

### [54] TREADMILL JOGGER

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#### Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 837,603, June 30, 1969, abandoned.

[52] U.S. Cl. .... 272/69

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

[58] Field of Search .... 272/69

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[57]

#### ABSTRACT

An exerciser of the treadmill type. A pair of rigid side members support a series of rollers along a concave curve with a forward portion higher than the rear. A continuous belt has an upper course lying above and resting on these rollers, and a lower course below them, so that a person walking, jogging, or running on them automatically locates himself fore-and-aft of the exerciser by the balance between his weight, his speed, and the variation in inclination along the curved path of the continuous belt. In addition, a foremost roller may guide the belt in front of the curved path rollers which may have a pair of identical flywheels, one on each side inboard of the frame for steadying the velocity. Further, a pair of diagonally extending and crossing turnbuckles joins the frame sides and enable adjustment of the training of the belt and the friction on the rollers. A handle, if used, can either be in a substantially vertical position for a beginner or can be put down flat and out of the way, for a more practiced user to run without any impediment. In addition, a forward roller used when moving the exerciser, is so located that when the frame is in operating position, the roller does not reduce the resistance to sliding of the exerciser.

10 Claims, 8 Drawing Figures

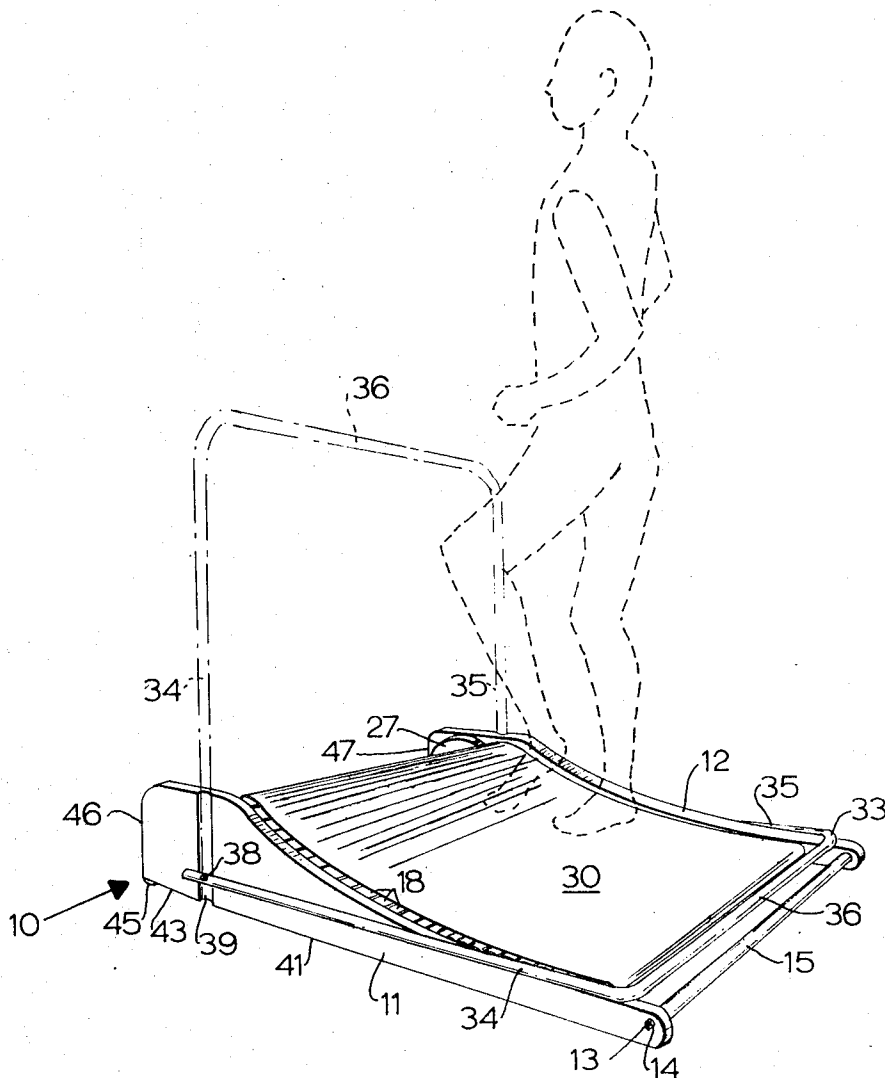


FIG. 1

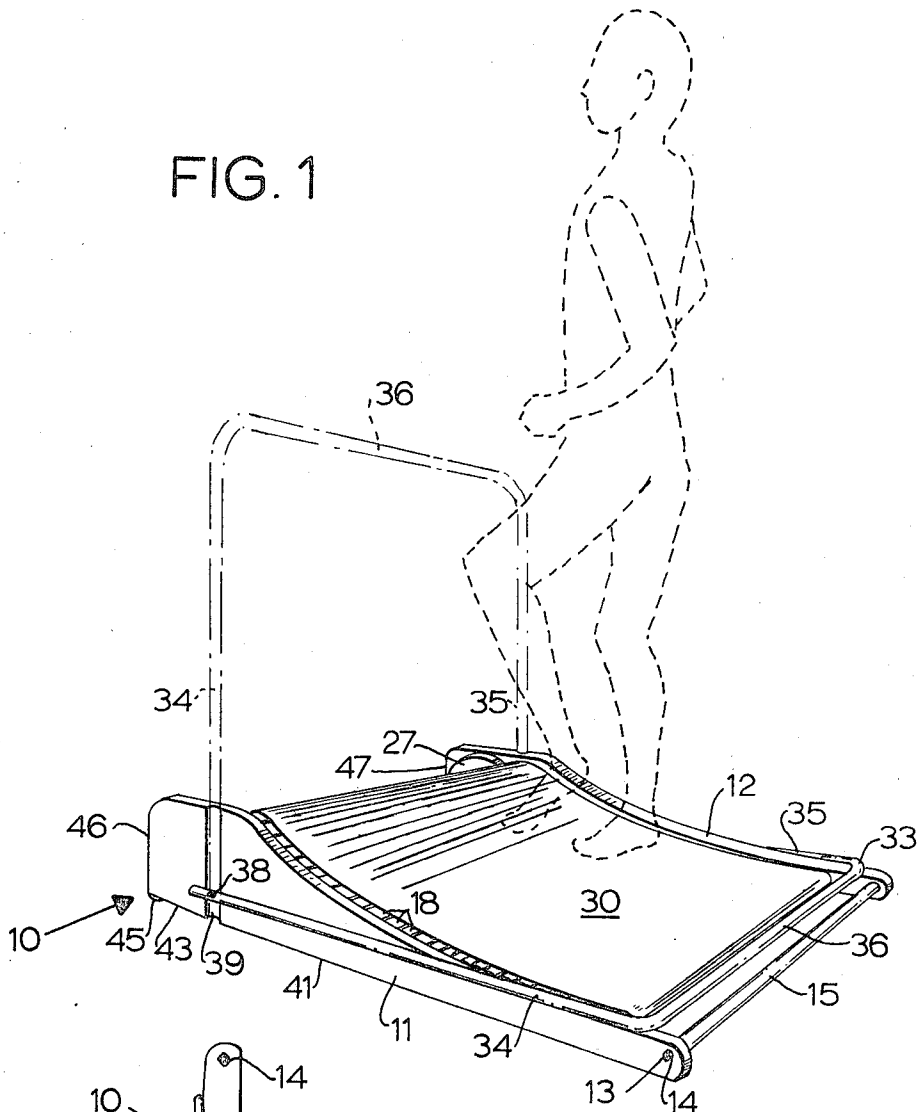


FIG. 7

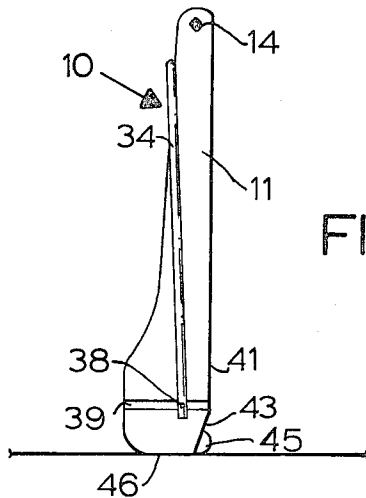
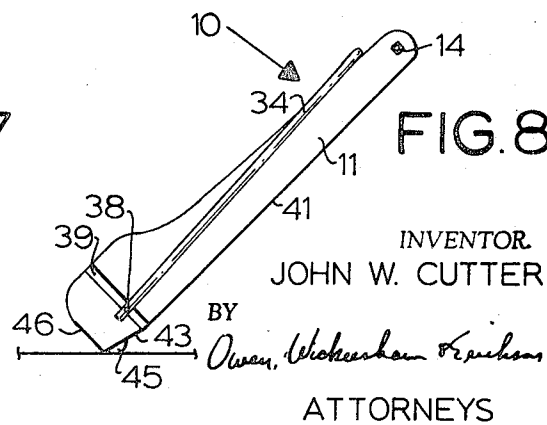


FIG. 8



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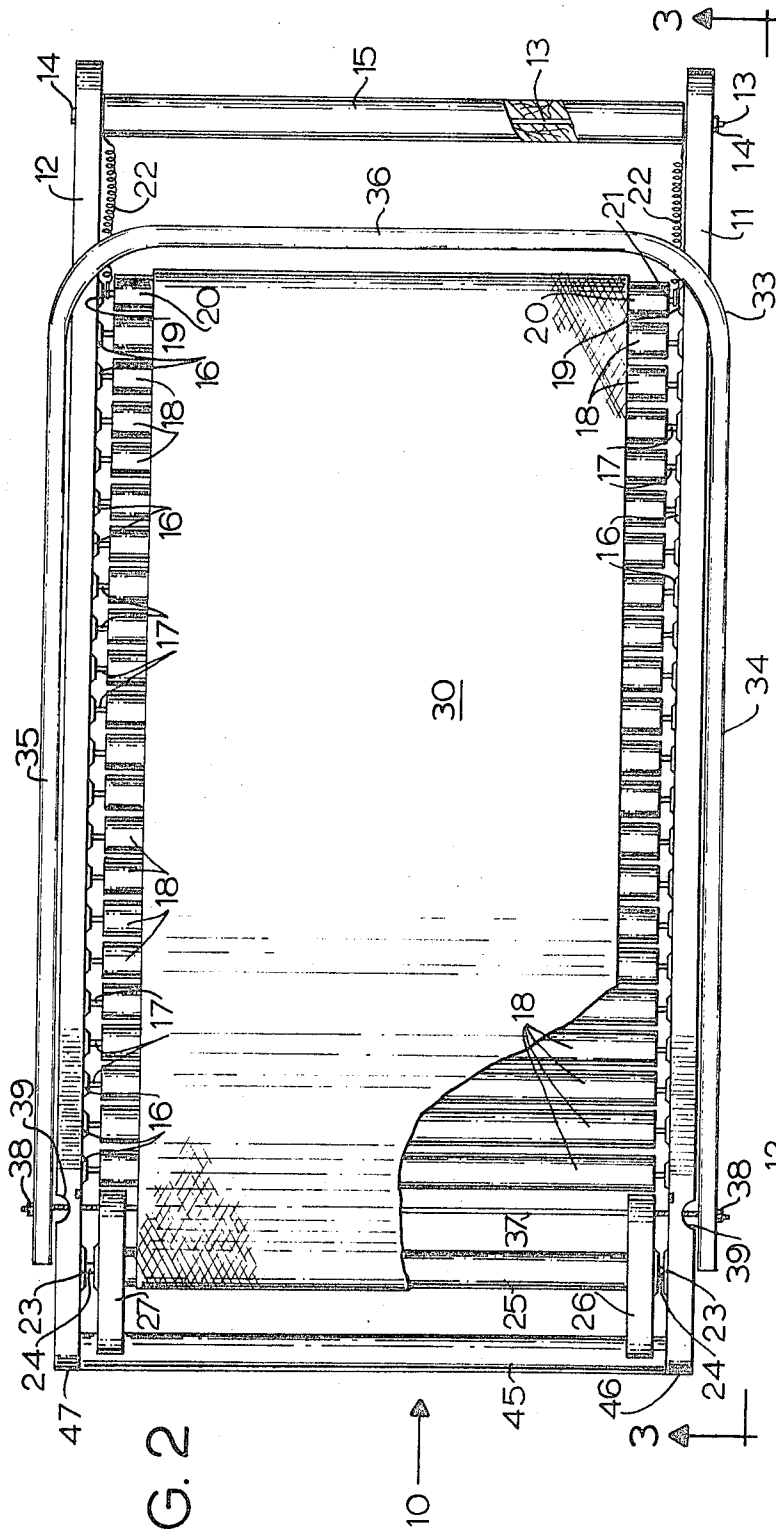


FIG. 2

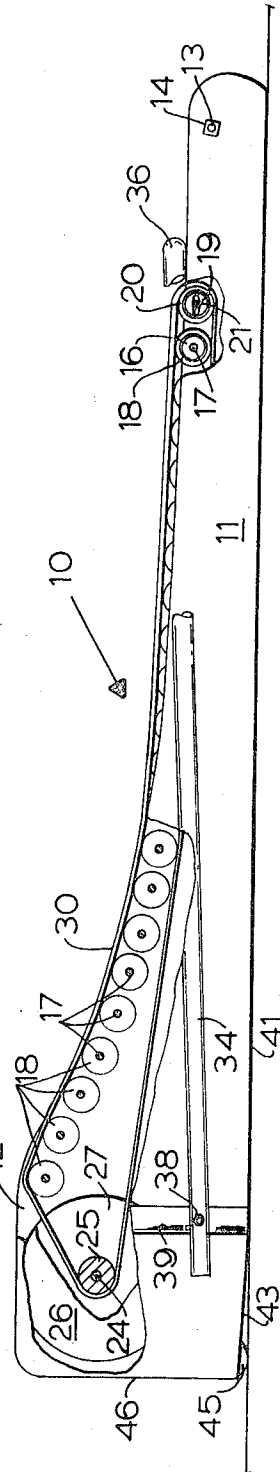


FIG. 3

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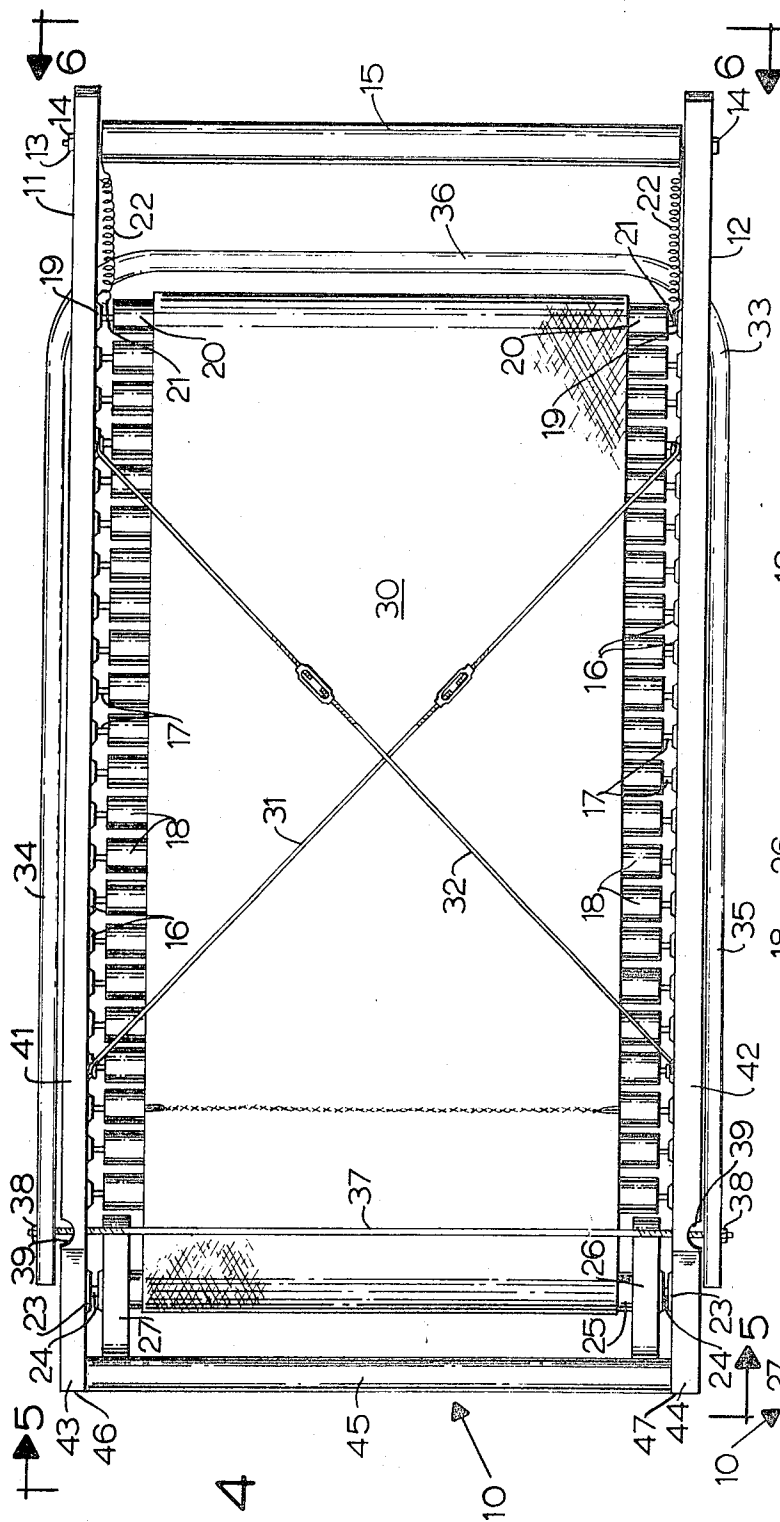


FIG. 4

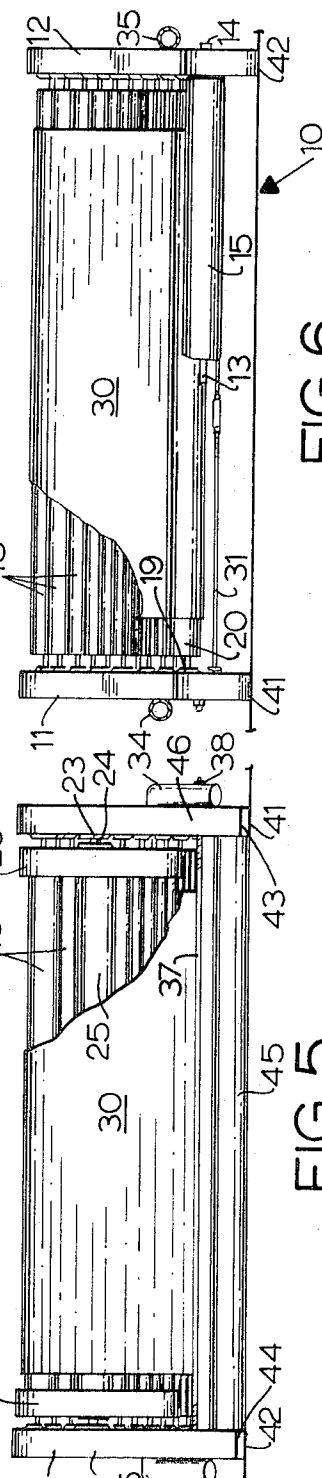


FIG. 5

FIG. 6

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## TREADMILL JOGGER

This invention is a continuation-in-part of application Ser. No. 837,603 filed June 30, 1969 and since abandoned.

Exercisers that employ a treadmill are well known, but heretofore a number of difficulties have prevented their being used to greatest advantage and have inhibited their popularity. A principal problem has been that of how to restrain the user from walking off or running off or falling off the end of the machine and possibly injuring himself, and how to exercise this restraint without so encumbering his body that he is unable to move naturally with the freedom of normal walking, jogging, or running. One approach that has been taken has been to motorize the treadmill, but while motorization partly solves the problem, it is expensive and it requires the user to adjust this speed to a preselected rate, the speed of the motor, rather than letting him be free to vary his speed as he wishes or as he should do. Another approach has been to provide various types of harnesses and belts, but these have unfortunately not been very successful in accomplishing their purpose. Another approach has been to rely on a handle of some type which the user has to grasp while he is walking, jogging, or running. When he does this, of course, he encumbers the natural swing of his arms and he does not get a true walking, jogging, or running action.

I have traced the problem to its root, and I now provide a novel solution. Most exercisers of the treadmill type have relied on supporting the belt by a series of idle rollers that lie along a flat plane, usually slightly inclined to the horizontal. The endless belt is therefore similarly inclined, and the user in overcoming the friction in the system is more or less in equilibrium with it. This means that the user can be in one fore-and-aft location as well as another; so there is no natural regulation of this position; from this fact has flowed the requirement for the handle, the harness, the belt, or the motor, all of which encumber to some degree the proper operation of the device. Some treadmills have provided for adjustment of the angle of incline, in the hope of capturing a so-called "perfect angle," which would enable the user to let go of the handle, but unfortunately, again, the variation in the weight of the users, as well as variations in speed from time to time during use, have meant that the angle would have to be infinitely adjustable, and then would have to be varied again if the user gains weight or loses it, or varies his speed while using it.

Another approach that has been taken, provides a belt that is not rigidly supported but is supported only by rollers at each end. This imparts somewhat of a curve to the belt's path, but it has the very undesirable result of inducing a sinking at each step, so that the user finds himself wallowing or almost wading in the device rather than running or walking or jogging on it with a natural action.

I have found that by arranging a series of rollers along a concavely curved path, and then supporting the belt directly on them, there is neither a wallowing action, nor is there a set angle of inclination; instead there is a concave path tending upward toward the upper end, with each point along the path at a slightly different angle. In my new structure the user, whether walking, running, or jogging, tends to achieve almost at once a natural balance in position at the proper instantaneous angle along the curve. Therefore his position fore-and-aft of the device, his presently current weight, and his actual speed of movement are automatically reconciled to each other. This automatic adjustment is a very important feature of this invention. No additional adjustment need be made to regulate this position, no motor need be used, and once the user has achieved a measure of practice and accustomed himself to the operation of the device, he does not need any handle or harness to be perfectly safe on the exerciser.

Another problem which exercisers of the treadmill type have heretofore had, has been a tendency toward jerky action. Some improvement has been obtained where a flywheel has been provided but I have found that special advantages, explained below, can be obtained from a structure in which

there is a pair of identical flywheels, symmetrically located with respect to the machine and inboard of the frame.

Another common problem of the treadmills is how to keep the belt from rubbing along one side of the supporting frame.

The result of such rubbing is, of course, wear and fraying of the belt. Many such devices come perfectly balanced from the factory, but during shipment there is enough displacement or warping of the frame to nullify the original setting, and the belts become improperly entrained.

I have found that this problem of controlling the proper training of the belt can be solved by employing a pair of diagonally extending and preferably crossing turnbuckles that join the two side members of the frame and enable adjustment of the tightness of the frame and the relative spacing between them. Not only do these crossed turnbuckles enable a very accurate and at all times readjustable training of the belt, to get a perfect movement thereof, but they also enable adjustment of the friction on the rollers, to impart more friction where that is desired in order to make the person exercise somewhat harder.

Another feature of the invention is the use of a folding handle, which can be placed entirely out of the way but not separately from the machine, the whole not taking up any more room than the machine without it, when it is not desired. This folding handle can be readily erected and held in place when it is needed.

A still further feature of the invention is that of having a front roller enabling rolling movement of the whole exerciser from one place to another when the exerciser is raised at the other end; this front roller is automatically taken out of floor-engaging position when the machine is again lowered flat on the floor, so that the frame does not tend to slide or move about during use.

Other objects and advantages of the invention will appear from the following description of a preferred embodiment.

In the drawings:

FIG. 1 is a view in perspective, somewhat foreshortened, of a device embodying the principles of the invention. A handle is shown in solid lines in its normal or inactive position and in broken lines in a position where it can be used by an inexperienced user. A person using the device is indicated in broken lines.

FIG. 2 is a top plan view of the treadmill exerciser of FIG. 1 with a portion of the belt's upper course broken away to show some of the supporting rollers more clearly.

FIG. 3 is a view in side elevation of the device, looking at FIG. 2 in the direction of the arrows 3—3, with some portions of the frame broken to show what is behind the frame. For a similar reason the handle is partly broken away.

FIG. 4 is a bottom plan view of the treadmill exerciser of FIG. 1.

FIG. 5 is a front end view of the treadmill exerciser, looking at FIG. 4 in the direction of the arrows 5—5, with a portion of the belt broken away to show more of the rollers.

FIG. 6 is a rear end view of the device, looking at FIG. 4 in the direction of the arrows 6—6, with another portion of the belt broken away and the handle and some other portions broken off, a portion of the handle being shown in section.

FIG. 7 is a view in side elevation on a smaller scale showing the device in a vertical position for storing it.

FIG. 8 is a similar view of the device tilted at about 45° for moving it from place to place.

A treadmill exerciser 10 embodying the principles of the invention is shown in FIGS. 1 through 8. It comprises a pair of side members 11 and 12, which may be connected together at one end by a rod 13 having threaded ends to receive a pair of nuts 14, with appropriate washers. A tubular spacer 15 fits around the rod 13 and in between the side members 11 and 12 and governs the distance between them there. As will be seen later, several other members are also involved in spacing the side members 11 and 12 apart and still others in holding them together, providing a substantially rigid frame.

The inside face of each of the two side members 11 and 12 is provided with a series of journaling sockets 16, arranged along a concavely curving path that is highest at its forward end. Each socket 16 serves as journal for the stub shaft 17 of a roller 18. A slotted rearmost socket 19 supports the rearmost roller 20 of this series by its stub shafts 21, and springs 22 tend to pull the roller 20 toward the rear, i.e., toward the rod 13 to which the springs 22 are preferably anchored. Also, forward of all the rollers 18 and preferably somewhat lower is a pair of sockets 23 that rotatably support the stub shaft 24 of a roller 25.

At each side of roller 25 is provided a flywheel 26 or 27, preferably of heavier metal, such as lead. These flywheels 26 and 27 are identical in size and weight and are located symmetrically with respect to the center of the roller 25 and are inboard of the frame, that is they lie adjacent but inside the two side members 11 and 12. This imparts a very smooth action because the flywheels 26 and 27 may be made relatively large and heavy, from a suitable heavy metal, and they may be able thereby to impart a very smooth action to the treadmill, quite in contrast to the jerky action that would be present without any flywheel. Being inboard, the flywheels 26 and 27 can be directly attached to the belt pulley or roller 25 and are not required to be dependent upon a set screw attached to a shaft. They are much less subject to damage in use or in transit, both because of this direct attachment and because of their inboard location. Moreover, the symmetry is very pleasing to the eye, as compared with the unbalanced appearance of conventional treadmills. This symmetry and good appearance is important where the exerciser is used in doctor's offices or in homes.

A continuous belt 30 extends around the rollers 18, 20 and 25 and is supported by and trained on them. The belt 30 is continuous and is arranged along a curved path, having the forward portion higher than the rear portion, and providing a generally concave configuration. This is a very important feature of the invention for it enables automatic adjustment of the position of the user to his weight and speed of use. The belt 30 lies in between the flywheels 26 and 27; the flywheels 26 and 27 thereby act as belt guides and aid in keeping the belt 30 centered.

For example, in one successful device embodying the present invention the elevation of the center of the front roller 18 was 7 inches while the elevation of the rear roller 20 was  $3\frac{1}{2}$  inches, so the belt 30 was at a small acute angle to the horizontal. The overall center to center distance between the rollers 18 and 20 was 28 inches. In accordance with this invention, the center of the arcuate path was such that it was  $1\frac{1}{2}$  inches below a plane connecting the upper surface of each of the rollers 18 and 20. The arc of that path was one of a radius of some 121 inches or approximately three times the length of the path. When the exerciser 10 is so constructed, a person utilizing the walker is able to run at a rapid rate and to maintain a constant position over the endless belt without having to hang on to any hand or side rail for support.

An important feature of the invention is shown in FIG. 4, a bottom view: a pair of crossing diagonal turnbuckles 31 and 32 are each anchored to each of the two side frame members 11 and 12. These turnbuckles 31 and 32 enable a precise adjustment of the distances between the side frame members 11 and 12 and the tension on them. They therefore enable proper training of the belt 30. Even if the device 10 should be damaged somewhat or set out of proper adjustment during transportation between the factory and the user, the user can readily by using the turnbuckles 31 and 32, adjust the device so that the belt 30 trains properly right down the center. In addition, the turnbuckles 31 and 32 enable adjustment of the friction on the shafts 17 of the rollers 18 so that more or less freedom of rotation can be provided, to give a little added resistance where needed or minimum resistance to free rotation where that is desired. The turnbuckles 31 and 32 thus act in cooperation with the flywheels 26 and 27 to provide a trouble-free belt-centering system.

In place of turnbuckles other diagonal members which can be adjusted can be used to alter the course or path of the belt 30 or to vary the friction on the roller bearings. For example, wires, springs or threaded rods may be used, though I presently prefer the turnbuckles shown. Even a single adjustable diagonal connector or turnbuckle gives advantages, in enabling alteration of the angles of the rollers relative to the side frame, but two are better in this and enable adjustment of friction.

One of the main features of the invention, is the unimpeded belt track that it presents without having to be impeded by any handles, belts, or other support members and without having to use a motor, so that the user of it can run on it, or jog on it, or walk on it, and will have his position located by the concave path. Since the belt 30 is supported by the rigid rollers 18 and runs right on their surface, there is no downward yielding every time a user takes a step and therefore no wading or wallowing action, and an automatic adjustment of his position is obtained quite naturally without any effort. Therefore, during normal use, and particularly by a user who is once used to the device, there is no need for a handle to be present at all.

However, an inexperienced user, one who is just getting used to it, or someone who is perhaps not in the best of health and needs a little steadying, may require such a handle, and a feature of the device is that it provides a handle 33 that can be put down out of the way when not desired and can be put up where it is needed, when it is needed.

The handle 33 may comprise a generally U-shaped member having two parallel side rods 34 and 35 and a horizontal cross-member 36. The length of the side rods 34 and 35 is such that when the handle 33 is at its normal unused position, the cross member 36 lies to the rear of the belt 30 and the roller 20. A threaded rod 37 extends through the rigid side members 11 and 12, and the handle 33 is pivoted on it and held there by nuts 38. A concave recess 39 in each of the side frame members 11, 12 enables seating of the side rods 34 and 35 when they are erected, and the nuts 38 then hold the handle 33 firmly in its erected position, whenever that is desired. No such expedient is needed when the handle 33 is in its inactive position, of course.

Another important feature of the invention, is that the bottom edges 41 and 42 of the side members 11 and 12 are flat over a main portion and therefore rest on the floor and prevent sliding action, so that the weight of the user is transmitted in a vertical plane and he may run without tending to cause movement of the exerciser 10 itself; still the exerciser 10 can readily be moved around from place to place when that is desired and can be stored vertically (FIGS. 7 and 8). For instance, it may be kept under the bed and moved in and out, or it may be moved to the side and stored against the sidewall and various other things are possible. This is made easier by the use of a forward inclined edges 43 and 44 which rise up above the floor level and by an additional roller 45 forward of the belt 30 and not involved with it, lying between the two frame members 11 and 12 and extending below the edges 43 and 44 of this forward inclined portion but not below the edges 41 and 42 of the main portions, and preferably slightly above them. Thus, when the device rests flat on the floor as shown in FIG. 3, the roller 45 does not interfere at all with the ability of the device to resist movement but when the rear end of the device is raised, all the weight of the machine is put onto the roller 45, and the exerciser 10 is easily rolled from place to place, as shown in FIG. 8. When stored vertically, as in FIG. 7, it rests on front edges 46 and 47, which lie perpendicular to the edges 41 and 42.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

I claim:

1. An exerciser of the treadmill type, including in combination:

a rigid frame having a pair of rigid side members,  
a forward portion and a rear portion, and means mounted  
on said frame providing a gripping surface for a hand of a  
person using the exerciser,  
a series of rollers rotatably supported by and lying between  
said side members and supported at each said side  
member at a series of points forming a line having a rela-  
tively flat rear portion merging upwardly into a generally  
concave forward portion located at a higher elevation  
than said rear portion,  
a continuous belt having an upper course lying above all  
said rollers and a lower course below all said rollers, said  
belt having its upper course supported directly by said  
rollers,  
whereby a person walking, jogging, or running on said belt  
automatically locates himself fore-and-aft of said upper  
course by the balance between his weight, his speed, and  
the variation in inclination along said curved path.

2. The exerciser of claim 1 having, below said belt,  
diagonally extending means adjustable in length joining said  
side members for enabling adjustment of the degree of rack of  
the rollers and belt, so as to control the path of the belt.

3. The exerciser of claim 2 wherein there are two said  
diagonal means crossing each other, whereby the friction on  
the rollers can be adjusted.

4. The exerciser of claim 1 having, below said belt, a pair of  
diagonally extending and crossing turnbuckles joining said  
side members and enabling adjustment of the degree of rack  
of the rollers and belt, so as to control the path of the belt, and  
for varying the friction on the rollers so as to restrict or free  
their freedom of rotation.

5. The exerciser of claim 1 in which said means providing a  
gripping surface is a handle comprising two parallel members  
joined by a cross member at an outer end and attached to said  
side members at inner ends forward of said forward portion of  
said series of rollers, said parallel members being pivotally  
supported by said side members for movement between a

lower generally horizontal inactive position wherein said cross  
member lies to the rear of said belt and an upper generally ver-  
tical position, and releasable means for maintaining said han-  
dle in said generally vertical position.

6. The exerciser of claim 1 wherein the lower edges of said  
side members have a main flat portion for resting on a floor  
and supporting said exerciser and frictionally resisting sliding  
of the exerciser along the floor, and a forward upwardly  
inclined portion, and an additional roller rotatably supported  
by and between said side members at their said forward por-  
tions, said roller extending below the edge of said forward por-  
tion but not below the edge of said main portion, whereby said  
roller does not reduce the normal ability of the exerciser to re-  
sist sliding movement but, when the rear end of the exerciser is  
raised, said roller engages the floor and supports the entire ex-  
erciser, enabling it to be moved along readily on said roller.

7. The exerciser of claim 1 including in combination:

a foremost roller forward of and lower than the forward por-  
tion of said series of rollers, rotatably supported by and  
lying between said side members, said belt being trained  
over said foremost roller.

8. The exerciser of claim 7 wherein said foremost roller has  
a pair of identical flywheels, one on each side the same  
distance from the center of said foremost roller, mounted in-  
board of said side members, for providing a smooth flywheel  
action tending to keep the velocity of the belt steadier and  
balancing the action while guiding the belt along its path.

9. The exerciser of claim 8 having, below said belt,  
diagonally extending means adjustable in length joining said  
side members and enabling adjustment of the degree of rack  
of the rollers and belt, so as to control the path of the belt.

10. The exerciser of claim 7 having, below said belt, a pair  
of diagonally extending turnbuckles crossing each other join-  
ing said side members and enabling adjustment of the degree  
of rack of the rollers and belt, so as to control the path of the  
belt, and for varying the friction on the rollers so as to restrict  
or free their freedom of rotation.

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