United States Patent [19]

Sumrall

[11] **3,737,163**

[45] **June 5, 1973**

[54] TREADMILL EXERCISING MACHINE

[76] Inventor: **Dale A. Sumrall,** 3219 Dearborn Street, Shreveport, La.

[22] Filed: **Aug. 17, 1970**

[21] Appl. No.: **64,371**

[52] **U.S. Cl.** **272/69,** 198/203, 74/194, 297/118

[51] **Int. Cl.** **A63b 23/06**

[58] **Field of Search** .....272/58 R, 69, DIG. 3, 272/DIG. 4, DIG. 5; 273/DIG. 8; 119/29; 74/194, 197, 217 S, 221; 198/203

[56] **References Cited**

UNITED STATES PATENTS

2,720,134	10/1955	Buhler et al.	74/194 X
2,852,130	9/1958	Wallace	198/203 X
2,929,800	3/1960	Hill, Jr.	260/77.5
3,075,397	1/1963	Winter	74/197 X
3,497,056	2/1970	Clark	198/203
3,529,482	9/1970	Jackson et al.	74/197
2,770,976	11/1956	Frantz et al.	74/194
3,127,171	3/1964	Noland et al.	272/58 R
1,251,784	1/1918	Joslin	74/194
3,372,928	3/1968	Showalter	272/79 R
3,038,726	6/1962	Hesidence	273/DIG. 8 UX
3,379,437	4/1968	Warner	272/69 X
2,602,666	7/1952	Burke et al.	273/55 R
3,193,287	7/1965	Robinson	272/69 X
3,327,546	6/1967	Gordon et al.	74/194

FOREIGN PATENTS OR APPLICATIONS

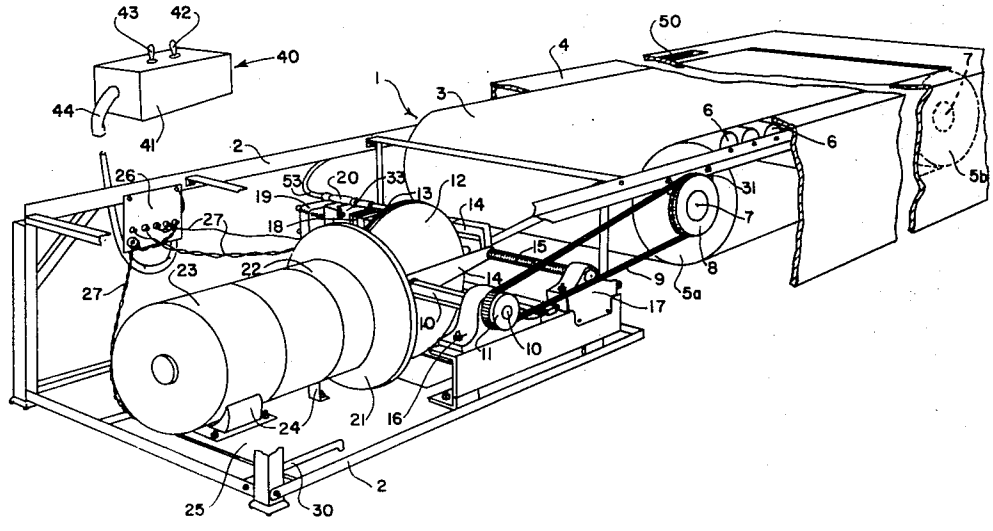
384,019	12/1933	Great Britain	272/69

Primary Examiner—Richard C. Pinkham
Assistant Examiner—Richard T. Stouffer
Attorney—John M. Harrison

[57] **ABSTRACT**

An exercising machine designed to provide maximum flexibility and safety in walking or running activity, which includes an endless belt mounted on a frame, the belt being driven by a novel drive system which may be controlled by the user as he exercises. The drive system is basically composed of a drive wheel-friction wheel combination interrelated in such a manner as to provide speed control over an essentially infinite range of selected speeds with smooth speed transition. The drive wheel and friction wheel cause movement of the endless belt when they are in contact with one another. They may be disengaged only when the belt is being driven at the minimum speed of the range of selected speeds. A series of pressure switches protects against disengagement of the drive wheel and friction wheel when the belt is at the maximum speed.

2 Claims, 7 Drawing Figures



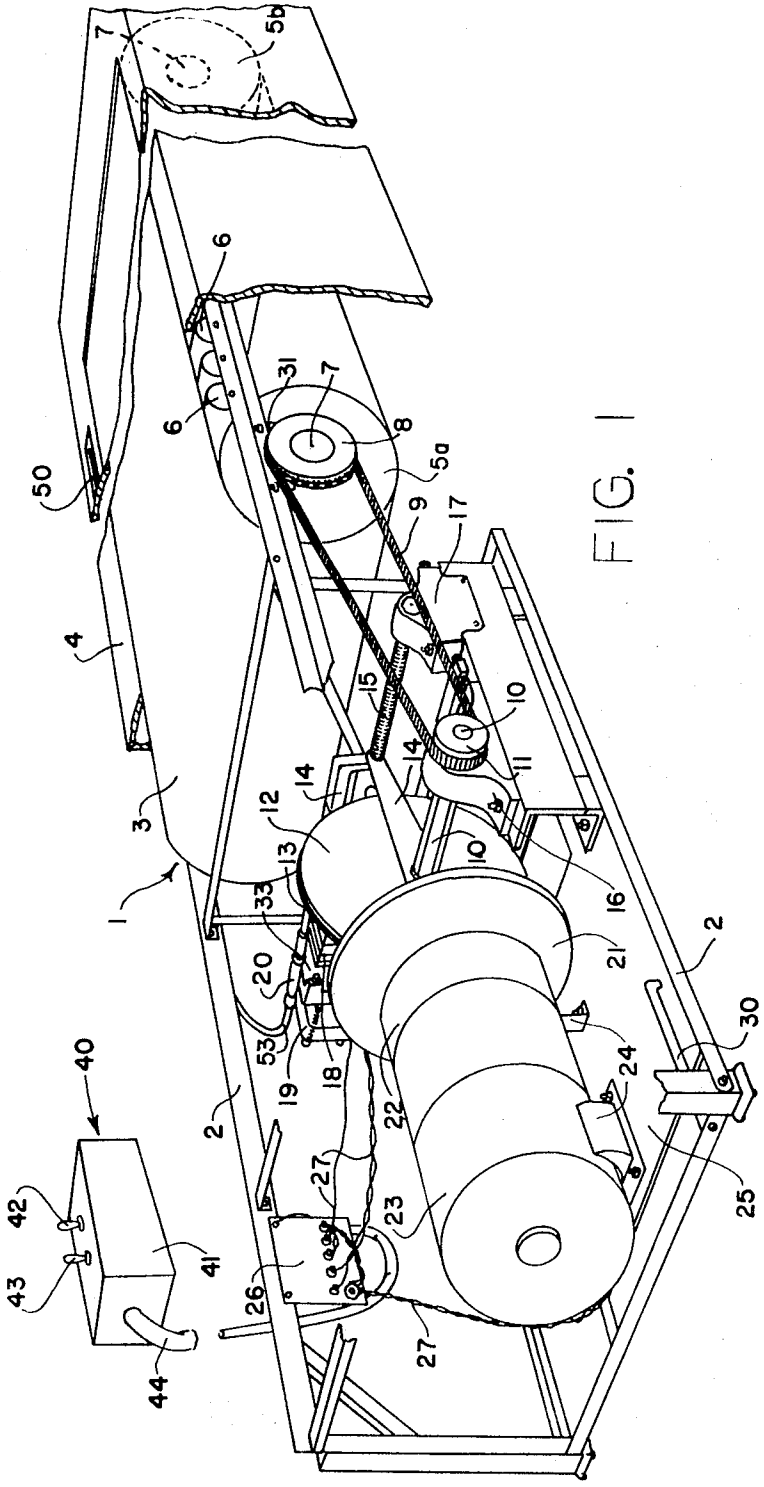


FIG. 1

INVENTOR.

BY Dale R. Samuels

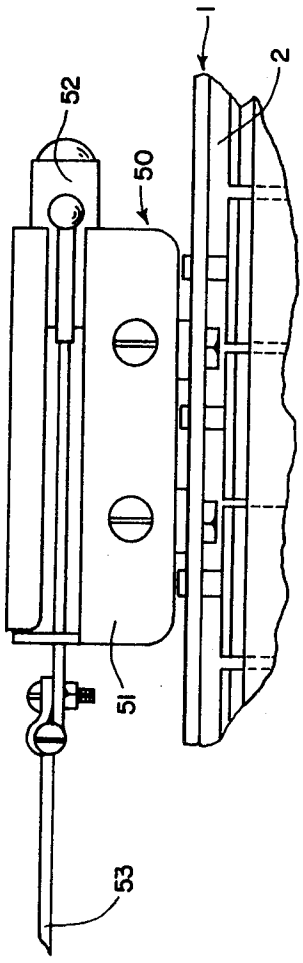


FIG. 3

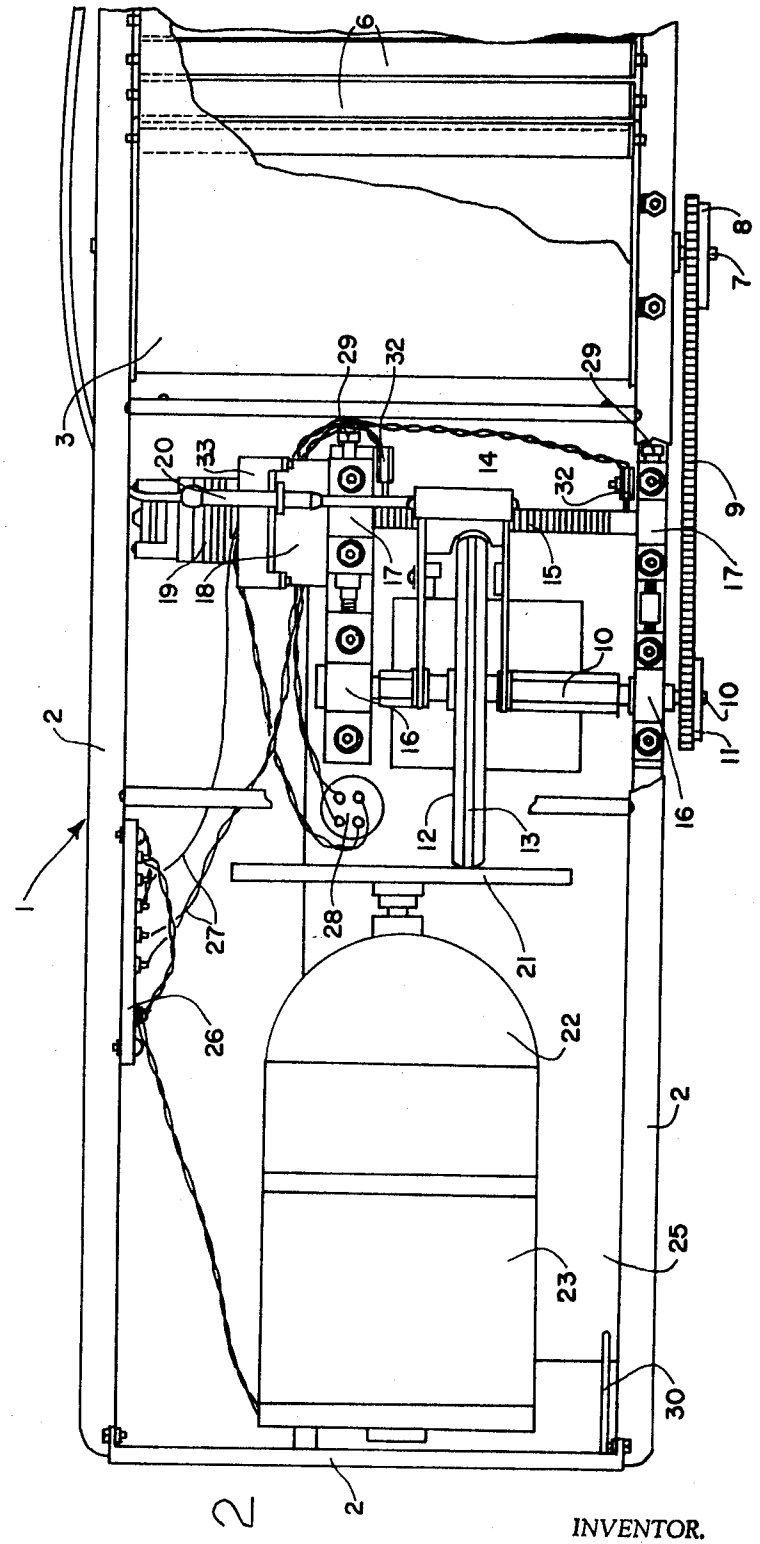


FIG. 2

INVENTOR.

BY Dale A. Samuels

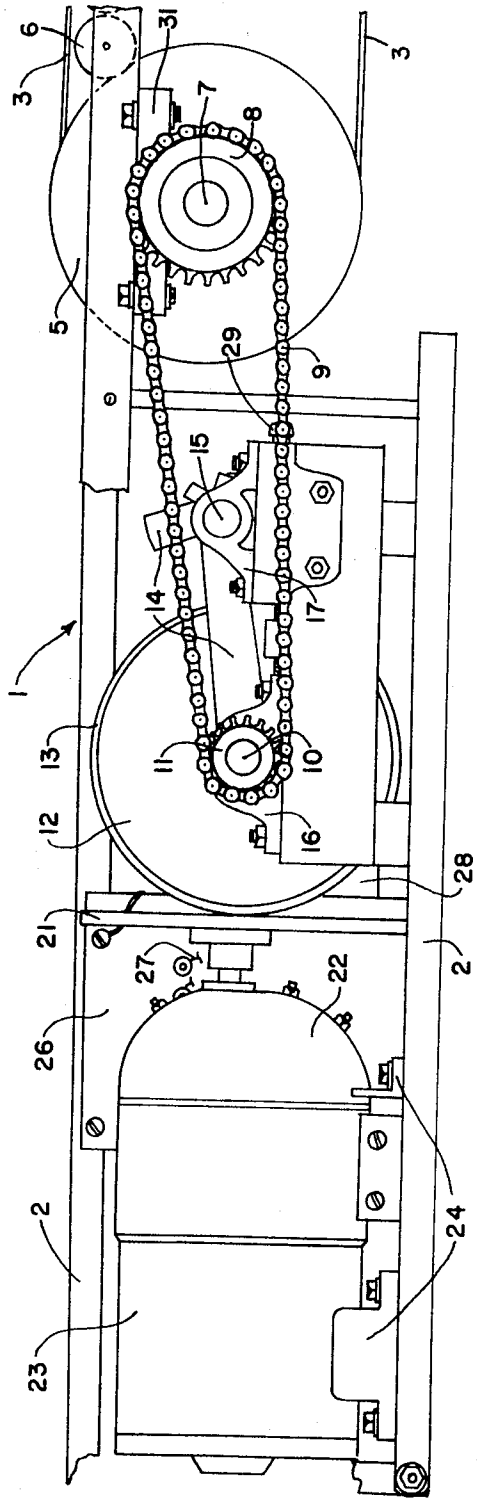


FIG. 4

INVENTOR.

BY Dale A. Lumsden

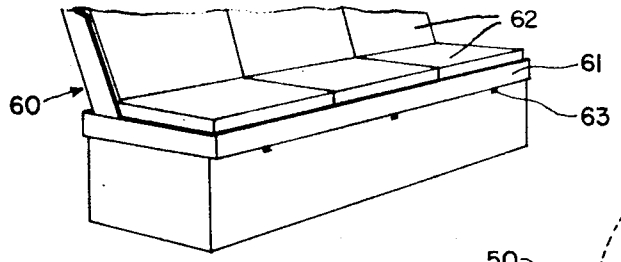


FIG. 5

FIG. 6

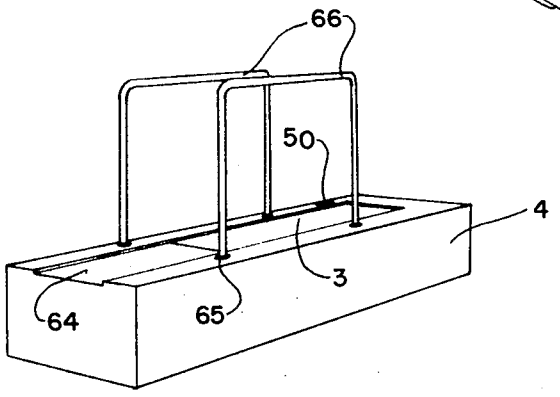


FIG. 7

INVENTOR.

BY Linda A. Kinnard

TREADMILL EXERCISING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a new and improved exercising machine which is designed to provide a safe, beneficial exercising medium to many classes of users, including crippled and infirm persons, as well as the athletically inclined and able. The machine may be adapted to substantially any environment, whether it be an office, home or health studio, since in a preferred embodiment, it may be integrated into an attractive piece of furniture which is susceptible of a variety of imaginative designs.

The exercise of walking and running is widely acclaimed by the medical profession as the best method of keeping in good physical condition which is available to the average individual since this activity brings into play most of the body muscles and requires little concentration. Modern living and working conditions in the world today have evolved to the point of making much needed exercise prohibitive to millions of Americans as well as others all over the world. For example, many business executives are forced to work long hours and have little time or inclination to devote to physical fitness after a day at the office. Furthermore, the ever increasing encroachment on suburban areas by the cities is rendering suitable space for uninhibited walking or running more and more difficult. As a result of these factors and many more similar considerations, many individuals are not in a position to provide themselves with beneficial walking or running exercise. In addition to those whose schedule or environment prevents such needed exercise, another class of individuals who can benefit from walking activity are certain of those who are aged, infirm or afflicted, but who are to a greater or lesser extent ambulatory. While it may be impractical for supervisory personnel to escort these persons on walks of varying length and frequency, the exercising machine disclosed in this invention may readily be provided for supervised exercise.

Thus, there exists a present need in the modern and enlightened world of today for an exercising device which will provide a broad range of flexibility, utility, safety and reliability.

2. Description of the Prior Art

Heretofore, exercising devices of varying shapes, sizes and design have been developed to provide the user with a means for keeping physically fit. These machines are typically of the treadmill type, the several varying modifications generally having to do with the method of mounting the belt to the frame and particular techniques for providing propulsion. The earliest designs typified by that disclosed in U.S. Pat. No. 759,296 to James Morairty, were propelled by the user and were generally characterized by a friction means of various design, applied to the belt to vary the degree of energy required to cause the belt to rotate. Later designs, illustrated by the device disclosed in U.S. Pat. No. 2,399,915 to Ward A. Drake, utilized self propelled systems, notably electric motors, to cause the belt to rotate while the user exercised.

Typical of the undesirable features which are common to these prior art devices, are the difficulty of achieving even rudimentary speed control and proper safety. Furthermore, with regard to the machines which require the user to propel them, these devices require

an additional output of energy for operation in excess of that necessary to perform the desired walking or running exercise. The user is therefore required to adjust his walking or running effort so that it coincides with a selected fixed speed of operation, and he must always exert enough effort to propel the machine.

Motorized treadmill exercising machines are frequently characterized by such disadvantages as poor speed control and safety features, these two disadvantages being frequently interrelated. For example, in many prior art devices of this nature, speed control is accomplished by techniques which produce abrupt changes in belt speed rather than effecting a desired smooth transition. Consequently, if the user elects to have the belt speed adjusted while continuing to exercise, he runs the risk of severe injury. Furthermore, many of these devices offer no convenient way of exiting the moving belt without stopping the drive mechanism, with the result that if a user should suddenly lose his balance or become confused while exercising, he risks suffering severe injuries before the device can be stopped.

Accordingly, it is an object of this invention to provide an exercising machine of the treadmill type which combines maximum speed control and safety in a design which allows the user to adjust the belt speed to his own desired exercising rate while remaining on the machine.

It is another object of the invention to provide a device which allows the user to exercise at his own rate and requires no effect on his part to drive the machine.

A still further object is to provide an exercising machine having a novel drive system which allows speed control over an essentially infinite range of selectable belt speeds.

Another object of the invention is to provide an exerciser upon which a user may walk or run, which will initially effect an extremely slow belt speed and will gradually automatically cause an increase in the belt speed, whereby the user may select his desired walking or running exercise rate.

A still further object is to provide a variable speed, safe treadmill exerciser, the drive mechanism and controls of which are adapted to be operated by a user while exercising.

Still another object of this invention is to provide the user with an exercising device which will automatically and controllably speed up and slow down smoothly in increments which are substantially imperceptible, and which further provides a means for determining ones exercising rate.

A further object of this invention is to provide an automated exercising machine of the treadmill design which is adapted to allow aged, young, infirm, diseased or healthy persons to exercise at a selected rate of activity under safe conditions.

Still another object of the invention is to provide an exercising machine which may be adapted to substantially any environment, including the home, office, or health spa, which is attractive and does not detract from the decor of the surroundings.

A still further object of this invention is to provide a treadmill exerciser which may be used for therapeutic purposes as well as general exercising.

Still another object of the instant invention is to provide an exercising machine which is portable, and

therefore easily located, and which is characterized by high reliability and low maintenance.

SUMMARY OF THE INVENTION

These and other objects of the invention are broadly provided in an exercising machine which includes the following elements:

1. A frame for providing support.
2. An endless belt movably mounted on the frame and adapted to support a user.
3. A drive mechanism in cooperation with the endless belt to cause the belt to travel.
4. A support mounted on the frame in close proximity to the belt to allow a user to step to and from the support and belt.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood in view of the following description presented with reference to the accompanying drawings.

FIG. 1 of the drawings is a perspective view of the exercising machine of this invention shown partially enclosed in a housing;

FIG. 2 is a top view of the machine illustrated in FIG. 1, showing the drive mechanism;

FIG. 3 is a top view of the milage indicator mechanism used to measure the exercising rate;

FIG. 4 is a side view of the machine shown in FIG. 1, illustrating the drive chain and coupling mechanism;

FIG. 5 is a perspective view of the exercising machine illustrating a couch mounted on the housing thereof according to a preferred embodiment of the invention;

FIG. 6 is a perspective view of the exercising machine illustrating a preferred method of attaching the couch to the machine; and

FIG. 7 is a perspective view of the exercising machine of the invention showing hand rails for user support during the exercising operation.

It should be noted that similar reference numerals designate like parts throughout all figures of the drawing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1-4 of the drawing, the exercising machine generally indicated by reference numeral 1 includes frame 2 carrying endless belt 3, both of which may be enclosed in housing 4. Endless belt 3 is in rotatable cooperation with frame 2 via drums 5A and 5B, which are in turn connected to a drive means for effecting rotation of the drums. Provision for the support of a user is preferably provided near endless belt 3 to allow convenient mounting of the belt. For example, housing 4 may be provided with a supporting belt approach as illustrated by reference to numeral 64 shown in FIGS. 6 and 7 of the drawings. Drums 5A and 5B are preferably secured to frame 2 by means of drum mandrels 7, carried by bearings 31, and endless belt 3 may be adapted to support a user by application of a suitable friction reducing means located between drums 5A and 5B. For example, frictionless rollers 6 may be attached rotatably to frame 2 for support of endless belt 3 and to aid belt travel over the drums.

Although the particular method used to drive endless belt 3 may take many forms known to those skilled in the art, it is preferred to utilize a drive mechanism which broadly includes a rotatable drive wheel 21 and a friction wheel 12 rotatably mounted on frame 2, the periphery of which is positioned perpendicular to, and is touching the outer surface of drive wheel 21. It will be recognized that under this mechanical arrangement, rotation of drive wheel 21 will effect rotation of friction wheel 12 at a speed proportional to the speed and size of drive wheel 21. The rotational speed of friction wheel 12 further depends upon the point at which friction wheel 12 touches the surface of drive wheel 21. For example, if the two wheels are touching at a point near the center of drive wheel 21, the rotational speed of friction wheel 12 will be slower than that resulting from a point of contact near the outer periphery of drive wheel 21, assuming a constant drive wheel speed. It will further be appreciated that the particular technique for placing drive wheel 21 and friction wheel 12 in contact in the manner disclosed by this invention to provide a drive mechanism, may be varied without departing from the scope of the invention.

Since a traversal of friction wheel 12 across the surface of drive wheel 21 effects a change in rotational speed of friction wheel 12, a convenient method for effecting this traversal is a desired feature of the invention. Although the mechanical cooperation between drive wheel 21 and friction wheel 12 may be accomplished by different techniques, it is preferred in the invention to utilize a friction wheel mandrel 10 slidably carrying a friction wheel yoke 14, to which is fixedly attached friction wheel 12. Friction wheel mandrel 10 is further preferably rotatably connected to frame 2 via friction wheel bearings 16. This arrangement permits friction wheel yoke 14 to travel friction wheel mandrel 10, thereby enabling friction wheel 12 to traverse drive wheel 21 in a controlled manner. The extremities of traverse are preferably equipped with a means for automatically preventing further wheel movement, to ensure that friction wheel 12 does not either travel off of the extreme outer edge or traverse the center of drive wheel 21 and thereby cause an abrupt change in the speed of endless belt 3. A preferred method of preventing extreme and undesirable traverse of friction wheel 12 is provision of pressure switches 32 at selected points along the path of friction wheel 12, to stop the friction wheel at these points.

It is further preferable to provide a method for effecting traverse of friction wheel 12 across the surface of drive wheel 21 which is essentially automatic, and can be controlled by one using the exercising device. While such an automatic system may take a variety of forms without departing from the spirit and scope of this invention, in a preferred embodiment the desired traversal is effected by means of an electric speed control motor which may optionally be equipped with a gearbox. Under conditions where such a motor is utilized, it is further preferred to place the speed control motor, designated reference numeral 19 in FIGS. 1 and 2 of the drawings, in fixed connection with speed control motor mount 18 and movable attachment with yoke travel screw 15, which is in turn rotatably secured to frame 2 by means of yoke travel screw bearings 17. One end of friction wheel yoke 14 is then adapted to engage the threads of yoke travel screw 15, so as to travel friction wheel mandrel 10 when speed control 19 is activated. This action in turn effects a traverse of friction wheel 12 across drive wheel 21 in a controlled manner, with a substantially imperceptible increase or decrease in the speed of endless belt 3. It will be noted

that a reversal of speed control motor **19** under circumstances where the speed of endless belt **3** is increasing, will initiate a gradual decrease in the speed of endless belt **3**, and vice versa.

It will be appreciated that it is highly desirable to provide a drive system which is adapted to begin operation from zero belt speeds up to a maximum desirable speed, with a method for achieving closely controlled intermediate speeds. This goal is accomplished by the instant invention in a novel manner. In order to begin operation at zero belt speeds, it is necessary only to equip drive wheel **21** with a slightly concave depression in its center, having the same curvature as friction wheel **12**. This provides an area where the outer periphery of friction wheel **12** cannot touch drive wheel **21**, and no movement of friction wheel **12** and endless belt **3** will result, although drive wheel **21** may be rotating. When speed control motor **19** is activated, the periphery of friction wheel **12** is caused to approach the outer circumference of the concave recession in drive wheel **21**, and upon touching the surface of drive wheel **21** at this spot, rotation of friction wheel **12** and endless belt **3** is gently initiated. Conversely, reversal of speed control motor **19** at this time ultimately results in a gentle stopping of endless belt **3** as the periphery of friction wheel **12** moves into the concave center of drive wheel **21**. In order to maintain a desired belt speed it is necessary only to initiate speed control motor **19** until a desired speed of endless belt **3** is attained, and then to turn speed control motor **19** off, thereby achieving a desired uniform belt exercising speed.

As in the preferred mechanism for effecting traverse of friction wheel **12** across drive wheel **21**, it is also preferable to utilize an electric motor to power drive wheel **21**. Accordingly, as illustrated in FIGS. **1, 2** and **4** of the drawings, drive motor **23** is preferably used in cooperation with gearbox **22** to effect rotation of drive wheel **21** at a desired speed. It will be recognized that alternate power systems may also be utilized in a variety of convenient ways to operate drive wheel **21** without departing from the scope of this invention. Drive motor **23** may be conveniently and adjustably affixed to frame **2** via drive motor mounts **24** and support plate **25**.

It is further preferable to utilize a drive chain **9** illustrated in FIGS. **1, 2** and **4** to effect mechanical cooperation between friction wheel **12** and endless belt **3**. Accordingly, friction wheel mandrel **10** is equipped with friction wheel sprocket **11**, and drum mandrel **7A** with drum sprocket **8**, both sprockets of which are adapted to receive drive chain **9**. Alternatively, other drive means known to the skilled artisan may be utilized; for example, a direct drive system might be envisioned, where friction wheel **12** is mounted on drum mandrel **7A**, and otherwise adapted to engage drive wheel **21**.

The control system of this invention is adapted to provide maximum flexibility, utility, and safety, since control can always be placed in the hands of the exerciser. Although central control systems may be utilized as in conventional devices, it is preferred to provide a control box generally shown as reference numeral **40** in FIG. **1**, which is small enough to be carried. Control box **40** includes control enclosure **41** containing speed control motor switch **42** and drive motor switch **43**, as well as a connecting end of control box conductor **44**. Speed control motor switch **42** is preferably a three-position control which initiates forward, stop, and reverse operation of speed control motor **19**, while drive motor switch **43** is typically a two-way switch which is designed to provide only on-off control of drive motor **23**. This simple arrangement avoids confusion and promotes safety, since drive motor **23** cannot be inadvertently switched into a reverse direction, thereby causing an abrupt and dangerous change in direction of endless belt **3**. Thus, manipulation of speed control motor switch from the "off" to "forward" position initiates a gentle acceleration of endless belt **3** from zero speed to a selected walking or running speed, where additional manipulation into the "off" position effects a constant belt speed. Movement of the switch in the reverse direction then causes a gradual decrease in the speed of endless belt **3**, with a final automatic termination of belt travel as heretofore described.

As heretofore noted, the above described drive and control systems are preferred in the instant invention for convenience and safety. However, prior art drive systems exemplified by the adjustable pulley drive disclosed in U.S. Pat. No. 2,969,768 to F. L. Grant could be adapted to this invention with modifications. For example, speed control motor **19** and control box **40** of the instant invention could be connected to screw **66**, illustrated in FIG. **5** of the patent to Grant, with appropriate wiring, to provide an automatic belt speed control system. Still other useful applications will be apparent to the skilled artisan upon consideration of the drive and control systems disclosed in the instant invention.

It is of frequent interest to the exerciser to determine his particular rate of exercise. This knowledge may be essential in order for a physician to monitor the user's effort and progress, or it may of substantial benefit in a progressive program to enable a healthy user to stay physically fit. Accordingly, many devices which measure exercising rate may be adapted for use in the instant invention, according to the knowledge of those skilled in the art. However, in a preferred embodiment of the invention, the exercising rate indicator generally designated by reference numeral **50** illustrated in FIG. **3** of the drawings, may be utilized to measure the exercising rate of a user. The components of exercising rate indicator **50** include exercising rate indicator housing **51**, slider **52** positioned in movable relationship inside exercising rate indicator housing **51**, and cable **53**. One end of cable **53** is connected to slider **52** in any convenient manner, and the other to friction wheel yoke **14** via cable connector **20**, as illustrated in FIGS. **1** and **2** of the drawings. A preferred mounting arrangement of exercising rate indicator **50** in housing **4** and on frame **2** which facilitates easy viewing, is illustrated in FIGS. **1** and **2**, although it will be recognized that the rate indicator can be placed anywhere on the exercising machine at the user's discretion. Exercising rate indicator **50** is activated as friction wheel yoke **14** is caused to travel friction wheel mandrel **10** and yoke travel screw **15**. Movement of friction wheel yoke **14** toward the outer extremity of friction wheel mandrel **10** as the speed of endless belt **3** increases causes slider **52** to be downwardly displaced inside exercising rate indicator housing **51**, via cable **53**. This displacement corresponds to calibrated exercising rates, preferably expressed in minutes per mile, placed on exercising rate indicator housing **51**, in view of the user. For example, a speed of endless belt **3** corresponding to 40 rpm is equivalent to an exercising rate of 14.4 minutes per

mile, where a belt length of 9 feet, 1 ¾ inches is utilized. Similar calibrations are made and exhibited at appropriate points on exercising rate indicator housing **51** along the path of slider **52** to denote progressively fast exercising rates.

Referring now to FIGS. **1** and **5–7** of the drawings, it will be appreciated by those skilled in the art that a variety of housing designs can be utilized to enclose frame **2** and the operating components of the instant invention. In a preferred embodiment, housing **4** is adapted to snugly enclose frame **2** while exposing a portion of belt **3**, and to provide a belt approach **64** for ready access to the exposed portion of belt **3**. (FIGS. **6** and **7**). It should be noted that exercising rate indicator **50** is also exposed for viewing when this preferred design of housing **4** in utilized. In order to provide maximum safety, housing **4** is further equipped with removable handrail mounts **65** adapted to receive handrails **66** for support of the exerciser, as further illustrated in FIGS. **6** and **7**.

It will be appreciated that belt approach **64** serves a multiple purpose in the invention. It not only provides the user with convenient access to endless belt **3**, but it also serves as a safety device while exercising machine **1** is in use. For example, if the user should become confused or excited while exercising on endless belt **3** and stop walking or running, instead of being thrown off the machine, he will be gently deposited on belt approach **64** without losing his footing. This will always result from stopping the running or walking operation while endless belt **3** is moving, since the belt always travels toward belt approach **64** and will not reverse. Handrails **66** are provided for use of the novice, crippled, or infirm as well as for additional safety.

The electrical system of this invention broadly includes a source of electricity (not illustrated) which is preferably 60 cycle, 115 volt and is common to most home and business facilities, wiring panel **26** adapted to receive electrical wiring **27**, and control box conductor **44** electrically connecting control box **40**, drive motor **23**, and speed control motor **19** via wiring panel **26**. (See FIGS. **1** and **2**). Drive motor **23** is wired through wiring panel **26** to control box **40** where on-off switching via drive motor switch **43** is provided. No reversing of drive motor **23** is provided, since this would constitute a dangerous condition, in that endless belt **3** could be suddenly and inadvertently reversed, as heretofore pointed out. Speed control motor **19** is wired through wiring panel **26** and capacitor **28** to speed control motor switch **42**, which provides forward — stop — reverse operation of the motor, as previously discussed. Capacitor **28** is included in the electrical system to allow reversing of speed control motor **19**. Speed control motor **19** is also in electrical communication with pressure switches **32**, illustrated in FIG. **2**, which serve to stop this motor at either end of the path of friction wheel **12**, as previously further described. Thus, in a preferred aspect of the instant invention, control box conductor **44** is characterized as a four-wire conductor, two each from speed control motor switch **42** and drive motor switch **43**. It will be appreciated that alternate methods of wiring the exercising machine of this invention to effect operation of the components disclosed, in the manner discussed, may be utilized without departing from the spirit and scope of the invention.

It will be recognized by those skilled in the art that a variety of materials of construction and types of equipment may be utilized in component parts of the invention so long as basic arrangements and configurations remain substantially unchanged. For example, referring to FIGS. **1** and **2** of the drawings, friction wheel **12** is preferably constructed of two circular aluminum plates having a friction promoting element (represented by friction wheel element **13**) sandwiched between the plates, and projecting around the periphery of the plates for contact with drive wheel **21**. Friction wheel element **13** may be formed of any suitable material which is relatively inflexible, but resilient enough to provide sufficient drive friction. In a preferred embodiment of the invention, friction wheel element **13** is formed of polyurethane or materials containing polyurethane in a sufficient proportion to ensure the proper degree of flexure and resiliency. Friction wheel **12** may alternatively be constructed of a circular, solid, or hollow piece of material, having friction wheel element **13** affixed to the periphery by any suitable means of attachment.

Drive wheel **21** may be constructed of any suitable material such as steel, aluminum or plastic, which has sufficient strength to provide the necessary drive friction to operate friction wheel **12**. Furthermore, depending upon the selection of drive motor **23**, gearbox **22** may be alternately utilized in connection with drive motor **23** and drive wheel **21**, to provide a desirable drive wheel speed.

The structural elements of exercising machine **1**, including frame **2**, support plate **25**, drive motor mounts **24**, and speed control motor mount **18**, are preferably constructed of metal, and most preferably of steel, to provide sufficient strength. However, alternate materials of construction such as fiberglass can be utilized in the invention providing members having sufficient supporting strength are supplied.

As heretofore discussed, the speed of endless belt **3** may be varied by several convenient methods in addition to, or including the traverse mechanism which utilizes yoke travel screw **15**, friction wheel mandrel **10**, friction wheel yoke **14**, and speed control motor **19**. For example, the size of drive wheel **21** can be increased to provide a larger surface for traverse of friction wheel **12**, or the speed of drive motor **23** can be increased. Alternatively, the diameter of drums **5A** and **5B** can be enlarged or proportionally larger sprockets substituted for friction wheel sprocket **11** and drum sprocket **8**, in order to increase the speed of endless belt **3**. The power or torque of endless belt **3** may be varied by either increasing the speed of drive motor **23** or the size of friction wheel **12**. A preferred torque range for general exercising, is **56** inch pounds at maximum belt speed, and **224** inch pounds of torque at minimum belt speed. It will be recognized that a combination of the above techniques can be utilized to provide a range of belt speeds and torque which suits the needs of a particular user or class of users.

It should be noted that belt **3** may be formed of any suitable material including fabric, plastic, and the like, which will not stretch to any substantial extent. In a preferred aspect of the invention a four ply rubber cord belt is utilized which has a length of 9 feet 1 ¾ inches.

Drive motor **23** is preferably characterized as a single phase, 2 pole machine, although it will be recognized that multiphase, multipole motors can be utilized with-

out departing from the scope of this invention. The speed of drive motor **23** is 1750 rpm, and this speed is geared to a preferred 288 rpm at drive wheel **21**, by application of gearbox **22**. It will be recognized that the particular speed required at drive wheel **21**, depends upon previously discussed factors, such as sprocket and drum size, and the like.

Speed control motor **19** may be generally characterized by the same features as drive motor **23**. However, as heretofore noted, this motor is preferably reversible in order to provide maximum flexibility in the traversal feature of the invention and to provide speed control of endless belt **3**. Furthermore, speed control motor **19** may be, and is preferably, placed in connection with a speed control motor gearbox **33** to achieve a desired traversal speed of friction wheel **12**.

Although any convenient type of sprocket and bearing may be utilized in the invention, in a preferred embodiment, friction wheel sprocket **11** and drum sprocket **8** are taper lock sprockets, while friction wheel bearings **16**, yoke travel screw bearings **17**, and drum bearings **31** are of the pillar block design. The exercising machine is further characterized by convenient flexibility in that the various cooperating elements may be adjusted for maintenance purposes. For example, referring to FIGS. **1** and **2** of the drawing, drive chain **9** may be replaced, tightened or loosened by manipulation of adjusting screw **30** connected to support plate **25**, in the appropriate direction. This action causes support plate **30**, drive motor **23**, and friction wheel mandrel **10**, to move toward or away from drum mandrel **7A**. Furthermore, referring now to FIG. **2**, friction adjusting screw **29** mounted at the base of friction wheel bearings **16** and yoke travel screw bearings **17**, is adapted to increase or decrease the contact pressure between friction wheel element **13** and drive wheel **21**. This feature provides a convenient adjusting mechanism to allow wear of friction wheel element **13**.

As previously discussed, and as noted in FIGS. **1** and **5–7** of the drawings, in a most preferred embodiment of the invention, housing **4** is adapted to removably receive a seating, reclining, or ornamental body such as a couch, chair, table or the like. Directing attention to FIGS. **1, 5** and **6**, exercising machine **1** is adapted to receive couch **60**, including couch frame **61** and cushions **62**, by means of hinges **63** connected to housing **4**. Couch **60** is further designed to hingedly fold upwardly and outwardly of exercising machine **1** to expose belt approach **64** and endless belt **3**, and to permit installation of removable handrails **66** in handrail mounts **65** (FIG. **6**). Alternatively, couch **60** may be equipped with legs having rollers (not illustrated), and adapted to enclose exercising machine **1**. Other methods of combining various pieces of furniture or ornamentation with the exercising device of this invention will be apparent to those skilled in the art. This feature of the invention enables the exercising machine to be integrated into substantially any environment regardless of the nature of the decoration in that environment. For example, the machine is well adapted for the executive office, since it may serve as a useful piece of furniture until used for exercising. Since the device is readily accessible, the busy executive needs only a few minutes per day to remove the couch illustrated as reference numeral **60** in FIGS. **5** and **6** of the drawing, install handrails **66**, and exercise on the device as shown in FIG. **7**. Similar furnishings can easily be provided for use with the exerciser of this invention to adapt it for use in substantially any environment.

In still another embodiment of the invention, the exercising machine can be expanded to provide a larger belt area for group exercise. Such an adaptation might find application in health spas or athletic programs, where it is desirable for large groups of people to exercise together.

Another useful feature of the exercising device of the instant invention is flexibility in providing a therapeutic unit for treatment of aged, infirm, or crippled persons. Since the machine can be operated at substantially any desired speed, persons of varying degrees of affliction may use it with a maximum degree of safety. Support means for suspending those who cannot support their own weight may readily be devised in order to exercise weak or disease ridden legs, and those who are ambulatory may support themselves by holding the handrails.

It will be apparent from a consideration of the above described embodiment of the invention that the exercising machine disclosed in the instant application is characterized by utility, flexibility, reliability, and safety not found in prior art devices. Accordingly, it is respectfully submitted that the machine makes a maximum contribution to this art, and

What is claimed is:

1. An exercising machine comprising:

a. A frame,

b. A pair of drums positioned in spaced rotatable relationship on said frame,

c. At least one friction reducing means mounted on said frame between the said drums,

d. An endless belt positioned on said drums and said friction reducing means whereby when said drums are rotated said belt is caused to travel over said friction reducing means,

e. An electric drive motor,

f. A gearbox in cooperation with said drive motor for reducing the rotational speed thereof,

g. A drive wheel geared to said gearbox in rotatable relationship,

h. A friction wheel comprising a pair of circular aluminum plates and a circular sheet of polyurethane sandwiched between said plates, positioned with said polyurethane in contact with said drive wheel,

i. A yoke travel screw affixed in rotatable relationship to said frame,

j. A friction wheel mandrel rotatable affixed to said frame,

k. A friction wheel yoke carrying said friction wheel and adapted to slidably travel said friction wheel mandrel, said friction wheel yoke being equipped with threads adapted to engage the threads of said yoke travel screw whereby when said yoke travel screw is rotated, said friction wheel yoke and said friction wheel are caused to travel on said yoke travel screw and said friction wheel yoke,

1. A reversible electric motor in cooperation with said threaded yoke travel screw to facilitate rotation of said threaded yoke travel screw, and

m. Pressure switch means positioned on said frame at the point where said yoke travel screw connects with said frame for engagement by said yoke, and means responsive to activation of said switch means by said yoke to interrupt the driving cooperation between said motor and said yoke travel screw.

2. An exercising machine comprising:

a. A supporting frame,

b. A pair of drum mandrels, each carrying a drum, said drum mandrels and said drums being positioned in spaced rotatable relationship on said frame,

c. A plurality of substantially frictionless rollers mounted in spaced relationship on said frame between said drums and adapted to support the weight of a user,

d. An endless belt positioned on said drums and said frictionless rollers whereby when said drums are rotated, said endless belt is caused to travel over said rollers,

e. An electric drive motor fixedly secured to said frame,

f. A gearbox attached to the shaft of said drive motor, and adapted to reduce the rotational speed of said drive motor,

g. A drive wheel geared to said gearbox in rotatable relationship,

h. A friction wheel mandrel connected in rotatable relationship to said frame,

i. A friction wheel yoke carrying a friction wheel and adapted to travel said friction wheel mandrel, the outer circumferential edge of said friction wheel being perpendicular to the outer surface of said drive wheel,

j. A friction wheel comprising a circular, polyurethane friction element and a pair of circular metal plates, said friction element being sandwiched tightly between said plates, and having a slightly larger diameter than said plates to facilitate contact with said drive wheel to provide drive friction between said drive wheel and said friction wheel,

k. A yoke travel screw adapted to engage said friction yoke and effect travel of said friction wheel yoke along said yoke travel screw and said friction wheel mandrel as said yoke travel screw is rotated,

l. A friction wheel sprocket mounted on at least one end of said friction wheel mandrel,

m. A drum sprocket mounted on at least one of said drum mandrels,

n. A drive chain engaging the teeth of said friction wheel sprocket and said drum sprocket, whereby when said friction wheel mandrel is rotated, said belt is caused to travel over said roller,

o. A reversible, speed control motor fixedly mounted on said frame and positioned in cooperation with said yoke travel screw, whereby said speed control motor is activated, said friction wheel is caused to traverse the outer surface of said drive wheel and effect variable speed rotation of said endless belt,

p. Support means mounted on said frame in close proximity to said endless belt, said support means being adapted to permit mounting of said belt by a user,

q. Means for adjusting the frictional contact between said friction wheel and said drive wheel and

r. A pressure switch means positioned on said frame at the point where said yoke travel screw connects with said frame for engagement by said yoke, and means responsive to activation of said switch by said yoke to interrupt the driving cooperation between said motor and said yoke travel screw.

* * * * *