

[54] **EXERCISER FOR PARAPLEGIC PATIENTS**

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[58] Field of Search 128/25 R, 25 B, 33;
272/73

[56] **References Cited**

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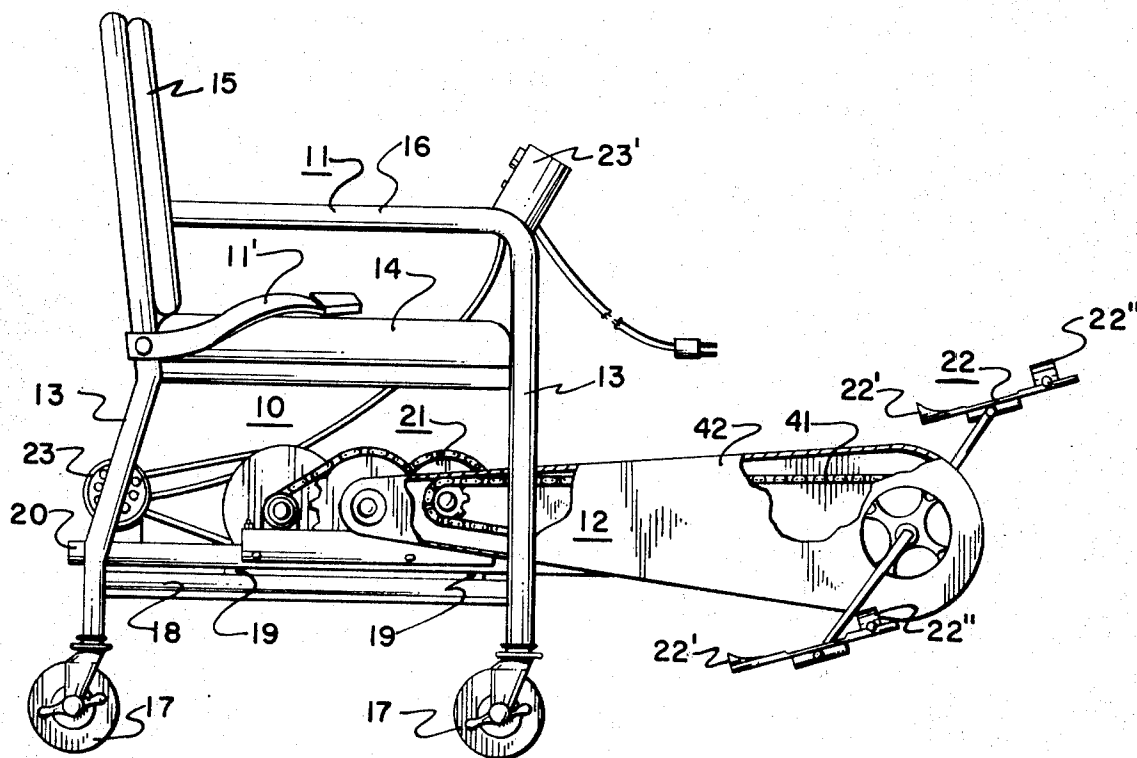
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[57] **ABSTRACT**

An exercising chair having a plurality of suitable legs, a pair of arms, a seat, and a back; a frame including a pair of rectilinear bars fastened at each side of the chair to the legs distally below the chair seat, a pair of transverse bars disposed distally from one another and fastened to the rectilinear bars, and a centrally disposed beam fastened to the transverse bars, the beam running under the chair seat and projecting distally forwardly of the chair; a drive train including an electric motor fastened to the beam, a suitable control means operable to selectively control the motor, and gears and drive means operable to reduce speed of output rotation of the motor and to reduce the load on the motor; and a pair of pedals driven by the drive train, the pedals being disposed on the forwardmost terminal end of the beam.

1 Claim, 3 Drawing Figures



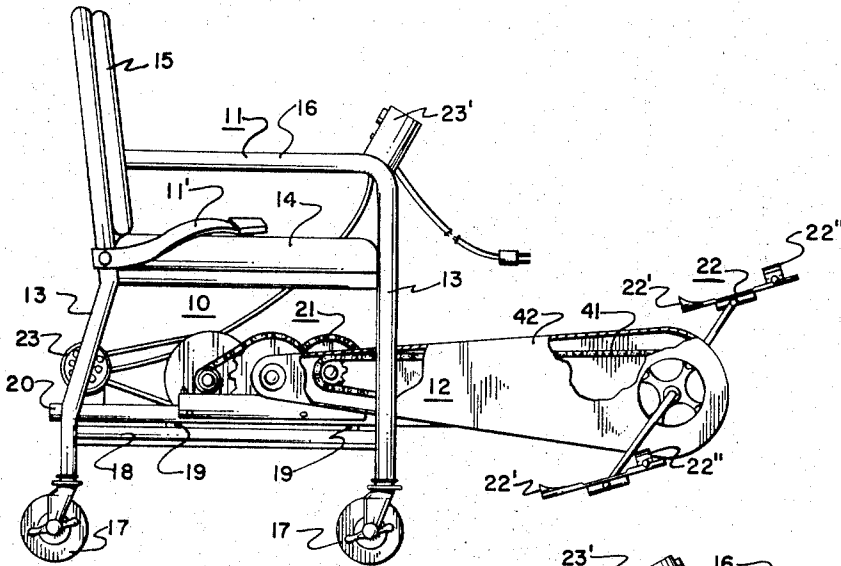


FIG. 1

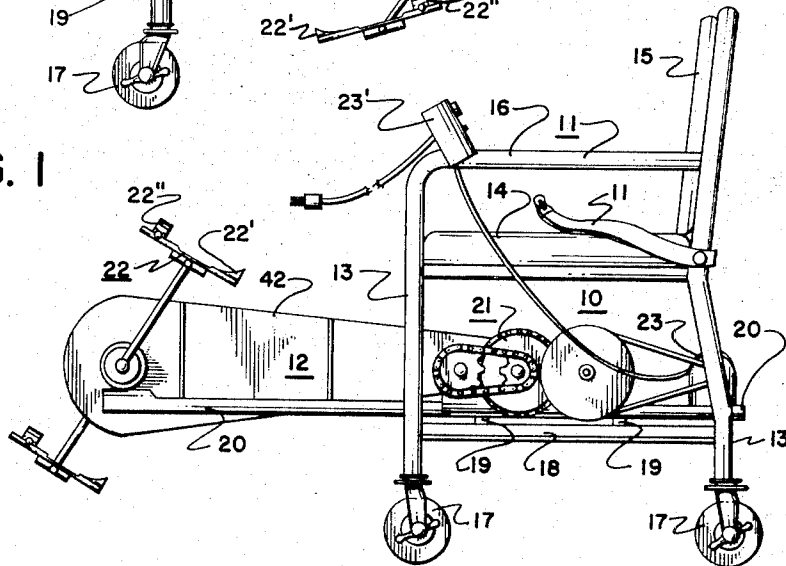


FIG. 2

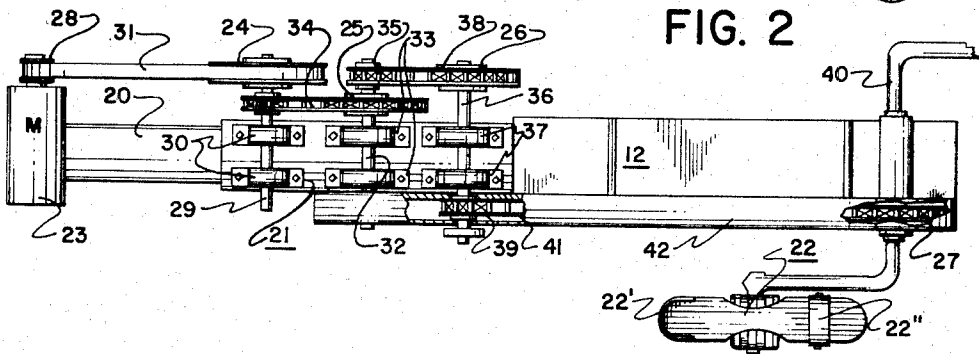


FIG. 3

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EXERCISER FOR PARAPLEGIC PATIENTS

FIELD OF INVENTION

The present invention relates to exercisers, and more particularly to exercisers for paraplegic patients.

DESCRIPTION OF THE PRIOR ART

Means for providing exercise for paraplegic patients, commonly used and employed, include various types of massage and physical motion of the patients' legs. It is important that a paraplegic patient be provided with exercise to paralyzed portions of his body in order to maintain muscle tone and development. Physical massage has been provided by manual means and by a variety of mechanical vibrators and similar devices. Means for exercising paraplegic patients involving physical motion of the patient include manually moving a debilitated portion of the patient's body by a therapist. Manual physical therapy requires highly skilled time-consuming labor. Mechanical therapy for paraplegic patients tends to be of a far too simple mechanical sort to properly affect the muscles to be treated.

Accordingly, it is an object of the present invention to provide means for exercising a paraplegic patient by mechanical means.

It is a further object of this invention to provide exerciser means operable to be selectively controllable for the amount and rate of exercise to be taken.

These and other objects shall become apparent from the description following, it being understood that modifications may be made without affecting the teachings of the invention here set out.

SUMMARY OF THE INVENTION

Generally, the exerciser of the present invention comprises a chair having a plurality of suitable legs, a pair of arms, a seat, and a back; a frame including a pair of rectilinear bars fastened at each side of the chair to the legs distally below the chair seat, a pair of transverse bars disposed distally from one another and fastened to the rectilinear bars, and a centrally disposed beam fastened to the transverse bars, the beam running under the chair seat and projecting distally forwardly of the chair; a drive train including an electric motor fastened to the beam, a suitable control means operable to selective control the motor and gears and drive means operable to reduce speed of output rotation of the motor and to reduce the load on the motor; and a pair of pedals driven by the drive train, the pedals being disposed on the forwardmost terminal end of the beam.

A more thorough and comprehensive understanding may be had from the detailed description of the preferred embodiment when read in connection with the drawings forming a part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a right side elevational view of the exerciser for paraplegic patients of this invention, including a portion of the drive chain of the chain guard cut away for illustrative purposes.

FIG. 2 is a left side elevational view of the exerciser for paraplegic patients of this invention.

FIG. 3 is a top plan view of the exerciser assembly drawn to a larger scale showing the drive train of this invention with the chain guard broken for illustrative purposes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and more particularly to the FIGS. 1 and 2, the exerciser for paraplegic patients of this invention is shown to advantage and identified by the numeral 10. The exerciser 10 comprises a chair 11 and an exerciser assembly 12. The chair 11 provides the environment for the apparatus of the exerciser assembly 12. The chair 11 is operable to carry a paraplegic patient and to hold him in a predetermined position with respect to the exerciser assembly 12. It has been found to advantage to provide a safety belt 11' as a body-retaining means to hold the patient in a more specific relationship to the chair 11. The chair 11 includes a four-legged frame 13, a seat 14, a back 15, and arms 16. The frame 13 may be fabricated from rigid members, such as metal tubing, and may be provided with casters 17 operable to permit the patient to be moved from one location to another while still seated in the chair 11. The casters 17 may also be provided with selectively locking means operable to hold the chair 11 in its location. The seat 14 and the back 15 may be provided with suitable padding to provide greater patient comfort. The chair 11 provides a frame for the exerciser assembly 12 by means of a pair of rectilinearly disposed channel members 18 disposed parallelly to the floor distally below the seat 14 and a pair of transversely disposed bars 19 disposed between the channel members 18 distally from each of the terminal ends of the channels 18.

The exerciser assembly 12 is generally carried on the frame formed by the channels 18 and bars 19 by means of a centrally rectilinearly disposed main beam 20 which is coextensive in length with the exerciser assembly 12 and which projects distally forwardly of the chair 11. The exerciser assembly 12 comprises a drive train subassembly 21 and pedals 22. The drive train subassembly 21 comprises an electric motor 23, a sheave-sprocket 24, a main sprocket 25, an output sprocket 26, and a pedal sprocket 27. The motor 23 is provided with a rheostatic control 23' which is operable to provide variable speed to the exerciser pedals 22. The control 23' may be fastened to one of the arms 16. As shown more clearly in the FIG. 3, the motor 23 is mounted at the rearwardmost terminal end of the beam 20. The motor 23 is provided with a suitable sheave 28. The sheave-sprocket 24 is disposed distally forwardly on the beam 20 by means of a transversely disposed shaft 29 journaled for rotation in pillow box journal bearings 30. The sheave portion of the sheave-sprocket 24 is connected with the sheave 28 by means of a pulley belt 31. The ratio of the respective sheaves 24 and 28 may be provided with a comparatively small pulley radius for the motor sheave 28 and a comparative large radius for the sheave-sprocket 24. The sprocket portion of the sheave-sprocket 24 is disposed on the same axis of rotation as the sheave portion of the sheave-sprocket 24 on the shaft 29. A main sprocket 25 is carried on a transversely disposed shaft 32 journaled for rotation in the pillow block journal bearings 33. The

main sprocket 25 is in communication with the sprocket portion of the sheave-sprocket 24 by means of a chain 34. The ratio between the sprocket portion of the sheave-sprocket 24 is provided as a comparatively small sprocket radius for the sprocket portion of the sheave-sprocket 24 and a comparatively large sprocket radius for the main sprocket 25. The shaft 32 is also provided with a sprocket 35. The output sprocket 26 is provided on a transversely disposed shaft 36 journaled for rotation in pillow block journal bearings 37. The shaft 36 is disposed distally forwardly of the shaft 32 on the beam 20. The sprocket 35 and the output sprocket 26 are in communication by means of a drive chain 38. The ratio between the sprocket 35 and the output sprocket 26 is such that the sprocket 35 has a comparatively small sprocket radius and the sprocket 26 has a comparatively large sprocket radius. The shaft 36 is provided at the terminal end opposite the output sprocket 26 with a sprocket 39. The pedal sprocket 27 is provided distally forwardly on a substantially S-shaped shaft 40 journaled for rotation at the forwardmost terminal end of the beam 20. The sprocket 39 and the pedal sprocket 27 are in communication by means of a suitable drive chain 41. It is to be understood that the drive train subassembly 21, set out above, is intended as a means of reducing load on the motor 23.

The pedals 22 are a pair of suitable footrests operable to loosely retain a foot. The pedals 22 are journaled for rotation on the substantially S-shaped shaft 40 with each of the pedals 22 having their axis of rotation on the outermost projections of the shaft 40. In practice, it has been found to advantage to journal the pedals 22 on the shaft 40 in order to maintain an upward relationship over the cycle holding the patients feet perpendicular to the pedals 22. It has also been found to advantage to provide extra foot-retaining means, such as a heel stop 22' at the rearwardmost terminal end of the pedal 22 and a strap 22'' centrally of the pedal 22. The pedal sprocket 27 is carried rectilinearly on the central portion of the S-shaped shaft 40. The pedals 22 are projected on the beam 20 at a predetermined distance and at a predetermined height from the seat 14. It is to be understood that the length of the chain 41 is determined by the length by which the beam 20 is projected

out from the chair 11. It has been found to advantage to provide a chain guard 42 coextensive in length with the projecting portion of the beam 20 to protect the patient.

In operation, the patient is placed into the exerciser 10 with his feet placed upon the pedals 22. The patient may then actuate the exerciser assembly 12 by selecting a suitable motor speed by the rheostat 23'. The patient may continue at the same selected speed or at a different selected speed.

Having thus described in detail a preferred apparatus which embodies the concepts and principles of the invention and which accomplishes the various objects, purposes and aims thereof, it is to be appreciated and will be apparent to those skilled in the art that many physical changes could be made in the apparatus without altering the inventive concepts and principles embodied therein. Hence, it is intended that the scope of the invention be limited only to the extent indicated in the appended claims.

I claim:

1. An exerciser for paraplegic patients, comprising a chair having a plurality of suitable legs, a pair of arms, a seat, and a back, said seat having body retaining means;
- a frame including a pair of rectilinear channel members fastened at each side of said chair to said legs distally below said chair seat, a pair of transverse bars disposed distally from one another and fastened to said rectilinear channels, and a centrally disposed rectilinear beam fastened to said transverse bars, said beam running under said chair seat and projecting distally forwardly of said chair;
- a drive train including an electric motor fastened to said beam, a suitable control means operable to selectively control said motor, and gears and drive means operable to reduce speed of output rotation of said motor and to reduce load on said motor; and
- a pair of pedals driven by said drive train, said pedals being disposed on the forwardmost terminal end of said beam and having foot-retaining means.

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