Jan. 13, 1970 M. J. E. GOLAY 3,489,142

ORTHOPEDIC GRAVITY TRACTION DEVICE

Filed July 21, 1966 2 Sheets-Sheet 1

Fig. 1.

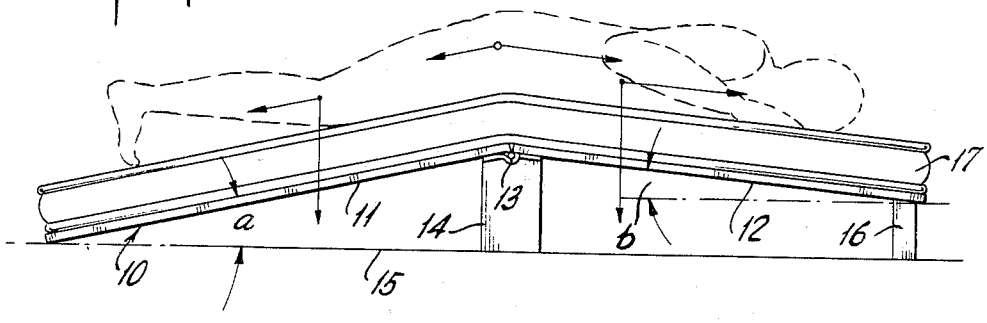


Fig. 2.

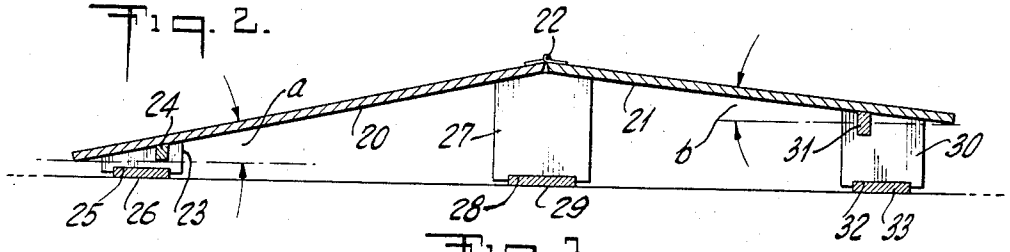
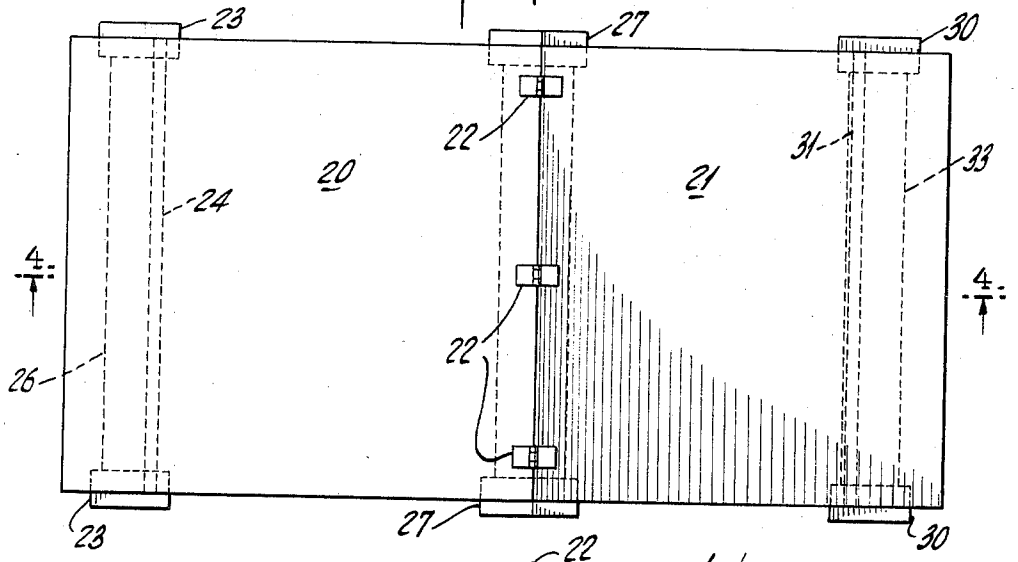


Fig. 3.



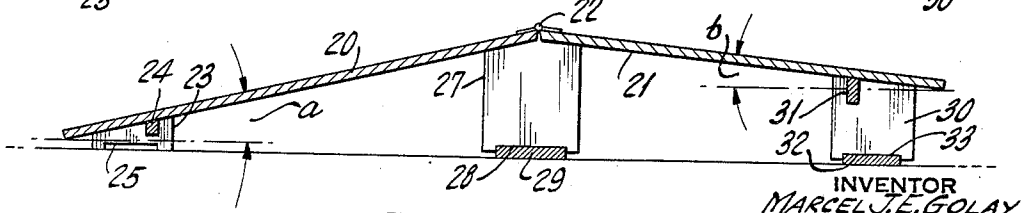


Fig. 4.

INVENTOR
MARCEL J.E. GOLAY
BY
ATTORNEY

Jan. 13, 1970 M. J. E. GOLAY 3,489,142

ORTHOPEDIC GRAVITY TRACTION DEVICE

Filed July 21, 1966 2 Sheets-Sheet 2

FIG. 5.

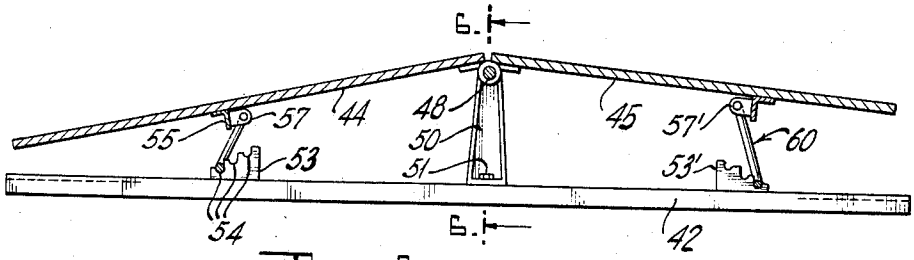


FIG. 6.

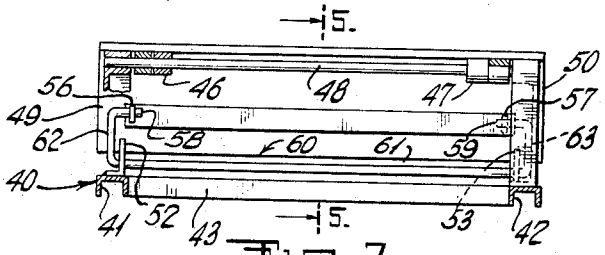


FIG. 7.

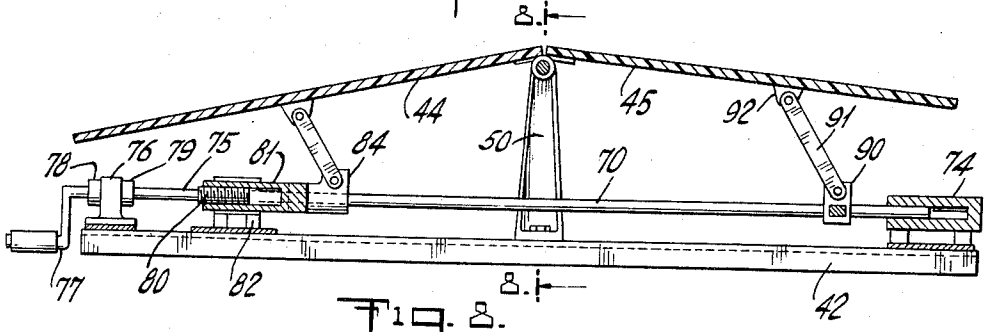
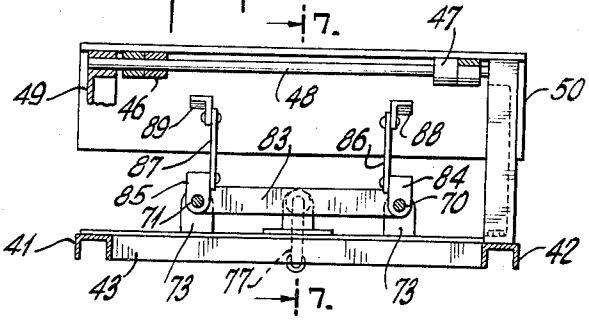


FIG. 8.



INVENTOR
MARCEL J.E. GOLAY
BY
ATTORNEY

United States Patent Office 3,489,142
Patented Jan. 13, 1970

3,489,142

ORTHOPEDIC GRAVITY TRACTION DEVICE

Marcel J. E. Golay, 116 Ridge Road,
Rumson, N.J. 07760

Filed July 21, 1966, Ser. No. 566,869
Int. Cl. A61f 5/01
U.S. Cl. 128—74 5 Claims

ABSTRACT OF THE DISCLOSURE

An orthopedic gravity traction device comprising a support and a mattress consisting of two substantially rigid flat sheets hinged one to the other and supported so that both sheets slope downwardly from the hinged edges, the slope of one sheet being greater than the slope of the other sheet so that an individual lying prone on the mattress supported by the sheets with the hips approximately in line wih the hinged edges will be in a balanced position with substantially equal gravitational forces reacting on the legs and the upper portion of the body.

This invention relates to orthopedic traction devices and more specifically to a novel and improved device for exerting traction on the hips and lower part of the spinal column without the need for braces, pulleys, weights, springs and the like which not only cause discomfort but tend to immobilize the patient.

In many cases, pain and other discomfort resulting from disorders of the vertebral column can be relieved by placing the individual under traction in order to relieve intervertebral pressure. Heretofore, this was usually accomplished by the utilization of devices attached to the patient so that at least portions of the spine would be placed under sufficient tension or traction, but such traction can be applied only for limited periods of time because of the attendant discomfort. Furthermore, with some back difficulties the condition becomes more aggravated with years and traction devices must be frequently used in order to relieve the pain. This invention overcomes the above and other difficulties with prior known traction devices and provides a novel and improved arrangement of elements which will place the patient in traction without the attachment of any of the usual mechanical devices directly to the patient.

Another object of the invention resides in a novel and improved traction device for the treatment of certain back disorders.

Another object of the invention resides in a novel and improved adjustable bed for patients with back disorders which enables the patient's back to be placed in traction without the attachment of any mechanical devices directly to the patient.

Still another object of the invention resides in a novel and improved traction bed for patients characterized by its simplicity, comfort, ease of operation, and relatively low cost.

Still another object of the invention resides in a novel and improved traction bed for patients which is readily and easily adjustable to provide selected amounts of traction.

A still further object of the invention resides in a novel and improved traction bed wherein the patient is automatically subjected to a predetermined degree of traction by merely placing himself in a selected position on said bed.

The above and other objects and advantages of the invention will become more apparent from the following

description and accompanying drawings forming part of this application.

In the drawings:

FIGURE 1 is a diagrammatic side elevational view of a novel and improved traction bed in accordance with the invention.

FIGURE 2 is a cross sectional view of one embodiment of a traction device in accordance with the invention embodying the principles illustrated in FIGURE 1.

FIGURE 3 is a plan view of the structure shown in FIGURE 2.

FIGURE 4 is a cross sectional view of FIGURE 3 taken along the line 4—4 thereof.

FIGURE 5 is a cross sectional view of another embodiment of a traction bed support in accordance with the invention.

FIGURE 6 is a cross sectional view of FIGURE 5 taken along the line 6—6 thereof.

FIGURE 7 is a cross sectional view of still another embodiment of a bed support in accordance with the invention.

FIGURE 8 is a cross sectional view of FIGURE 7 taken along the line 8—8 thereof.

Referring now to the drawings and more specifically to FIGURE 1 thereof, the bed support is generally denoted by the numeral **10** and comprises a pair of relatively rigid flat elements **11** and **12** of wood or other suitable material. The elements **11** and **12** are connected one to the other by hinges **13** and provided with a central support **14** so that the element **11** makes a selected angle *a* with the supporting surface **15**. The element **12** has a support **16** at its outer end so that it forms an angle *b* with the supporting surface **15**. The angles *a* and *b* are selected so that a patient lying on the mattress **17**, which overlies the support **10**, will be in a balanced position and will not tend to slide in one direction or the other.

For purposes of the present illustration, let it be assumed that the element **11** is slightly longer than the element **12** so that the hinges **13** are positioned about the normal hip line of a patient when placed in bed. If the patient has a weight of approximately 180 lbs., it can be assumed that the weight of the patient's legs including a portion of the hip is about 60 lbs. The remaining portion of his body would therefore be approximately 120 lbs. Under these conditions, if the element **11** is placed at approximately 12 degrees with the horizontal and the element **12** about 6 degrees with the horizontal, then the tendency of the patient's legs to move down the incline produced by the element **11** will approximately counterbalanced the tendency of the remainder of his body to move down the incline **12**. Furthermore, with the angle *a* being approximately 12 degrees, the traction on each hip will be approximately 6 lbs., though this traction will be affected by the friction of the patient's body and clothes on the bed linen. However, since the patient may move about, an average of 12 lbs., of traction will be produced at all times as the movement of the patient will minimize the effect of friction. Similarly, the inclination of the element **12** at approximately 6 degrees to the horizontal will produce about 12 lbs., average traction in the opposite direction. As a result, the lower portion of the patient's back will be subjected, under these conditions, to approximately 12 lbs., of traction, and there will be negligible tendency for the patient to shift in one direction or the other. As a result, the patient can sleep on the improved bed without incurring any of the discomforts occasioned by mechanical traction devices.

FIGURES 2 through 4 illustrate one embodiment of a device utilizing the principles discussed above. In this embodiment of the invention, the support comprises a pair of elements **20** and **21** hinged at the center by a

plurality of hinges 22 though it is evident that a single continuous hinge may be employed. The hinges are placed on the top side of the elements 21 and 22 so that the elements can be folded one upon the other for storage and shipment. The outer or left end of the element 20 as shown in FIGURE 2 is provided with a pair of supports 23 adjoining the side edges thereof and fixedly secured to the undersurface. When forming the element 20 and the supports 23 of wood, a transverse member 24 may be utilized to brace the supports 23. The bottom edge of each support 23 is recessed as indicated by the numeral 25 to receive a bed slat 26 and thus help insure retention of the device on a conventional bedstead or the like. The meeting edges of the elements 20 and 21 are supported at the desirable elevation by center supports 27 which are attached to one of the elements 20 or 21. The bottom edges of the supports 27 are recessed at 28 to accommodate a central slat 29. The outer edge of the element 22 is provided with a support 30 similar to the support 23, and a transverse brace 31 may be utilized to provide the necessary rigidity. The support 30 is recessed at 32 as in the case of the other supports to engage a slat 33.

This form of the invention is particularly useful in the home and can be folded to occupy a relatively small storage space. Furthermore, it is possible to modify the angles *a* and *b* by adjusting the thickness of the slats 26, 29 and 33. Assuming that this improved support is placed on a plain surface such as the floor, the angles *a* and *b* can be increased by omitting the slats 26 and 33, or, in the alternative, the slat 29 can be increased in thickness. Thus, the two angles *a* and *b* can be increased or decreased in any desired manner to meet the needs of the individual patient.

A modified embodiment of the invention and one more adapted for hospital use illustrated in FIGURES 5 and 6. It comprises a metal frame generally denoted by the numeral 40 having a pair of side channels 41 and 42 preferably joined at their ends by transverse braces 43. The inclined elements 44 and 45, which would be preferably made of wood such as plywood or the like, are connected one to the other by hinge elements 46 and 47, and a cooperating central transverse rod 48. The ends of the rod 48 engage fixed frame elements 49 and 50 secured to the channels 41 and 42 by bolts 51 or other suitable fastening means. This enables the elements 44 and 45 to be moved angularly about the rod 48.

The angle of the element 44 relative to a horizontal plane is adjusted by means of a pair of inclined racks 52 and 53 each having descrete notches 54 in the upper edge thereof. The underside of the element 44 carries a transverse brace 55 and a pair of spaced lugs 56 and 57. The lugs 56 and 57 each include an opening to pivotally receive the inwardly extending portions 58 and 59 of a U-shaped bar 60. The U-shaped bar 60 has a transverse element 61 of a length greater than the distance between the racks 52 and 53. The ends of the bar 60 have upwardly extending portions 62 and 63 which carry the inwardly extending portions or trunnions 58 and 59. With this arrangement, the angle of the element 44 can be modified by shifting the position of the bar 60 in the racks 52 and 53. The angle of the element 45 is similarly adjusted by a pair of racks 52′ and 53′ and adjusting bar 60′ which is carried by a pair of lugs 56′ and 57′ similar to the lugs 56 and 57.

In many cases, it may be necessary to make frequent adjustments of the slope of the individual elements of the traction bed without materially disturbing the patient or, in the alternative, enable these adjustments to be made by the patient himself. For this purpose, a structure such as that shown in FIGURES 7 and 8 may be employed. This embodiment of the invention is substantially identical to the embodiment shown in FIGURES 5 and 6, and accordingly, corresponding elements of each embodiment are denoted by like numerals. As in the case of the previous embodiment of the invention, the elements 44 are supported by uprights 49 and 50 carried by a horizontal frame consisting of longitudinal channels 41 and 42 joined by transverse members 43 at each end thereof.

Adjustment of the angles of the elements 44 and 45 is accomplished by displacement of a pair of elongated rods 70 and 71 slidably supported at one end by pillow blocks 73 and at the other end by pillow blocks 74, one of which is not shown in the drawings. The rods 70 and 71 are simultaneously reciprocated by a shaft 75 carried by a journal 76 and rotated by means of a crank 77. A pair of collars 78 and 79 are secured to the shaft 75 on each side of the journal 76 to prevent longitudinal displacement. The inner end of the shaft 75 carries a lead screw 80 which threadably engages an internally threaded sleeve 81. The sleeve 81 is slidably supported in the journal 82 and can be reciprocated by rotation of the shaft 75. The forward end of the sleeve 81 carries a transverse bar 83 having openings on each end for engaging the shafts 70 and 71. The bar is fixedly secured to the shafts 70 and 71 and carries connectors 84 and 85 which move longitudinally with the shafts 70 and 71. The connectors 84 and 85 engage links 86 and 87 which are pivotally secured to brackets 88 and 89, the latter being secured to the underside of the element 44. With this arrangement, as the crank is rotated, the shafts 70 and 71 move simultaneously in one direction or the other to automatically modify the angle of the element 44.

The angle of the element 45 is similarly adjusted by connectors 90, one of which is secured to each shaft 70 and 71. Each connector 90 is coupled by a link 91 to a bracket 92 secured to the underside of the element 45.

With the foregoing arrangement and by coordinating the lengths of the links 86 and 87 at one end and links 91, 91 at the other end, the elements 44 and 45 can be moved through selected angles of inclination while at the same time maintaining a precise relationship between such angles so that the patient will also be maintained at all times in a balanced position. It is of course evident that the crank 77 can be replaced by an electric motor and appropriate speed reducer to permit the patient to adjust the bed for maximum comfort.

While only certain embodiments of the invention have been illustrated and described, it is apparent that alterations, modifications and changes may be made without departing from the true scope and spirit thereof as defined by the appended claims.

What is claimed is:

1. An orthopedic device comprising a pair of substantially rigid flat sheets, hinge means joining said sheets one to the other to form an elongated support for bedding, central supporting means adjoining said hinge means to support the hinged edges of said sheets at a predetermined distance above a given horizontal plane, and outer supporting means spaced from said central supporting means to support the outer ends of said sheets at distances above said horizontal plane which are shorter than said predetermined distance, the last said distances being adjusted one relative to the other and to said predetermined distance to substantially equalize the gravitational forces on a patient lying on said sheets with the hips in approximate alignment with the hinged edges of said sheets, one of said sheets being inclined relative to said horizontal plane at an angle of approximately 6 degrees and the other of said sheets being inclined relative to said horizontal plane at an angle of approximately 12 degrees.

2. An orthopedic device according to claim 1 wherein said central and outer supporting means are secured to the underside of said sheets and said sheets are foldable one upon the other with the upper faces thereof in overlying relationship.

3. An orthopedic device according to claim 1 including a rigid horizontal frame underlying said sheets, means fixedly securing said central supporting means to said frame with the upper ends of said central supporting

means being pivotally coupled to the hinged edges of said sheets, and said outer supporting means comprising inclined racks carried by said frame and transverse rack-engaging means carried on the underside of said sheets to individually adjust the inclination of said sheets.

4. An orthopedic device according to claim 1 including a rigid horizontal frame underlying said sheets, means fixedly securing said central supporting means to said frame with the upper ends of said central supporting means being pivotally coupled to the hinged edges of said sheets, means pivotally coupling the upper edge of each of said outer supporting means to said sheets and longitudinally displaceable means carried by said frame and pivotally secured to the lower ends of said outer supporting means whereby longitudinal displacement of the last said means will simultaneously and proportionally modify the angles of inclinations of said sheets.

5. An orthopedic device according to claim 4 including rotary means and mechanical power converting means connecting said rotary means to said longitudinal displaceable means, said converting means translating the rotary motion of said rotary means into longitudinally reciprocable motion.

References Cited

UNITED STATES PATENTS

309,678	12/1884	Aubin	108—9 X
546,235	9/1895	Luther	269—325
2,152,431	3/1939	Jensen	128—74
2,533,273	12/1950	MacGregor	272—58
2,658,754	11/1953	Courtney	272—58
2,724,428	11/1955	Sellner	155—45
1,814,482	7/1931	Miller	269—325

RICHARD A. GAUDET, Primary Examiner

JOHN D. YASKO, Assistant Examiner

U.S. Cl. X.R.

5—327; 108—61, 137