July 16, 1957 W. E. BERNE 2,799,545

ADJUSTABLE HEIGHT TREATMENT TABLE

Filed March 16, 1956 3 Sheets-Sheet 1

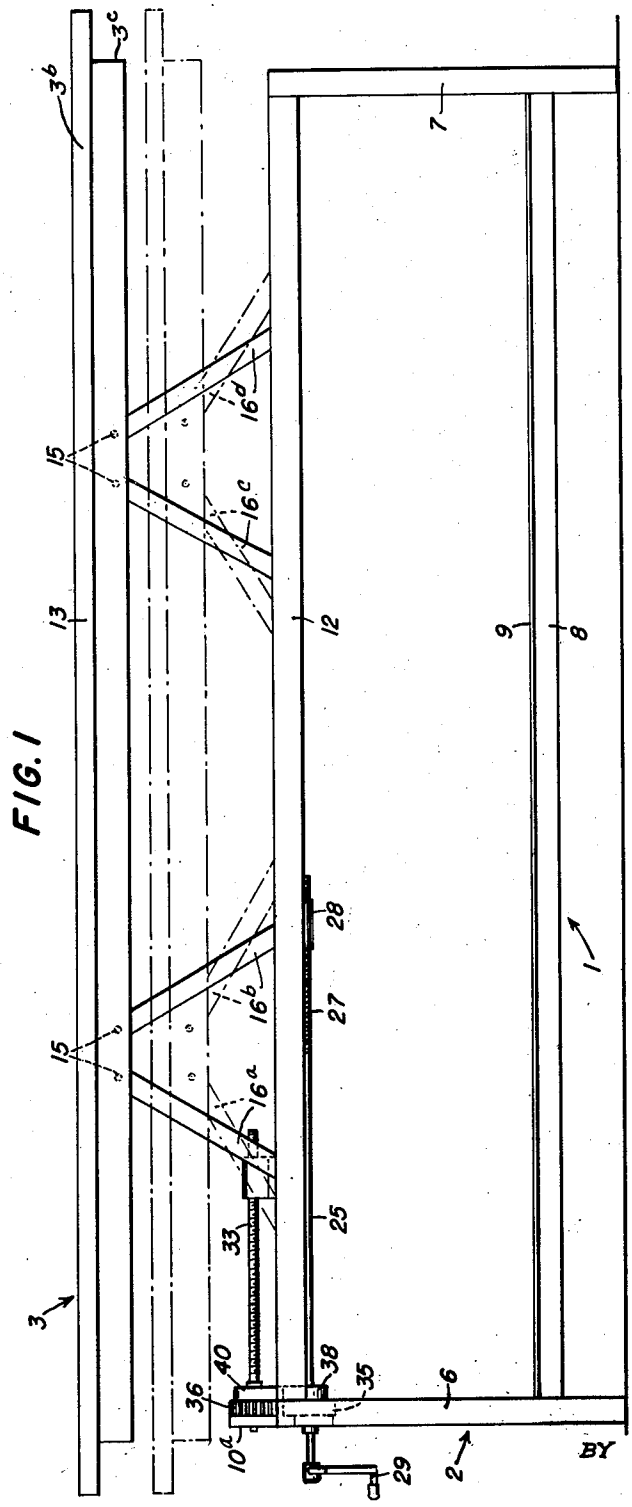


FIG. 1

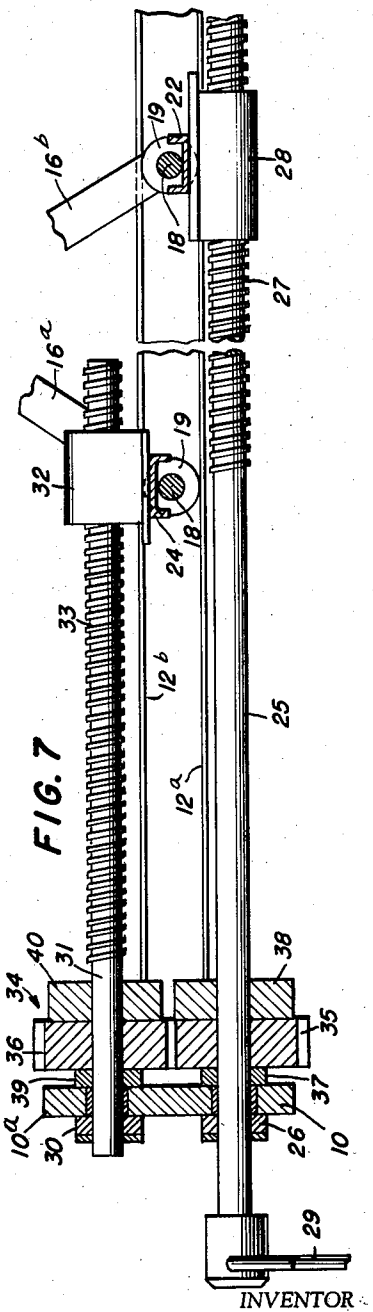


FIG. 7

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ADJUSTABLE HEIGHT TREATMENT TABLE

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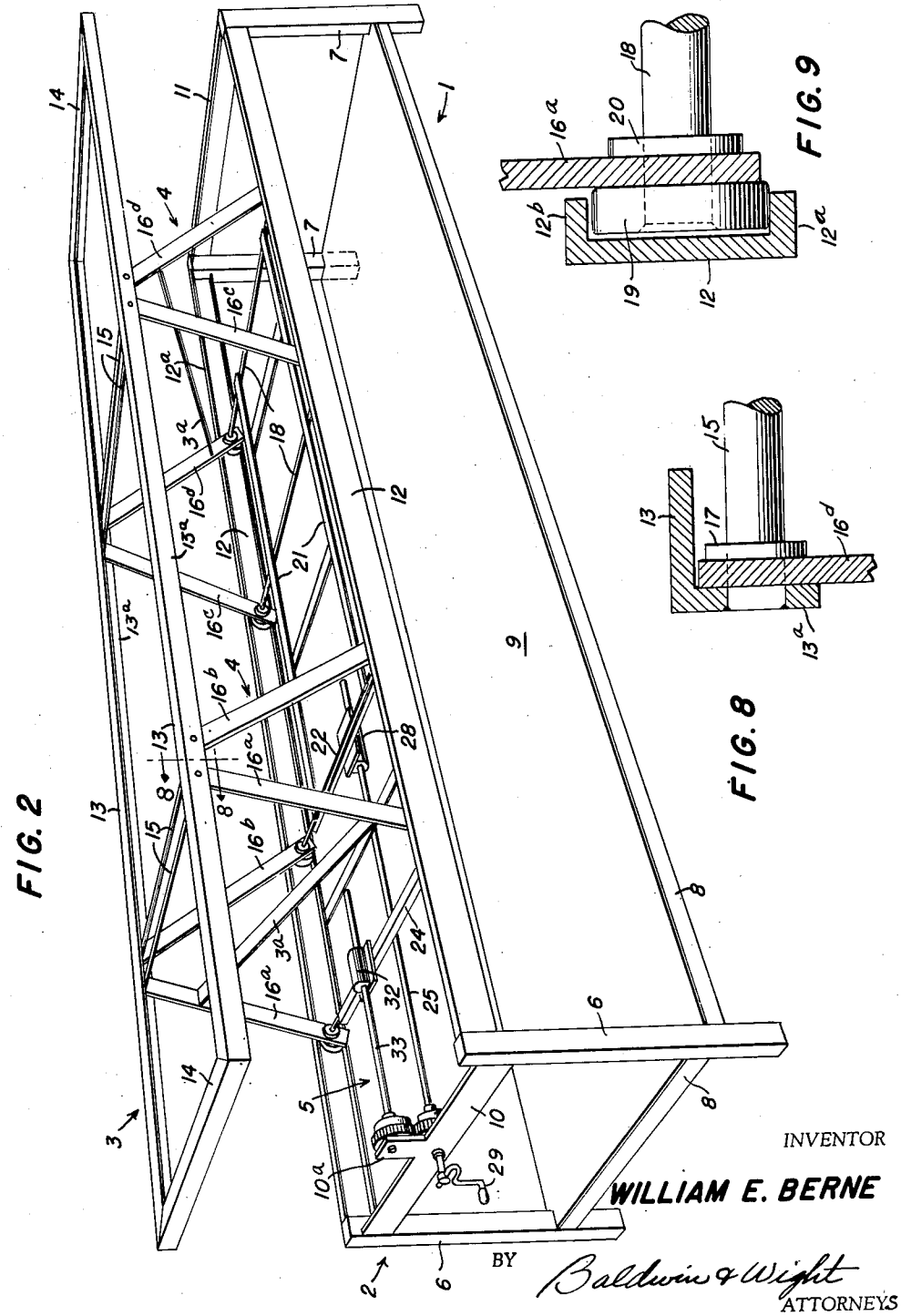


FIG. 2

FIG. 9

FIG. 8

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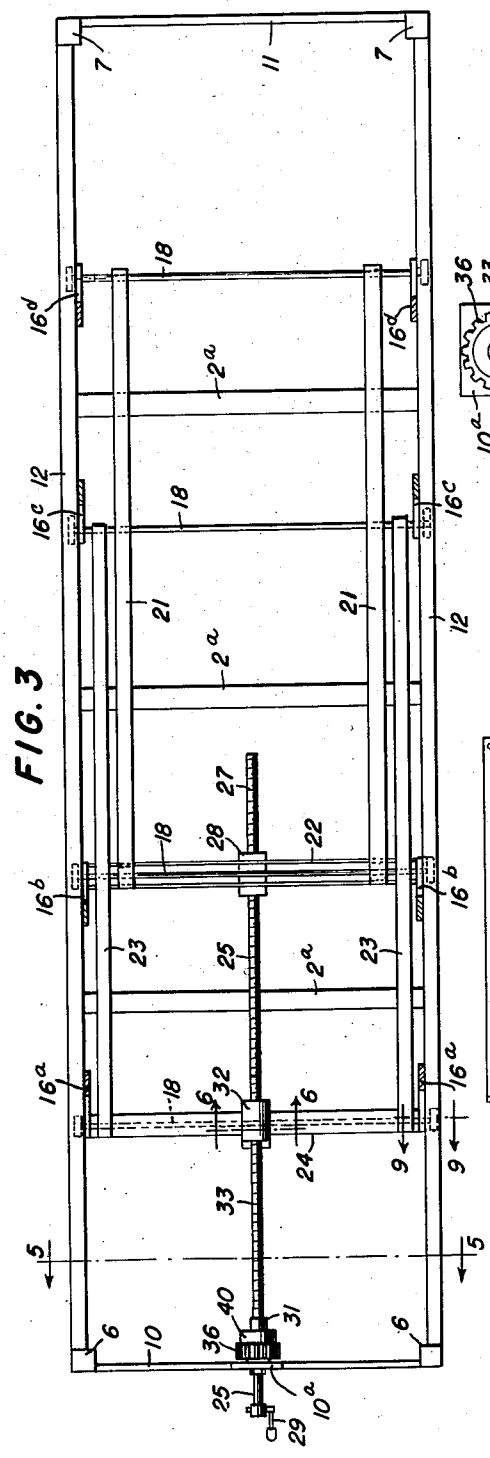


FIG. 3

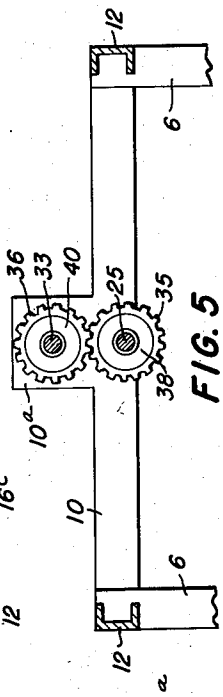


FIG. 5

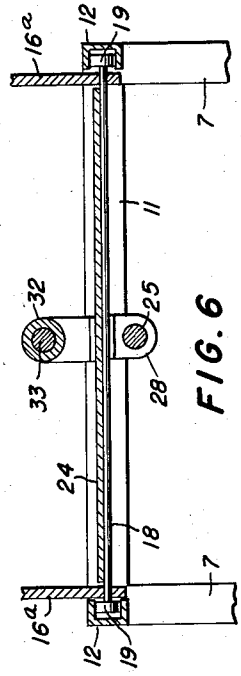


FIG. 6

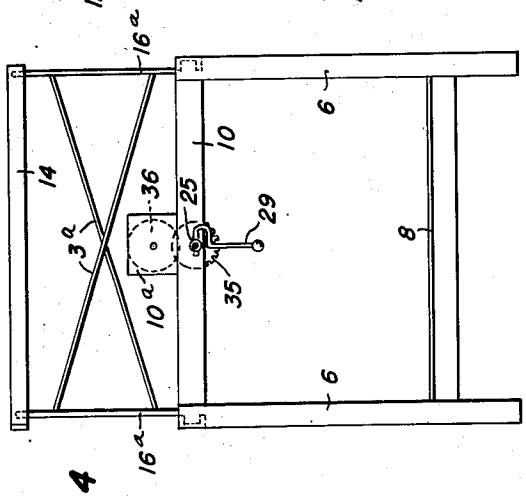


FIG. 4

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ADJUSTABLE HEIGHT TREATMENT TABLE

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Application March 16, 1956, Serial No. 572,027

3 Claims. (Cl. 311—39)

This invention relates to table constructions of the kind especially adapted for the use of physicians in treating patients and more particularly to treatment tables of the kind referred to which include a patient supporting portion and mechanism operable to adjust the height of the patient supporting portion through a wide range, the height adjusting mechanism being so constructed as to insure that the patient supporting portion will remain in adjusted position without necessitating the provision of additional locking means.

An object of the invention is to provide an improved adjustable height treatment table, the height of which may be varied at will by operation of a single driving member.

Another object of the invention is to provide an improved adjustable height treatment table having height adjustment mechanism operable to vary the height of the table and being capable of maintaining the table at selected heights exclusively of separate adjustment mechanism locking means.

A further object of the invention is to provide an improved treatment table of the kind referred to which includes a base portion and a patient supporting portion supported on the base portion parallel to a floor surface, the height of the patient supporting portion above the floor surface being variable by means of adjusting mechanism interconnecting the base portion of the patient supporting portion and being capable of maintaining the patient supporting portion parallel to the floor surface in all positions of the adjusting mechanism.

Other objects of the invention will be pointed out specifically or will become apparent from the following description and claims considered in conjunction with the accompanying drawings in which:

Figure 1 is a side elevational view of a table constructed in accordance with the invention and showing a patient supporting portion of the table in two positions of adjustment;

Figure 2 is a perspective view of the construction shown in Figure 1;

Figure 3 is a top plan view of the base portion and adjusting mechanism, certain parts of the latter being shown in section;

Figure 4 is an end view of the apparatus shown in Figures 1 and 2;

Figure 5 is an enlarged, fragmentary sectional view taken on the line 5—5 of Figure 3;

Figure 6 is an enlarged, fragmentary sectional view taken on the line 6—6 of Figure 3;

Figure 7 is an enlarged, fragmentary view, partly in section and partly in elevation, of certain parts of the height adjusting mechanism;

Figure 8 is an enlarged, fragmentary sectional view taken on the line 8—8 of Figure 2; and

Figure 9 is an enlarged, fragmentary sectional view taken on the line 9—9 of Figure 3.

An adjustable height treatment table constructed in accordance with the invention and designated generally by the numeral 1 in the drawings comprises a lower frame or base portion 2, a patient supporting upper frame or portion 3, a plurality of pairs of legs 4 for supporting the portion 3 on the portion 2, and adjusting mechanism 5 for varying the height at which the patient supporting portion 3 is supported above the base portion 2.

The base portion 2 comprises a rectangular frame having a pair of legs 6 at one end, a pair of legs 7 at the other end, and angle bars 8 connecting the legs 6 and 7 one to another adjacent to the lower ends of the legs. If desired, a low shelf may be provided by supporting a panel 9 of suitable material on the several angle bars 8. Between the legs 6 and adjacent to their upper ends is a frame member 10, and between the upper ends of the legs 7 is connected a frame member 11. The member 11 may be an angle bar whereas the frame member 10 preferably is formed of sheet material. The pairs of legs 6 and 7 are connected by channel members 12, the channels preferably being so arranged as to face one another and provide a pair of parallel tracks 12^a for a purpose hereinafter to be described. The frame members 6, 7, 10, 11 and 12 preferably are formed of metal and may be rigidly secured one to another in any suitable manner, such as by welding.

The patient supporting frame portion 3 preferably is composed of side and end metal angle bars 13 and 14, respectively, suitably connected one to another in rigid rectangular form as by welding. The length of the frame members 13 is substantially the same as the length of the parts 12, but the members 14 are slightly shorter than the elements 10 and 11, for a purpose which will be described. The base frame 2 of the table may be reinforced by means of braces, three of which are shown at 2^a in Figure 3, and the patient supporting frame 3 may be reinforced by braces such as are shown at 3^a in Figures 2 and 4. The patient supporting frame also may be provided with a table top 3^b adapted to rest on the frame members 13 and 14, and having depending skirts 3^c between which the frame members 13 and 14 may be received. The table top construction thus is removable and, when in place on the frame, cannot move either laterally or longitudinally of the frame 3 since the engagement of the skirt portions 3^c with the frame members precludes such movement.

At longitudinally spaced points, the frame members 13 are provided with openings for reception of rods 15, the ends of which are flush with and welded or otherwise fixed to the depending flanges 13^a of the members 13 as is indicated in Figure 8. Each of the rods 15 carries a pair of metal strips which constitute the individual legs 16 of a plurality of pairs of legs 4. Each of the individual legs is apertured adjacent to its upper end so as loosely to receive the associated rod element 15, thereby rockably or pivotally connecting each of the legs to the frame portion 3. The upper end of each of the legs is maintained adjacent to an end of its associated rod 15 with sufficient clearance between the leg and the flange to enable the leg to be freely rockable, by means of a washer or the like 17 which may be welded or otherwise suitably secured inwardly of the end of the associated rod element 15.

The patient supporting frame portion 3 is intended to lie in a horizontal plane parallel to a floor surface on which the table 1 rests, and the plurality of pairs of legs 4 depends from the frame 3 in vertical planes. In order that the lower ends of the individual legs may be located inwardly of the base frame portion 2, therefore, the end frame members 14 of the frame 3 are made of slightly shorter length than the corresponding parts of the base frame as has been pointed out previously.

The lower end of each of the plurality of legs 4 is apertured for the loose reception of a shaft or rod 18, the ends of which extend beyond the associated legs and are provided with journalling means (not shown) for small wheels or rollers 19 which are adapted to roll along the substantially horizontal tracks 12a formed by the lowermost flanges of the channel members 12. A washer or the like 20, similar to the element 17, may be welded or otherwise secured to the shaft 18 in engagement with the associated leg 16 to maintain the latter in its proper location on the shaft.

In the disclosed embodiment of the invention there are four pair of legs 16a, 16b, 16c, and 16d, but additional pairs of legs may be used as desired. The first and fourth pairs of legs 16a, 16d which are adjacent to the ends of the table may be considered the outside pairs of legs and the second and third pairs of legs 16b, 16c located inwardly of the outside pairs of legs may be considered the inside pairs of legs. Certain pairs of the plurality of pairs of legs 4 are interconnected for conjoint movement and the remaining pairs of legs also are interconnected for conjoint movement. In the disclosed embodiment, one of the outside pairs of legs is connected to the remote inside pair of legs and the other outside pair of legs is connected to the other inside pair of legs.

Referring to Figure 3, a pair of metal bars 21, each of which is rigidly connected at one end to the shaft 18 of the pair of outside legs 16d, extends over the shaft 18 of the pair of legs 16c, each bar 21 being rigidly connected at its other end to a metal channel strip 22 which is rigidly secured to the lower surface of the shaft 18 extending between the inside pair of legs 16b. A similar pair of bars 23 is rigidly secured at corresponding ends to the shaft 18 between the inside pair of legs 16c and at their other ends to a channel strip 24 which is rigidly secured to the upper surface of the shaft 18 between the outside pair of legs 16a. The arrangement is such that the bars 21, the channel strip 22, and the shaft 18 which extends between the legs 16d constitute a rigid substantially horizontal rectangular structure extending substantially equally to opposite sides of the longitudinal center line of the table, the rigid structure being connected at its four corners respectively to the legs of the pairs of legs 16b, 16d. The bars 23, the channel strip 24, and the shaft 18 between the legs 16c constitute another rigid substantially horizontal rectangular structure connected at its four corners respectively to the pairs of legs 16a, 16c.

In the preferred arrangement of parts, the application of force to one rigid rectangular structure to move the pair of legs 16a will cause corresponding movement of the pair of legs 16c, and the application of force to the other rectangular structure to move the pair of legs 16b will cause corresponding movement of the pair of legs 16d. Upon the application of force to move the several pairs of legs, the wheels 19 will roll along the tracks 12a and the legs will rock or pivot about their connections to the frame 3 so as to raise or lower the frame 3 relatively to the frame 2, the direction of movement of the patient supporting frame 3 depending on the direction of movement of the several pairs of legs. As is best shown in Figure 9, there is a small clearance between the wheels 19 and the upper flange 12b of each channel 12, thereby assuring freedom of movement of the wheels. The flange 12b is provided to prevent inadvertent separation of the legs 4 from the base frame 2.

The invention includes operating mechanism for imparting movement to the several pairs of legs, the mechanism being indicated generally by the numeral 5 and comprising an operating shaft 25 journalled adjacent to one of its ends in a suitable bearing 26 in the base frame element 10 and being provided at its other end with worm threads 27. The worm 27 extends through a correspondingly threaded bore in a worm block 28, the threads of the two parts being intermeshed. The worm block 28 is rigidly mounted on the channel strip 22 and cooperates with the worm 27, upon actuation of the latter, to impart movement to the pair of legs 16b and, consequently, to the pair of legs 16d which is connected to the former by the pair of bars 21. The end of the operating shaft 25 which projects beyond the frame part 10 is provided with a driving member or crank 29 to facilitate the turning of the shaft.

As is best shown in Figures 2, 4, and 5, the frame member 10 is provided with an upwardly projecting part 10a in which is journalled for rotation in bearings 30, one end of a second operating or jack shaft 31. The other end of the shaft 31 extends through a block 32 rigidly secured to the channel strip 24 and the shaft 31 is provided with worm threads 33 which mesh with similar threads (not shown) formed in the bore of the block 32. Upon rotation of the shaft 31 the worm block 32 will be caused to move in one direction or the other, thereby causing corresponding movement of the joined pairs of legs 16a and 16c.

When it is desired to raise the patient supporting frame portion 3 from the position shown in Figure 2, it is necessary that the pairs of legs 16a and 16b be moved in opposite directions about their pivotal connections to the frame 3, and that the two pairs of legs 16c and 16d also be moved in opposite directions. As is best shown in Figure 7, the threads of the two worms 27 and 33 are of the same hand so that the desired opposite movement of the respective pairs of legs can be achieved by the driving of the worms 27, 33 in opposite directions. To effect the driving of the worm gears 27, 33 in opposite directions, transmission means 34 is provided for interconnecting the two operating shafts 25 and 31. The transmission means comprises a driving spur gear or part 35 mounted fast on the shaft 25 and a driven spur gear or part 36 mounted fast on the shaft 31, the two gears being in mesh. The spur gears 35 and 36 have the same diameters and the same number of teeth, whereby the driving of the gear 35 in response to the driving of the shaft 25 by operation of the crank 29 will cause the gear 36, and consequently the worm 33, to be driven at the same rate of speed as the worm shaft 25, but in an opposite direction. The gear 35 is maintained in longitudinal fixed position on the shaft 25 by a bearing 37 and by a stop part 38, suitably fixed to the shaft 25, and the gear 36 is maintained in longitudinally fixed position on the shaft 31 by similar parts 39 and 40.

When it is desired to elevate the patient supporting portion from the position shown in dash lines in Figure 1 to the position shown in full lines, the driving crank 29 is rotated in a clockwise direction, whereupon the worm 27 also will be rotated in a clockwise direction whereas the worm 33 will be driven in a counterclockwise direction at the same speed as the worm 25. The pairs of legs 16b and 16d thus will be rocked clockwise about their pivotal connections to the frame 3 and the pairs of legs 16a and 16c will simultaneously be rocked counterclockwise about their pivotal connections with the frame 3 so as to raise the frame 3 and the table top 3b. Since each of the legs of the several pairs of legs 4 is of uniform length and since the rate of movement of each leg is the same, the patient supporting table portion 43 will remain parallel to the floor on which the apparatus rests. When the frame 3 has been raised to the desired height, the operation of the crank 29 may cease and the table 3b will be maintained at the adjusted height by means of the interengagement of the threads on the worms 27 and 33 and their respective worm blocks 28 and 32. Thus, it is not necessary to provide any additional means to lock the patient supporting frame portion in adjusted position. When the table is to be lowered, the crank 29 may be rotated in a counterclockwise direction whereupon the parts of the apparatus will be caused to move in directions opposite to those just described.

In the disclosed embodiment of the invention the pro-

vision of rigid rectangular structures extending substantially equally on either side of the longitudinal center line of the table and interconnecting the pairs of legs which are to move conjointly results in a construction in which movement of the several pairs of legs relative to the base frame is free from binding. Thus, the raising and lowering of the patient supporting frame may be accomplished smoothly without the imposition of unnecessary stresses on the frame members.

The disclosed embodiment of the invention is illustrative of a preferred form of the apparatus. The apparatus is susceptible of modification, such as by mounting the height adjusting mechanism **5** on the frame portion **3** and by reversing the manner in which the plurality of pairs of legs is connected to the respective frame portions **2** and **3**. The table **1** also may be provided with wheels secured to the legs **6** and **7** so as to make the table movable. The disclosure of the invention, therefore, is intended to be illustrative rather than definitive of the invention. The invention is defined in the claims.

I claim:

1. In an adjustable height table construction, a lower frame; an upper frame; means mounting said upper frame on said lower frame for vertical adjustment comprising, on each side of said construction, two pairs of legs spaced from each other longitudinally of said construction, means pivotally connecting one end of each leg of each pair to one of said frames, and means mounting the opposite end of each pair on the other of said frames for movement longitudinally with respect to said other of said frames with the legs of each pair extending from said one of said frames to said other of said frames in oppositely inclined relation; means extending longitudinally of said construction and connecting said opposite ends of legs which are similarly inclined for constraining legs of similar inclination to swing in unison about their respective pivots on said one of said frames; a first worm; means journalling said first worm on a fixed part of said other of said frames to extend longitudinally of said frame; a first worm block connected to those legs which are inclined in one direction and having threaded engagement with said first worm; means on said first worm engaging said frame fixed part for maintaining said first worm against longitudinal movement under tensile loading; a second worm; means journalling said second worm on said frame fixed part to extend parallel to said first worm; a second worm block connected to those legs which are inclined in the opposite direction and having threaded engagement with said second worm; means on said second worm engaging said frame fixed part for maintaining said second worm against longitudinal movement under compressive loading; and operating means for rotating said worms simultaneously, the relative directions of lead of the respective worm threads being so related to the relative directions of rotation of the two worms as to effect simultaneous relative approaching movement of said worm blocks and simultaneous relative separating movement of said worm blocks, according to the direction of rotation of the operating means, whereby said first worm will be under tension and said second worm under compression, and lash longitudinally of said worms in mounting of the worms on said frame fixed part and connection of said worms to said legs will be eliminated.

2. A table construction as set forth in claim 1 in which the first and second worms are of the same direction of lead, the operating means comprising driving connections between the worms for effecting rotation thereof in opposite directions.

3. A construction as set forth in claim 1 in which said legs are pivotally connected to said upper frame and are mounted on said lower frame for longitudinal movement with respect thereto, said worms being journalled on a fixed part of said lower frame, and the operating means comprising interengaging gears on the two worms respectively.

References Cited in the file of this patent

UNITED STATES PATENTS

640,942	Peacock	Jan. 9, 1900
757,807	Hazard	Apr. 19, 1904
848,332	Westervelt	Mar. 26, 1907
893,031	Stone	July 14, 1908
1,794,165	Gannaway	Feb. 24, 1931
2,415,820	Herring	Feb. 18, 1947

FOREIGN PATENTS

223,905	Germany	Apr. 26, 1911