United States Patent [19]

Smith, Jr.

[11] **3,911,907**

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[54] **PLANETARY EXERCISING MACHINE**

[75] Inventor: **Roy V. Smith, Jr.**, Apalachicola, Fla.

[73] Assignee: **Dan E. Sangaree**, Fort Myers, Fla. ; a part interest

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[21] Appl. No.: **495,145**

[52] **U.S. Cl.**..... **128/24 R**; 128/25 R; 272/57 A; 272/DIG. 4

[51] **Int. Cl.**[2]..... **A61H 1/00**

[58] **Field of Search**.... 272/57 R, 57 A, 57 B, 57 D; 35/29 R, 29 C, 29 D; 128/25 R, 49, 48, 24 R; 74/25, 27, 63, 66, 426, 665 F, 665 GC, 67, 70

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Primary Examiner—Richard J. Apley
Assistant Examiner—William R. Browne
Attorney, Agent, or Firm—D. Paul Weaver

[57] **ABSTRACT**

A user's legs and lower torso are strenuously exercised by the continuous oscillatory movement of foot-supporting platforms on which the subject stands while grasping a hand rail for stability and safety. The foot-supporting platforms are carried on and movable with an oscillating main turntable which is supported above a stationary base carrying the power drive for the oscillating components. The machine is useful in rehabilitating stroke or other paralytic victims. The foot-supporting platforms are oscillate in unison relative to the turntable while the turntable is oscillated relative to the base.

6 Claims, 11 Drawing Figures

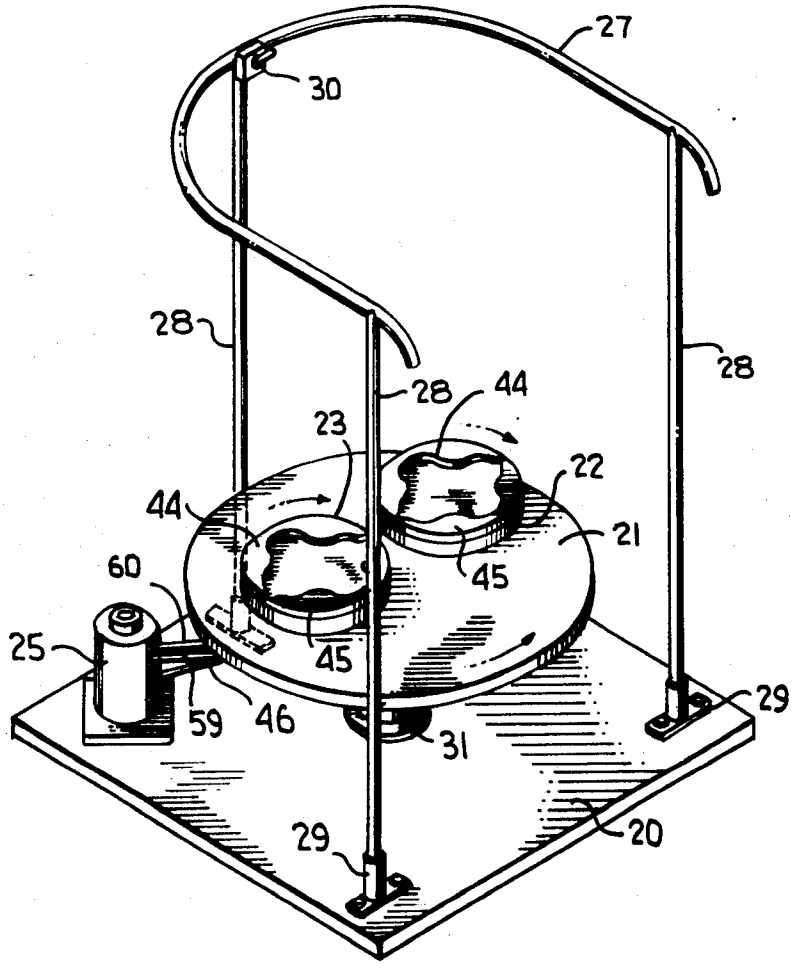


FIG.1

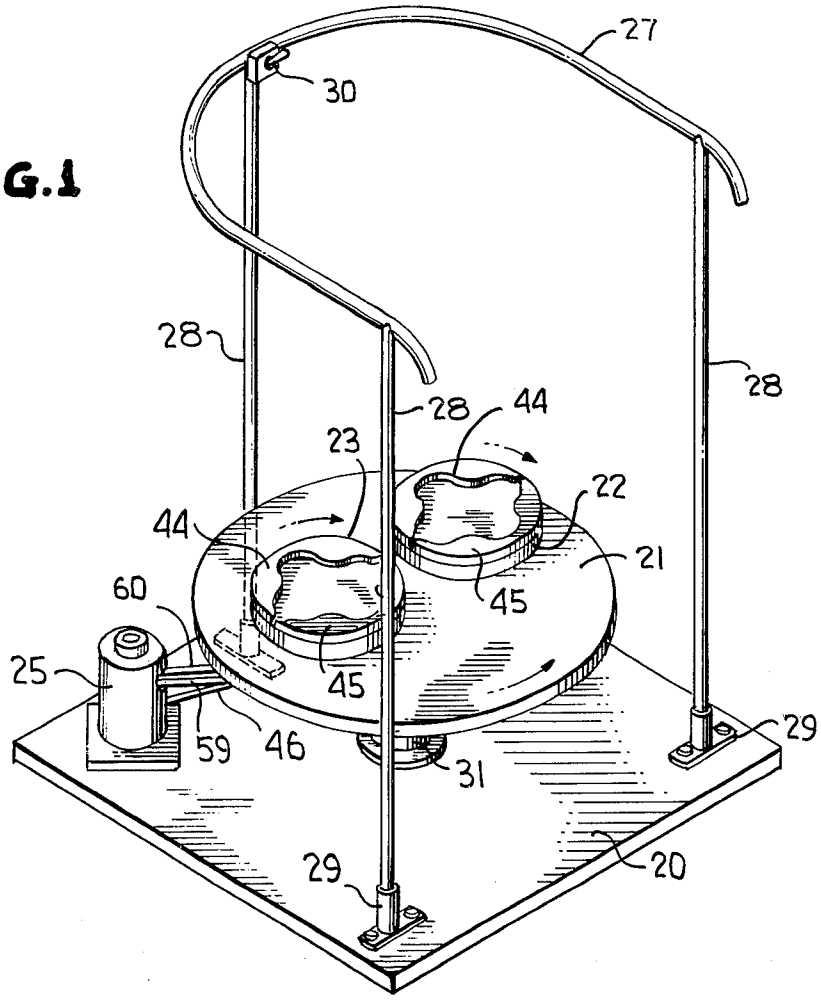


FIG.2

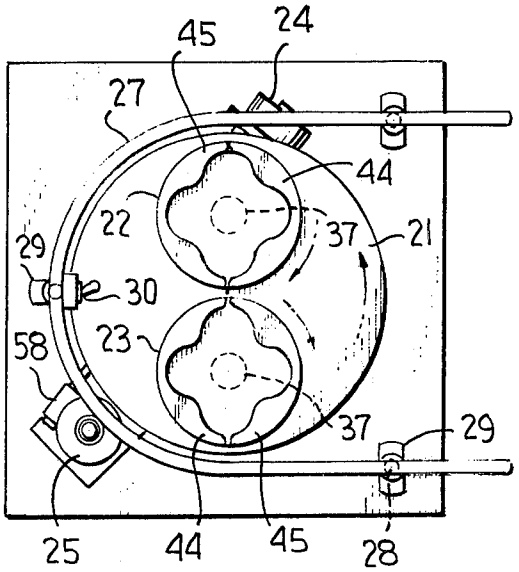


FIG.3

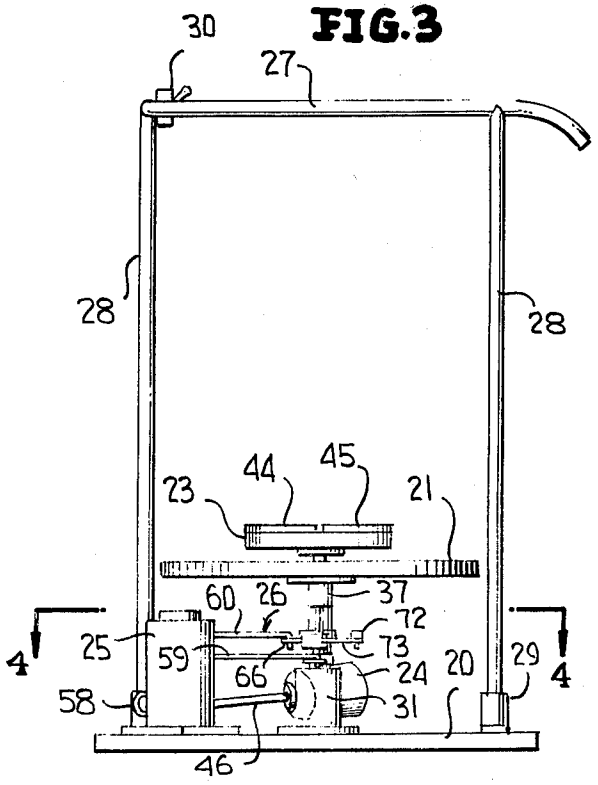


FIG.4

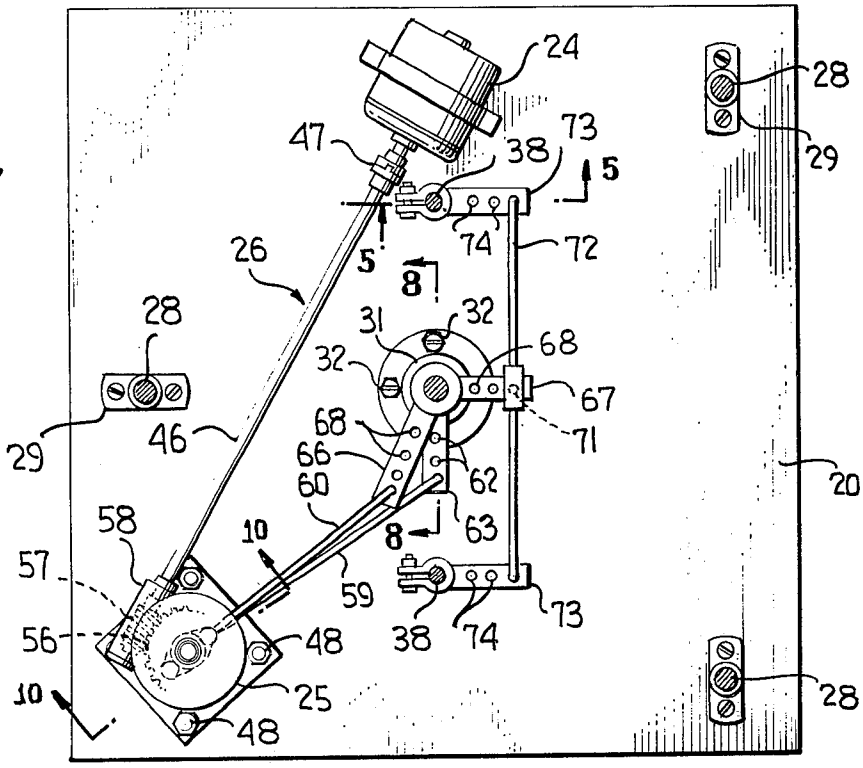


FIG.5

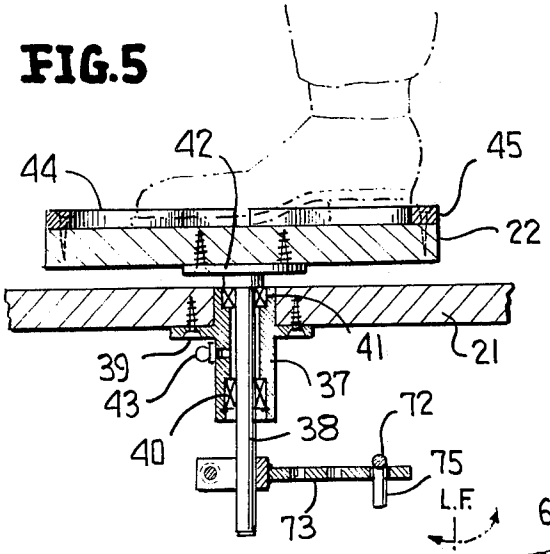
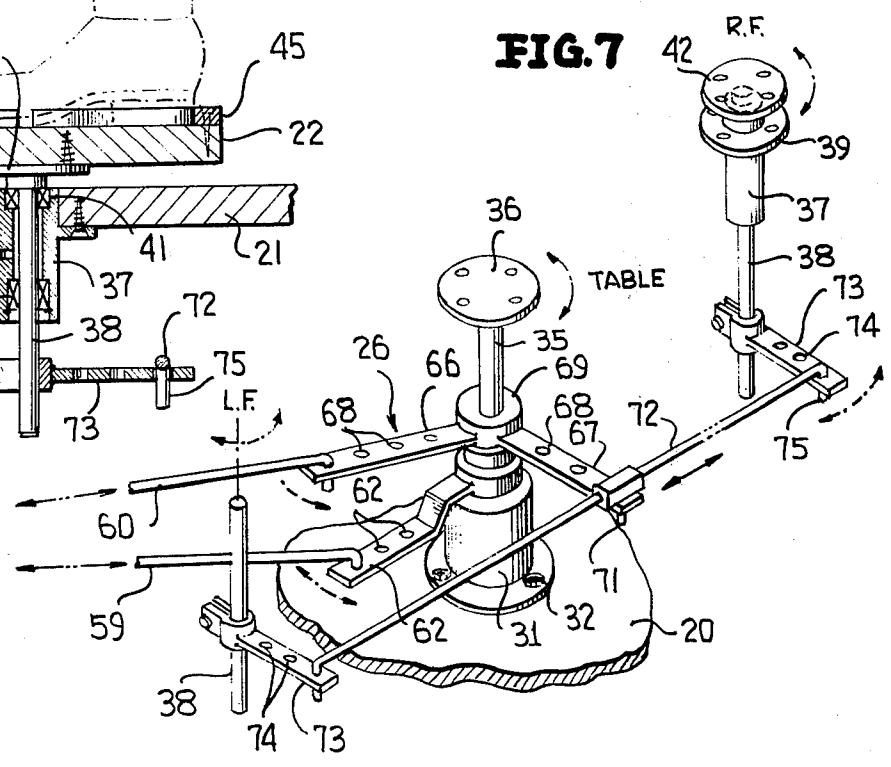


FIG.7



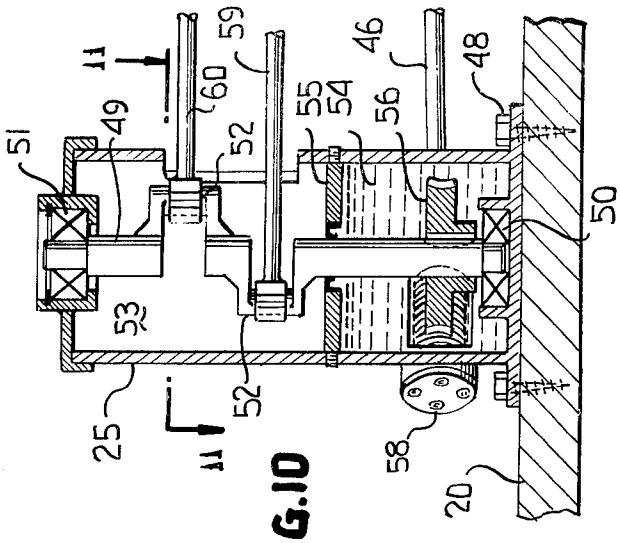


FIG.10

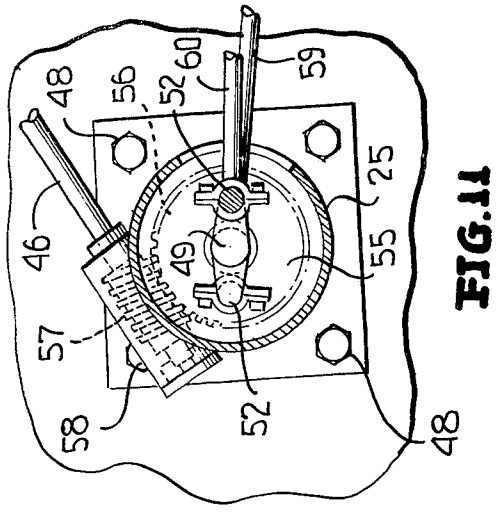


FIG.11

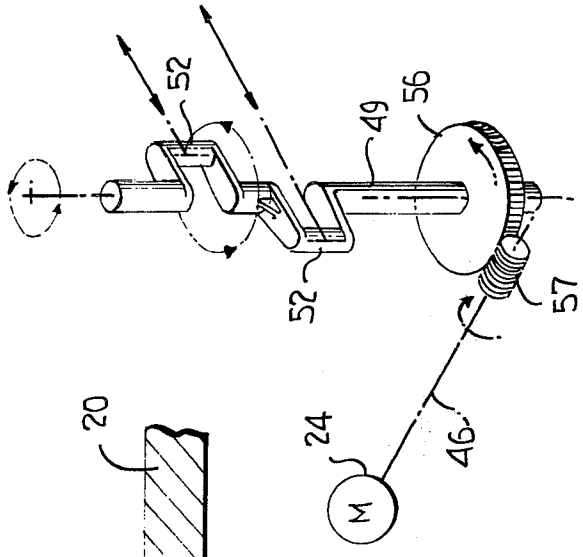


FIG.9

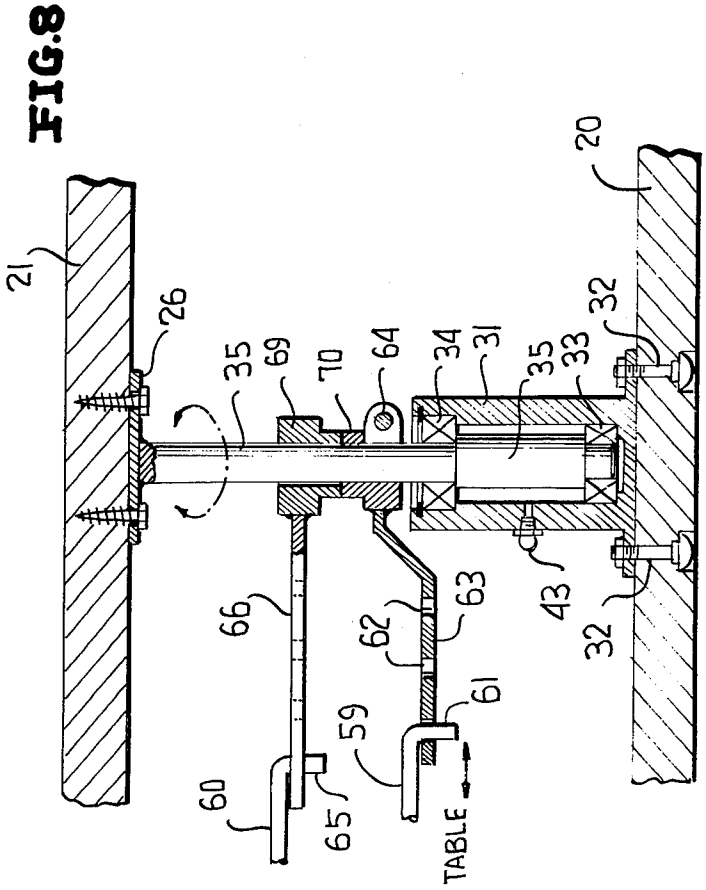


FIG.8

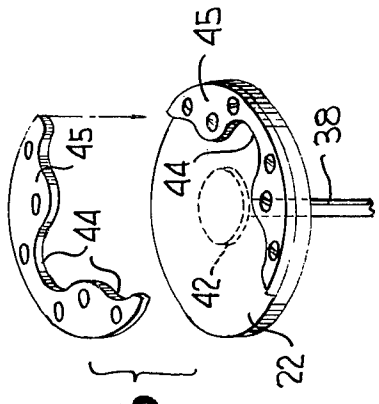


FIG.6

PLANETARY EXERCISING MACHINE

BACKGROUND OF THE INVENTION

Exercising machines for the legs and torso are known in the prior art and some examples of the patented prior art are contained in U.S. Pat. Nos. 745,154; 3,374,782; 3,384,369 and 3,441,271.

The objective of this invention is to improve upon the prior art by the provision of an exercising machine which will exercise more effectively and strenuously the ankles, legs and thighs of stroke victims and the like with complete safety to the user. The machine possesses an improved mode of operation in comparison to the prior art inasmuch as the user's two legs are simultaneously subjected to cyclic twisting in two directions, while simultaneously the entire lower torso is twisted cyclically at a different rate and in a different cycle from the legs. All of this exercising motion is produced by a simplified, sturdy and compact power drive mechanism which has a wide range of adjustability. Due to available adjustments, the degree of twisting imparted by the machine to an individual's leg or legs may be regulated to meet particular needs. While the exercise therapy is taking place, the subject stabilizes himself by grasping a convenient hand rail near waist level with one or two hands. The oscillatory foot rest platforms are recessed for further safety and stability and to assure a firm twisting action on the legs without slippage. The driving mechanism is extremely simple and economical and provision is made for lubrication.

Other features and advantages of the invention will become apparent during the course of the following detailed description.

BRIEF DESCRIPTION OF DRAWING FIGURES

FIG. 1 is a perspective view of an exercising machine embodying the present invention.

FIG. 2 is a plan view thereof.

FIG. 3 is a side elevation of the machine.

FIG. 4 is an enlarged horizontal cross section taken on line 4—4 of FIG. 3.

FIG. 5 is an enlarged fragmentary vertical section taken on line 5—5 of FIG. 4.

FIG. 6 is an exploded perspective view of a foot rest platform.

FIG. 7 is a fragmentary perspective view of a power drive linkage embodied in the machine.

FIG. 8 is an enlarged vertical section taken on line 8—8 of FIG. 4.

FIG. 9 is a partly diagrammatic perspective view of a crank shaft and gear driving means.

FIG. 10 is an enlarged vertical section through a sealed drive box taken on line 10—10 of FIG. 4.

FIG. 11 is a horizontal section taken on line 11—11 of FIG. 10.

DETAILED DESCRIPTION

Referring to the drawings in detail, wherein like numerals designate like parts and considering FIGS. 1 through 3 initially, the exercising machine comprises a broad horizontal base plate 20 on which the oscillatory turntable 21 and individual leg exercising foot rest platforms 22 and 23 are mounted centrally in a unit, as will be fully described. A power drive mechanism for the oscillatory elements 21, 22 and 23 is secured to the base 20, below turntable 21 and includes a variable speed drive motor 24, a drive or transmission box 25

and an associated adjustable drive linkage 26 having components directly coupled to turntable 21 and foot rest platforms 22 and 23. The final component of the simplified power-driven exerciser consists of a sturdy horizontal U-shaped hand rail 27 spaced above the base 20 and supported by three vertical standards 28 whose lower ends are firmly secured to the base 20 by brackets 29. A control switch 30 for the electric drive motor 24 is conveniently located at the forward side of hand rail 27 in ready reach of the user of the machine. The hand rail 27 is preferably disposed about 3 feet above the elevation of turntable 21, the latter being about 1 foot above the base 20. These dimensions, while generally preferred, are not critical.

Continuing to refer to all of the drawing figures, a turntable shaft support housing 31 is disposed at the center of the machine base 20 and rises therefrom and is securely bolted to the base as at 32. The housing 31 contains a pair of spaced bearings 33 and 34 for the rotational support of a vertical turntable shaft 35 which extends well above the top of the housing 31 and is attached at its top through a plate or flange 36 to the bottom of relatively large circular turntable 21.

At diametrically spaced locations on the turntable 21, a pair of vertical axis guide sleeves 37 for vertical foot rest platform drive shafts 38 are secured as at 39 to the bottom of turntable 21, FIG. 5. The guide sleeves 37 contain spaced bearings 40 and 41 for the pair of drive shafts 38, whose upper ends are attached through flanges 42 to the bottoms of foot rest platforms 22 and 23. The guide sleeves 37 like the housing 31 are equipped with lubrication fittings 43.

The foot rest platforms 22 and 23 are preferably circular, as shown, and embody dual position foot-receiving shallow recesses 44 in their upper sides so that the user's feet are firmly implanted and will not slip relative to the oscillating platforms. The recesses 44 are produced by contoured insert sections 45 of plywood or the like formed separately from the platforms 22 and 23 and attached thereto as shown in FIG. 5.

The power drive means for the exercising machine includes the aforementioned motor 24 mounted near one side of the base 20 and coupled through a generally diagonal shaft 46 and flexible coupling 47 with the drive box 25, the latter being bolted at 48 to the base 20 near one corner thereof.

The drive box 25, FIG. 10, contains and supports a vertical axis crank shaft 49 held rotatably in two spaced bearings 50 and 51 at the bottom and top of the drive box. The crank shaft has two diametrically opposed cranks or eccentrics 52 within an upper dry chamber 53 of the drive box 25. A lower oil-filled chamber 54 is separated from the dry chamber by a sealed divider 55 and keyed to the crank shaft 49 within the oil-filled chamber is a worm gear 56 meshing with a worm 57 attached to the drive shaft 46. The worm 57 is fully enclosed within an extension 58 of the drive box or housing 25.

Attached to the two opposed eccentrics 52 of crank shaft 49 are push rods 59 and 60 employed in the operation of the turntable 21 and the two foot rest platforms, respectively. The rods 59 and 60 are preferably equipped with needle bearings at their connections with crank shaft eccentrics 52. A downturned terminal end 61 of push rod 59 is received in a selected one of several adjustment openings 62 in a lower crank arm 63, which crank arm is firmly clamped at 64 to turnta-

ble shaft **35.** By selecting a different opening **62,** the degree of oscillation of turntable **21** may be adjusted as the crank shaft **49** revolves. Similarly, the rod **60** has a terminal end **65** adjustably connected to one arm **66** of a bell crank having a second generally right angular arm **67** rigid therewith. The arms **66** and **67** have adjustment openings **68,** as shown. The bell crank composed of arms **66** and **67** has a hub **69** freely journaled for rotation on the shaft **35** and this hub bears slidably on a hub portion **70** of crank arm **63.**

The crank arm **67** is pivotally coupled adjustably at **71** with a shiftable drive rod **72** for two additional horizontally swingable crank arms **73,** one of which is firmly clamped to each of the vertical foot rest platform drive shafts **38.** Each arm **73** has plural adjustment openings **74** therein for the selective reception of terminal ends **75** of drive rod **72.** Through the medium of the rod **72** and the two crank arms **73** pivoted thereto, movement of the bell crank arm **67** will impart simultaneous oscillatory movement to the two shafts **38** and to the foot rest platforms **22** and **23** secured thereto. The individual oscillation strokes of the two foot rest platforms may be adjusted by the selection of different ones of the openings **74** for coupling with the drive rod **72.**

In light of the foregoing description, the operation of the exercising machine may be briefly summarized as follows.

With the subject planting his feet in the recesses **44,** the motor switch **30** is turned on and the hand rail **27** is grasped for security and stability. The drive motor **24** and associated gearing will produce continuous rotation of crank shaft **49** in a selected direction. The opposed eccentrics **52** will simultaneously reciprocate the two push rods **59** and **60.** The lower push rod **59** through its associated crank arm **63** will produce oscillatory movement of the turntable **21** to an extent regulated by the adjustment openings **62.** Simultaneously, in an out of phase mode, due to the arrangement of the eccentrics **52,** the upper push rod **60** and the bell crank composed of arms **66** and **67** and the drive rod **72** will produce oscillation of the arms **73,** shafts **38** and foot rest platforms **22** and **23.** The foot rest platforms **22** and **23** will oscillate in unison and in the same directions but will be out of phase with and therefore turning oppositely to the movement of turntable **21,** as indicated by the arrows in FIG. **1.** As a result of this unique action, the two legs of the subject will be subjected to a twisting exercise simultaneously while the torso is being turned or twisted oppositely to the direction of movement of the legs. As previously stated, the extent of movement can be adjusted through a considerable range. The exercise is strenuous and benefits the ankles, calves and thighs without danger of straining the limbs beyond safe limits. The entire apparatus is characterized by its simplicity and compactness. The drive linkage shown in FIG. **4** is located safely between the base **20** and the large turntable **21.** The many advantages of the machine should be apparent to those skilled in the art without further description herein.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. An exercising machine comprising a base, a vertical axis horizontal turntable journaled on said base for oscillatory movement, a pair of spaced horizontal vertical axis footrest platforms journaled on said turntable for independent rotation relative thereto, and power drive means connected with the turntable and said footrest platforms and causing the latter to oscillate in unison relative to the turntable while the turntable is oscillated relative to said base, said power drive means comprising a drive motor on said base, a vertical axis crank shaft coupled to the drive motor and driven thereby and having a pair of opposing eccentrics, and an adjustable drive linkage coupled with said turntable and said footrest platforms and including a pair of rods coupled to said crank shaft eccentrics and operated thereby in an out-of-phase mode.

2. An exercising machine as defined by claim **1,** and upstanding support shafts for said turntable and foot rest platforms, said linkage including crank arms on each of said shafts, an intermediate linkage portion connecting the crank arms on the shafts of the foot rest platforms, one rod of said pair of rods coupled to the intermediate linkage portion and the other rod of the pair of rods coupled to the crank arm on the shaft of the turntable.

3. An exercising machine as defined by claim **2,** and said intermediate linkage portion comprising a bell crank freely rotatably mounted on the shaft of the turntable, a tie rod means interconnecting the crank arms on the shafts of the foot rest platforms and being connected to one arm of said bell crank, and the other arm of said bell crank coupled to said one rod of said pair.

4. An exercising machine as defined by claim **3,** and each arm of said bell crank and each of said crank arms having a series of adjustment openings formed therein.

5. A machine for exercising the legs and lower torso of a standing subject comprising a relatively stationary base, an elevated hand rail on the base at a convenient height to be grasped by a standing subject, a substantially horizontal oscillatory turntable on the base, a pair of laterally spaced oscillatory footrest platforms bodily mounted on the turntable and movable with the turntable during oscillation of the latter, and power drive means common to said turntable and footrest platforms and operatively coupled with the turntable and footrest platforms in such a way that the power drive means simultaneously causes oscillation of the turntable and simultaneous oscillation of the footrest platforms on and relative to the turntable while the footrest platforms are moving bodily with the turntable.

6. A machine as defined in claim **5,** and said turntable and footrest platforms spaced somewhat above said base, and said power drive means for the turntable and footrest platforms mounted on the base below said turntable.

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