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Stenn

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[54] **THERAPY CYCLE**

[76] Inventor: **Harriett M. Stenn,** 5738 S. Talman, Chicago, Ill. 60629

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[52] **U.S. Cl.** ..... **272/58;** 272/73; 272/79 D

[51] **Int. Cl.²** **A63B 23/04;** A63B 69/16

[58] **Field of Search** ..... 272/58, 57 R, 73, 79 R; 128/25 R

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Primary Examiner—Richard J. Apley
Assistant Examiner—Joseph R. Taylor
Attorney, Agent, or Firm—Wegner, Stellman, McCord, Wiles & Wood

[57] **ABSTRACT**

An exercising device for bed patients is provided with straps for attachment to the mattress of a bed and has a hand holding device and foot operated energy absorbing mechanism for use by the patient in an effort to retain and/or restore muscles unused or weakened by an illness. Separate adjusting means are provided for positioning the hand holding device at a proper level and for varying the resistance on the foot operated energy absorbing mechanism to simulate different exercise levels. Disposable slippers for the patient to use in the foot cradling pedals and disposable sleeves for use on the bed contacting pads are provided to permit the device to be moved from patient-to-patient without sterilization of the device after each use.

7 Claims, 5 Drawing Figures

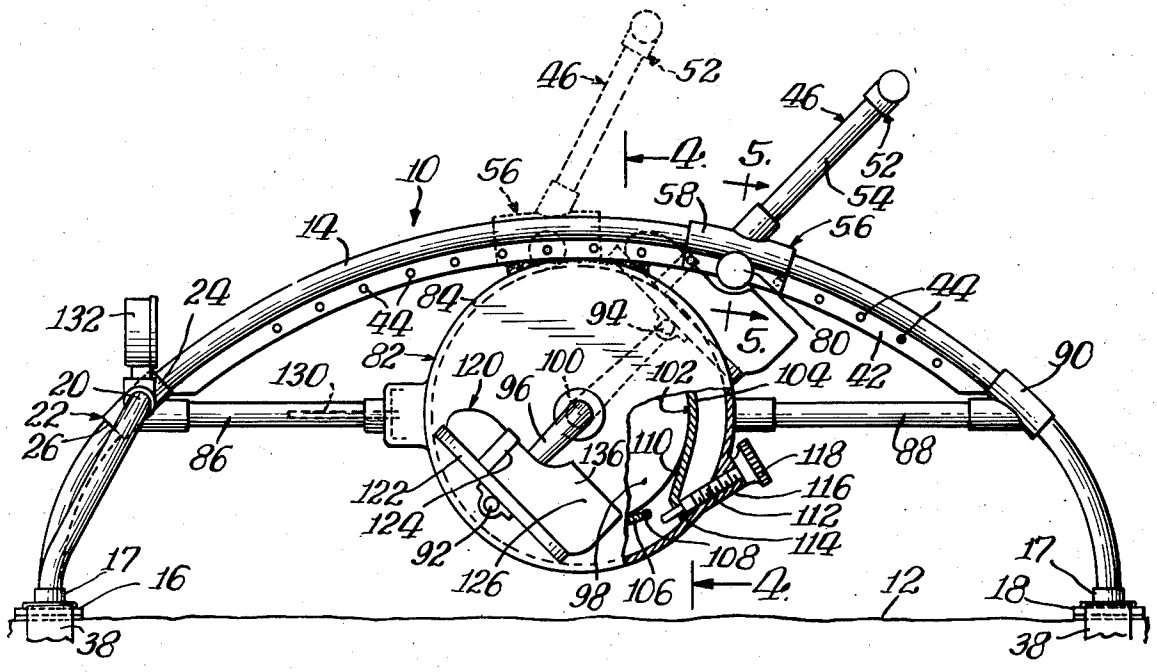


Fig. 4.

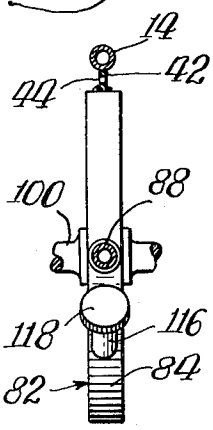


Fig. 1.

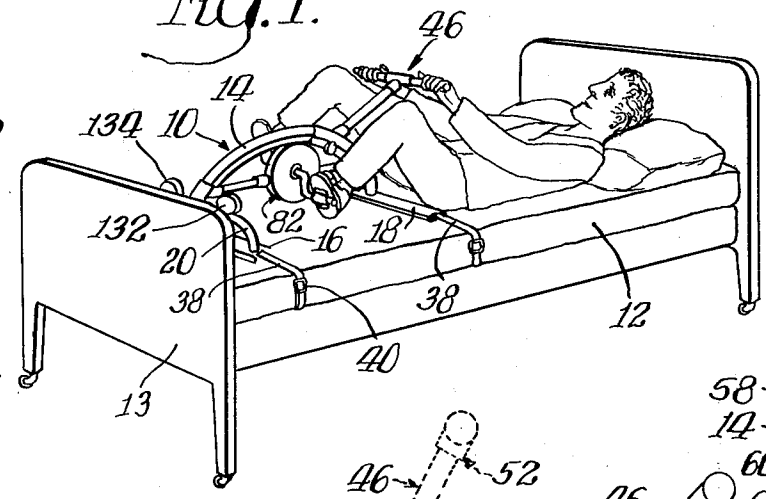


Fig. 5.

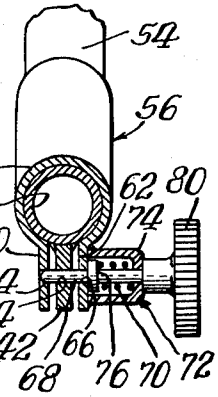
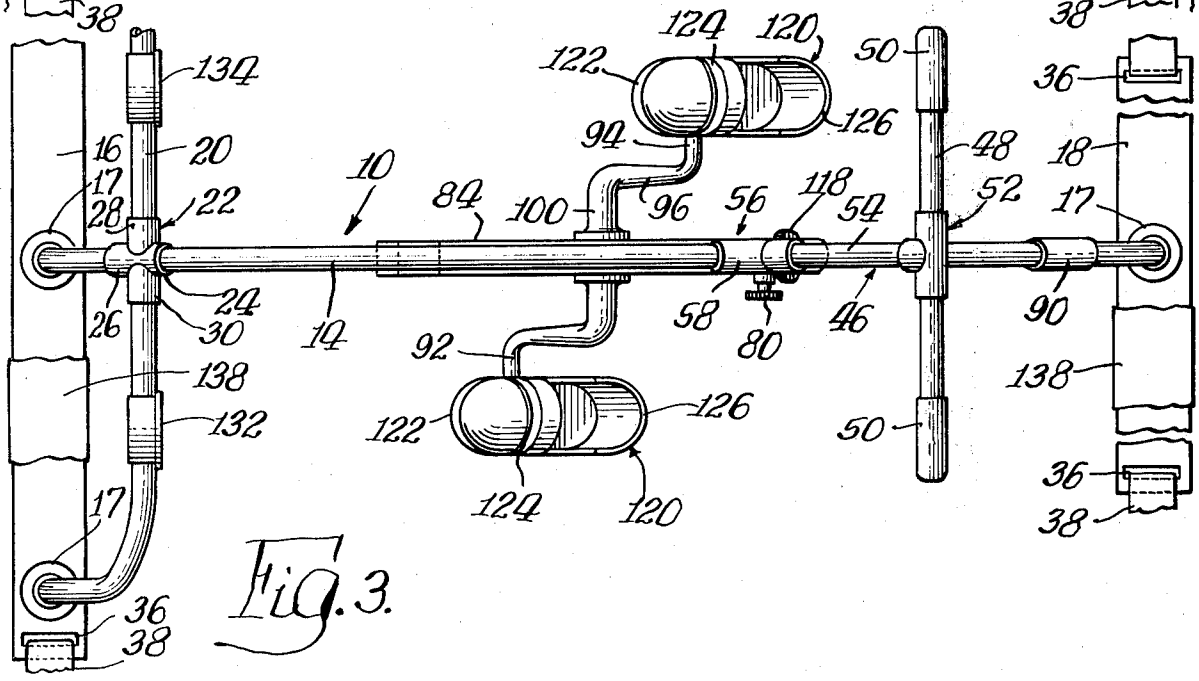


Fig. 2.

Fig. 3.



THERAPY CYCLE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to exercise devices and, more particularly, to an exercise device of the cycle type for attachment to a bed for therapeutic use by bedridden patients.

2. Description of the Prior Art

Cycle-type exercising devices mounted in an upright position on a fixed stand have been known and used for a long time. These devices are mounted on feet, on rods or on stands so that a person wanting exercise can walk to the device and step into a position with the person's feet on a pair of pedals, the person's hands on a pair of handlebars and the person's posterior supported on a seat all very much like an ordinary bicycle or tricycle-type vehicle. The seat and handlebars are sometimes movable as the pedals are actuated to provide exercise for more than just the legs.

The use of current cycle-type exercising devices is conditioned on the general reasonably good health of the user and unless the user can sit up and support himself in an upright position, he cannot gain the benefit of the exercise provided by the device.

In U.S. Pat. No. 3,057,201 to Jaeger entitled "Ergometer," a device is provided which can be converted for use by a patient in a reclining position to actuate the pedals during a physical examination. However, this device is ineffective for use by a bedridden patient since it would require the patient to be lifted onto the device, the pedals are inconveniently located and the indicators are inaccessible.

SUMMARY OF THE INVENTION

Many bedridden patients are physically well enough to have mild exercise but, due to the nature of their illness, are not permitted out of bed or to even sit up for any length of time and, as a result, are not able to get exercise on currently available devices. Typical of a patient meeting the just described situation would be a cardiac patient who has not recovered enough to be up and around and yet has recovered enough to be able to have mild exercise either to tone his muscles or to prevent excessive deterioration of his muscles due to continued non-use.

My invention provides a cycle-type exercising device for attachment to the mattress of a bed and has feet engaging slippers on the pedals of the device in which the patient can rest and support his feet. The pedals are connected to an adjustable energy absorbing device whereby the resistance to pedalling is varied to suit the needs of the patient. A hand holding arrangement is adjustable to a position of comfort for the patient so that the patient can grip the holding arrangement during exercise.

Appropriate dials are provided and are operatively connected to the energy absorbing device so that the equivalent speed and distance being covered by the patient can be observed by the patient. Disposable foot coverings for the patient and disposable sleeve coverings for the bed engaging portions of the device are provided so as to meet current health requirements permitting the cycle to be moved from patient-to-patient without sterilization.

BRIEF DESCRIPTION OF THE DRAWINGS

The details of construction and operation of the invention are more fully described with reference to the accompanying drawings which form a part hereof and in which like reference numerals refer to like parts throughout.

In the drawings:

FIG. **1** is a perspective view of my exercising cycle attached to a mattress and being used by a bed patient;

FIG. **2** is an enlarged side view of the exercising cycle of FIG. **1**;

FIG. **3** is a top plan view of the exercising cycle of FIG. **2**;

FIG. **4** is a view taken along the line **4—4** of FIG. **2**; and,

FIG. **5** is a cross-sectional view taken along the line **5—5** of FIG. **2**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings and, in particular, to FIG. **1**, my invention of an exercising cycle-type device **10** is illustrated as being strapped to the mattress **12** of a bed **13** with a bedridden patient lying on the bed and having both hands and feet in position to operate the exercising cycle.

As best shown in FIGS. **2** and **3**, the exercising cycle **10** comprises an arcuate or circular-shaped frame member **14** which is connected by fittings **17** at each end to a pair of flat, elongate, substantially rigid pads **16** and **18**. A cross brace **20** is connected by fittings **17** at each end thereof to the extremities of the pad **16** with the center of said cross brace **20** being connected to the frame member **14** by a connector **22** spaced from the pad **16**. The connector **22** is shown as a multi-branched element with the frame member **14** passing continuously through two aligned legs **24,26** and with the two halves or sides of the cross brace **20** seating in two transverse branches **28,30** thereof.

The opposite end portions of the elongate pads **16,18** have narrow transverse slots **36** formed therein through which slots is threaded a strap **38**. Strap **38** has a buckle **40** on one end which is engaged by the other end of the strap. The straps **38** can be formed of canvas or other flexible material and are threaded down through the slot **36** in one end of the pad **16** or **18** and overlaps the pad on the undersurface thereof and is threaded up through the slot **36** in the opposite end of said pad. The straps **38** are adapted to be wrapped around the mattress **12** of the bed **13** and are secured by means of the buckles **40** to the mattress and/or to the bed. As an alternative, clamps may be provided on the ends of pads **16** and **18** to clamp the cycle **10** to the mattress or to the bed.

Throughout the midportion of the frame member **14**, an arcuate-shaped index member **42** is welded or otherwise carried by the frame member **14** and has a plurality of equally spaced openings **44** extending transverse therethrough. The index member **42** is permanently affixed to the frame member **14** so that it will not rotate or shift relative to the frame member. A handlebar or hand gripping arrangement **46** is adjustably positioned on the frame member and comprises a cross bar **48** having padded grips **50** at the outer extremities thereof and which arrangement is engaged by the two hands of the patient. The center of the cross bar **48** is connected

to a T-joint **52** which in turn is connected by a tube **54** to an adaptor **56** fixed on the lower end of said tube. The adaptor **56** has an arcuate-shaped body portion **58** which shape coincides with the arcuate shape of the frame member **14.** The body portion **58** of said adaptor **56** has a U-shape in cross section with the legs **60,62** of the U-opening toward the center of the arc of the portion **58.** As best shown in FIG. **5,** a pair of aligned apertures **64,66** are formed through the legs **60,62** of the U and are adapted to slidably receive a pin **68** which is urged by a spring **70** into position to engage in one pair of aligned apertures **64,66** in said adaptor **56.** A latching member **72** is welded to one leg **62** of said adaptor **56** and comprises a cup-shaped housing **74** welded around the lip of the cup to the wall of the leg **62.** The pin **68** has a collar **76** inside the housing **74** which collar is urged against the wall of the leg **62** by the spring **70** between the collar **76** and the bottom of the cup. An enlarged knurled knob **80** is connected to the end of the pin **68** and is urged against the outside bottom of the cup by the spring **70.** Pulling the knob **80** will pull the pin **68** to the right as shown in FIG. **5** as the spring **70** is compressed. The pin will be removed from the apertures **64,66** in the legs **60,62** of the adaptor **56** and from the aligned opening **44** in the index member **42** on the frame member **14.** The handlebar **46** can now be moved to any one of the plurality of positions along the frame member **14** until it is comfortably situated for the patient. At that point, the knob **80** is released so that the pin **68** will seat in the apertures **64,66** in the adaptor and in the aligned opening **44** in the frame member **14** to lock the handlebars **46** in position with respect to the frame member.

A brake or energy absorbing member **82** is carried by the frame **14** and includes a hollow drum-shaped member **84** welded to the underside of the index member **42** on the frame member **14** and is securely positioned in alignment with the frame member **14** by means of the forward and aft supports **86,88** extending from the frame member to the sides of the drum member **84.** The support **86** is connected to the coupling **22** on the forward part of the frame member **14** and the support **88** is connected to a Y-coupling **90** carried by the rear portion of the frame member. A cycle-type pair of foot engaging pedals **92,94** are connected on the opposite ends of an offset crank **96** which is rotatably mounted on the axis of the drum-shaped member **84.** Within the drum-shaped member **84** is an enlarged weighted flywheel or cylinder-like element **98** which is keyed to the cross bar **100** of the offset crank **96** and is adapted to be rotated by means of the pedals **92,94** within the drum-shaped member **84.**

A brake **102** in the form of a continuous band **104** encircles the outer surface of the flywheel **98** and is anchored at one end **106** by means of a pin **108** to the sides of the drum with the other end **110** connected to an adjusting screw **112** by means of the retainer **114.** The adjusting screw **112** is mounted on the drum **84** by means of the threaded lug **116** and said screw has a knob **118** which when turned in one direction or the other will loosen or tighten the brake band **104** with respect to the outer surface of the flywheel **98** thereby increasing the amount of force needed to turn the pedals.

The cycle-type pedals **92,94** on the opposite ends of the crank **96** have pivotally secured thereto identical foot engaging slippers or shoes **120** which comprise a sole portion **122** and a strap **124** which is adapted to pass over the instep of the foot of a patient. A hollow U-shaped heel support **126** is attached to one end of the sole **122** and opens toward the strap **124** so that the foot of a patient can be inserted under the strap **124** with the heel nested in the U-shaped heel portion **126** so that the patient need not support his foot independently of the slipper support on the pedals.

To make it possible to visually observe the results of the exercise, a flexible shaft **130** extends from the flywheel **98** through the support **86** between the drum member and the frame **14** to a pair of indicator gauges **132,134** carried on the cross brace **20.** Indicator gauge **132** is of the type that will indicate equivalent distance traveled in terms of feet, yards or fractions of a mile. The other indicator gauge **134** is calibrated to indicate speed in terms of feet per minute or yards per minute or the like. Rotation of the pedals **92,94** will actuate the flexible shaft **130** to cause the gauges **132,134** to indicate both equivalent distance and speed traversed. It is intended that different types of indicator gauges can be used depending upon the needs and the conditions of the patients, for instance the indicator gauges could indicate units of energy expended or foot pounds of work performed or the like.

It is contemplated that paper or plastic protective covers **136** be provided and be put over the feet of the user prior to insertion of the feet in the slippers or shoes **120** on the pedals. The covers **136** may be removed and disposed of after each use. In addition, it is contemplated that sleeve members **138** (shown broken away in FIG. **3**), made of plastic or paper, be provided and be wrapped around the elongate pads **16,18** and straps **38** where the pads **16,18** and straps **38** pass over the sheets of the patient's bed which sleeves **138** may be removed and disposed of after each use. In this way, by protecting the device from direct contact with the patient, the device may be moved from one patient's bed to another without the need for sterilization between use.

I claim:

1. A cycle-type exercising device for attachment to a horizontal surface and having an arcuate shaped frame member, a pair of elongate pads connected at their midpoints to the opposite ends of said frame member, strap means fastened to said pads for attaching said exercising device to a horizontal surface, a drum-shaped housing carried by the midportion of said frame member, a crank means mounted on the housing and having pedal supports projecting outwardly from the opposite sides thereof, foot engaging members pivotally carried by said pedal supports, energy absorbing means mounted in said housing and being attached to said crank means, means connected to said energy absorbing means for varying the amount of energy expended by said energy absorbing means as said pedal means drives said energy absorbing means, a handlebar connected to said frame member, means for adjusting said handlebar in any one of a plurality of positions on said frame member, said means for adjusting said handlebar comprising a flange member projecting radially from said frame member and a U-shaped means carried by said handlebar and straddling said frame member and said flange member and means coacting between said U-shaped means and said flange member to lock said handlebar in any one of a plurality of locations along said frame member.

2. A cycle-type device as claimed in claim 1 wherein said energy absorbing means is a brake provided on said crank means for adjusting the amount of energy needed to drive said energy absorbing means.

3. A cycle-type device as claimed in claim 1 wherein each foot engaging member pivoted on one of said pedal supports comprises a sole, a cross strap spaced from the sole and bridging the toe area of the foot and a U-shaped heel supporting portion, said foot engaging member being adapted to cradle and support a foot of said supine user.

4. A cycle-type device as claimed in claim 1 wherein an indicator means is carried by said frame member and comprises at least one gauge connected to said energy absorbing means to indicate the equivalent distance covered by actuation of the energy absorbing means by the supine user.

5. A cycle-type exercising device as claimed in claim 4 wherein a cross brace is connected to said frame member and to the remote one of said pads at points spaced from said frame member and wherein said indicator means is mounted on said cross brace in visual alignment with said supine user.

6. An exercising device as claimed in claim 1 wherein protective means are provided for protecting said elongate pads and said strap means from contact with said horizontal surface, said protective means comprising disposable sleeves encircling the strap means and elongate pads thereby preventing said elongate pads and said strap means from contacting said horizontal surface.

7. An exercising device as claimed in claim 1 wherein foot protective means are provided for protecting the foot supporting members from contact with the feet of the user, said foot protective means comprising disposable members encasing the feet of the user thereby preventing direct contact between the feet and said foot supporting members.

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