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3,100,640

ROTARY EXERCISER APPARATUS

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FIG. 1

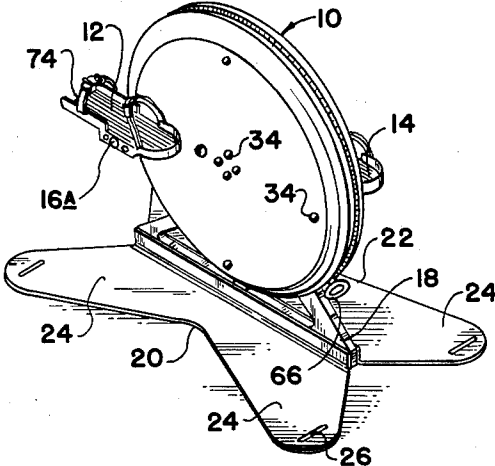


FIG. 2

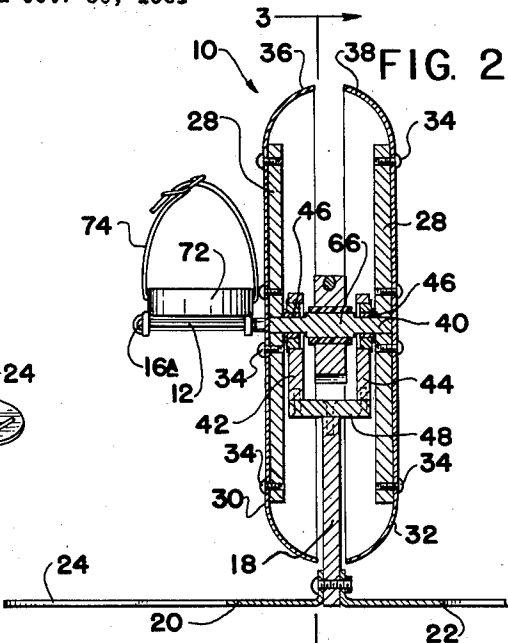


FIG. 3

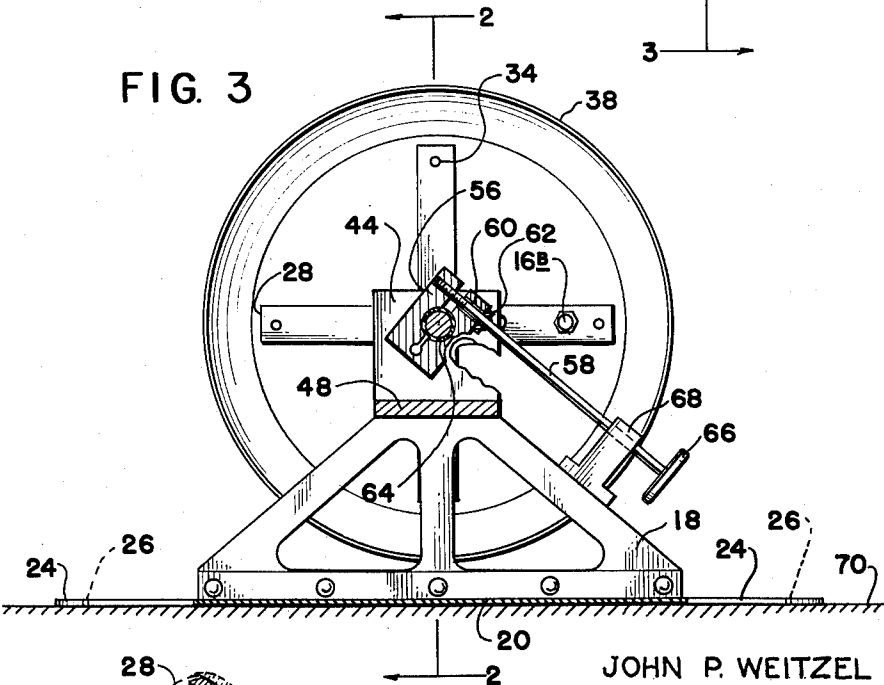
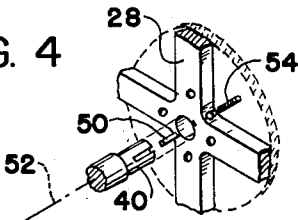


FIG. 4



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ROTARY EXERCISER APPARATUS

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1 Claim. (Cl. 272-73)

The present invention relates to rotary exerciser apparatus. It more particularly relates to apparatus of this character having an adjustable frictional retarding mechanism and primarily affording a series of progressive exercise treatments for the limbs, e.g. the limbs of patients such as a paralytic whose muscles are being rehabilitated.

It is a primary object of the invention to provide a simplified rotary exerciser apparatus, of which the rotor has a generally enclosed construction and, as viewed externally, comprises only three major moving parts; these parts consist of the rotor itself and a pair of foot or hand supports which are pivotally mounted for the cranking function at opposite ends of the rotor.

More particularly, the rotor of the exerciser according to the present invention is supported on a fixed, vertically disposed stand, the rotor being of a bipartite construction formed of confronting half-shells which rotate in unison in the vertical plane of the stand. The stand at the upper end carries a stub shaft journaled therein, which shaft holds the half-shells in closely spaced apart relation so as to admit the upper end of the stand therebetween, and which shaft is made fast at each end to the shell at that end. The noted retarding mechanism consists of a novel friction brake which is entirely concealed in the space within the half-shells and which is controlled by a remote actuator shaft extending from the shells to a point slightly externally therebeyond. The extending portion of the shaft carries an operator's hand wheel at a point providing sufficient clearance distance for the hand adjacent the turning half-shells.

It is noted that the present construction, more fully explained below, is crank arm free and the mechanism hereof including the shaft is fully enclosed. This arrangement minimizes, if not altogether obviating, the difficulty with apparel or bed clothes and the like becoming entangled during operation.

Further features, objects and advantages will be specifically pointed out or become apparent when reference is made to the written description taken in conjunction with the accompanying drawing which forms a part hereof and in which:

FIG. 1 is a isometric view of an exerciser embodying the present invention.

FIG. 2 is a front elevational view taken in section along the lines 2-2 of FIG. 3.

FIG. 3 is a side elevational view taken along the section line 3-3 of FIG. 2 and

FIG. 4 shows a detail in isometric view.

In particular reference to the drawing, an exerciser apparatus is shown having a rotor 10 supported for rotation in a vertical plane and provided with laterally extending plates 12 and 14 disposed one at each end of the rotor. The plates serve as supports for the limb extremities of a patient and they are mounted by crank pins 16a and 16b for pivoting movement with respect to the adjacent ends of the rotor at opposite points eccentric to the rotor axis.

A stand for supporting the rotor 10 consists of a vertically disposed supporting member 18 of triangular, truss-like construction, and two half sections 20 and 22 which together form a base and which are bolted to the lower edge of the triangular supporting member 18. The sections 20 and 22 jointly provide four flat legs 24 each slotted to provide a strap hole 26 at the end. For reasons of stability the width of the base at its widest points is equal to the overall height of the exerciser.

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The rotor 10 is of bipartite shell construction, with each shell structure having a reinforcing spider 28 therein provided with four radially extending arms. Two sheet metal shells 30 and 32 each have a flat central section secured to the associated spider 28 by means of the screws 34 and having smooth, intumed flange portions 36 and 38 at the rims which confront one another with a space between and which are integral with the center flat sections. The arms of the spiders are transversely aligned.

The arm of the spider 28 to which the pin 16a is journaled is 180° out of phase with the arm of the other spider to which the pin 16b is journaled. At least two through holes in each shell and the associated pin carrying arm provide for radial adjustment of the pins and plates 12 along the length of the arm to change the length of the hand stroke or foot stroke.

A stub shaft 40 has its opposite ends secured fast within hub openings in the respective spiders 28 and is journaled in bearing pedestals 42 and 44 for rotation on a fixed rotor axis. Bearings in the pedestals contain inserts 46 in which the shaft 40 fits and which engage the opposite spiders 28 to prevent end play of the shaft. The flat central sections of the shells act as integral wheel covers completely concealing the hubs and mechanism therebetween.

A horizontally disposed support plate 48 is secured by means of screws to the top surface of the truss-like base member 18 and has the respective pedestals 42 and 44 affixed perpendicularly thereto by means of screws along the outer edges of plate 48.

The means of securing the shaft 40 to each of the spiders 28 is shown in FIG. 4. A key 50 fitting between the hub opening in the spider 28 and the shaft 40 holds the spider fast for rotation with the shaft along the rotor axis 52. A set screw 54 projects through a threaded opening in the hub of each spider 28 and locks the key 50 in place and at the same time prevents axial movement of separation of the two spiders from the shaft 40.

A split braking block 56 has one portion threadedly engaging the extremity of a brake actuator shaft 58 and is formed with a smooth bore 60 in the other portion for journaling the shaft 58. A reaction washer 62 welded to the shaft 58 provides a means of adjusting the portions of the block 56 so that in response to rotation of the shaft 58 the block can change the clamping pressure of its hub against an insert 64 therein. The insert 64 is a sleeve made of wear-surface material such as yieldable plastic and engages an enlarged mid-portion 66 of the stub shaft 40.

Compression in the split brake block 56 causing the sleeve 64 to frictionally grip the shaft 40 is adjusted by means of a hand wheel 66 carried at the outer of the actuator shaft 58. An apertured guide 68, secured to the truss-like member 18, rotatably supports the outer end of the actuator shaft 58 and is located in a position between and adjacent the edges of the confronting flanges 36 and 38 of the half-shells.

In operation, the legs 24 of the base of the apparatus are laid flush against a supporting surface 70 which can be a horizontally or a vertically disposed member. If vertically disposed, as in the case of a bedboard, straps are threaded through the strap openings 26 and utilized to hold the base in place at the right height. Thereupon the patient can exercise in bed and usually the plate supports 12 will be provided with gloves by means of which a patient's hands are secured for rotating the rotor 10. As illustrated, however, the plates 12 are provided with sandal frames 72 carrying appropriate straps 74 for securing a patient's feet thereto. This arrangement provides for leg muscle exercise and the supporting surface 70 is generally the floor area immediately adjacent a chair in which a patient can sit and exercise.

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Ordinarily, the hand wheel 66 is in a backed-off position in the early stages to produce little or no frictional retarding force in the brake block 56. As muscular control develops in the patient so that he gradually builds up greater muscular power, an attendant sets the brake tighter and tighter so that the exertion to overcome the frictional force becomes more and more strenuous. The reaction washer 62 prevents the block 56 from advancing along the shaft 58; rotation is preferably clockwise as viewed in FIG. 3 and the static force tending to rotate the brake block from its fixed position is reacted through the shaft 58 and guide 68 into the triangular member 18 of the base.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

Having described the invention with sufficient clarity to enable those familiar with this art to construct and use it, I claim:

A limb exerciser comprising:

a stand which includes a flat base secured to an upwardly projecting base supported member which is generally planar and is held by the base in a plane normal thereto;

a bearing support rigidly secured to the upper end of the base supported member, said support having a pair of laterally spaced upwardly projecting arms provided with transversely aligned bearing receiving apertures;

transversely aligned bearings, one in the aperture in each of said arms;

a stub shaft having an enlarged diameter portion intermediate its ends, the ends of said shaft being journaled in said aligned bearings with the enlarged diameter portion of the shaft located between the bearings;

a one piece brake block split centrally from one end to a point adjacent its other end and encompassing and frictionally engaging the enlarged diameter portion of

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said stub shaft between the bearings journaling it, said block being supported by said stub shaft independent of any connection to the bearing support or base supported member;

a threaded laterally disposed aperture in one free end of the split brake block, and an aligned larger diameter laterally disposed aperture in the other free end thereof;

an elongated brake adjusting rod having a threaded end freely rotatable in the larger diameter aperture in the said other free end of the brake block, and threadedly engaged in the threaded aperture in the brake block, the other end of the brake adjusting rod extending outward from the brake block adjacent the base supported member;

means fixed to the base supported member journaling the brake adjusting rod near its outer end;

a reaction member fixed on said rod adjacent the brake block to cooperate with the threadedly engaged end of the rod to force the two free ends of the brake block toward each other to apply increased frictional pressure against the stub shaft when the rod is rotated in one direction;

a pair of hollow dished wheels, one secured non-rotatably on each end of said stub shaft, the two wheels cooperating to complementally house the stub shaft, its bearing support, the brake block, and major portions of the base supported member and the brake adjusting rod, in their concavities;

and a pair of pedal journaling pins, one projecting laterally outward from and carried by each of said wheels and located 180° from each other about the axis of the stub shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

334,635	Bowen	Jan. 19, 1886
363,522	Knous	May 24, 1887
2,673,088	Wentz	Mar. 23, 1954
3,008,265	Converse	Nov. 14, 1961