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PULL ROPE FRICTION TYPE EXERCISING DEVICE

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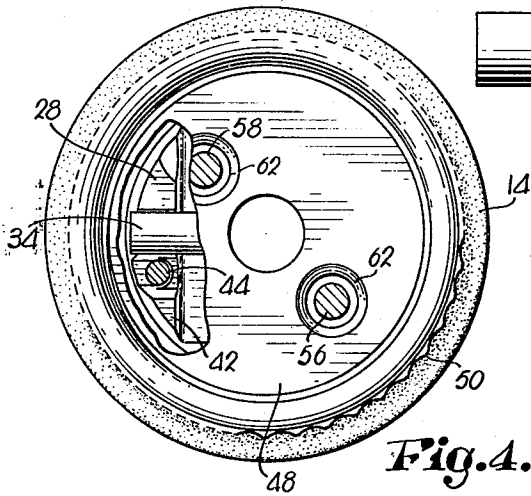


Fig. 4.

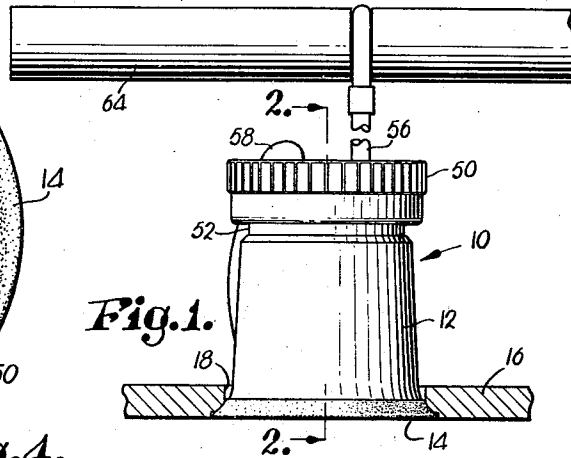


Fig. 1.

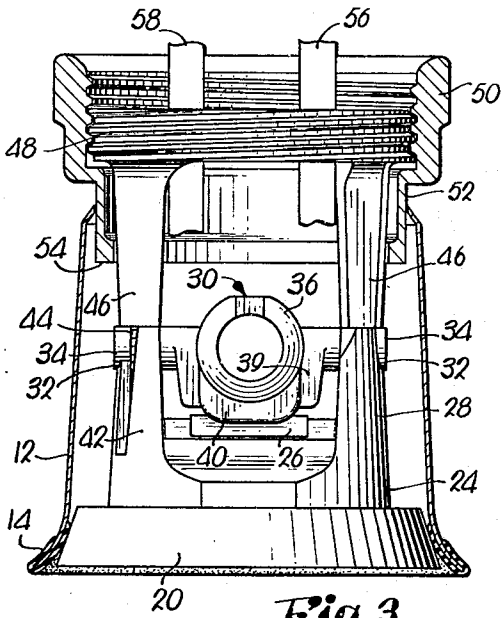


Fig. 3.

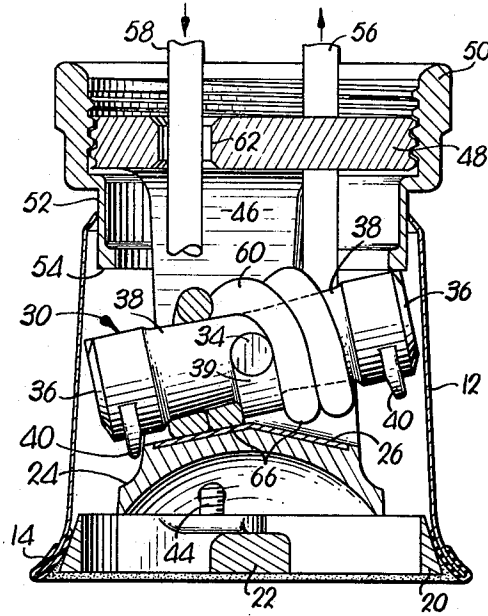


Fig. 2.

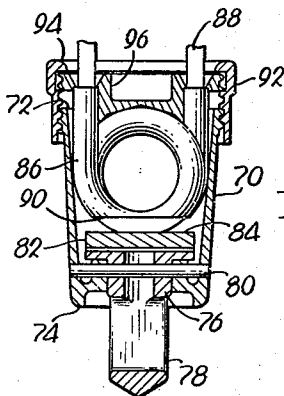


Fig. 5.

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## PULL ROPE FRICTION TYPE EXERCISING DEVICE

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11 Claims

### ABSTRACT OF THE DISCLOSURE

A selectively controllable load is placed on the pull rope of an isometric-isotonic exercising device by pressing segments of the rope within the device against a bearing surface to thereby pinch the rope to a degree dependent upon the load which the user desires to overcome in performing an exercise.

Exercising devices of the isometric-isotonic type utilize a pull rope having a lead line and a trail line which may be grasped by the user and manipulated in a manner to perform either static exercises or dynamic exercises where the rope is pulled under a fixed load preset by the device. Such exercising devices have recently enjoyed increasing popularity since they are small and quite portable and thus lend themselves to home training as well as use by professional athletes.

It is requisite that an exercising device of this type be readily adjustable so that the load on the rope may be quickly selected and easily changed at the whim of the user. Commonly, prior devices employ a winding spindle which varies the tension on the rope by the degree to which it is wrapped or coiled about the spindle. Although this approach is generally satisfactory, certain disadvantages arise in that the spindle must be positively locked in a selected position and oftentimes adjustments require that the operator release detents or catches to change the position of the spindle. Furthermore, the change in load on the rope as the spindle is rotated is quite non-uniform and may require several turns before high loads are attained. This produces an ancillary problem of providing a scale for the range of loads which may be easily read and understood by the operator.

It is, therefore, the primary object of this invention to provide an improved exercising device of the isometric-isotonic type which is simple to adjust and which may be set up and operated with minimum operator effort.

As a corollary to the foregoing object, it is an important aim of this invention to provide such a device in which the load on the pull rope is set by manually rotating a knob that is readily accessible to the operator and which, in approximately two or three turns, covers the entire range of rope loads from zero to the maximum setting.

Another important object of the invention is to provide a device as aforesaid having various features contributing to maximum overall convenience in operating the device and exercising therewith, including a housing construction that renders the device self-supporting, the provision of means that positively precludes fouling of the rope, and the provision of an arrangement whereby two ranges of adjustment are possible so that women and children, for example, may be readily accommodated as well as strong, muscular men.

In the drawing:

FIG. 1 is an elevational view of the device in readiness for exercising and showing a handle attached to the lead line;

FIG. 2 is an enlarged, vertical sectional view taken

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along line 2—2 of FIG. 1, the rocker being shown in elevation for clarity;

FIG. 3 is an enlarged, elevational view of the device shown in FIG. 1, the housing and the adjustment knob being shown in cross section to reveal the interior construction;

FIG. 4 is a plan view of the device shown in FIG. 3, the top plate being broken away to reveal the interior construction; and

FIG. 5 is a cross-sectional view of a second form of the invention, the coiled rope guide tube thereof being shown in elevation.

Referring to FIG. 1, the device is broadly designated by the numeral 10 and includes an outer, generally cylindrical housing 12 which is flared at its base or lower end 14. A hold-down member in the nature of a plank 16 has a circular opening 18 therethrough receiving the housing 12 and enlarged adjacent the undersurface of the plank 16 to complementarily fit with the base flange 14 of housing 12. As shown, the flange 14 may be covered with a rubber coating or similar substance.

Referring also to FIGS. 2—4, the device 10 has an internal construction including a base ring 20 bridged by a central crosspiece 22 upon which bed structure 24 rests, the bed structure 24 being somewhat dome-shaped in configuration and supporting a pressure plate 26 that presents an upper bearing surface. It should be noted that the plate 26 is of inverted, shallow, V-shaped configuration and hence the bearing surface presented thereby comprises two flat surface zones which face outwardly at a slight angle to the horizontal.

The bed structure 24 is provided with a pair of integral, upstanding, spaced ears 28 which serve as mounts for a rocker 30, each ear 28 having a notch 32 in the upper end thereof for receiving a respective stub shaft 34 projecting laterally from the central portion of the rocker 30. The two notches 32 are aligned with each other and the two stub shafts 34 are diametrically opposed, the latter defining the axis of rocking movement of the rocker 30.

As is clear by a comparison of FIGS. 2 and 3, the main body of the rocker 30 is elongated and of generally cylindrical configuration, presenting a pair of opposed ends 36 which clear the inner surface of housing 12 during movement of the rocker 30. A pair of frusto-conical sections 38 of the rocker 30 are disposed between the central divider portion 39 thereof and respective ends 36, both of the sections 38 tapering toward the center as is clear in FIG. 2. A pair of downwardly projecting guards 40 are integrally formed on rocker 30 and are disposed adjacent respective ends 36.

The bed structure 24 is also provided with a pair of integral, upstanding, spaced projections 42, each of the projections 42 being located adjacent the notch 32 of a corresponding ear 28 and spaced a relatively short distance therefrom, as is clear in FIG. 4. An upright screw 44 has its shank disposed in the space between each ear 28 and the adjacent projection 42, the two screws 44 extending upwardly through crosspiece 22 and bed structure 24 and into tapped openings (not shown) in the lower ends of a pair of spaced legs 46 depending from a circular top plate 48. Thus, the bed structure 24 is effectively clamped and held between the legs 46 and the base ring 20, the lower ends of the legs 46 being in overlying engagement with the ears 28 and the projections 42.

The circumferential periphery of the top plate 48 is externally threaded to support a hollow knob 50 for rotation about a vertical axis orthogonal to the axis of rocker 30 defined by the stub shafts 34. The knob 50 is in the nature of a nut having internal threads receiving the threads of the top plate 48, and has an integral, depending sleeve member 52 which extends within housing

12 through the top thereof and presents a cam or stop utilized to control the rope load. The sleeve member 52 terminates in an annular rim 54 that defines a continuous shoulder aligned with the ends 36 of the rocker 30.

A length of rope, although continuous from end to end, may be considered for purposes of illustration as divided into a lead line 56, a trail line 58, and a stretch 60 interconnecting the lead line 56 and the trail line 58 and received by the rocker sections 38. The stretch 60 is wound twice around one of the sections 38, then crosses over the central divider 39 of the rocker 30, and is thence wound twice around the other section 38. A pair of spaced openings 62 in top plate 48 provide clearance passages for the lead and trail lines 56 and 58.

In use, the rope resistance or load is set by the position of the knob 50. The rocker 30 is shown in a horizontal, center position in FIG. 3 which would normally be the position assumed by the rocker 30 when there is no pull on the rope. In FIG. 2, the user has pulled on the lead line 56 as by grasping and pulling on a handle 64 secured thereto (FIG. 1). The right end 36, as viewed in FIG. 2, has thus shifted upwardly until it engages the rim or shoulder 54 of sleeve member 52. This compresses the two segments 66 of the stretch 60, wound on the left-hand rocker section 38, against the bearing surface provided by the pressure plate 26. The segments 66 are also forced against the divider 39 which prevents the rope from shifting beneath the rocker axis and crossing over to the other section 38. Note that the angularity (as viewed in FIG. 2) of the two surface zones of pressure plate 26 is approximately the same as the tilt of the rocker 30, this being preferred in the interest of uniform rope crush.

The higher the position of knob 50, the greater the pinching action obtained between rocker section 38 and the bearing surface. Conversely, the lower the position of knob 50 with respect to top plate 48, the less the pinching action since a smaller displacement of the ends 36 of rocker 30 is required until the upper end 36 reaches the shoulder 54. The upper surface of top plate 48 may have a scale or legend thereon (not shown) to indicate the resistance corresponding to particular setting of the knob 50.

It is apparent that the device 10 is self-supporting on its base ring 20, and thus the knob 50, being at the top of the device, may be readily reached and adjusted by the operator. It has been found that approximately two and one-half turns of the knob 50 will provide moderate sensitivity over a full range of adjustment from substantially zero resistance to a maximum resistance on the order of several hundred pounds. The maximum resistance, of course, will depend upon the particular application of the device 10 and its size and construction.

A number of isometric-isotonic exercises are performed with the device 10 between the feet of the user. As is apparent from FIG. 1, the device is readily held on the floor through the use of the plank 16; the feet are placed on the plank 16 on opposite sides of the device. During the exercise, it may be desired to have the trail line 58 become the lead line after line 56 has been pulled out of device 10 to maximum length, in which case the handle 64 may be switched to the line 58 or a second handle (not shown) previously attached to line 58 may be utilized. In either event, it is significant to note that the pull of the rope may be reversed without changing the degree of rope resistance or load, since the rocker 30 merely rocks in the opposite direction to pinch the two rope segments 66 beneath the right-hand rocker section 38 against the bearing surface provided by pressure plate 26. Uniform load in either direction of pull is assured by symmetrical construction of the rocker 30 and by proper alignment of parts so that equal displacement of rocker 30 in either direction will bring the appropriate end 36 thereof into engagement with the shoulder 54. If desired, the device may be readily secured to other points of attachment by utilizing an anchoring strap (not shown) around the cross-

piece 22 to connect the device to a wall or other support. Note that the dome shape of the bed structure 24 provides adequate clearance for a hook, as might be used for attachment to a ceiling, etc.

It is important to note that the conical taper of the sections 38 of rocker 30 forces the rope segments 66 to assume the same position each time the device is operated. The rope segments 66 are drawn inwardly toward the central divider 39 and the inner segment 66 is forced thereagainst by the action of the tapered surfaces of sections 38 along which stretch 60 slides during lengthwise movement of the rope. Contact with the pressure plate 26 at first one point and then another cannot be permitted if the load on the rope is to be the same each time the rope is pulled in either direction. This is particularly the case if only one turn of the stretch 60 is wound on each of the sections 38 to decrease the rope resistance and provide a second range of rope loads for lighter exercises.

The dual range capability is a valuable feature for many reasons including adaptation of the device to individuals of less physical strength, yet with assurance that a uniform rope load will be obtained at a given setting of the knob 50. Since the device is readily disassembled by removing the screws 44, dual scales may be provided on the top plate 48, one for use when the operator wraps two turns on the stretch 60 around each rocker section 38, and the other for use when only a single turn is employed.

The lower rope load range is particularly useful when the device is employed for coach control work, as in batting or running exercises. A lightly loaded, free-running rope, usually of extended length, would be employed and the load may be controlled by removing the housing 12 and inserting an extension handle into the bore of the rocker 30. Thus, the coach may control the rope load with the extension handle during the performance of the exercise.

It is also noteworthy that the device may be utilized in skeletal form (housing 12 removed) in any exercise if desired, with the advantage that the rocker 30 may then be rotated by hand to release the rocker 30 and remove the load from the rope when it is desired to reposition the rope handle to a convenient position. For example, the user may wish to execute a particular exercise without tampering with a predetermined resistance setting of the knob 50.

A second form of the invention is illustrated in FIG. 5 and comprises a unit of generally cylindrical configuration having a cup-shaped housing 70 which is of somewhat larger diameter at its top edge 72 than at the bottom 74 thereof. The bottom 74 of housing 70 is apertured to receive a base member 76 which is integrally formed with an eye 78 disposed beneath bottom 74. The base member 76 is held in place by a cross pin 80 and serves as a support for a press pad 82 that presents a flat, upper bearing surface 84.

A coiled tube 86 of at least one and one-half turns is disposed within housing 70 and receives a length of rope 88 therewithin, the bottom of the coiled tube 86 being cut away at 90 to expose a portion of the rope 88 that is thus in contact with the bearing surface 84. The top edge 72 of housing 70 has external threads receiving the internal threads of an adjustment knob or nut 92. The top of the knob 92 is formed with a continuous, inwardly extending lip 94, an insert 96 being disposed between knob 92 and the coiled tube 86.

Force is applied to the insert 96 by the lip 94 of knob 92 as the latter is rotated to advance the knob downwardly. This clamps the tube 86 between the insert 96 and the press pad 82, with the result that the exposed portion of the rope 88 is compressed against the bearing surface 84. Thus, as in the first embodiment of the invention discussed above, the position of the knob 92 determines the degree of pinching action and hence the load on the rope 88 that must be overcome in order to pull the rope and effect lengthwise movement thereof. It may be noted,

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however, that the load increases with downward movement of the knob 92, rather than with upward movement thereof as in the previous embodiment.

Clearance openings are provided in the insert 96 to permit passage of the rope 88 from the unit so that exercises may be performed and the device utilized as discussed above. The unit of FIG. 5, however, is not self-supporting; instead, the eye 78 is employed for the purpose of anchoring the unit to a suitable support by a connecting strap slipped through the eye. In order to assure that the bearing surface 84 will uniformly distribute the pressure on the exposed portion of the rope 88 pressed thereagainst, it is preferred that the press pad 82 be mounted on base member 76 by a pivot edge to allow a small degree of tilting of the pad 82 if needed for uniform pressure distribution.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. An exercising device comprising:  
structure presenting a bearing surface;  
a length of rope; and  
pressure means adjacent said surface and receiving said rope for lengthwise movement to guide the rope into contact with said surface with the rope compressed between the pressure means and said surface, whereby to place a load on the rope which must be overcome to pull the same and effect said lengthwise movement thereof, said pressure means including a rocker for effecting said guiding of the rope, said rocker having opposed ends and being mounted intermediate said ends for rocking movement thereof, one of said ends shifting toward said surface in response to lengthwise movement of the rope in one direction to pinch the rope between the rocker and said surface, and the other of said ends shifting toward said surface in response to lengthwise movement of the rope in the opposite direction to pinch the rope between the rocker and said surface, whereby to effect said compression of the rope when the latter is pulled in either direction.
2. The device as claimed in claim 1; and means mounting said rocker for said rocking movement thereof about a transverse axis disposed intermediate said ends,  
said rope extending around said rocker on both sides of said axis with a pair of spaced segments of the rope being disposed on respective sides of the axis between the rocker and said surface.
3. The device as claimed in claim 2,  
said rocker being elongated in configuration to present said ends, and having a central portion and a pair of rope-receiving sections between said portion and respective ends,  
said axis extending through said portion,  
said rope having a lead line and a trail line joined by a stretch wound around one of said sections, crossing said portion, and wound around the other of said sections,  
said stretch presenting said segments between respective sections and said surface.
4. The device as claimed in claim 3,  
said rocker being generally cylindrical,  
each of said sections being tapered toward said central portion.
5. The device as claimed in claim 1; and an adjustable stop disposed for engagement by each of said ends to limit the shifting of the opposite end toward said surface, whereby to control the compressing of the rope and hence the load thereon.
6. The device as claimed in claim 5; and

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support means mounting said stop for movement toward and away from said rocker through a range of adjustment,

said stop having shoulder means aligned with said ends for said engagement thereby and spaced therefrom, throughout said range, to cause equal displacement of the rocker at a selected disposition of the stop in response to lengthwise movement of the rope in either direction, whereby the load on the rope at the selected disposition of the stop is equal in either direction of pull.

7. The device as claimed in claim 6,  
said support means mounting said rocker for said rocking movement thereof about a transverse axis disposed intermediate said ends,

said rope extending around said rocker on both sides of said axis with a pair of spaced segments of the rope being disposed on respective sides of the axis between the rocker and said surface.

8. The device as claimed in claim 7,  
said rocker being elongated in configuration to present said ends, and having a central portion and a pair of rope receiving sections between said portion and respective ends,

said axis extending through said portion,  
said rope having a lead line and a trail line joined by a stretch wound around one of said sections, crossing said portion, and wound around the other of said sections,

said stretch presenting said segments between respective sections and said surface.

9. The device as claimed in claim 6; and a rotatable adjustment knob threaded on said support means and having a sleeve member presenting said stop,

said member having an annular rim defining said shoulder means,

said support means mounting said rocker for said rocking movement thereof about a transverse axis disposed intermediate said ends,  
said knob having an axis of rotation orthogonal to said axis of rocking movement of the rocker.

10. The device as claimed in claim 1; and a base mounting said structure and said pressure means and rendering the device self-supporting on said base,

there being an upright housing for said base and said structure having means projecting outwardly from the lower end of the housing,

there further being a hold-down member engageable with said projecting means for maintaining said base on a supporting surface during operation of the device.

11. The device as claimed in claim 10,  
said housing having a flange presenting said projecting means,

said member comprising a plank having means defining an opening therein receiving said housing but engageable with said flange in overlying relationship thereto.

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RICHARD C. PINKHAM, Primary Examiner

W. R. BROWNE, Assistant Examiner

U.S. Cl. X.R.

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