 and 20, or either of said legs, for swinging the hangers and the parts supported thereby to the left and right, as seen in Figure 1.

Various other modifications and changes are likewise contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A swing type physical exerciser comprising a pair of substantially U-shaped hangers, journal means swingably supporting said hangers at their upper ends, a seat supported adjacent its forward end on the intermediate portion of one of said hangers and adjacent its rear end on the

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intermediate portion of the other hanger, journal members secured to the seat in which the intermediate portions of the hangers are journaled, a back rest having one end swingably connected to the rear end of the seat, leg rests having inner ends swingably connected to the forward end of the seat, a shaft disposed beneath and transversely of the seat, journal elements supporting and journalling said shaft and secured to and depending from the seat, an actuating lever fixed to and projecting from the intermediate portion of one of the hangers, a plurality of longitudinally and circumferentially spaced lever arms fixed to and projecting from said shaft, a link connecting one of the lever arms to the actuating lever for imparting an oscillating motion to the shaft and lever arms when the seat and parts supported thereby are swung by the hangers, link means connecting the back rest to at least one of the lever arms, and link members connecting the leg rests to different lever arms whereby the back rest and leg rests will swing individually relatively to the seat as said seat is swung forwardly and rearwardly in unison with the hangers.

2. A physical exerciser as in claim 1, said journal means supporting and journalling the upper ends of the hangers being spaced a greater distance apart than the journal members in which the intermediate portions of the hangers are journaled whereby the seat is caused to oscillate forwardly and rearwardly during its forward and rearward swinging movement to increase the effective swinging movement imparted to the back rest and leg rests.

3. A physical exerciser as in claim 1, a head rest swingably connected to the outer end of said back rest for swinging movement in unison therewith and relatively thereto, and a link connecting the head rest to the link connection to said one of the lever arms and actuating lever for causing the head rest to swing relatively to the back rest when the actuating lever is oscillated.

4. A physical exerciser as in claim 1, foot rests pivotally connected to the outer ends of the leg rests for swinging movement outwardly and inwardly with respect thereto, and links individual to said foot rests and connecting the foot rests to certain of said lever arms for causing the foot rests to oscillate relatively to the leg rests when the leg rests are swung by oscillating motion of said shaft.

5. A physical exerciser as in claim 1, a supporting frame including upright side members between which the seat, back rest, leg rests and hangers are swingably disposed, said supporting frame having top portions supporting said journal means.

6. A swing type physical exerciser comprising a seat, hanger members swingably connected at their lower ends to the seat adjacent forward and rear ends of the seat and extending upwardly therefrom, journal means supporting and journalling the upper ends of said hangers, a back rest swingably connected to and projecting from the rear end of the seat, a lever arm, means supporting and journalling the lever arm on the seat and therebeneath for swinging movement longitudinally thereof, link and lever means connecting one of said hangers to said lever arm for causing oscillation of the lever arm in response to swinging movement of said hanger, and a link connecting said lever arm to the back rest for causing the back rest to swing upwardly

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and downwardly relatively to the seat as the seat and back rest are swung forwardly and rearwardly with the hangers.

7. A physical exciser as in claim 6, individual leg rests swingably connected to the forward end of the seat, and individual link and lever means connecting the leg rests individually to said lever arm for individual swinging movement of the leg rests relatively to the seat as the seat is swung with the hangers.

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