

[54] **THERAPEUTIC EXERCISING APPARATUS
FOR TORSO AND BODY EXTREMITIES**

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[58] Field of Search **128/24, 25, 33, 60;
5/348, 349**

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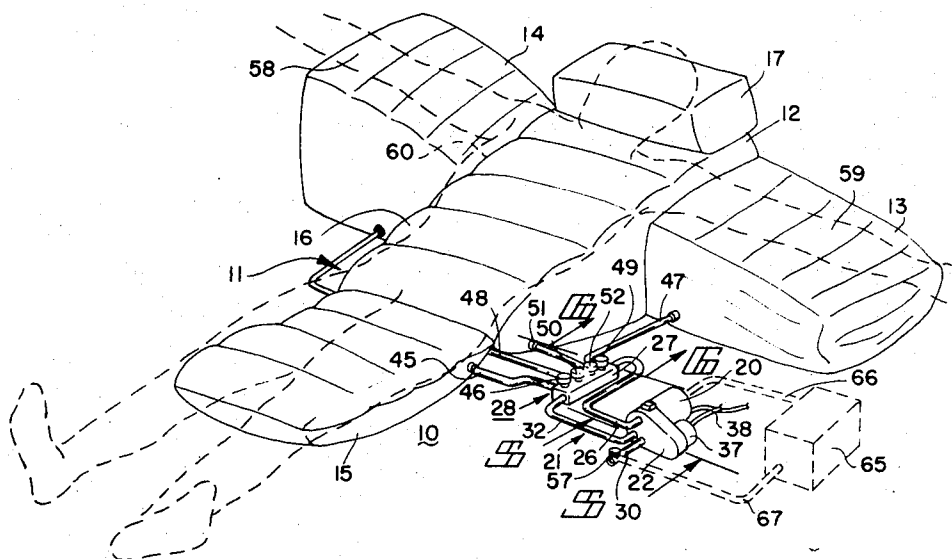
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ABSTRACT

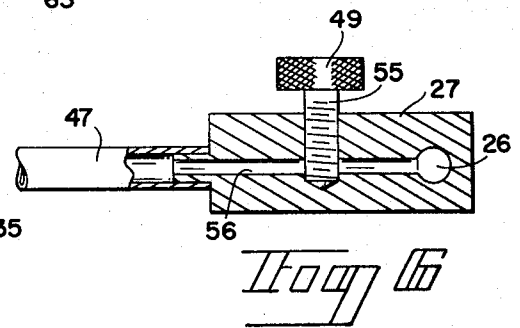
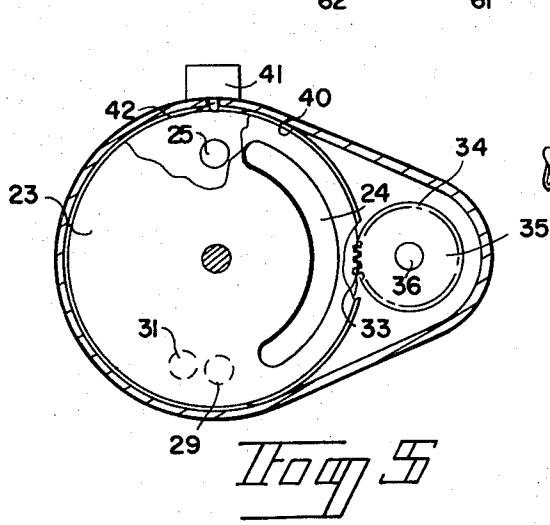
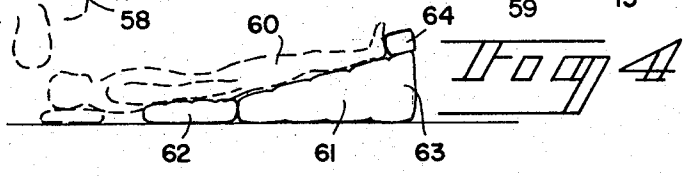
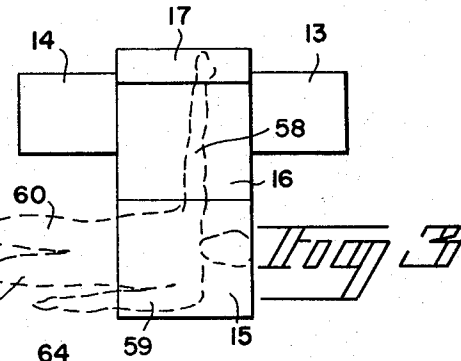
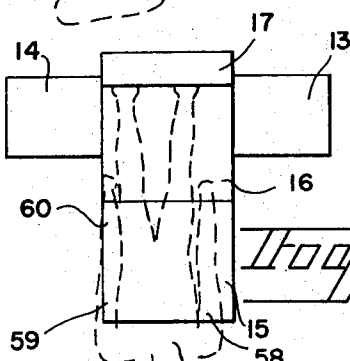
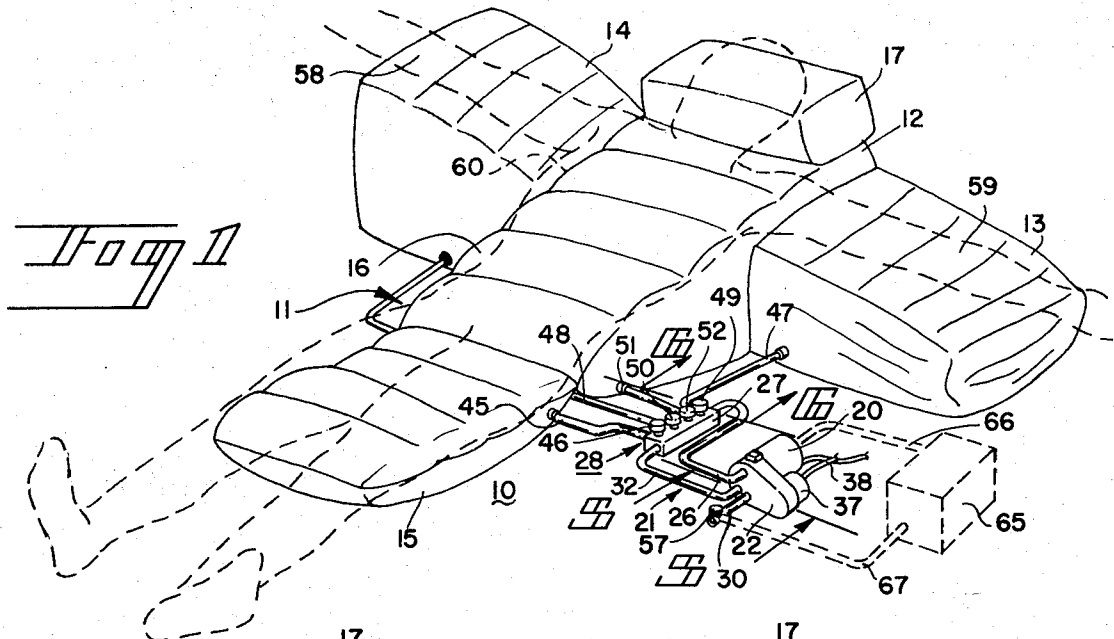
A therapeutic apparatus for automatically inclining and declining the torso and upper and lower extremities of a person from a substantially horizontal to a vertically sloping position to aid in controlling the circulation and position of these members.

3 Claims, 6 Drawing Figures



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THERAPEUTIC EXERCISING APPARATUS FOR TORSO AND BODY EXTREMITIES

BACKGROUND OF THE INVENTION

This invention pertains to therapeutic devices and is particularly directed to a torso and upper and lower body extremities circulation device.

1. Field of the Invention

Many people are unable to position or exercise their own torso and body extremities. Consequently their general health, as well as the health and well-being of patients recovering from illness or operations may be slowed or substantially retarded by the lack of regular exercise. The lack of exercise is particularly acute with bedridden people whose lack of strength prohibits them from moving their torsos or body extremities for exercise purposes.

2. Description of the Prior Art

Heretofore leg circulation devices have been provided which utilized a hinge platform spring biased upwardly sufficiently to neutralize the weight of the legs. Thus, a user may raise and lower his legs or change their relative horizontal position for circulation conditions and comfort since the spring element biasing the leg supporting platform is arranged to substantially neutralize the effect of gravity on the legs. The leg supporting platform floats to any desired tilted angle with only very light pressure from the user's legs.

Since the user must have enough strength to lift his legs to cause the spring biasing means to lift the leg supporting platform, this prior art device could not be used for very weak people, the ones most needing the exercise. Further, this prior art device was limited to exercising the legs and was not readily adaptable for arms, legs and torso exercising activity.

Accordingly, a new torso and body extremity exerciser is needed which will readily exercise both arms, legs and torso of a user with little, if any, effort on the part of the person.

SUMMARY OF THE INVENTION

In accordance with the invention claimed an improved therapeutic torso and body extremity exercising apparatus is provided which exercises the arms and legs of a person without any substantial effort on the part of the person through the use of a systematic inflatable and deflatable body supporting structure.

It is, therefore, one object of this invention to provide an improved therapeutic torso and body extremity exercising apparatus.

Another object of this invention is to provide an improved device for automatically inclining and declining either the torso, arms or legs of a user from a horizontal to a vertically sloping pitched-up or pitched-down position to exercise the muscles of the torso, arms and legs and to aid in controlling the positioning of and circulation in these members of the body.

A further object of this invention is to provide an improved exerciser for the arms of a person which may function to individually or simultaneously raise and lower these extremities.

A still further object of this invention is to provide a device which automatically raises and lowers the torso and body extremities under manual control of the user.

A still further object of this invention is to provide a resilient device which periodically raises and lowers the

torso or one or both arms or legs of a user in time sequence.

A still further object of this invention is to provide an inflatable and deflatable couch-like device for exercising the muscles of the torso or legs of a user.

Further objects and advantages of the invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

BRIEF DESCRIPTION OF THE DRAWING

The present invention may be more readily described by reference to the accompanying drawing in which:

FIG. 1 is a right hand perspective view of a preferred form of the therapeutic apparatus incorporating the features of this invention with the form of a person shown in dash lines in one position;

FIG. 2 is a diagrammatic view of the apparatus shown in FIG. 1 with the person shown in dash lines in another position;

FIG. 3 is a diagrammatic view similar to FIG. 2 showing the person in dash lines in another position on the therapeutic apparatus;

FIG. 4 is a diagrammatic side view of a modification of the inflatable therapeutic device shown in FIGS. 1 - 3 with the person shown in dash lines in still another position;

FIG. 5 is a cross-sectional view of FIG. 1 taken along the lines 5 - 5; and

FIG. 6 is a cross-sectional view of FIG. 1 taken along the lines 6 - 6.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring more particularly to the drawing by characters of reference, FIG. 1 discloses a therapeutic torso and body extremity exercising device 10 comprising a body supporting structure 11 having an inflatable body, torso or extremity supporting member 12 and inflatable arm supporting members 13 and 14 extending laterally therefrom. As shown in FIG. 1 the body, torso or extremity supporting member 12 when inflated forms a horizontal portion 15 and a wedge shaped inclined portion 16 which slopes upwardly and terminates at its upper end with an inflatable pillow or foot supporting member 17.

The arm supporting members may be attached to the wedge shaped inclined portion 16 of supporting member 12 and in their fully inflated condition may, if so desired, slope slightly upwardly from the attachment of the arm supporting member to the body supporting member.

In the preferred embodiment of the body supporting structure 11, the structure is formed of rubber which may be easily inflated for use and deflated for storage. The arm members, as shown, form separate air chambers or compartments so that they may be inflated and deflated separately from the body supporting member 12 in time sequence if so desired. The horizontal portion 15 of supporting member 12 is shown in FIG. 1 as a separate inflatable and deflatable portion from the wedge-shaped inclined portion 16.

As the inflatable structure 11 is shown, each of the arm supporting members 13 and 14, the horizontal portion 15 and the wedged shaped inclined portion 16 of the supporting member 12 may be inflated and deflated

in timed sequence or any one element alone or in combination with any of the other parts of the structure may be sequentially inflated and deflated in time sequence.

Thus, it is possible with the improved structure disclosed to exercise various parts of the body by lying in one direction or another as shown in FIGS. 1-4 on the structure.

FIG. 4 illustrates that the structure can be utilized for its therapeutic purpose without the arm members 13 and 14 shown in FIG. 1-3.

In order to inflate and deflate one or more members of the structure shown in FIG. 1 in timed sequence, the members of the structure are each individually connected to a source of fluid such as air under pressure generated by an air pump 20 through a suitable common valving arrangement 21.

The valving arrangement 21 comprises a housing 22 connected to the air pump 20 and having rotatably mounted in it a slotted disk 23. Disk 23 is provided with an arcuate slot 24 which sequentially makes and interrupts communication between the outlet port 25 leading from the air pump 20 and an inlet pipe 26. Inlet pipe 26 connects housing 22 with one end of a housing 27 of a valve structure 28. Housing 22 is further provided with an outlet port 29 connecting housing 22 through a pipe 30 to atmosphere. Another outlet port 31 in housing 22 connects housing 22 through a pipe 32 to the other end of housing 27 of valve structure 28.

Disk 23 is provided along one edge of its periphery with gear teeth 33 which are in meshing engagement with gear teeth 34 arranged on the outer edge of a gear 35 fixedly mounted on a shaft 36 of a timing motor 37. The timing motor 37 and the air pump 20 are actuated by electric motors (not shown) connected to a source of electric power through conductors 38.

The outer edge of disk 23 is also provided with a cam surface 40 which actuates a micro switch 41. As disk 23 rotates and cam surface 40 raises plunger 42 of micro switch 41 to actuate air pump 20, slot 24 of disk 23 is over port 25 and connects through slot 24 the source of air under pressure with inlet pipe 26.

When cam 40 of disk 23 has moved beyond outlet port 25, as shown in FIG. 5, the micro switch plunger 42 drops down to the position shown and shuts off the air pump by interrupting the electric circuit to its electric motor.

During the period of time that disk 23 is rotating through its arcuate cycle wherein slot 24 does not overlap either outlet port 25 or exhaust ports 29 and 31, the pressure condition of housing 27 of valve structure 28 is in a static condition.

Upon further rotation of disk 23, slot 24 will overlap exhaust ports 29 and 31. At this time air under pressure in housing 27 of valve structure 28 will vent through pipe 32, outlet port 31, slot 24 of disk 23, outlet port 29 and pipe 30 to atmosphere.

Thus, it is possible to sequentially, in timed relationship apply air under pressure to housing 27 of valve structure 28 and to exhaust air under pressure in housing 27 to atmosphere.

In order to pressurize any or all of the members of structure 11 each member of it is separately connected by a pipe line to housing 27 of valve structure 28 through a hand actuated valve as shown in FIG. 1. For example, the inside cavity of the horizontal portion 15 of structure 11 is connected through a pipe 45 and

hand actuated valve 46 to the inside of housing 27 of valve structure 28. The inside cavities of arm supporting members 13 and 14 are connected through pipes 47 and 48 and hand actuated valves 49 and 50, respectively, to housing 27. The inside cavity of the wedge shaped inclined portion 16 of structure 11 is connected to housing 27 through a pipe 51 and hand actuated valve 52.

Each hand actuated valve comprises a shaft 55 threaded into housing 27 to intersect a pipe line 56 leading from the air inlet conduit 26 extending into and through housing 27 to pipe lines 45, 47, 48 and 51. In FIG. 6 valve 49 is shown as closing pipe line 56 of housing 27 leading into pipe 47 which connects housing 27 with arm supporting member 13. By opening and closing the various hand valves 46, 49, 50 and 52 the various body supporting members of structure 11 may be inflated and deflated in time sequence.

In operation, as shown in FIG. 1, all of the hand valves 46, 49, 50 and 52 may be opened initially to fill the couch-like structure. To accomplish this function a hand operated valve 57 may be added to the exhaust pipes 30. With this valve closed and hand operated valves 46, 49, 50 and 52 opened the members of structure 11 will inflate. After they are inflated, hand operated valve 57 may be opened and, for example, hand operated valves 46 and 52 closed leaving hand operated valves 49 and 50 opened. This action will cause the arm supporting members 13 and 14 to simultaneously inflate and deflate in time sequence to raise and lower the arms 58 and 59 of a user 60. Such action exercises the arms of the user with little or no effort on his part.

If the user places his feet on the wedge shaped inclined portion 16 in the manner shown in FIG. 2, and hand operated valve 50 is opened as well as valve 57 but the other hand operated valves in housing 27 are closed, the wedge shaped inclined portion will inflate and deflate thereby exercising the legs of the person.

FIG. 3 illustrates how the wedge shaped inclined portion can be used to exercise one arm of the user.

FIG. 4 illustrates a modification of structure 11 wherein structure 61 merely comprises two wedge shaped portions 62 and 63 having a pillow as foot rest 64 at the upper end of portion 63.

It should be recognized that although an air pump 20 is shown as the source of fluid under pressure a separate tank of air under pressure could be suitably connected to the housing 22 through outlet port 25 and still be within the scope of this invention.

FIG. 1 illustrates in dash lines a source of fluid 65 such as water in a closed system. This source may be used in place of the air system heretofore described. The source of fluid 65 is connected through a pipe line 66 to pump 20 or any other suitable fluid pumping structure. This pump will pump the fluid into the valving arrangement disclosed which will operate in the same manner as disclosed for air except that the exhaust fluid will be connected from pipe 30 through a pipe line 67 back into the source of fluid 65. Valve 57 or any other suitable valve will be needed to complete the closed fluid system.

In this manner water may be used to inflate and deflate structure 11 in place of air.

It should be recognized that even through a timed sequence of inflatable and deflatable action has been described that merely needs to be started to continue in

a repetitious manner, the disclosed or claimed structure may be fully controlled by the user. In this type of action the user would control the action of the timer 37 by having a switch (not shown) controlling its action near at hand.

Although but a few embodiments of the invention have been shown and claimed it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A therapeutic device comprising in combination: an inflatable body supporting structure, and means for inflating and deflating said structure in sequence,

said means comprising a source of fluid under pressure,

valve means for periodically connecting the interior of said structure to said source of fluid under pressure, and

means for actuating said valve means in a predetermined sequence,

said structure comprising a wedge-shaped torso supporting portion and a pair of arm members, one extending laterally from each side of the wedge-shaped portion, said wedge-shaped portion and each of said arm members having an interior isolated from the other and each being individually connected to said valve means, and

said valve means sequentially connecting any of said wedge-shaped portion and said arm members to said source of fluid under pressure and to atmosphere to sequentially inflate and deflate said wedge-shaped member and said arm members for

exercising the user.

2. The combination set forth in claim 1 wherein each of said arm members comprises a wedge-shaped portion for supporting the extremities of a user

said valve means sequentially connecting said wedge-shaped portion to said source of fluid under pressure and to atmosphere to sequentially inflate and deflate said wedge-shaped member for exercising the extremities of the user.

3. The combination set forth in claim 1 wherein said valve means comprises,

a housing,

an input port in said housing for receiving fluid under pressure,

a first outlet port connecting said housing to the interior of said wedge-shaped portion and said arm members,

a second output port connecting said housing to atmosphere,

a third output port connecting the interior of said wedge-shaped portion and said arm members to said second output port,

a slotted disk rotatably mounted in said housing, the slot in said disk upon rotation of said disk sequentially connecting said first input port with said first output port and said second output port with said third output port to sequentially inflate and deflate said wedge-shaped portion and said arm members, and

hand operated valves mounted in said housing one for each of said wedge-shaped portion and said arm members for controlling the fluid flow into said wedge-shaped portion and said arm members.

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