

[54] **EXERCISING MACHINE WITH
SPRING-RETURN PEDALS AND PULL
LINES**

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[58] Field of Search **272/72, 73, 79 R, 79 D, 81,
272/82, 83 R, 83 A, DIG. 3**

[56] **References Cited**

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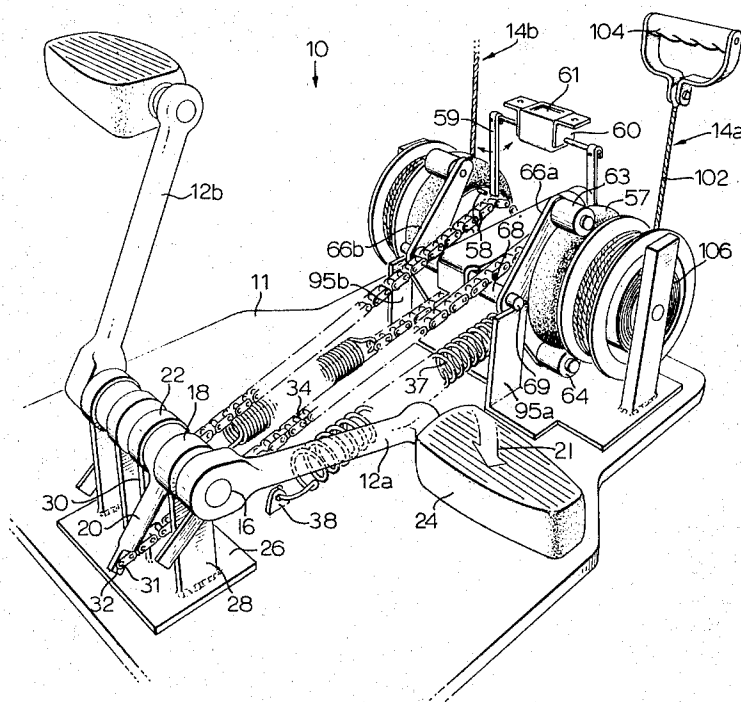
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[57] **ABSTRACT**

An exercising machine having a pair of pedals and a pair of sheaves both mounted for rotation upon a base. A line is wound around each sheave and a handle is connected to the end of each line. The pedals and sheaves are operatively connected to a friction mechanism which opposes turning of the pedals in one direction and unwinding of the lines from the sheaves. A spring is provided for turning the pedals in the opposite direction and for winding the lines on to the sheaves and a clutch serves to disengage the friction mechanism when the pedals and sprockets are being turned by the spring. The force exerted by the spring mechanism opposing turning of the pedals and sprockets may be manually adjusted. The pedals are restricted from rotating fully about their axis by a pair of stop points formed by the base.

8 Claims, 3 Drawing Figures



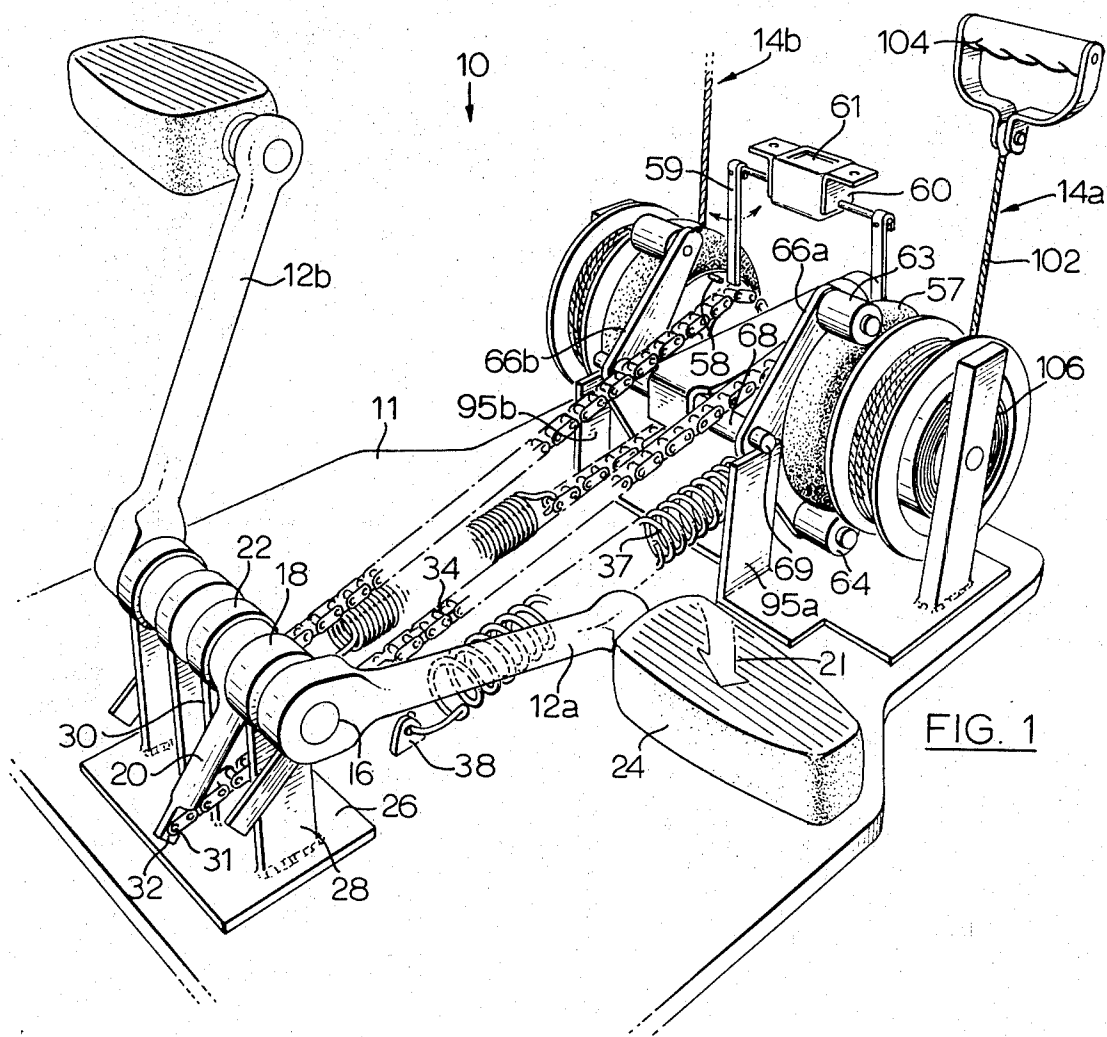


FIG. 1

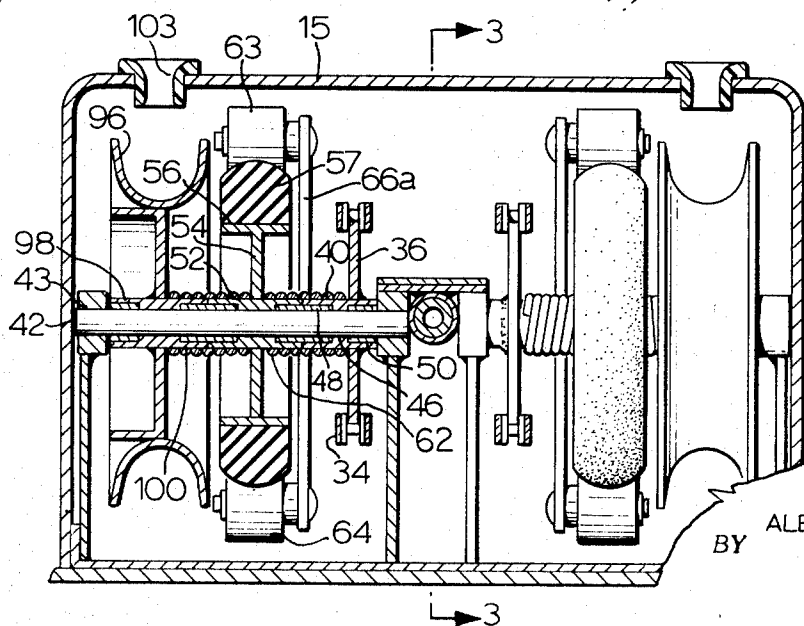


FIG. 2

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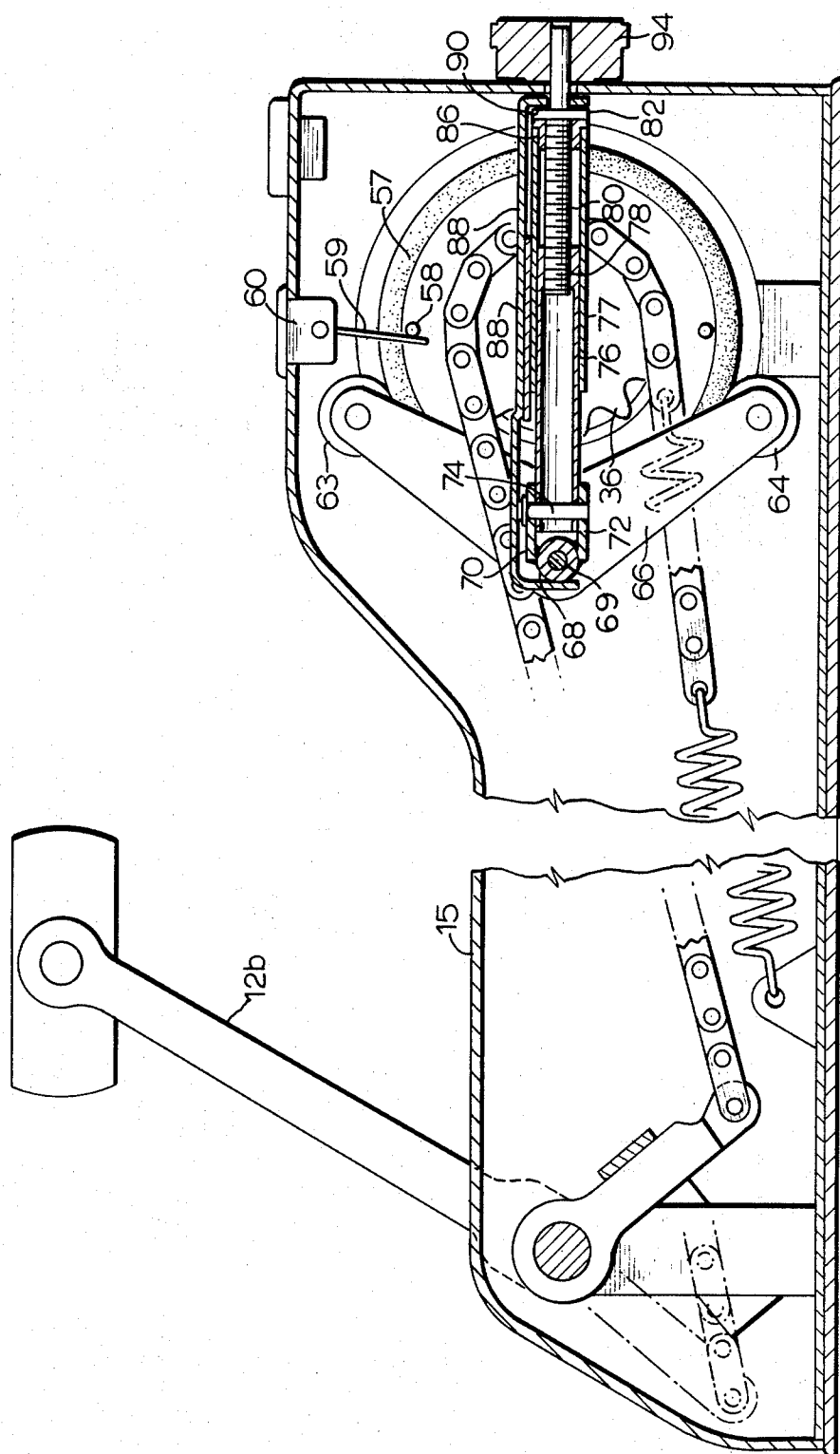


FIG. 3

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EXERCISING MACHINE WITH SPRING-RETURN PEDALS AND PULL LINES

This invention relates to exercising machines and more particularly to a portable exercising device having a pair of movable pedals and handles and a friction mechanism for hindering movement of the pedals and handles.

A number of portable exercising machines are known and in common use. These machines usually provide a pair of pedals or a pair of handles attached to lines wound upon sheaves mounted within the machines. The pedals which may be reciprocated or rotated. In some devices, the human operator must exert some force to turn the pedals while in others a prime mover is incorporated into the device to turn the pedals and the operator is entirely passive.

Conventional exercise programs call for an increase in both variety and difficulty of exercises over a period of time. The above described devices are, in most cases, unsuitable for such programs since they lack the required versatility. They provide either handles for arm exercisers or pedals for leg exercises but not both. Moreover, the handles or pedals are spring biased and the force exerted by the spring opposing operation of the handles or pedals is not constant but changes as the spring lengthens. Additionally no ready means is provided for selectively adjusting the force required to pull the handles or turn the pedals.

It is accordingly an object to provide an exercising machine which provides both pedals and handles and has means by which the force required to pull the handles or operate the pedals may be readily adjusted. Once the force is adjusted however, the force remains substantially constant as the handles are being pulled or the pedals turned.

Another object is to provide a machine having means for a complete range of body exercises.

It is another object to provide a compact portable machine which is light, is made of conventional components and is simple and relatively inexpensive of manufacture.

These and other objects may be accomplished by providing an exercising machine including: a base; a pedal and reel mounted for turning upon the base; a flexible line having a handle and connected to the reel; a brake operatively connected to the reel and the pedal for hindering turning of the reel in a direction tending to unwind the line from the reel and for hindering turning of the pedal; and resilient means for turning the reel in a direction tending to wind the line around the reel.

A fuller understanding of the invention may be had by referring to the following description of a preferred embodiment of the present invention taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of the exercising machine of the invention, the housing being removed to expose the operative components of the device;

FIG. 2 is an end view, partly in section, of the machine, the handles and flexible line of which being removed; and

FIG. 3 is a view on line 3—3 of FIG. 2.

Like reference characters refer to like parts throughout the description of the drawings.

With reference to FIG. 1, the exercising machine according to the invention is designated generally 10 and

includes a base 11, a pair of pedals 12a and 12b, a pair of braking and handle assemblies generally 14a and 14b all mounted within housing 15 (FIGS. 2 and 3). Pedals 12a and 12b have the same structure as have braking and handle assemblies 14a and 14b. Accordingly, the structure of only one pedal is described together with the braking and handle assembly to which the pedal is operatively connected. Where, however, it is necessary to distinguish one pedal from the other or one braking and handle assembly from the other, the numerals identifying the two parts are followed by the letters a or b.

Pedal 12 is secured to an end of an axle 16 which projects outwardly of bearings 18. A limb 20 is also connected to axle 16 and extends downwardly from the side of bearings 18 opposite pedal 12. Downward rotation of pedal 12 in the direction of arrow 21 produces a corresponding upward rotation of limb 20. The end of axle 16 opposite pedal 12 is journaled within bearing 22. The axles 16a and 16b to which the two pedals 12a and 12b are mounted are not connected, thus the two pedals operate independently of each other.

The pedals are free to reciprocate between two stop points. One stop point is reached when foot rest 24 of the pedal contacts the upper surface of base 11 and the other stop point is reached when the free end of limb 20 contacts the upper surface of plate 26.

Bearings 18 and 22 are maintained in position by supports 28 and 30 respectively and the supports are fastened to plate 26 resting on base 11.

An aperture 32 is formed in the free end of limb 20 for admission of a pin 31 to interconnect roller chain 34 with limb 20. The chain extends around sprocket wheel 36 (FIGS. 2 and 3) and its end is connected to an end of a resilient coil spring 37. The other end of the spring is connected to a lug 38 which is fastened to the upper surface of base 11.

With reference to FIG. 2, sprocket wheel 36 is affixed to a sleeve 40 which is freely rotatable about an axle 42. The axle is oriented parallel to axle 16 and is rigidly mounted to supports 43 and 44. An annular surface 46 of sleeve 40 bears against the outer surface of axle 42 and two packing rings 48 and 50 are positioned on opposite sides of surface 46.

A second sleeve 52 is mounted beside sleeve 40 for rotation about axle 42. A disc 54 is mounted to sleeve 52 approximately midway of its ends. The disc extends radially outward and terminates at a circular flange 56. An annular braking pad 57 is bonded to the outer surface of flange 56.

A number of pins are spaced about and project inwardly from flange 56. One pin is visible in FIG. 1 and is designated 58. Upon movement of flange 56, the uppermost pin 58 contacts downwardly extending limb 59 of a conventional counter 60 and moves it forward until the pin is beneath the lowermost edge of the limb whereupon the limb springs back. Each forward and return movement of the limb is counted and displayed on the dial 61 of the counter thereby indicating the number of incremental advances of the brake pad.

A spring clutch 62 is mounted about and affixed to both sleeves 40 and 52. Rotation of sleeve 40 in one direction will produce a tightening of the coils of the spring clutch. As the coils tighten, they will frictionally rip both sleeves 40 and 52 and sleeve 52 will turn with

sleeve 40. Rotation of sleeve 40 in the opposite direction will cause the coils of clutch 62 to loosen and sleeve 52 will not turn with sleeve 40 but remains stationary.

Two friction wheels 63 and 64 exert a braking force on the outer surface of each braking pad 57a and 57b. The structure of the apparatus which permits adjustment of the braking or hindering force is best seen in FIGS. 1 and 3. With reference first to FIG. 3, wheels 63 and 64 are rotatably mounted to a generally V-shaped plate 66. The wheels are located at the free ends of the limbs which make up the "V." A sleeve 68 is rigidly mounted to the plate in the region of the intersection of the two limbs and the sleeve is rotatably mounted about a shaft 69. Two lugs 70 and 72 are connected to the sleeve and a pin 74 joins the lugs to the end of a tube 76. The tube is slidably positioned within a guide sleeve 77. The end of tube 76 opposite pin 74 has a threaded opening 78 for receipt of an externally threaded end portion of a stud 80 and the stud has an enlarged intermediate portion 82. The stud is rotatable within the guide sleeve 77 and the enlarged portion 82 contacts a radially inwardly projecting end portion 86 of sleeve 77. Attached to the upper surface of sleeve 77 is a cover plate 88 formed with a downwardly extending lip 90 which faces the side of enlarged portion 82 opposite end portion 86. Stud 80 is therefore rotatable within guide sleeve 77 but movement of the stud along its axis is restrained by end portion 86 and lip 90 which contacts opposite sides of enlarged portion 82.

The unthreaded end of stud 80 is connected to knob 94 to permit manual rotation of stud 80 from outside housing 15. When the knob is rotated, tube 76 will be moved axially within guide sleeve 77 by stud 80 thereby moving plate 66 and friction wheels 63 and 64 toward or away from braking pad 57. Thus, the force retarding rotation of pad 57 can be adjusted by turning of knob 94.

With reference to FIG. 1, shaft 69 is connected to and extends between plates 66a and 66b. Accordingly, turning of the knob 94 will vary the force exerted on both pads 57a and 57b by friction wheels 63a and 63b and 64a and 64b. The two ends of shaft 69 are slidable on support plates 95a and 95b.

With further reference to FIG. 2, a reel or sheave 96 is fastened to a sleeve 98 freely rotatable about axle 42. Sleeve 98 is positioned beside sleeve 52 and a spring clutch 100 is mounted about and affixed to both sleeves. Rotation of sleeve 98 in one direction will cause a corresponding rotation of sleeve 52 while rotation in the opposite direction will not cause rotation of sleeve 52.

A flexible line or wire 102 is wrapped around sheave 96. The wire extends through aperture 103 formed in housing 15 and a handle 104 is attached to the end of the wire. When handle 104 is pulled outwardly, sheave 96 is caused to rotate and the wire 102 unwinds therefrom. Rotation of the sheave in this direction will result in tightening of the coils of spring clutch 100 and braking pad 57 will also rotate. A spiral spring 106 is positioned about axle 42, one end of which being fastened to sheave 96 and the other to axle 42. The spring is in an unstressed state when the wire is wound on sheave 96 but tightens about the axle as handle 104 is pulled outwardly. When the handle is released, spring

106 causes the sheave to rotate in the direction tending to rewind the wire around the sheave. As the wire is being rewound, the coils of spring clutch 100 slacken and brake pad 57 remains stationary.

The exercising machine of the invention can be used in a variety of ways. It may be placed on the floor in front of a chair and the operator may reciprocate the pedals with his feet. With reference to FIG. 1, before the operator places any weight on pedals 12, both will be in an upright position, i.e., pedal 12a will be in the same upright position as pedal 12b. As the operator presses downwardly on pedal 12a, roller chain 34 will turn sprocket wheel 36 counterclockwise and coil spring 37 will be placed under tension. The coils of spring clutch 62 are tightened by the turning of the sprocket wheel and brake pad 57 also turns. The force exerted by wheels 63 and 64 on pad 57 opposing rotation of the brake pad is substantially constant as the pedal is being turned. Counter 60 will register each downward movement of pedal 12a. When the operator's foot is released, spring 37 will draw chain 34 over sprocket wheel 36 and the pedal will return to an upright position. The sprocket wheel will be turned clockwise but brake pad 57 will remain stationary since the coils of spring clutch 62 are loosened. Thus, the braking pad and friction wheels will not resist return of the pedal to the upright position.

In order to increase the force required to move both pedals downward, it is merely necessary to rotate knob 94 in the direction required to move friction wheels 63 and 64 more closely into contact with pad 57. To reduce the force, the knob is turned in the opposite direction.

While the machine is still on the floor, the handles may be manipulated by pulling upward thereby turning sheaves 96 counterclockwise. Spring clutch 100 will turn sleeve 52 with sleeve 98 and force resisting unwinding of the wire will be exerted by the braking pad and friction wheels. When the handle is released, spiral spring 106 will rewind the wire onto the sheave and spring clutch 100 will release sleeve 52.

The machine may be used in a number of other ways. A description of several will indicate the great variety of uses. The operator of the machine may lie prone face down and move the pedals with his hands or he may lie prone with his face up and pull the handles upward over his back. The operator may be seated on the floor and the machine braced with his feet and with the handles pulled in a rowing manner.

It will be understood, of course, that modifications can be made in the preferred embodiment of the invention described and illustrated herein without departing from the scope and purview of the invention as defined by the appended claims. For example, the pedals may be arranged to rotate completely. In such event, the pedals must be operatively connected to sprocket 36 by means of a continuous roller chain and the axle about which the pedals revolve must be provided with a sprocket wheel having teeth which fit into the links of the chain. A timer may be substituted for counter 60 if it is desired to ascertain the length of the exercise period.

What we claim as new and desire to protect by Letters Patent of the United States is:

1. An exercising machine including: a base; a pedal; and a reel, said pedal and said reel being mounted for turning independently of each other upon said base; a flexible line having a handle and connected to said reel; a brake operatively connected to said reel and said pedal for hindering turning of said reel in a direction tending to unwind said line from said reel and for hindering turning of said pedal in one direction; first resilient means for turning said reel in a direction tending to wind said line around said reel; second resilient means for moving said pedal in a direction opposite to said one direction; and means for limiting the extent of reciprocation of said pedal in both directions.

2. The exercising machine as claimed in claim 1 further including means for adjusting the force exerted by said brake hindering movement of said reel and said pedal.

3. An exercising machine including; a base; a reel mounted for rotation upon said base; a flexible line wound upon and joined at one end to said reel and at the other end joined to a handle; a brake pad mounted for rotation upon said base; first clutch means for causing said brake pad to turn with said reel upon rotation thereof in a direction causing unwinding of said line but allowing said brake pad to remain stationary upon rotation in the opposite direction; first resilient means for urging said reel to turn in the opposite direction; a pedal mounted for reciprocation between two stop points upon said base; second clutch means for causing said brake pad to turn with said pedal upon turning of said pedal in one direction but allowing said brake pad to remain stationary upon turning of said pedal in the opposite direction; and second resilient means for urging said pedal to turn in the opposite direction.

4. The exercising machine as claimed in claim 3 further including a friction wheel movable into and out of firm contact with said brake pad so that the force required to turn said pad may be varied.

5. The exercising machine as claimed in claim 4 wherein said second clutch means includes an axle spaced apart from said pedal and rigidly mounted upon said base, a sprocket wheel rotatably positioned about said axle, said brake pad also being positioned about said axle, a spring clutch and a roller chain having one end connected to said pedal and the other end connected to said second resilient means anchored to said base, the length of said chain engaging teeth of said sprocket wheel so that upon application of force to cause said pedal to turn in one direction, said sprocket wheel is caused to turn in a forward direction and said resilient means is caused to deform and upon withdrawal of said force, said resilient means reverts to its normal unstressed condition thereby causing said pedal and said sprocket wheel to turn in the opposite direction, said spring clutch engaging said brake pad with said sprocket wheel upon turning of said sprocket wheel in said forward direction and causing said brake pad to turn with said sprocket wheel but disengaging said brake pad from said sprocket wheel upon turning of said sprocket wheel in the opposite direction.

6. The exercising machine as claimed in claim 4 wherein said first clutch means includes an axle spaced apart from said pedal and rigidly mounted upon said base, said reel and said brake pad being rotatably positioned about said axle and a spring clutch so that upon

application of force to said handle to cause said reel to turn in a direction causing unwinding of said line, said brake pad is caused to turn and said first resilient means is caused to deform and upon withdrawal of said force, said first resilient means reverts to its normal unstressed condition thereby causing said reel to turn in the opposite direction, said spring clutch engaging said brake pad with said reel upon turning of said reel in a direction causing unwinding of said line but disengaging said brake pad from said reel upon turning of said reel in the opposite direction.

7. The exercising machine as claimed in claim 4 further including a friction wheel rotatably mounted to a plate, a threaded stud rotatably mounted within said housing and threadably received in an opening of said plate, a knob connected to said stud facilitating manual rotation of said stud, said knob when rotated in one direction causing said friction wheel to move into firm engagement with said brake pad and retard turning of said pad and upon rotation of said knob in the opposite direction causing said friction wheel to move away from said brake pad.

8. The exercising machine as claimed in claim 4 wherein said first clutch means includes an axle spaced apart from said pedal and rigidly mounted upon said base, said reel and said brake pad being rotatably positioned about said axle and a first spring clutch so that upon application of force to said handle to cause said reel to turn in a direction causing unwinding of said line, said brake pad is caused to turn and said first resilient means is caused to deform and upon withdrawal of said force, said first resilient means reverts to its normal unstressed condition thereby causing said reel to turn in the opposite direction, said first spring clutch engaging said brake pad with said reel upon turning of said reel in a direction causing unwinding of said line but disengaging said brake pad from said reel upon turning of said reel in the opposite direction; a sprocket wheel rotatably positioned about said axle, a second spring clutch and a roller chain having one end connected to said pedal and the other end connected to said second resilient means anchored to said base, the length of said chain engaging teeth of said sprocket wheel so that upon application of force to cause said pedal to turn in one direction, said sprocket wheel is caused to turn in a forward direction and said second resilient means is caused to deform and upon withdrawal of said force, said second resilient means reverts to its normal unstressed condition thereby causing said pedal and said sprocket wheel to turn in the opposite direction, said second spring clutch engaging said brake pad with said sprocket wheel upon turning of said sprocket wheel in said forward direction and causing said brake pad to turn with said sprocket wheel but disengaging said brake pad from said sprocket wheel upon turning of said sprocket wheel in the opposite direction; said exercising machine further including a friction wheel rotatably mounted to a plate, a threaded stud rotatably mounted within said housing and threadably received in an opening of said plate, a knob connected to said stud facilitating manual rotation of said stud, said knob when rotated in one direction causing said friction wheel to move into firm engagement with said brake pad and retard turning of said pad and upon rotation of said knob in the opposite

direction causing said friction wheel to move away from said brake pad.

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