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3,353,532

TRACTION APPARATUS

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2 Sheets-Sheet 1

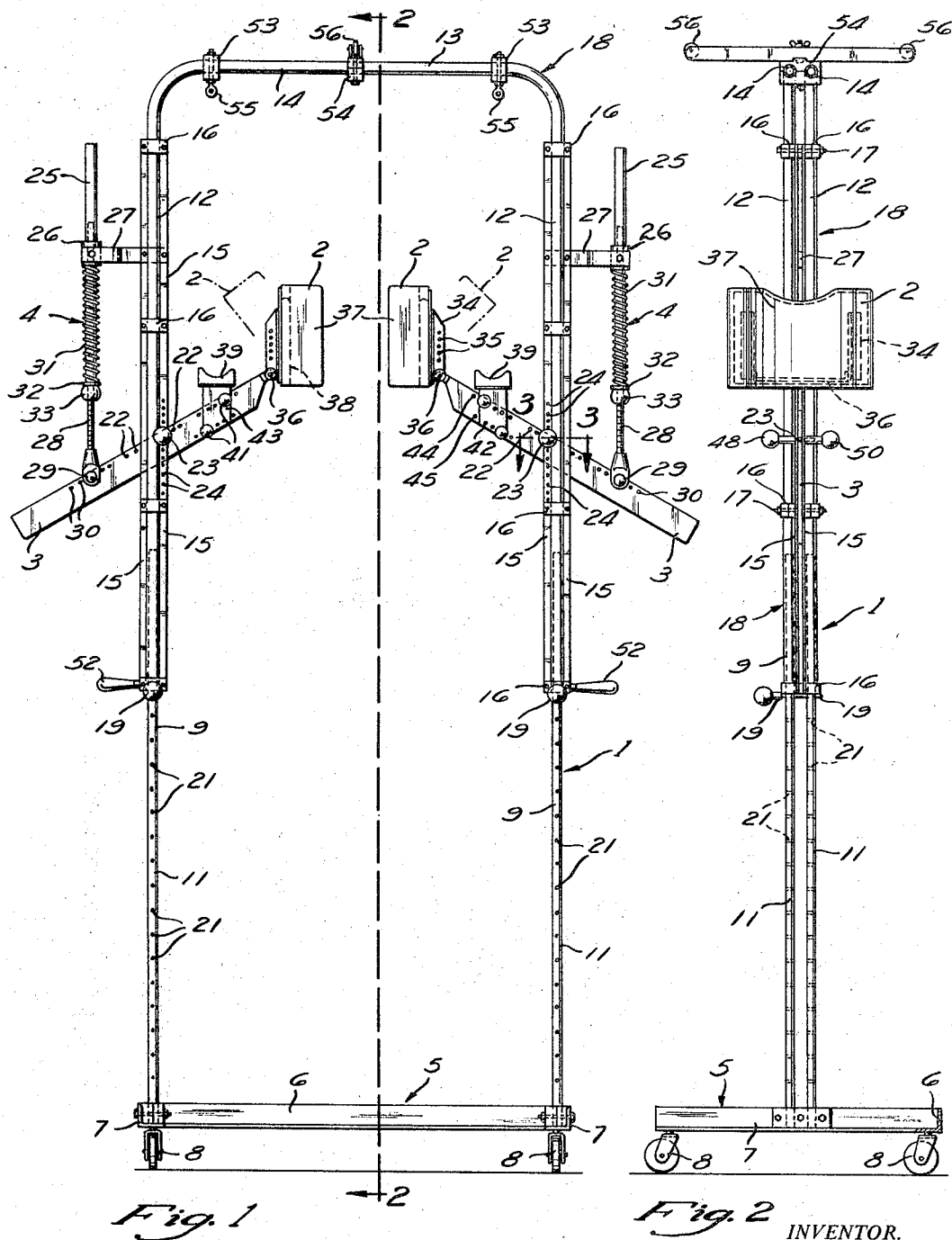


Fig. 2

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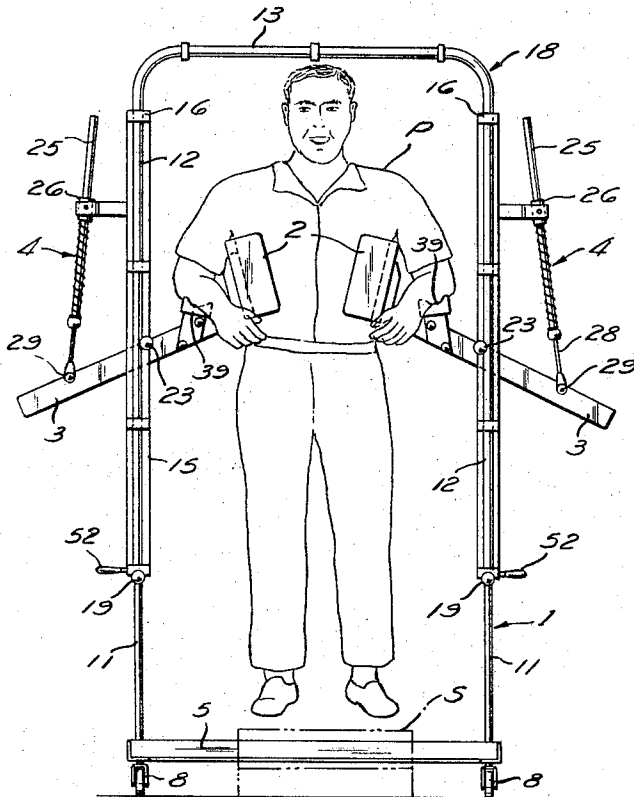


Fig. 5

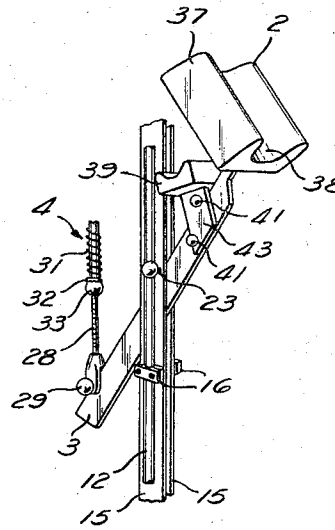


Fig. 4

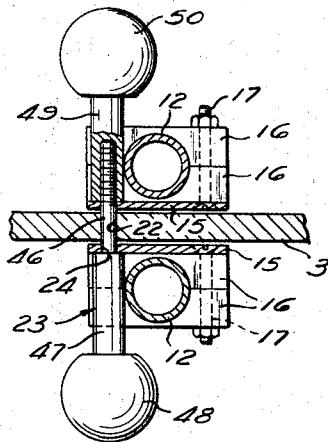


Fig. 3

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TRACTION APPARATUS
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This invention relates to apparatus for applying traction to the body of a patient, and more particularly to apparatus for applying traction to the spine of the patient.

Heretofore, to the best of my knowledge, apparatus for providing spinal traction has involved the application to the body of the patient of arrangements of belts or the like that encircle the body and that are connected by cords, pulleys and the like to supporting means. Prior forms of apparatus generally have also required that another person assist in placing the patient in the apparatus and adjusting the apparatus to apply the desired spinal traction.

Many of the prior forms of apparatus have not been portable and hence have necessitated a reservation of considerable floor space, or even whole rooms, in hospitals or other therapeutic institutions to contain such apparatus, this even though such apparatus may not be used sufficiently to justify the reservation of such space. In such institutions there is usually a shortage of space and hence the reservation of space for such apparatus is particularly undesirable. Prior apparatus for such purpose has also been quite bulky and expensive, and quite specialized.

The major object of the present invention is to provide apparatus for exerting traction on the patient's body, such as spinal traction, which apparatus overcomes as many of the above shortcomings of prior apparatus as desired, or all of them if desired. A further object is the provision of such traction apparatus that is simple in construction and operation. Another object is the provision of such apparatus that, if desired, can be operated by an ambulatory patient alone, without the assistance of another person. A further object is the provision of such apparatus that can be made to occupy little floor space and, if desired, can be made portable. Another object is the provision of such apparatus that can be manufactured at a reasonable cost.

These and other objects of the invention will become apparent from the following description of a preferred embodiment of the invention, in connection with the accompanying drawings in which:

FIGURE 1 is a front view of apparatus embodying the invention, ready for use by a patient;

FIGURE 2 is a section along line 2—2 of FIGURE 1;

FIGURE 3 is a section along line 3—3 of FIGURE 1;

FIGURE 4 is a perspective of a portion of the apparatus, showing one of the engaging members and its associated arm rests; and

FIGURE 5 is a front view of the apparatus showing it being used to apply spinal traction by means of suspension of a patient.

The illustrated embodiment comprises a supporting frame, generally indicated by reference numeral 1, that carries two body-engaging members 2 by means of arms 3, that are pivotally mounted on supporting frame 1 at locations spaced laterally from and below the locations at which the body-engaging members 2 engage the body of the patient. Each body-engaging member 2 is resiliently biased upward by a biasing means generally indicated by reference numeral 4 operating between arm 3 and frame 1.

The frame 1 of the illustrated apparatus comprises a base 5 that is rigidly formed of welded angle metal and comprises a rear cross member 6 and two forwardly extending legs 7 welded to the rear cross member and arranged in a U-shape plan configuration that provides the

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desired lateral and longitudinal stability of the frame while permitting the patient to move into the apparatus between the side legs 7 of the base without stepping over a cross member. The base carries swivel castors 8 that permit the apparatus as a whole to be readily movable.

The frame 1 also comprises two spaced parallel upright side members 9 that are rigidly mounted on the base 5. The spacing between these upright side members 9 is substantially larger than the width of any person likely to use the apparatus. In the embodiment shown, each upright side member 9 includes two spaced parallel upright metal posts 11 rigidly fixed to one of the legs 7 of the base, approximately midway of the length of the leg.

Each side member 9 also comprises two parallel upright tubular sections 12, the lower portions of which telescope over and closely but slidably fit the upper portions of the posts 11. The side members 9 of the apparatus are connected together by a cross member 13 at the top of the apparatus; the cross member in the illustrated embodiment is made up of two tubular sections 14, each of which is integral with a pair of vertical tubular sections 12 forming parts of the side members 9.

The two tubular sections 12 forming a part of each side member 9 have two relatively wide metal bars 15 located between the sections 12 and extending longitudinally thereof. Each of these bars is rigidly clamped to the tubular sections 12 with which it is associated, by clamping members 16 and bolts 17. The bars 15 strengthen the tubular sections with which they are associated, particularly against laterally directed components of forces imposed on them by arms 3, and the pair of bars 15 of each side member 9 of the apparatus act as guides for the arm 3 carried by such bars during pivotal movement of the arm.

The assemblage, including the tubular sections 12 and 14 and the bars 15, thus constitutes a carriage 18 that is vertically movable on the posts 11 and can be adjustably held in various vertical locations on these posts by means of removable pins 19 that extend through selected openings 21 of a series of spaced openings 21 in the posts 11; the pins 19 engage the lower ends of the carriage 18 to support it.

The arms 3 that, at their inner ends, carry body-engaging members 2 are formed from stiff metal bars. Each of these bars has a number of spaced holes 22 near its upper edge. A pivot member 23 extends through a selected one of these holes and through selected coaxial holes 24 of a series of holes in the pair of bar members 15 that are rigidly connected to the tube sections 12 of the carriage, as described above.

Each biasing means 4 (FIGURES 1, 2 and 4) comprises a tubular member 25 that is slidably mounted in a bushing 26 pivotally connected to a laterally extending supporting member 27 fixed to the appropriate side bars 15 of the carriage 18. A member 28 has its upper portion telescopically slidably mounted in the lower portion of each tubular member 25. The lower end of member 28 is pivotally connected to the arm 3 that is operated on by the biasing means, by a pivot member 29 that extends through a selected one of a series of holes 30 in the upper edge of the outer end portion of arm 3. A compression type spring 31 surrounds the tubular member 25 so the upper end of the spring bears against the lower end of the bushing 26 and its lower end bears against a washer 32 the upper portion of which is located against the bottom of tubular member 25 and the bottom of which bears against a nut 33 that is threaded on the member 28. By adjustment of nut 33 the force exerted by spring 31 on the arm 3 can therefore be adjusted. By this adjustment, as well as by selection of the hole 30 in arm 3 to which the lower end of member 28 is connected, and by selec-

tion of the holes 22 and 24 by which the arm is pivotally mounted on the frame 1, it is possible to adjust within wide limits the biasing force exerted on the associated body-engaging member 2.

Selection of the holes 24 in the bars 15 and the selection of the holes 22 in the arms 3, which determines the location in which the arms 3 are pivoted, provides the proper engaging action of the members 2 on the sides of the chest of the patient. A person having a narrower chest would require a different adjustment than one having a substantially wider chest.

For additional adjustability, each bracket 34 of U-shaped cross section by which a body-engaging member 2 is pivotally mounted on its associated arm 3, also has aligned spaced holes 35 through a selected pair of which passes a pivot member 36 that pivotally connects the bracket 34 to the arm 3.

In each body-engaging member 2 the bracket 34 has fixed thereto a thick resilient pad portion 37 formed of foam rubber or plastic or the like that preferably is grooved or hollowed at 38 as shown in FIGURE 4 to make possible a large area of firm non-slipping engagement of the pad portion with the sides of the chest of the patient and to prevent discomfort of the patient. The pad portion and the hollow therein of each body-engaging member 2 faces the corresponding portions of the other body-engaging member.

Preferably, though not necessarily, each of the arms 3 can be provided with an arm rest 39 that is adjustably mounted on the arm adjacent the associated body-engaging member 2 by means of pins 41 that extend through holes 42 of the arm rest bracket 43 and through selected ones of the holes 44 and 45 in the arm 3.

In the illustrated apparatus, the pivot member 23 connecting each arm 3 to the side frame member of the apparatus is shown in FIGURE 3 as having a pin portion 46 that extends through the openings in the bars 15 and arms 3 and is rigidly connected to an enlarged barrel 47 to which is fixed a handle 48; the end of the pin is threaded and has threaded thereon another barrel 49 having a handle 50. It is obvious that the pin can be readily disengaged and readily secured in other holes when desired. The pivot member 29 that connect the members 28 to the arms 3, the pivot members 36 that connect the body-engaging members 2 to the arms 3, and the members 41 that connect the arm rests 39 to the arms 3 can all be of similar construction.

For convenience, handles 52 may be fixed to the lower ends of the carriage 18 to assist in raising and lowering it manually for the desired height adjustment.

The carriage 18 also supports, in the illustrated embodiment, laterally extending members 53 and 54 that carry eyes 55 and pulleys 56 to permit the apparatus to be used for other types of traction therapy or to facilitate placing of non-ambulatory patients in the apparatus.

FIGURE 5 illustrates how the apparatus may be used by a patient P. For a given patient, height of the carriage 18 and the side posts 11 may be adjusted by proper placement of pins 19, the handles 52 being utilized to raise or lower the carriage as required. If necessary the height of the pivotal connections of the arms 3 on the carriage 18 or the spacing between the members 2, may be adjusted by moving the pivot members 23 into the proper openings 22 on the arms and into openings 24 in side bars 15 of the carriage.

If the patient is ambulatory, he can place himself in the apparatus by mounting portable steps S or the like, shown in broken lines in FIGURE 5, and locate the pad portions 37 of the engaging members 2 against the sides of his chest, with his chest sides located in the hollows 38 of such pad portions. He then disengages his feet from the steps by bending his knees, but preferably either by spreading his legs laterally or moving away the step-stool with his feet, so that his body is supported entirely by engagement of the body-engaging members 2 at the

sides of his chest and the lower portion of his body is suspended with no engagement of any body-supporting member with his spine. The body-engaging members 2 accommodate themselves to grip the sides of the patient's chest firmly but comfortably in non-slipping relation, to provide the desired suspension traction. This is made possible because the pad members 37 of the body-engaging members have large support areas to distribute the supporting forces over large areas of the chest sides of the patient, because the resiliency of the pad members 37 permits them to accommodate themselves to body contours at the locations where they engage the body, because the body-engaging members 2 can tilt at their pivotal connections to the arms 3, and because the independently upwardly directed forces on the patient provided by the independent biasing means 4 permit the body-engaging members 2 to engage the patient's chest in a stable manner at substantially corresponding locations on opposite sides of his chest, thus inhibiting any tendency to twist or overturn the patient. Desired substantial vertical suspension traction is thus applied to the spinal column of the patient which can be continued as long as desired. By merely stepping upwardly on the step-stool, the patient can disengage his body from the body-engaging members 2 and step out of the apparatus.

It is apparent that even with a patient who is not ambulatory, it is a relatively simple matter to place him in the apparatus and suspend him so that there is traction on the spine. In such case, the pulleys 56 and the eyes 55 may be helpful in temporarily supporting the patient until he is properly placed in the apparatus, if it is not convenient or feasible to place him in the apparatus by manual carrying. The operation of the apparatus is then as described above.

The arm rests 39 are merely provided for comfort to the patient, so that he can have support for his arms. These arm rests are not required, and indeed, preferably should not be used to support the weight of the body by the arms. Furthermore, the pad members are adjusted and are located against the sides of the chest so that preferably they do not engage the arms in the armpits, but only engage the body at the sides of the chest. In such case a most desirable traction effect is applied to the body.

The described apparatus thus makes possible the application of spinal suspension traction to a patient's body without the necessity of using encircling belts around the patient's body, or pulleys, cords, etc. Ambulatory patients may use the apparatus for exercising purposes without the aid of other persons, as is often required with present apparatus.

The apparatus is portable, and light in weight, and can be readily moved from place to place where needed by means of its castors or by being carried. It can be manufactured at a reasonable cost.

Those skilled in the art will appreciate that various modifications may be made in the apparatus illustrated without departing from the spirit of the invention. It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty reside in the invention.

What is claimed is:

1. Apparatus for applying suspension traction to a person while he is in an upright position, comprising supporting means embodying two spaced generally upright supporting members adapted to receive between them a person while he is in an upright position, means for engaging essentially only the generally upright sides of the chest of said person firmly in nonslipping relation, and means for supporting said engaging means from said generally upright supporting members at locations on said supporting members below and laterally of the location at which said engaging means engages the chest of the person, said engaging means and said supporting members cooperating to support the person substantially

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entirely by such enagement so the lower portion of his body is suspended without engagement of the spine by a body-supporting member.

2. The apparatus of claim 1 in which said means for supporting said engaging means are arm means operating between each engaging means and its adjacent supporting member.

3. The apparatus of claim 2 in which each of said arm means is pivotally connected to its associated generally upright supporting member.

4. Apparatus for applying suspension traction to a person, comprising supporting means, means at each side of the apparatus for engaging the sides of the chest of the person, arm means at each side of the apparatus for supporting said engaging means, said arm means being pivotally supported by said supporting means at a location from below and laterally of the location at which the engaging means engages the chest of the person, said engaging means and said supporting means cooperating to support the person so the lower portion of his body is suspended, and means for biasing said engaging means upwardly.

5. Apparatus for applying suspension traction to a person, comprising supporting means, means at each side of the apparatus for engaging the sides of the chest of the person, arm means at each side of the apparatus for supporting said engaging means, said arm means being pivotally supported by said supporting means at a location below and laterally of the location at which the engaging means engages the chest of the person, said engaging means and said supporting means cooperating to support the person so the lower portion of his body is suspended, and spring means operating on said arm means for biasing said engaging means upwardly.

6. Apparatus for applying suspension traction to a person, comprising supporting means, means at each side of the apparatus for engaging the sides of the chest of the person, arm means at each side of the apparatus for supporting one of said engaging means from one end portion of said arm means, said arm means being pivotally

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supported between its ends by said supporting means at a location from below and laterally of the location at which the engaging means engages the chest of the person, said engaging means and said supporting means cooperating to support the person so the lower portion of his body is suspended, and means for upwardly biasing said engaging means operating between said supporting means and the end portion of each arm means opposite that carrying said engaging means.

7. The apparatus of claim 6 in which said supporting means includes a carriage carrying said engaging means, said arm means and said spring means, and means for adjustably movably supporting said carriage so it can be positioned in a range of positions at different elevations.

8. The apparatus of claim 6 comprising means adjustably pivotally supporting said arm means with reference to said arm means and to said supporting means.

9. The apparatus of claim 7 comprising means adjustably pivotally supporting said arm means on said carriage with reference to said arm means and said carriage.

10. The apparatus of claim 6 in which each of said biasing means is a compression spring means operating between said supporting means and one of said arm means.

11. The apparatus of claim 6 in which said biasing means is adjustable so the biasing force can be varied.

12. The apparatus of claim 10 comprising means for adjusting the force that can be exerted by said spring means.

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