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Glaser et al.

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[54] **BICYCLE TYPE EXERCISING MACHINE**

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[21] Appl. No.: **209,783**

[52] **U.S. Cl.** .....**272/73,** 128/25 R, 272/DIG. 4

[51] **Int. Cl.** **A63b 23/04**

[58] **Field of Search** .....272/73, 79 R, DIG. 3, 272/DIG. 4; 128/25 R

[56] **References Cited**

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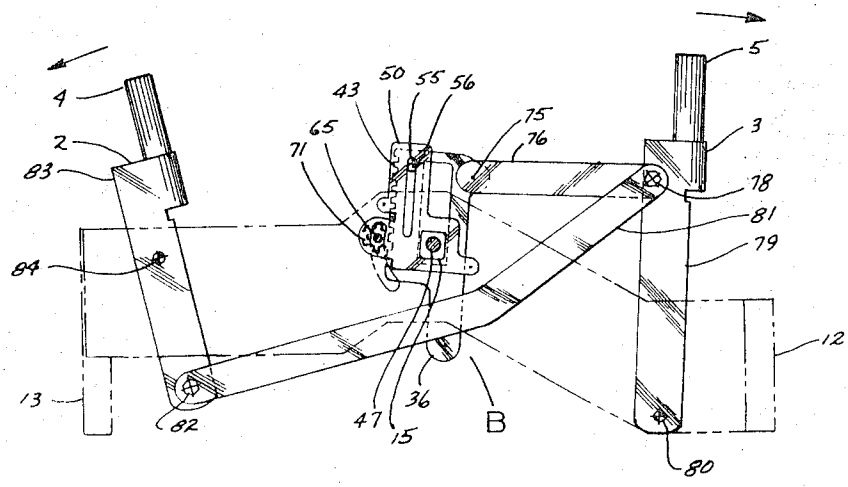
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[57] **ABSTRACT**

A bicycle exercising machine comprising a seat and a handle bar, pedal members for receiving the user's feet, and a mechanism for rotating the pedal members to simulate bicycle riding. Motion transmitting linkage interconnecting the seat and the handle bar is provided to effect movement of the same toward and away from each other simultaneously with cycling action; there being an adjustment member for controlling the relative movement of the seat and handle bar toward and away from each other to accommodate users of all sizes.

10 Claims, 8 Drawing Figures



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SHEET 1 OF 4

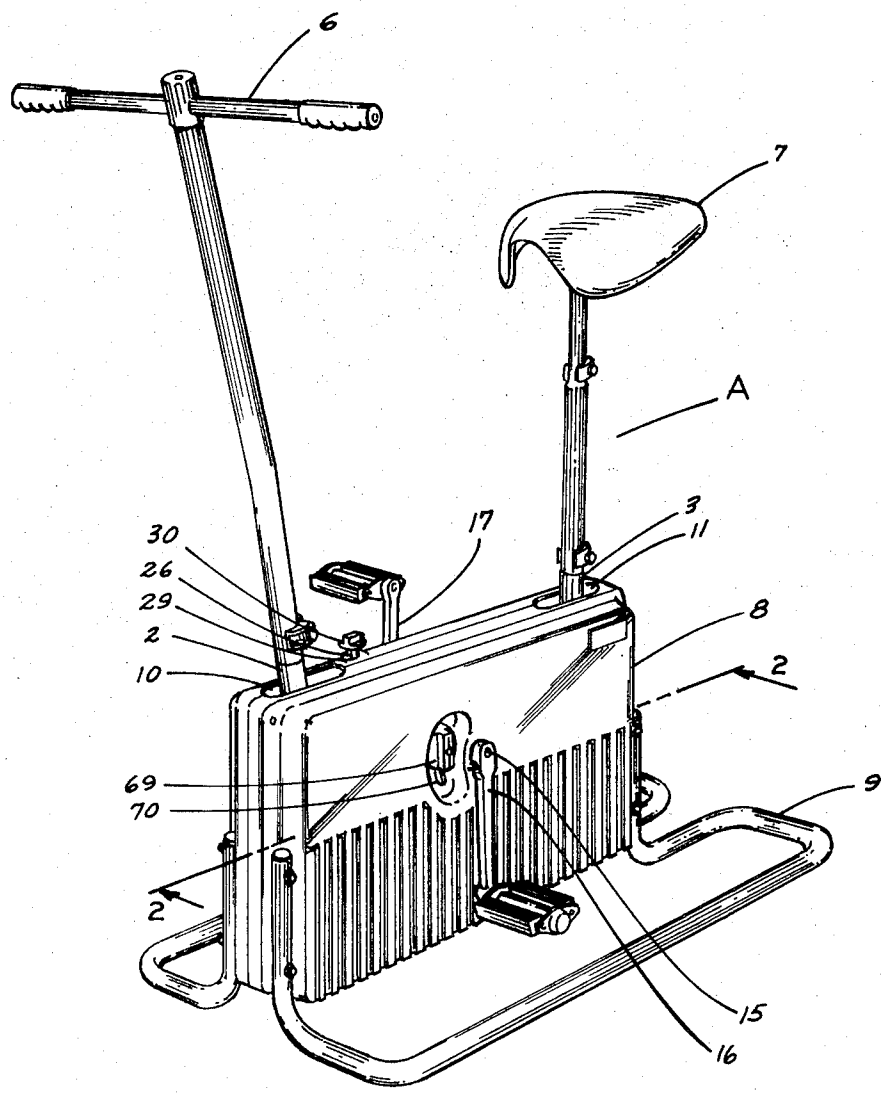


FIG. 1

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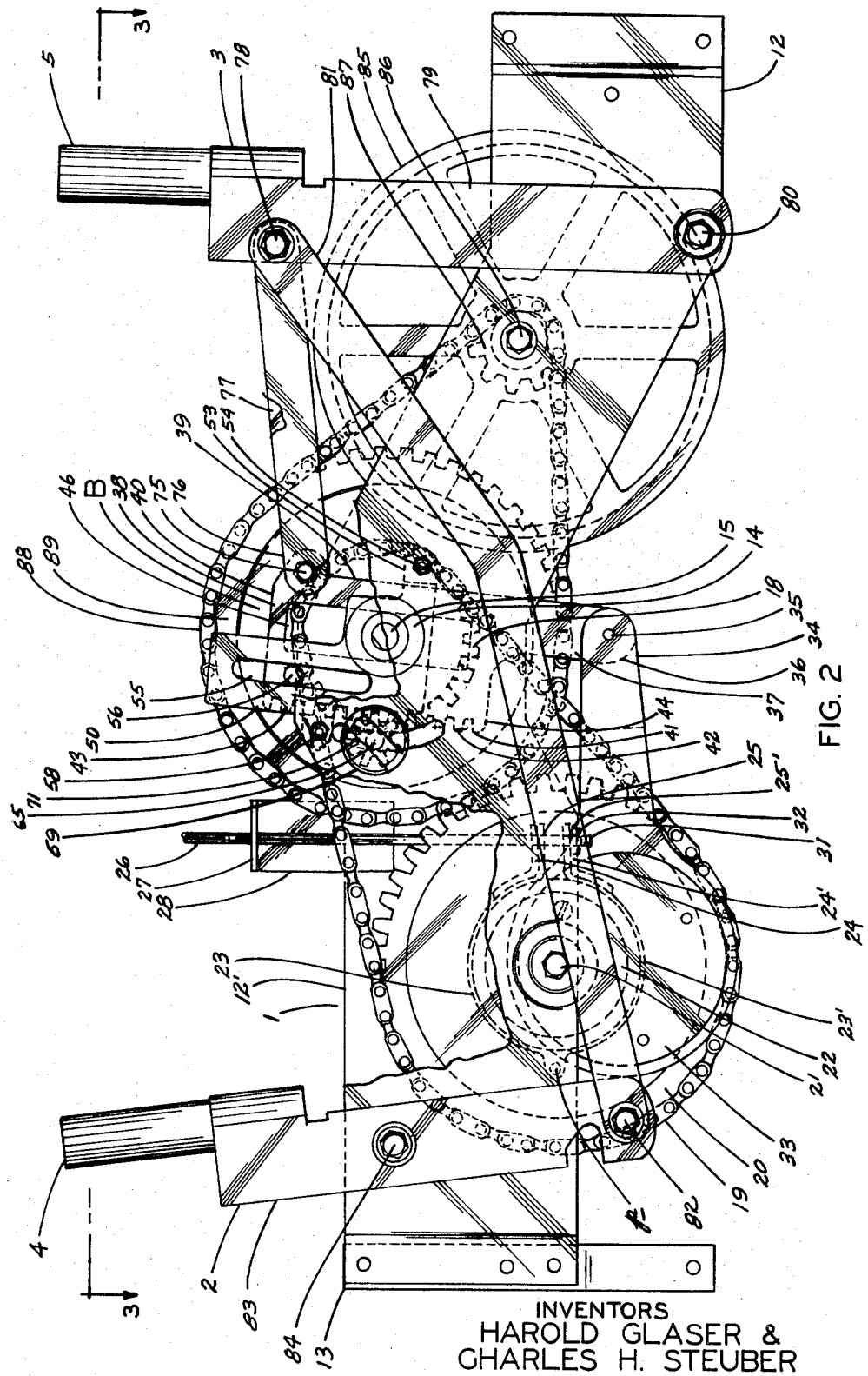


FIG. 2

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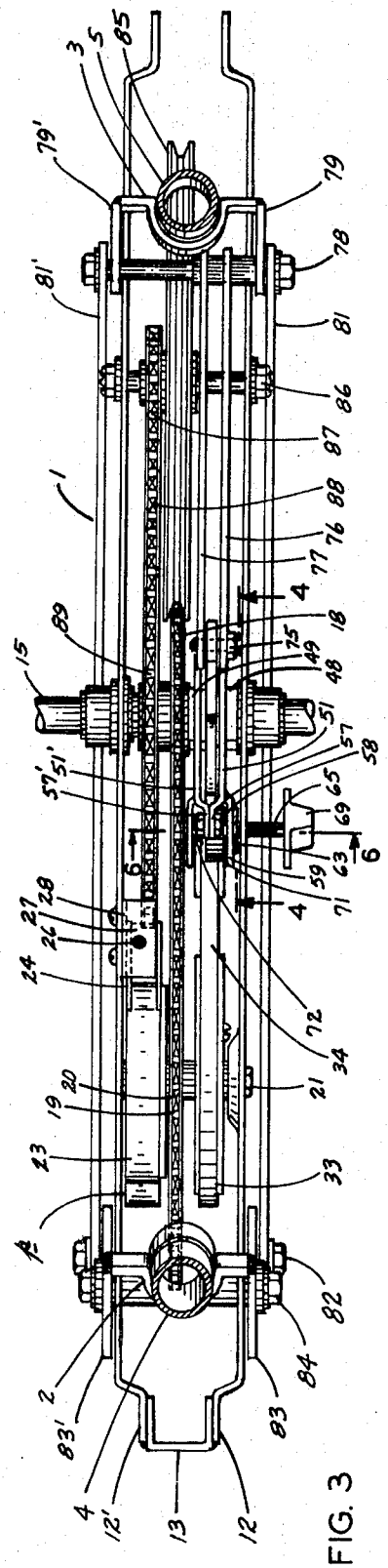


FIG. 3

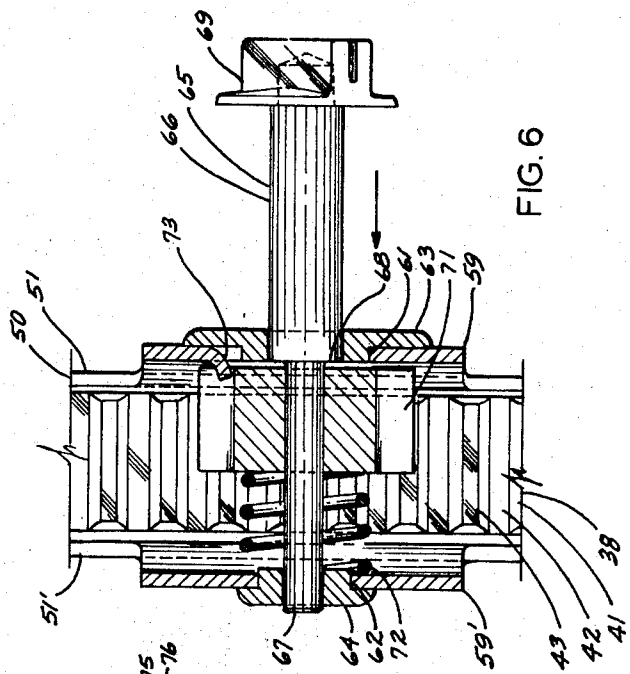


FIG. 6

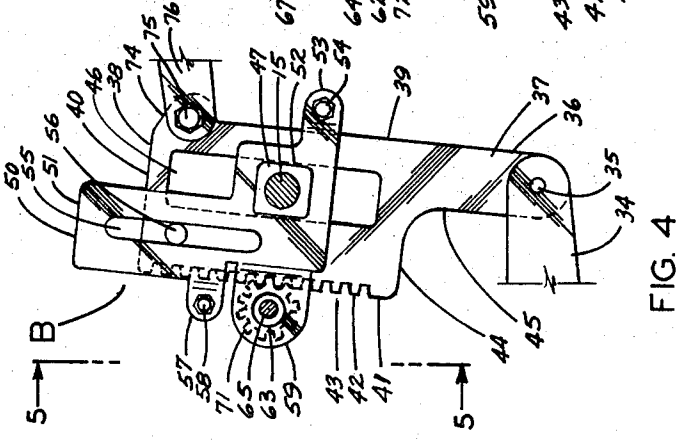


FIG. 4

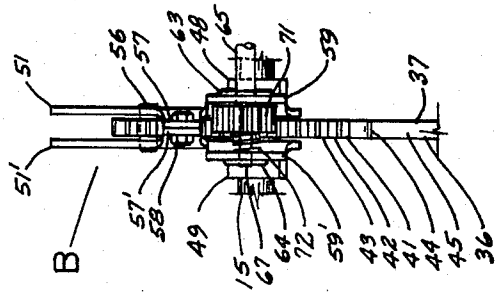


FIG. 5

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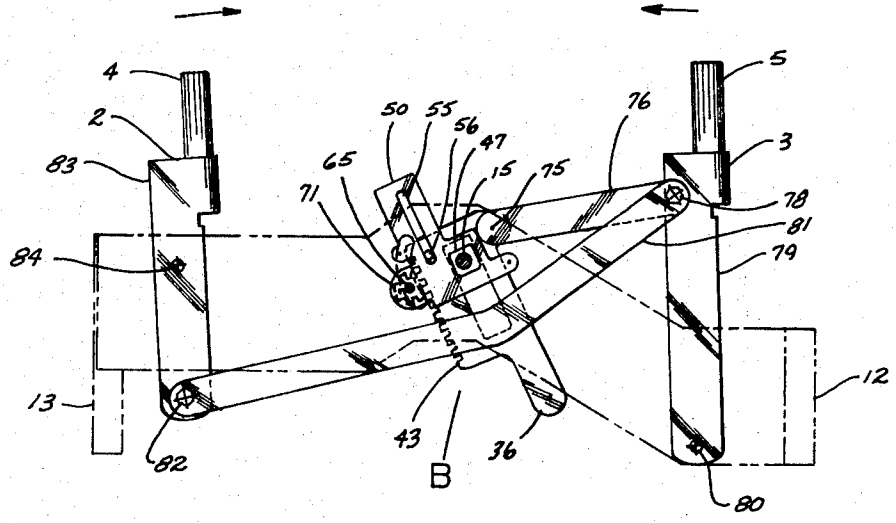


FIG. 7

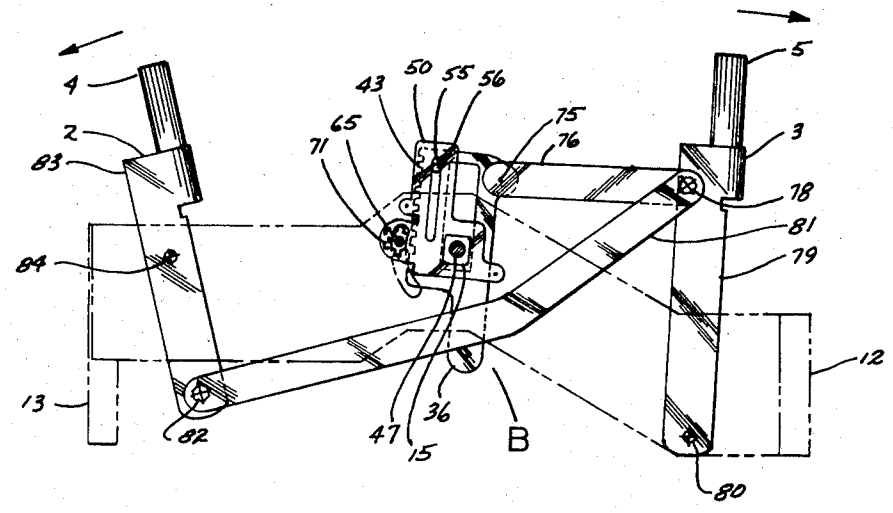


FIG. 8

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BICYCLE TYPE EXERCISING MACHINE

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates in general to exercising apparatus, and more particularly, to a bicycle type exercising machine.

It is an object of the present invention to provide a bicycle exercising machine for enabling users thereof to obtain the physical benefits of bicycle riding while remaining indoors or within any other protected area.

It is a further object of the present invention to provide a bicycle exercising machine which is adapted for use by individuals of all sizes and ages; being adjustable for requisite accommodation.

It is another object of the present invention to provide a bicycle exercising machine of the character stated which comprehends means for reciprocally moving the seat and handle bars toward and away from each other so as to accord the user to torso exercise in addition to the simultaneous pedaling operation.

It is a further object of the present invention to provide a bicycle exercising machine of the character stated which embodies unique adjustment means for controlling the relationship of the seat and handle bars so that comfort of the user is assured despite arm and leg lengths.

It is an additional object of the present invention to provide a machine of the character stated wherein the means for controlling the relationship of the seat and handle bars are easily operated by the user; such means being readily accessible and not requiring strength for operation so that the necessary adjustment can be made by any user.

It is a still further object of the present invention to provide a machine of the character stated having the indicated control means, which latter do not necessitate the utilization of extrinsic tools so that appropriate adjustment can be accomplished at any time without inconvenience.

It is another object of the present invention to provide a machine of the character stated which contains a simplicity of parts, the latter being sturdy and hence resistant to breakdown; which is durable and reliable in usage; which may be most economically manufactured; and which presents an extreme versatility in usage so as to provide the user with an overall beneficial form of physical exercise.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a bicycle exercising machine constructed in accordance with and embodying the present invention.

FIG. 2 is a fragmentary vertical transverse sectional view taken substantially on the line 2—2 of FIG. 1.

FIG. 3 is a horizontal view taken on the line 3—3 of FIG. 2. 0p FIG. 4 is an enlarged side elevational view of the adjustment mechanism. 0p FIG. 5 is a fragmentary vertical view taken on the line 5013 5 of FIG. 4. 0p FIG. 6 is a vertical transverse sectional view taken on the line 6013 6 of FIG. 3. 0p FIG. 7 is a schematic view illustrating the relationship of the operative components when said adjustment mechanism is at one limit of its adjusting range.

FIG. 8 is a schematic view illustrating the relationship of the operative components when said adjustment mechanism is in the other limit of its adjusting range from that illustrated in FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now by reference numerals to the drawings which illustrate the preferred embodiment of the present invention, A generally designates a bicycle exercising machine which broadly comprises an internal frame 1 for an operative system generally denoted *m* and including supports 2,3 for tubular extensions 4,5 which at their upper ends, respectively, carry a handle bar 6 and a seat 7. Encasing frame 1 and operating system *m* is a housing 8 which may be comprised of cooperating mutually disengageable sections for permitting ready access to the interior of said housing 8; there being a base 9 as constructed of formed tubular stock for stabilizing machine A in operative position. The upper surface of housing 8 is provided with relatively elongate openings 10, 11 for projection therethrough of said tubular extensions 4,5, respectively.

Machine A may be either pedal operated or, if desired, motor operated. However, for purposes of illustration said machine will be described herein as adapted primarily for pedal operation.

Frame 1 comprises a pair of spaced-apart, parallel plates 12,12' which at their opposite ends are partially converged toward each other and at their forward ends are integral with a closure channel 13. Substantially intermediate their lengths frame plates 12,12' are apertured for accepting bearings 14,14' within which is journaled a drive shaft 15 extending laterally beyond the related frame plates 12,12' and through openings (not shown) formed in the adjacent sides of housing 8. The ends of said drive shaft 15 have mounted thereon foot pedal cranks 16, 17 whereby shaft 15 may be rotated in the manner of a bicycle by the occupant of seat 7. Carried upon shaft 15 between frame plates 12,12' is a sprocket 18 which is connected by an endless drive chain 19 to a relatively enlarged sprocket 20 fixed upon a countershaft 21 journaled at its ends in frame plates 12,12' forwardly of shaft 15. It will thus be seen that the diameter of sprocket 20 is substantially greater than sprocket 18 to effect a requisite stepped down ratio. Provided on one side of sprocket 20, that confronting, preferably, frame plate 12', there is mounted upon countershaft 21 a brake drum 22 about the periphery of which is disposed upper and lower brake bands 23,23'. Said bands 23,23' at their forward ends are pivotally engaged to a pin *p* and at their rearward ends are each provided with rearwardly extending vertically registering flanges 24,24', respectively. The flanges 24,24' have aligned openings 25,25' for extension therethrough of vertically presented control rod 26 which latter in its upper portion extends through the horizontal flange 27 of an angle-shaped mounting member 28 and thence upwardly through an opening 29 in the upper portion of housing 8 for receiving a control knob 30 upon its upper extremity. The lower end of rod 26 is threaded, as at 31, for engagement within a nut 32 rigid on the underside of flange 24'. By rotating knob 30 in one direction said flanges 24,24' may be moved relatively toward each other for tightening bands 23,23' about drum 22 for increasing the fric-

tion upon shaft 21 in order to provide the user with such resistance as may be selected. Conversely, by rotating knob 30 in the opposite direction the resistance of shaft 21 may be relatively decreased.

Also mounted upon shaft 21, on the side of sprocket 20 opposite brake drum 22 is an eccentric 33 carrying on its periphery a rearwardly extending crank 34 which at its rearward, free end is engaged, as by pin 35,to the lower end of an arm 36 formed with, and depending from, the body 37 of the throw control member 38 of an adjustment mechanism B. Said body 37 is of flat plate character having a rearward linear edge 39, the lower portion of which is coincident with arm 36; a top edge 40 axially normal to rearward edge 39; a forward edge 41 parallel to rearward edge 39 and being provided throughout its extent with a vertical series of teeth 42 to constitute a rack generally denoted 43; said forward edge 41 is of less length than rearward edge 39 being continuous with a short bottom edge 44, parallel to top edge 40; the rearward portion of bottom 44 merging into the forward margin 45 of arm 36. Provided within body 37 upwardly of arm 36 and offset to the rearward portion thereof is an elongated, preferably rectangularly contoured opening 46 for defining a slideway; the longitudinal axis of said opening being parallel to forward and rearward edges 39,41. The transverse extent of opening 46 is greater than the diameter of drive shaft 15 which extends therethrough; said member 38 being located between sprocket 18 and frame plate 12. Disposed upon the portion of shaft 15 within opening 46 is a guide 47 of generally square cross section for slidable engagement, on opposed surfaces, with the normally front and rear sides of opening 46. Guide 47 is freely moveable lengthwise of shaft 15 so that rotation of the latter is unimpeded therein; there being spacers 48,49 provided on shaft 15 to prevent axial displacement therealong of guide 47 so as to assure appropriate operative connection of adjustment mechanism B and shaft 15.

Coordinating with throw control member 38, as a component of adjustment mechanism B, is a cooperating member designated generally 50 being engageable upon member 38 for relative positioning with respect thereto. Cooperating member 50 comprises a pair of side plates 51,51' located immediately laterally outwardly of the opposite sides of member 38 in substantially planar parallel relationship thereto. Each side plate 51,51' is provided in its lower rearward portion with an opening 52 complementary to guide 47 for snug acceptance of the same therein for effectively interengaging said guide 47 and member 50. Each plate 51,51' embodies aligned bosses 53 which at their lower rearward ends extend beyond edge 39 and are interconnected by means of a bolt 54. Each of said side plates 51,51' in their upward, forward portions is provided with a narrow elongated aperture 55, axially parallel to opening 46, through which extends the outer end of a guide pin 56 fixed in body 37 of member 38. Said guide pins 56 serve to stabilize member 50 in its selected position relative to member 38. In their upper forward portions, plates 51,51' embody aligned, inwardly offset bosses 57,57' with a bolt 58 interengaging same for cooperating with bosses 53 and bolt 54 for integrating said side plates 51,51'.

In their lower forward portions, downwardly of bosses 57,57' each side plate 51,51' incorporates a relatively enlarged boss 59,59', respectively, which are laterally outwardly offset with respect to the main plane of the associated side wall 51, 51' for developing a chamber 60 therebetween (see FIG. 6). Bosses 59,59' are provided with aligned openings 61,62, respectively, with the former being of greater diameter. Fitted within openings 61,62 are bearings 63,64, respectively, for journaling therein of a shaft 65. Shaft 65 incorporates a relatively enlarged outer section 66 and a diametrically reduced inner section 67; there being an annular shoulder 68 developed at the joint between said sections 66,67. Section 66 extends through an opening in frame plate 12 for projection laterally therebeyond; bearing 63 being dimensioned for receiving section 66. For purposes presently appearing, a control knob 69 is carried on the outer end of section 66 and is accessible for manipulation purposes through an opening 70 formed in the proximate side wall of housing 8. Mounted upon reduced shaft section 67 is a toothed wheel or pinion 71; for meshing engagement with teeth 42 of rack 43. One side face of pinion 71 abuts against shoulder 68 while against the opposite side face thereof bears one end of a coil compression spring 72, the opposite end of which bears against the inner face of boss 59'. It will be seen that by means of spring 72 pinion 71 is urged against shoulder 68 and thence toward the end of shaft section 67 proximate shaft section 66.

With reference to FIG. 6 it will be seen that upon inwardly directed pressure being applied to shaft 65 said shaft may be moved axially inwardly, causing compressing of spring 72 and with pinion 71 being thus moved inwardly, or to the left hand side of FIG. 6.

Provided in boss 59 spacedly circumferentially about opening 61 is a plurality of inwardly bent ears or detents 73 for extension between selected adjacent teeth of pinion 71 for locking the same against rotative movement. With reference once again to FIG. 6 it will be seen that when spring 72 is in normal condition, pinion 71, being urged toward boss 59, will be disposed so that one of the ears 73 is appropriately relatively located for effecting detaining engagement with pinion 71. Upon shifting shaft 65 inwardly against the bias of spring 72, said pinion 71 is removed from engagement from such ear 73 and is freed for rotative movement which may be effected by turning of knob 69 in selected direction. By this action pinion 71 is caused to move upwardly or downwardly along rack 43 so as to disposed member 50 into selected positionment with respect thereto. After such positioning has been achieved the inward pressure upon shaft 65 is removed causing spring 72 through release to cause pinion 71 to be brought into engagement with at least one of such ears 73 for locking the same. By such action mechanism B is suitably adjusted for purposes presently appearing. It will be seen that the limits of such adjustment are determined by abutment of guide 47 against the upper and lower ends of opening 46 so that the extent thereof effectively controls the bounds of adjustment.

At the upper end of edge 39 of body 37 there is provided a boss 74 to the opposite faces of which there are connected, as by a bolt 75, the forward ends of links 76,77 the rearward ends of which are engaged upon a

shaft 78, axially parallel to drive shaft 15 and extending at its opposite ends through bearings formed in the upper end portions of the opposed flat side members 79,79' of tubular extension support 3. Said side members 79,79' are presented laterally outwardly of frame plates 12,12', respectively, and at their lower ends are fixed upon a shaft 80 extending through bearings (not shown) in said frame plates 12,12' for extension transversely therebetween. Thus, extension support 3 is adapted for vertical swingable movement about the axis of shaft 80. It will be seen that shaft 80 is axially parallel to shaft 78 which latter is moveable with extension support 3 as the same rocks about shaft 80. Also engaged upon shaft 78, laterally outwardly of side members 79,79' are the upper rearward ends of angulated bars 81,81' which at their lower forward ends are engaged upon the opposite, outer ends of shaft 82 journaled within the lower portions of side members 83,83' of forward tubular extension support 2; the same being adjacent to but laterally outwardly of frame plates 12,12', respectively, and with said shaft 82 being located downwardly of frame plates 12,12' for extension therebeneath (see FIG. 2). Said side members 83,83', in their intermediate zone are engaged upon the outer ends of a shaft 84 which is journaled within openings (not shown) in frame plates 12,12' for extension therebetween in the upper forward portion of said plates 12,12' (see FIG. 2). Accordingly, support 2 with the associated tubular extension 4 are thus rockable about the axis of shaft 84.

The structure hereinabove described is adapted for pedaling operation by the user. As stated, machine A may be readily equipped with means for operation by a prime mover (not shown), but which may be accommodated within housing 8 or an extension thereof. Said prime mover would incorporate a customary drive shaft (not shown), a pulley (not shown) mounted on said drive shaft for connection by an endless belt (not shown) to an enlarged pulley wheel 85 carried upon a driven shaft 86 journaled at its ends within bearings provided in frame plates 12,12' rearwardly of pedal drive shaft 15 and forwardly and upwardly of shaft 80. Also mounted upon shaft 86 is a sprocket 87 of relatively reduced diameter about which is engaged a portion of an endless drive chain 88, the forward portion of which engages a relatively enlarged sprocket wheel 89 fixed on shaft 15 between sprocket 18 and frame plate 12'. Accordingly, machine A may be easily operated by the energies of the user or by actuation of a prime mover as may be desired.

In view of the foregoing it will be seen that with a user seated upon seat 7 and grasping handle bar 6, shaft 15 may be rotated through the user's operating foot pedals 16, 17 or by means of a prime mover (not shown) which operation will accord the user the conventional physical exercise resulting from bicycle riding. Direction operation of foot pedals 16, 17 will understandably accord greater benefit since the user's own strength will bring about the requisite motion. By manipulation of control rod 26, as above set forth, the resistance to the cycling motion may be altered for obligating the user to exert that degree of force desired.

In addition to the pedaling operation, machine A is also uniquely adapted to cause seat 7 and handle bar 6 to move toward and away from each other causing an alternating flexing and extending movement of the user's torso so that the upper body as well as the legs, is being simultaneously provided healthful exercise. With reference particularly to FIGS 2, 7, and 8 the operation of machine A causing the reciprocating action of seat 7 and handle bar 6 will now be described:

Upon rotation of countershaft 21 crank 34 will effect a rearward pushing and then forward pulling upon the lower end of arm 36 of throw control member 38 of adjustment mechanism B which latter is carried upon drive shaft 15 but being freely rockable thereon by reason of the structure of members 38 and 50. Upon forward pulling (see FIGS. 2 and 8) of arm 36 the upper rearward portion of mechanism B will be swing rearwardly so as to effect a rearward pushing upon links 76,77 which causes a rearward rocking of support 3 together with tubular extension 5 and seat 7 about the pivot axis established by shaft 80. Such rearward rocking of support 3 will bring about a rearward pulling at the upper ends of bars 81,81' which in turn effects a rearward and upward swinging of the lower ends of forward support 2; such movement will bring about pivoting about the axis of shaft 84 so that support 2 together with associated tubular extension 4 and handle bar 6 will be swung forwardly whereby seat 7 and handle bar 6 thus directed away from each other. Upon continued rotation of countershaft 21 crank 34 will cause a rearward swinging of the lower end of arm 36 causing the upper portion of mechanism B to be forwardly swung upon shaft 15 (see FIG. 7) with attendant forward pulling of links 76,77 and forward rocking of seat 7 by reason of forwardly directed swinging of the upper portion of support 3 about shaft 80. Concurrently, bars 81,81' will push the lower end of front support 2 forwardly causing the upper portion of said support to rock rearwardly about axis 84 so that handle bar 6 and seat 7 will be moving toward each other to cause a flexing or bending of the user's body from the waist upward. By reason of the unique motion transmitting means machine A is thus adapted for concurrently providing the user's legs with normal cycling motion and the body with beneficial alternating forward and rearward bending.

Adjustment mechanism B serves to permit a user to control the aforesaid motion transmitting system for the seat and handle bar in order that the same may be relatively positioned to comfortably accommodate the user's size. Thus, depending upon the height of the individual the overall stroke of such system may be adjusted so that intermittent loss of contact with the handle bar is avoided. The particular disposition of mechanism B upon shaft 15 determines the character of the adjustment. As described above, a user through operation of knob 69 may easily move pinion 71 with respect to rack 43 to effect mutual engagement at a predetermined point; with such engagement being secure by reason of abutment of any one of detents 73 with pinion 71 (FIG. 6). Such action will cause member 38 to be moved relatively upwardly or downwardly of shaft 15 with the limit of relative downward movement being determined by abutment of guide 47 against the upper end of opening 46 (as generally suggested in FIG. 7) and with the lower limit of such adjustment being determined by abutment of said guide 47 against the lower end of opening 46 (as generally indicated in

FIG. 8). With throw control member **38** in the former position the effective radius of throw as determined by the distance between shaft **15** and the connection of crank **34** and arm **36** is maximum so that the extent of movement of seat **7** and handle bar **6** toward and away from each other is greatest. Conversely, with throw control member **38** in the latter position wherein the distance between the axis of shaft **15** and the point of connection between crank **34** and arm **36** is at the minimum, the extent of movement of seat **7** and handle bar **6** is concomitantly restricted. Manifestly, the extent of opening **46** determines the potential range of adjustment. Thus, by means of the novel relationship of members **38** and **50** and effective, operating distance between seat **7** and handle bar **6** is adjustable to suit the physical requirements of the particular user without diminution in the beneficial operation of machine A.

Having thus described our invention, what we claim and desire to obtain Letters Patent for is:

1. A bicycle exercising machine comprising a frame, a seat support pivoted on said frame in its rearward portion, a handle bar support pivotally mounted on said frame in the forward portion thereof, both said handle bar support and said seat support being mounted for forward and backward rocking movement, a drive shaft journaled in said frame between said seat support and handle bar support, means for rotating said drive shaft, a user adjustable control means for adjustably controlling the limits within which said seat support and said handle bar support rock, said control means being carried on said drive shaft for rockable movement thereabout, a countershaft journaled in said frame, motion transmitting means connecting said drive shaft and said countershaft, crank means operatively mounted on said countershaft engaged to said control means for effecting a reciprocating pushing and pulling action thereon upon rotation of said countershaft, means interconnecting said seat support and said handle bar support, and linking means connecting said control means and said seat support, which linking means connection causes the rocking motion of the control means to be transmitted to the seat support and the handle bar support.

2. A bicycle exercising machine as defined in claim **1** and further characterized by said linking means being connected to said control means at a point upwardly of the connection between the latter and the crank means.

3. A bicycle exercising machine as defined in claim **2** and further characterized by said seat support member being pivoted at its lower end upon said frame and said handle bar support member being pivoted to said frame at a point upwardly of the lower end of the former and above the pivot connection of said seat support member.

4. A bicycle exercising machine as defined in claim **3** and further characterized by said interconnecting means being connected to said seat support member at a point proximate its upper end and to said handle bar support member at a point proximate its lower end.

5. A bicycle exercising machine as defined in claim **1** and further characterized by said control means having an arm depending from its lower end, said crank means being engaged to said arm of said control means proximate its lower end extremity.

6. A bicycle exercising machine as defined in claim **1** and further characterized by said user adjustable control means being manually adjustable.

7. A bicycle exercising machine as defined in claim **1** and further characterized by said control means comprising a first member having a body of general plate form having an elongated opening through which said drive shaft freely extends, an arm extending from said body for connection to said crank means, and a second member mounted on said first member for relative moveable position with respect thereto, means provided on said second member for engaging said drive shaft, and means for effecting interlocking relationship between said first and second members to maintain said in selected relative position.

8. A bicycle exercising machine as defined in claim **7** and further characterized by said interlocking means comprising a rack provided on said first member, a pinion engageable with said rack provided on said second member.

9. A bicycle exercising machine as defined in claim **8** and further characterized by means for effecting optional disengagement of said pinion from said rack to free said first and second members for relative movement into selected relationship, said relative movement comprising the adjustable operation of said control means.

10. A bicycle exercising machine as defined in claim **9** and further characterized by said arm being connected to said first member in its rearward upper portion.

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