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FRICTION DEVICE FOR EXERCISERS

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FIG. 1.

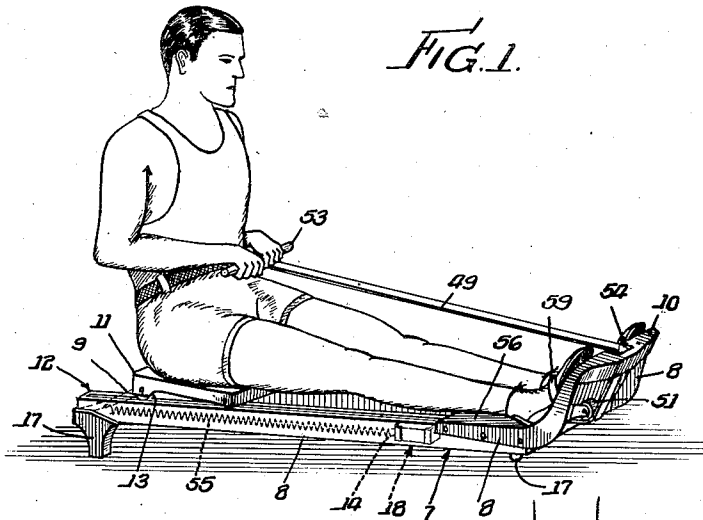


FIG. 2.

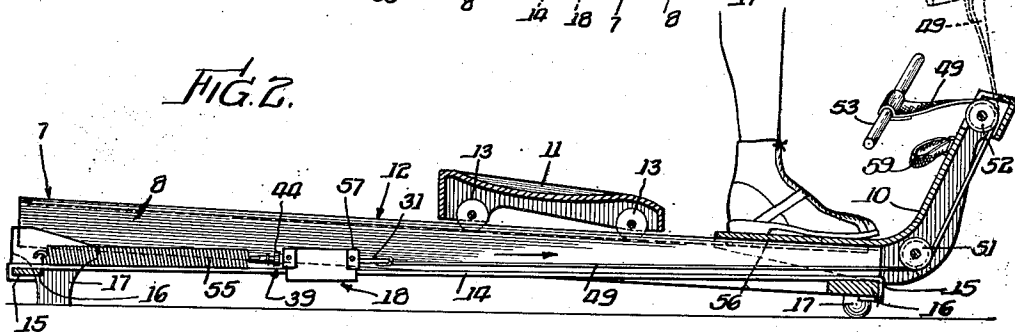


FIG. 3.

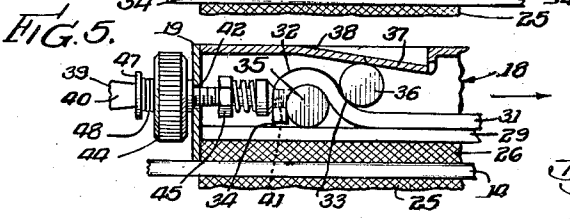
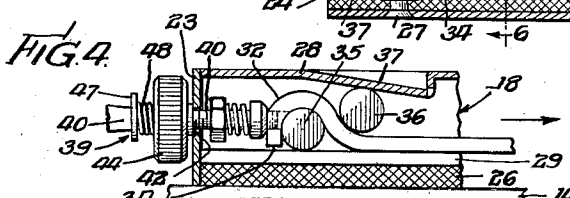
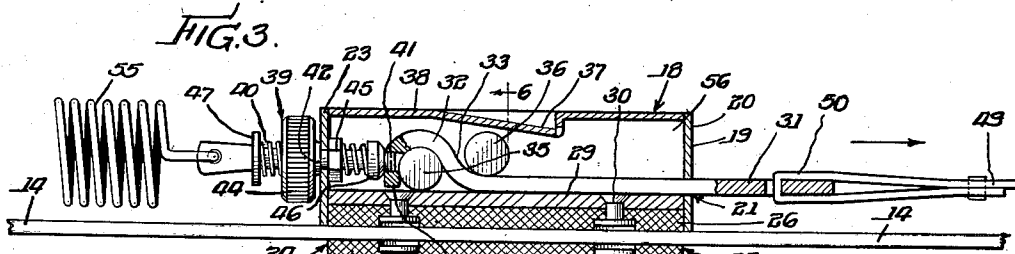
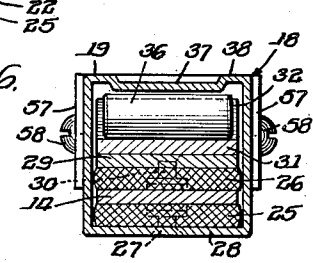


FIG. 6.



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FRICTION DEVICE FOR EXERCISERS

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16 Claims. (Cl. 272-72)

This invention relates to friction devices in general, and particularly to friction devices for exercising machines, such as rowing machines.

The primary object of the invention is to provide a new and novel exercising machine for the promotion of health, and which is safe so as to prevent injury to the user should any of the parts become broken, dislodged, or disconnected.

A further object of the invention is to provide a friction device for exercisers which device is simple in construction, which is positive and efficient in operation, and which can be readily and economically manufactured.

Another object of the invention is to provide a friction device, particularly suitable for exercising machines, whereby the exerciser is provided with a proper and even amount of resistance at the commencement of the pulling or exercising stroke, the device being capable of being adjusted to vary the resistance, making the device easier or harder to operate so that it may be used by persons of different strengths and capabilities, from children to grown-ups.

A further object of the invention is to provide an adjustable resistance device which includes a friction element capable of being set to require a considerable force for moving it in one direction, but which is freely movable in an opposite direction, the device including an adjustable feature so as to vary the friction for the pulling or exercising stroke.

Still another object is to provide a friction element for exercisers and the like, which includes a housed element slidably mounted on a rod, the element including brake shoes engaging the rod and means for creating a friction upon the rod when the device is moved in a predetermined direction, but which is freely slidable in an opposite direction.

Numerous other objects and advantages will be apparent throughout the progress of the following specification.

The accompanying drawing illustrates a selected embodiment of the invention and the views therein are as follows:

Fig. 1 is a detail perspective view of an exercising device, such as a rowing machine.

Fig. 2 is a longitudinal sectional view through the rowing machine.

Fig. 3 is a detail longitudinal sectional view through the resistance or friction device, showing the parts in freely slidable position.

Fig. 4 is a view similar to Fig. 3 but showing the parts in frictional engagement for the purpose of

providing resistance for the operating or power stroke.

Fig. 5 is a view similar to Fig. 4 showing the device in further adjusted position so as to require still additional force to operate the same during the pulling or exercising stroke.

Fig. 6 is a detail sectional view on the line 6-6 of Fig. 3.

The exerciser to which the invention is applicable is shown as a rowing machine comprising a frame 7 including spaced rails 8 connected at its rear by a cross member 9 and at its forward end by a prow 10. The spaced rails 8 provide a slide for a form fitting seat 11. The rails may be provided with grooves 12 forming a track upon which the seat 11 is movable, the seat being provided with wheels 13 which operate on the track 12 and which are guided thereby. The frame 7 may be inclined so that the seat 11 will naturally slide forwardly when not in use and which assists in making the device capable of giving a true rowing motion. A longitudinal rod or bar 14 may be arranged between the rails 8, and this rod may have its front and rear ends 15 bent to engage cross braces 16. Rests or feet 17 are mounted at opposite ends of the device and arranged so as to give proper inclination to the frame 7.

A resistance element 18 cooperates with the bar or rod 14 for the purpose of providing the proper amount of resistance for the operating or pulling stroke of the exerciser.

The resistance element 18 comprises a casing 19 having an end 20 in which there are provided openings 21 and 22. The end 23 of the casing has an opening 24 which is in alignment with the opening 22 in the end 20 and through which the rod or bar 14 extends when the element 18 is arranged in proper operable position. Elements 25 and 26 are arranged inside of the casing above and below, respectively, of the rod or bar 14 and in normal contacting engagement therewith. The elements 25 and 26 are for the purpose of creating or maintaining a friction on the resistance or friction bar 14 and are preferably made of material the same or similar to that from which automobile brake linings are made, although any other material may be used for creating the desired effect. The friction lining element 25 is fixed to the casing in any convenient manner, such as by riveting the same, as indicated at 27, to the bottom wall 28 of the casing. The friction resistant element 26 is preferably fixed to a plate 29 in any convenient manner, such as by rivets 30, and is prevented from longitudinal movement due to engagement with the end walls 20 and 36 of

the casing. The friction elements 25 and 26 may be of any convenient width, but in the present instance they are shown as being substantially the same width as the interior cross sectional dimension of the casing 19. A bar 31 is mounted on top of the plate 29 and has a hooked end 32, there being an inclined rounded surface 33, of suitable radius, where the straight portion of the bar integrally connects with the hooked end. The end 34 of the hooked end of the bar 31 is positioned above the top of the plate 29, as clearly shown in the various figures, while the lower surface of the bar rests upon and is flush with the top surface of the plate 29, as clearly shown in Figs. 3 and 5. A roller 35 is positioned in the hooked end of the member 31 at the lower side thereof and its purpose is to keep the end 34 of the bar away from the upper surface of the plate 29 and to overcome, as much as possible, friction between the member 31 and the plate 29. The roller 35 has rolling movement during forward and backward motion of the rod 31 and overcomes friction, preventing the end 34 of the hooked end of member 31 from digging into the plate.

A roller 36 is mounted on top of the bar 31 and normally occupies the position shown in Fig. 3, which position is just off the rounded or inclined portion 33 of the bar 31. This roller is adapted to be impinged between the end 32 of the rod 31 and the inclined portion 37 arranged in the upper wall 38 of the casing 19. The inclined portion 37 may comprise a wedge suitably fixed to the inside upper wall of the casing, or it may comprise a downwardly struck portion, as shown in the drawing. When the roller 36 is impinged between the part 37 and the slant or inclined portion 33 of the bar, the bar will be pressed downwardly squeezing the brake elements 25 and 26 together so as to create a friction on the bar 14.

An adjustable element 39 is provided for the purpose of varying the resistance and this element comprises a threaded stem or rod 40 which is fixed to the end of the rod 31, as indicated at 41. The threaded rod 40 extends through an opening 42 in the end wall 23 and carries a thumb nut 44 for the purpose of permitting longitudinal movement of the rod or bar 31 to bring the inclined portion 33 further away or closer to the inclination 37, thereby causing greater or less impingement of the roller 36 between the inclined member 37 and the inclined surface 33 and consequently increasing or decreasing the frictional resistance of the bar 14 relative to the friction elements 25 and 26. Nuts 45 and 46 are fastened to the rod 40 inside of the casing 19, as shown in Fig. 3, for the purpose of locking the rod 40 to the rod 31 and to maintain the end 32 of the rod 31 in proper position relative to the end 23 of the casing 19. The thumb nut 44 is arranged exteriorly of the casing and has threaded engagement with the rod 40, the adjustable movement of this nut being limited between the wall 23 of the casing and a flange or abutment 47 formed near the end of the rod 40. A spring 48 is arranged between the abutment 47 and the thumb nut 44 to hold the nut in its adjusted position.

The friction stroke of the device is in the direction shown by the arrows, friction being accomplished by a pull on the flexible member 49 which is fixed to the bar or rod 33, as indicated at 50, Fig. 3. The flexible member 49 passes around the pulleys 51 and 52 and has a handle 53 fixed at its free end for the purpose of being grasped and pulled by any one using the exerciser. The flexible element extends through a

slot 54, Fig. 1, provided in the prow 10. Thus, when resistance, such as a pull, is applied on the flexible member 49, the resistance element 18 will be moved along the rod or bar 14, the same operating under friction during the pulling or exercising stroke. At the end of the stroke, the resistance or pulling pressure is released, permitting a spring 55, which is fixed to the member 40 and a part of the frame, to return the friction element to normal position which is the position shown in Fig. 2. By turning the thumb nut 44, the friction on the rod 14 may be increased or decreased. If more friction is required, the thumb nut 44 is backed off, providing greater space between the nut 45 and the thumb nut 44, thereby permitting the rod 31 to be shifted further to the right in the casing, tending to permit the incline 33 on the rod 31 to come closer to the incline 37 on the casing, permitting greater impinging action on the roller 36 and tending to force the rod 31, and consequently the friction member 26, downwardly against the rod 14 and the rod 14 against the friction element 25. Therefore, when the nut is backed off, the friction on the rod 14 is greatly increased, while normal screwing motion of the thumb nut will move the radius or incline 33 further away from the incline 37, permitting the roller to be free, or in other words, kept from engagement with the inclined portion 37 of the casing, thereby preventing a wedging action between the bar 31 and the incline 37. Fig. 3 shows the roller in the position it will assume during the return stroke and also the position the parts will assume when the thumb nut is screwed tight against the casing, there being no friction on the device regardless of the direction it is moved on the rod 14. In Fig. 4, the thumb nut 44 has been backed off somewhat causing the roller to force the rod 31 against the plate 29, thereby permitting a friction to be exerted on the rod 14. This friction will occur, however, only in the pulling stroke which is in the direction shown by the arrow. At the end of the exercising stroke the spring 55 will pull the rod 31 a slight distance to the left, said distance being equal to the space between the nut 45 and the thumb nut 44 at which time the roller 36 will slide down the incline 33 and again assume the position as shown in Fig. 3. During the return stroke the spring 55 will pull on the threaded stem or rod 40 until the nut 45 engages the inside of the casing wall 23. The device 18 is thus returned to normal position. During the pulling or exercising stroke, Fig. 1, the friction device 18 will be moved forward along the rod 14 to the position shown in dotted lines in Fig. 1. At the end of the exercising stroke, when the pull on the handle is discontinued, the spring 55, which has been expanded during the pulling stroke, will return the friction device 18 back to normal position, as shown in Fig. 2.

The exerciser is also provided with a standing plate permitting a person to stand on the plate and operate the exerciser to be used for purposes other than a rowing machine, such as standing and bending exercises. The end walls 20 and 23 of the casing may be removable, as shown, having side ears 57 which are fastened to the side walls of the casing by screws 58. Arch straps 59 may be fastened to the prow of the exerciser to permit the feet of a person to be engaged thereby.

It is to be noted that one of the distinguishing differences between the present device and the ordinary devices using springs is that if the han-

die 53 should be released at the end of the pulling stroke, the handle 53 will return to normal position easily, while if springs were used as the tension medium, the handle would fly back with a terrific force and strike the feet of the user a violent blow, probably breaking his arches. The device is exceedingly simple in construction and may be utilized for other purposes besides a rowing machine, such as airplane landing gears, recoils of all types, control carrying arms for printing presses and other exercisers. The invention also contemplates the use of the present device as a substitution for wall exercisers, replacing the usual weights. The entire device, including the exerciser and the friction element, is a health promoting device which can be safely used and which is capable of being economically manufactured. The device is exceedingly simple and is efficient in operation. The resistance or friction element is capable of adjustment to either increase or decrease the amount of power required for its operation, thereby making the device universal in use.

Changes may be made in the form, construction, and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. A friction element for exercisers and the like comprising a longitudinal bar, means slidably arranged on said bar, means for causing said first named means to frictionally engage the bar when moved in one direction, and means for releasing said friction and returning the first named means in an opposite direction.

2. A friction element for exercisers and the like comprising a longitudinal bar, means slidably arranged on said bar, means for causing said first named means to frictionally engage the bar when moved in one direction, means for releasing said friction and returning the first named means in an opposite direction, and means for varying the friction on said rod during the friction movement.

3. A friction element for exercisers and the like comprising a longitudinal bar, friction means engaging the bar, manually operated means for moving the friction means in one direction on the bar, resilient means for returning the friction means after such movement, and means for releasing the friction on the return movement.

4. A friction element for exercisers and the like comprising a longitudinal bar, friction means engaging the bar, manually operated means for moving the friction means in one direction on the bar, resilient means for returning the friction means after such movement, means for releasing the friction on the return movement, and adjustable means for varying the friction during movement in the first direction.

5. A friction device comprising a rod, friction elements contacting with said rod, a bar, a roller engaging the bar, means adapted for engagement with the roller upon movement of the bar in a predetermined direction to create a friction on the rod, and means for releasing the friction on said rod upon movement of the bar in a reverse direction.

6. A friction device comprising a rod, friction elements contacting with said rod, a bar, an inclined member spaced from the bar, a roller arranged between the bar and inclined member and

adapted to be impinged therebetween upon movement of the bar in a predetermined direction, said roller exerting a pressure against the bar when impinged and causing the bar to squeeze the friction elements against the rod, and means for preventing friction to be exerted on the rod when the movement of the bar is released.

7. A friction element comprising a rod, friction means in engagement with said rod, a bar for moving the friction means in a predetermined direction when pulled, an inclined surface above the bar, a roller arranged between the bar and the rod, means cooperating with the inclined surface for forcing the roller against the rod for creating a pressure on the rod during the pulling movement, and means for releasing said pressure and frictional engagement on the rod and returning the bar to starting position when the pull is discontinued.

8. A friction element comprising a rod, friction means in engagement with said rod, a bar for moving the friction means in a predetermined direction when pulled, an inclined surface above the bar, a roller arranged between the bar and the rod, means cooperating with the inclined surface for forcing the roller against the rod for creating a pressure on the rod during the pulling movement, means for releasing said pressure and frictional engagement on the rod and returning the bar to starting position when the pull is discontinued, and adjustable means cooperating with the bar for varying the pressure on the rod during the pulling movement.

9. A friction element comprising a rod, a housing movable on the rod, friction elements in the housing and adapted for engagement with the rod, a bar connected to the housing to move the housing on the rod when the bar is pulled, means including a roller for urging the bar downward to cause the elements to create a friction on the rod and holding the friction during the pull, and means for returning the housing when the pull is discontinued, said last named means also releasing the friction on the rod during the return movement of the housing.

10. A friction element comprising a rod, a housing movable on the rod, friction elements in the housing and adapted for engagement with the rod, a bar adapted to be moved and connected to the housing to move the housing on the rod when the bar is pulled, means including a roller for urging the bar downward to cause the elements to create a friction on the rod during pulling of the bar, means for returning the housing when the pull is discontinued, said last named means also releasing the friction on the rod during the return movement of the housing, and means connected to the bar and extending through the housing for moving the bar longitudinally a predetermined distance to vary the friction on the rod.

11. A friction device comprising a rod, a metal housing movable on the rod, friction elements arranged above and below the rod, a bar arranged above the friction elements, an inclined surface on said housing, an inclined surface on the bar, a roller arranged between said inclined surfaces, said roller creating a pressure against said bar when said bar is urged in a predetermined direction and thereby tightening the friction elements on the rod, and spring means connected to said bar for returning the housing to starting position when the urging action of the bar is discontinued.

12. A friction device comprising a rod, a metal housing movable on the rod, friction elements arranged above and below the rod, a bar arranged

- above the friction elements, an inclined surface on said housing, an inclined surface on the bar, a roller arranged between said inclined surfaces, said roller creating a pressure against said bar
- 5 when said bar is urged in a predetermined direction and thereby tightening the friction elements on the rod, spring means connected to said bar for returning the housing to starting position when the urging action of the bar is discontinued,
- 10 a shaft connected to said bar and extending through the housing, and a thumb nut on said housing for moving the shaft longitudinally and consequently moving the bar to vary the pressure on the rod.
- 15 13. A friction device comprising a rod, a metal housing movable on the rod, friction elements arranged above and below the rod, a bar arranged above the friction elements, an inclined surface on said housing, an inclined rounded surface on
- 20 the bar, a roller arranged between said surfaces, said roller moving upwardly along the inclined surface when a pull is exerted on the bar and being impinged between said surfaces, said roller creating a pressure against said bar when said bar
- 25 is urged in a predetermined direction and thereby tightening the friction elements on the rod, and spring means operatively connected to said bar for returning the housing to starting position when the urging action of the bar is discontinued.
- 30 14. A friction device comprising a rod, a metal housing movable on the rod, friction elements arranged above and below the rod, a bar arranged above the friction elements, an inclined surface on said housing, an inclined rounded surface on

the bar, a roller arranged between said surfaces, said roller moving upwardly along the inclined surface when a pull is exerted on the bar and being impinged between said surfaces, said roller creating a pressure against said bar when said bar is urged in a predetermined direction and thereby tightening the friction elements on the rod, spring means operatively connected to said bar for returning the housing to starting position when the urging action of the bar is discontinued, and adjustable means arranged intermediate the ends of said bar and said spring for varying the frictional engagement of said elements on the rod.

15 In an exerciser, a rod, a friction element, means for moving the friction element in a predetermined direction along the rod, means causing the element to create a friction on the rod when the element is moved along the rod in said predetermined direction, and means for returning the element on the rod to initial position and releasing the friction on the rod when the movement of the element in said direction has ceased.

20 16. In an exerciser, a rod, a friction element, means for moving the friction element in a predetermined direction along the rod, means causing the element to create a friction on the rod when the element is moved along the rod in said predetermined direction, means for returning the element on the rod to initial position and releasing the friction on the rod when the movement of the element in said direction has ceased, and means for varying the frictional engagement of the element relative to the rod.

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