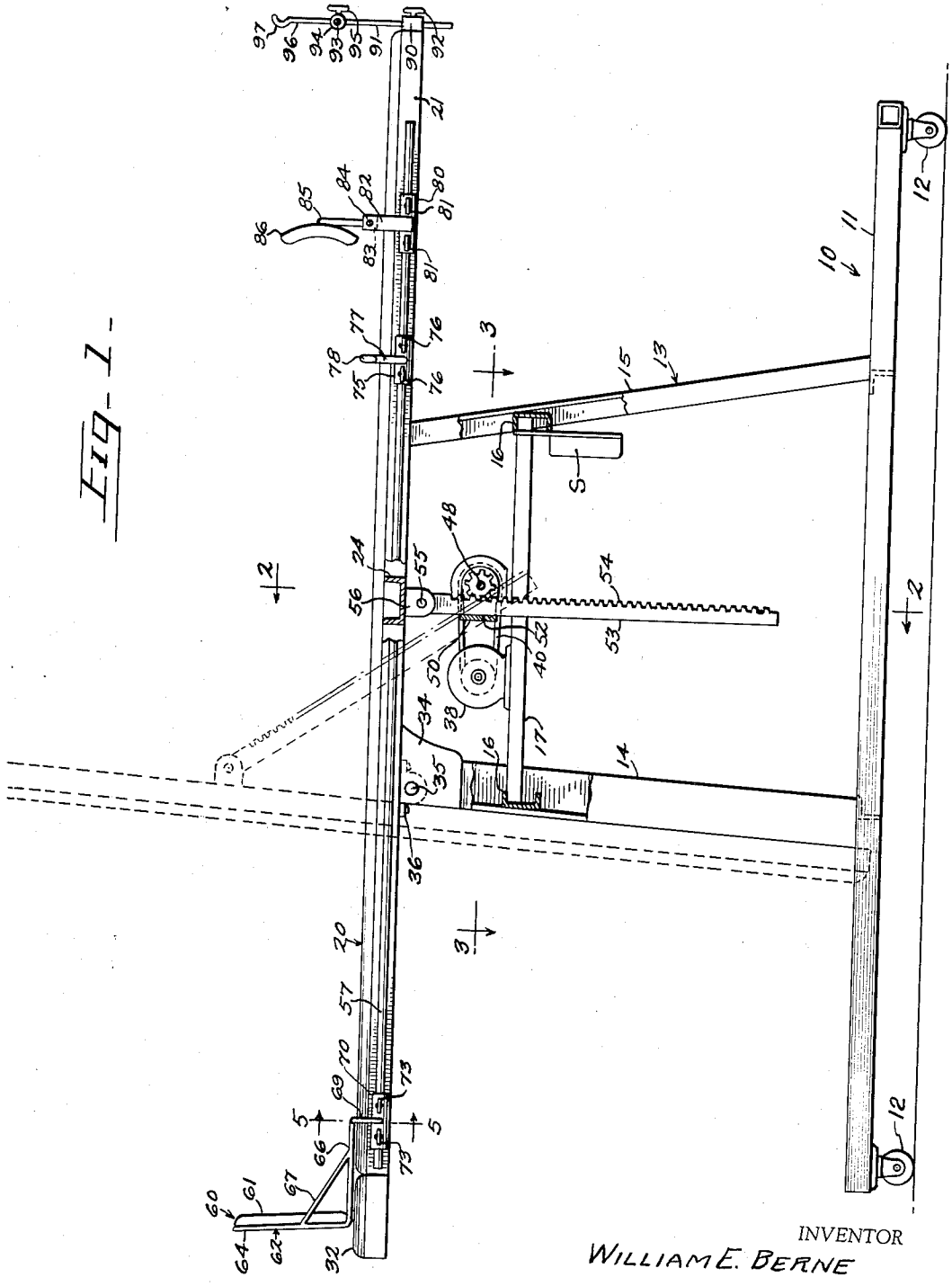
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ATTACHMENT FOR OPERATING TABLES

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4 Sheets-Sheet 1

Fig. 1.



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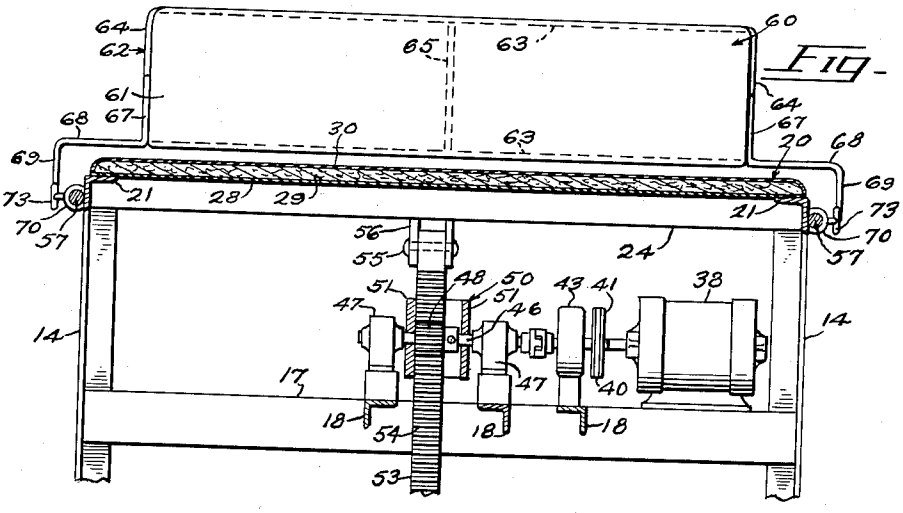


Fig. 2.

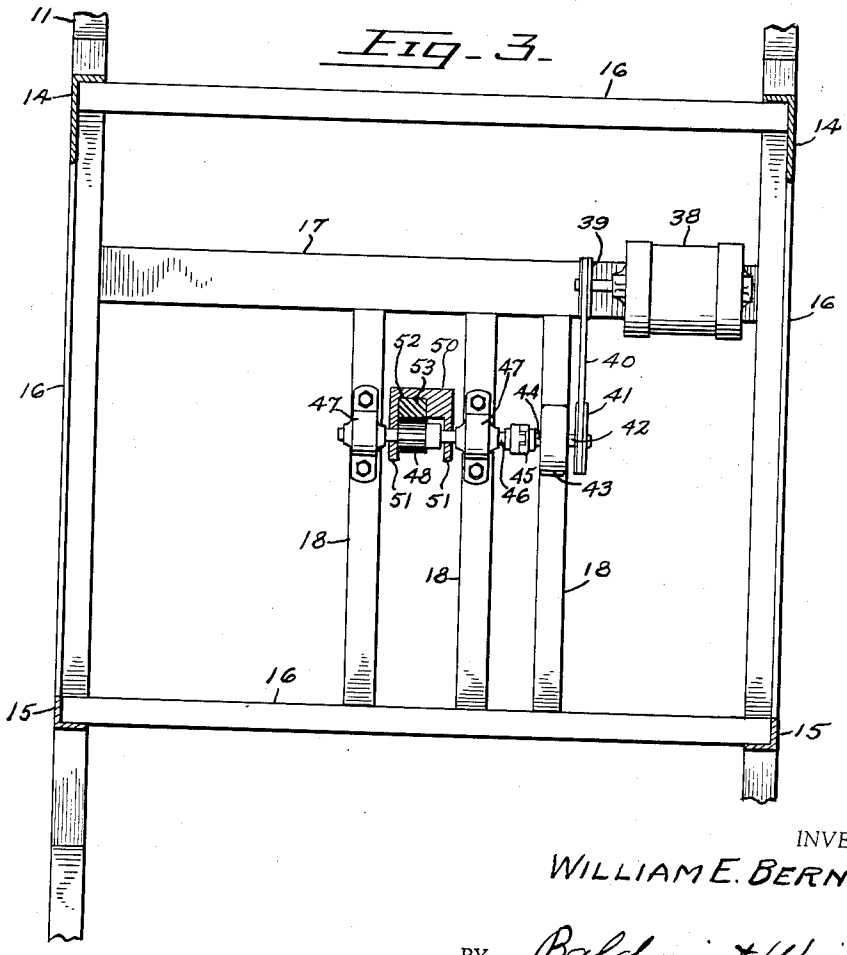


Fig. 3.

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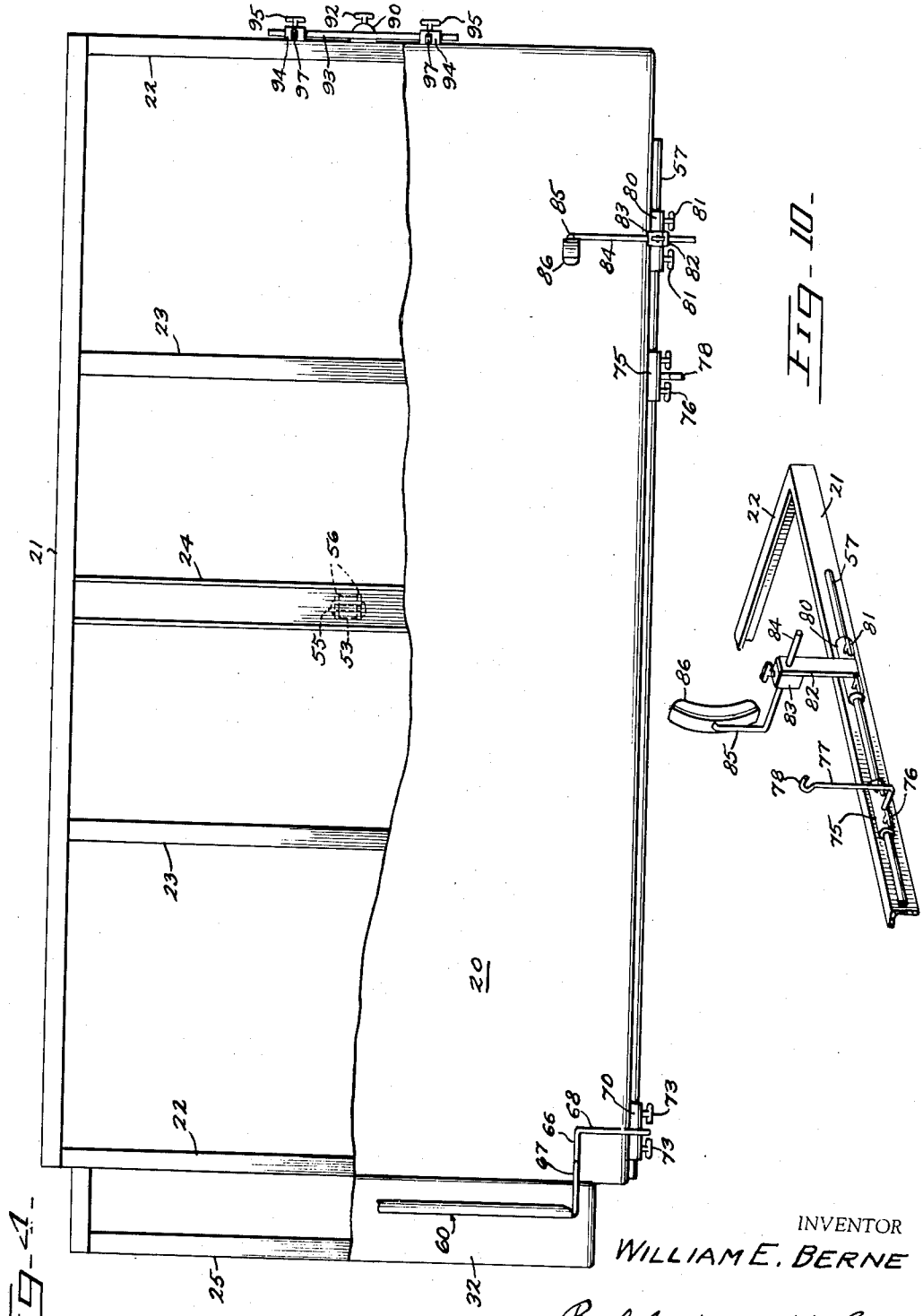


FIG. 1.

FIG. 10.

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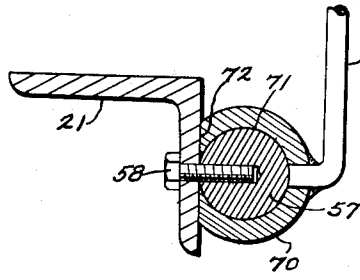


Fig. 5.

Fig. 6.

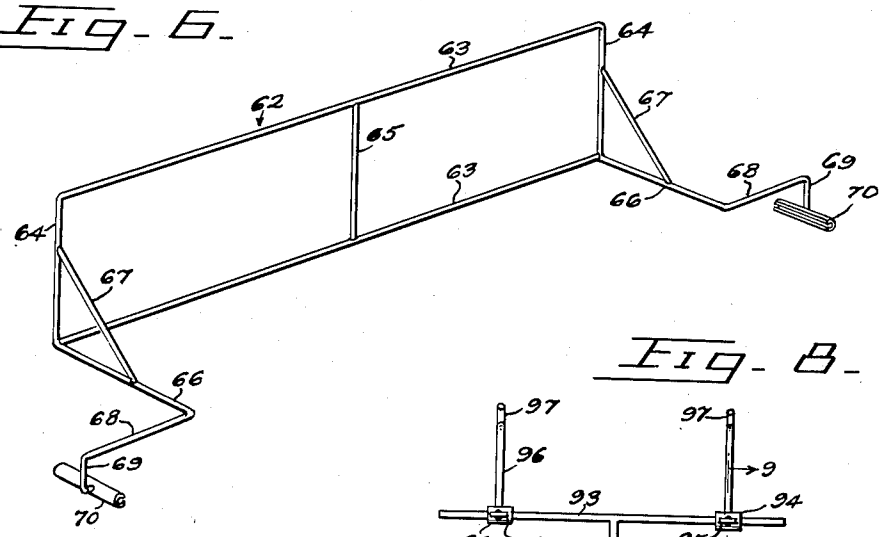


Fig. 8.

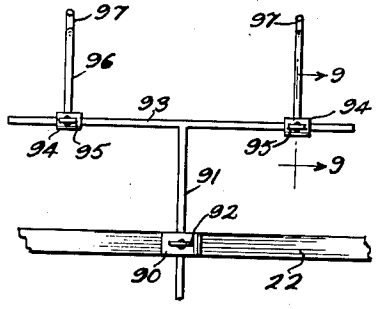


Fig. 7.

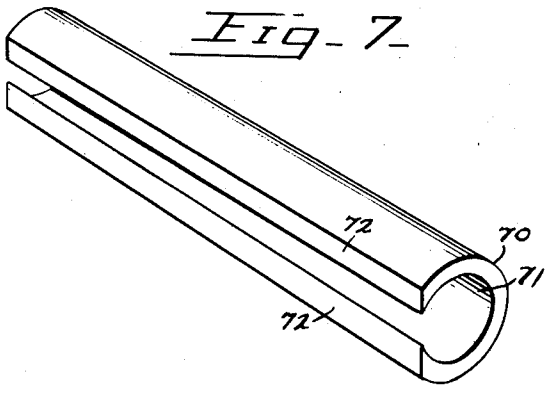
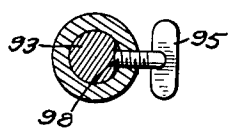


Fig. 9.



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2,735,738

ATTACHMENT FOR OPERATING TABLES

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Application November 25, 1953, Serial No. 394,269

4 Claims. (Cl. 311—10)

This invention relates to a physiotherapy or operating table, and particularly to an attachment for a table for use in the treatment of polio patients, paraplegic patients, and for the general treatment of other physiotherapy patients.

An important object of the invention is to provide a novel table construction which is power operated between a horizontal position and a substantially vertical position and is provded with a foot board, whereby the tilting of the table to a substantially vertical position, after use, will permit the patient to step directly from the table. A further object is to provide such a table wherein a motor is employed for driving through novel motion transmitting connections, to move the table to any desired position between a horizontal position and a position at approximately 85° to the horizontal, thus permitting the patient to be arranged in any desired position or angle for the proper treatment which may be prescribed in individual cases.

A further object is to provide such a table wherein the foot board, usable as a step as referred to above, may be adjusted to any desired position along the table according to the height of the patient.

A further object is to provide a novel supporting bar at each side of the table to facilitate the slidable connection to the table of various appliances such as crutch elements, bars for connecting restraining straps, etc. A further object is to provide such guide bars which extend throughout the greater portion of the length of the table, thus permitting a wide range of adjustment of any appurtenances connected to the slide bar. A further object is to provide such a construction wherein the crutch elements not only are slidable longitudinally of the table along the guide bars, but are also adjustable toward and away from each other according to the distance between the armpits of the patient, and which may be withdrawn and reversed where it is desired to treat a patient in a heads-down position, the crutch elements under such conditions being engageable with the tops of the shoulders of the patient.

Other objects and advantages of the inventon will become apparent during the course of the following description.

In the drawings I have shown one embodiment of the invention. In this showing:

Figure 1 is a side elevation of the table shown in horizontal position in solid lines and in substantially vertical position in dotted lines, parts being broken away and parts being shown in section,

Figure 2 is a fragmentary vertical sectional view on line 2—2 of Figure 1,

Figure 3 is a horizontal fragmentary sectional view substantially on line 3—3 of Figure 1,

Figure 4 is a plan view of the table, a portion of the cushion structure being broken away,

Figure 5 is a substantially enlarged detailed sectional view on line 5—5 of Figure 1,

Figure 6 is a detailed perspective view of the frame for the foot board,

Figure 7 is a detailed perspective view of a split tube adapted for use with any of the appurtenant devices for supporting them for sliding engagement with one of the slide bars,

Figure 8 is a fragmentary end elevation showing one of the appliances usable with the device,

Figure 9 is an enlarged detailed sectional view on line 9—9 of Figure 8, and

Figure 10 is a fragmentary perspective view of a portion of the frame of the table showing two of the appliances connected thereto.

Referring to the drawings the numeral 10 designates a support as a whole comprising a base 11 formed of any suitable type of structural elements supported at the corners thereof by wheels or casters 12 to facilitate the movement of the table from place to place. The support further comprises a stand indicated as a whole over the numeral 13 supported by the base 11 and projecting upwardly therefrom and preferably formed of angle iron structural members including four legs, two of which are indicated with the numeral 14 and the other two of which are indicated by the numeral 15. The legs 14 are preferably substantially heavier as clearly shown in Figures 1 and 3 for a purpose which will become apparent. The legs of the stand are connected and braced by suitable structural members 16 extending between the legs and certain of these legs at opposite sides of the table are connected by a structural member 17 which, in turn, is connected to one of the structural members 16 by supporting members 18 (Figure 3) for a purpose to be described.

A table unit indicated as a whole by the numeral 20 is arranged above the stand 13 and, as shown in Figure 4, is of elongated substantially rectangular shape and comprises side frame members 21, end cross members 22 and intermediate cross members 23 spaced apart and spaced from the end members 22. Between the members 23 is arranged a relatively heavy cross member 24 connected to the side frame members 21, and at one end of the table unit, namely the foot end which will become apparent, an auxiliary frame structure 25 is secured to the adjacent cross members 22.

A top structure is arranged on the frame of the table unit and may be of any desired construction. For example, a plywood or similar board 28 may be provided with a cushion unit 29 and may be completely covered with plastic 30 or any other suitable covering material, and the plywood body 28 may be fixed by screws or any other suitable means to the side frame members 21 and any or all of the cross members 22 and 23. An auxiliary structure of the same type, indicated by the numeral 32, is secured to the auxiliary frame 25.

Plate members 34 are secured to the leg members 14 and each plate and its associated leg member carries a relatively heavy pivot pin 35, the pivot pins at opposite sides of the table obviously being in axial alignment with each other. These pivot pins pass through bearings 36 secured in any suitable manner to the side frame members 21, and accordingly it will be apparent that the table unit 20 is pivoted to the stand 14 to swing upwardly about the axis of the pins 35.

The cross member 17 (Figure 3) supports an electric motor 38 driving a pulley 39 around which passes a belt 40, and this belt also passes around a pulley 41 carried by a shaft 42 forming the input shaft of a speed reducing unit 43. The output shaft 44 of this unit is connected preferably by a resilient coupling 45 of any desired type to a shaft 46 supported in bearings 47 secured to certain

of the supporting members 18. A pinion 48 is carried by the shaft 46, as shown in Figures 1, 2 and 3.

A rocking guide 50 is provided with projecting parallel walls 51 through which the shaft 46 extends to pivot the guide for turning movement on the axis of the shaft 46 as will become apparent. The guide 50 straddles the pinion 48 and is provided therethrough with a groove 52 forming a guide in which is slidable a rack bar 53 having teeth 54 (Figure 1) meshing with the pinion 48. The rack bar 53 is pivotally connected as at 55 to ears 56 secured to the cross member 24 as shown in Figures 1, 2 and 4. It will be apparent that rotation of the pinion 48 operates the rack bar 53 to move the latter upwardly or downwardly. The pivot pin 55 being substantially spaced from the axis of the pins 35, it will be apparent that movement is imparted by the rack bar 53 to the table unit 20 whereby the latter is adapted to be swung from the normally horizontal operative position shown in solid lines in Figure 1 to the almost vertical dotted line position.

To each side frame member 21 of the table unit is secured a smooth guide rod 57. Each such guide rod lies in direct contact with the vertical flange of the associated side rail 21 and is secured thereto by screws 58. The rods 57 preferably are of circular cross section and extend throughout the greater portion of the length of the side rails 21 as shown in Figure 1. These bars 57 form highly simplified means for supporting a variety of appliances for use with the table, as further described below.

A step structure indicated as a whole with the numeral 60 is connected to the table unit adjacent one end thereof. This step structure comprises a "board" 61 which may be made up in a manner similar to the top of the table, including a plywood base and a fabric or plastic cover. Such board is fixed to a frame indicated as a whole by the numeral 62 and shown in detail in Figure 6. This frame comprises parallel rods 63 connected at their ends by vertical rods 64 and similarly connected intermediate their ends by a bracing rod 65. At the lower end of each vertical rod 64 is provided a rod 66 extending longitudinally of the table and braced relative to the associated rod 64 as at 67. The rods 66 are parallel to each other and at their ends, they are turned outwardly as at 68 and then downwardly as at 69, beyond the sides of the table, as clearly shown in Figure 2, and to the lower end of each rod end 69 is welded or otherwise secured a guide sleeve 70 slidably receiving the adjacent rod 57.

Referring to Figure 5 it will be noted that the sleeve 70 is provided with a cylindrical bore 71 slidably receiving the associated guide rod 57. The side of the sleeve 70 adjacent the vertical flange of the side rail is flattened as at 72 substantially tangentially of the bore 71 and rod 57, thus splitting the sleeve 70 which provides space for the screws 58. Moreover, the surfaces 72 of the sleeve are engageable with the outer face of the vertical flange of the rail 21, serving to assist the rod 57 in guiding the sleeve 70 by preventing the latter from turning on the axis of the rod 57. This latter feature is of no special importance so far as the step structure 60 is concerned since the very nature of this structure, being rigid and supported by both rods 57, prevents any part of the structure from turning about the axis of either rod. As stated below, however, the sleeve 70 is substantially identical with other sleeves used in conjunction with the rods 57 to support in association with the table different appliances adapted to be used by the physiotherapist. As is true of other such sleeves, the sleeve 70 is provided with thumb screws 73 whereby the sleeve may be tightened relative to its associated rod 57 to secure the step structure in any adjusted position relative to the adjacent end of the table.

One of the appurtenant devices which may be used in conjunction with the table is a restraining strap, although two or more of such straps may be used on a patient if desired. To provide for the securing of the ends of any such strap, a pair of sleeves 75, similar to the sleeves 70, is provided, one sleeve 75 being slidable on each rod 57. Each sleeve 75 is provided with thumb screws 76 for securing it in adjusted positions. To each sleeve 75 (Figure 10) is welded or otherwise secured a rod having an inner horizontal end 76 and an upwardly extending end 77 terminating in a hook 78 or any other device to which one end of a restraining strap may be secured. These devices will be used in pairs, one at each side of the table as will be apparent.

Crutches comprise another particularly important type of appliance adapted for use in conjunction with the table. Referring to Figures 1, 4 and 10, the numeral 80 designates each of a pair of sleeves adapted for sliding connection with one of the side bars 57. The sleeve is similar in structure to the sleeve shown in Figure 7 and likewise is provided with thumb screws 81 to fix it in adjusted positions. A rigid strap 82 is welded or otherwise secured to the sleeve 80 and is provided at its upper end with a block 83 apertured to receive a horizontal rod 84 having its inner end upturned as at 85 and provided at the upper extremity thereof with a crutch element 86. The crutch element in Figure 10 is shown in a position to engage beneath the arms of a patient, while the element shown in Figure 1 is turned in the opposite direction to be engaged over the shoulders of the patient, for example, when the patient is being subjected to cervical traction. This reversal is accomplished by disconnecting the crutch elements and reversing them, side for side, on the table as will be apparent.

Provision is made for applying cervical traction, or for connecting slings adapted to pass beneath the arms of the patient. The end frame member 22 opposite the step structure 60 is provided with a block 90 (Figures 4 and 8) fixed thereto and apertured to receive a vertical rod 91 adapted to be fixed in adjusted vertical positions by a thumb screw 92. At the upper end of the rod 91 is fixed a cross rod 93, each end of which carries a slide bearing 94, adapted to be fixed in adjusted positions by a thumb screw 95. Each slide bearing carries a vertically extending rod 96 terminating at its upper end in a hook 97 (Figure 1) for connection thereto of one end of a sling or other device, for example portions of harness used in applying cervical traction.

It will be apparent that none of the sleeves of the side bars 57, for example the sleeves 75 and 80 (Figure 10) can rock relative to the side bars because of the structure of the sleeves, as shown in Figure 7. However, other interconnected parts, such as the connection of the rod 84 to the block 83, the connection of the rod 91 (Figure 8) to the block 90, and the connection of the slide bearings 94 relative to the cross arm 93, could rock if circular rods were employed. Accordingly these rods are formed as shown in detail in Figure 9, this specifically being a detail of the structure shown in Figure 8, although it will be apparent that the same structure is usable with other adjustably connected elements such as those referred to above. The cross arm or bar 93 (also the rod 91 and rod 84) is flattened at one side as at 98 where the rod is to be engaged by its associated thumb screw, shown in Figure 9 as the thumb screw 95. Therefore, it will be apparent that when one of these thumb screws is tightened, the structure associated therewith cannot rock. Thus all of the parts at all times may be rigidly held in any desired adjusted positions.

Operation

It will be noted that the base 11 is open at the end corresponding to the step structure 60, there being no cross member at this point as is true of the opposite end of the base, although it will be apparent that any number of cross braces for the base structure may be employed at any desired points, for example as suggested in dotted lines in Figure 1. When the table is to be used, the at-

tendant will press the proper button housed by the switch structure generally designated by the letter S in Figure 1, to start the motor **38** to cause the pinion **48** to rotate in a clockwise direction. The meshing of the pinion **48** with the teeth **54** causes the rack bar **53** to be moved upwardly, thus swinging the foot end of the table downwardly until the table assumes the dotted line position shown in Figure 1. This position of the table is approximately 85° to the horizontal. The patient to be treated will then back into the open end of the base structure, step up upon the step board **61**, and lean against the table. The attendant will then reverse the operation of the motor, the pinion **48** now turning in a counterclockwise direction to move the table downwardly to horizontal position, or to any intermediate position. In this connection attention is invited to the fact that the speed reduction device **43** has been only generally indicated in Figure 3 since, in itself, it is an old mechanism used for many purposes. Any desired type of reduction gearing may be used, preferably of the type in which the output shaft is irreversible. Thus the motor may be stopped at any time, and the table will remain in the position to which it has been moved, being automatically held in such position by the reduction gearing.

With the patient lying on the table, any physiotherapy or other treatments may be administered to the patient. If such treatment requires cervical traction, the usual harness will be connected to the hooks **97** and to the head of the patient with the crutch elements **86** in the position shown in Figure 1, engaging over the tops of the patient's shoulders. The traction then may be applied as desired. If the crutch elements are to be used beneath the patient's shoulders, crutch elements at opposite sides of the table may be readily disconnected by loosening the thumb screws associated with the blocks **83**, whereupon the rods **84** may be slid out of the blocks **83** and reversed on the table to face the crutch elements in the opposite direction.

Where restraining bands are indicated in any treatment of the patient, such bands can be connected to the hooks **78** at opposite sides of the table. Two or more sets of the sleeves **75** may be used if desired. In this connection it is pointed out that any of the sleeves associated with the side bars **57** may be removed merely by loosening their thumb screws and sliding them endwise to the extremities of the bars **57**. Thus the sleeves of the crutch elements may be completely removed, or they may be removed for the addition of other restraining strap sleeves **75**, or other appurtenant devices.

It will be apparent that the crutch elements are readily adjustable toward and away from each other to properly fit above or below the shoulders of a patient. It also will be apparent that the rods **96** at the end of the table may be adjusted both as to the distance between such rods and their height above the table. The thumb screws **95** may be loosened to adjust the distance between the rods **96**, while the thumb screw **92** may be loosened to adjust the height of the rods **96**, as may be desired.

Each of the sleeves associated with the side bars **57** is adjustable therealong to any position which may be desired, merely by loosening the associated thumb screws and sliding the sleeves along the bars. This applies also, of course, to the sleeves **70** associated with the step **60**, this step accordingly being adjustable to any point along the table in accordance with the height of the patient or the particular treatment he is to be given.

When the treatment has been completed, the attendant merely will reverse the operation of the motor **38**, the pinion **48** now rotating in a clockwise direction to elevate the right hand end of the table as viewed in Figure 1, thus swinging the table to the dotted line position. The patient thereupon can merely step from the foot board onto the floor and walk from the open end of the frame **11**.

It will be apparent that the nature of the invention is

such as to greatly facilitate its use in many different respects. For example, it is quite easy for a patient to step on the step structure **60** and lean against the table to be swung to the horizontal position of the table for the administration of any desired treatments, and he can readily step from the table when it is swung to the upright position. This eliminates the necessity for having to climb upon a table, frequently requiring the assistance of the doctor or attendant. It also will be apparent that the side bars **57** are highly advantageous in their association with the other elements of the structure. For example, the bars **57** lie solidly against the side frames **21**, thus facilitating their rigid connection to the frame of the table. Lying close to the side frames of the table, it is impossible for clothing or anything else to become wedged behind these rods, and the tearing of clothing or the like accordingly is prevented. Moreover, this arrangement of parts facilitates the use of the apparatus in that it provides a single bar at each side of the apparatus adapted to slidably support a substantial number of appurtenant devices, each of which includes sleeves which are fixed against rocking movement relative to the rods **57** by the engagement of the flat faces **72** (Figure 7) against the vertical flanges of the frame members **21**. The rods **57** are continuous and unbroken from end to end to facilitate adjustment of the positions of the sleeves associated therewith or the removal of such sleeves and the replacement thereof. Rocking of appurtenant devices not directly connected to the rods **57** is prevented by the formation of the structures as shown in Figure 9.

The construction illustrated embodies the invention in a preferred form, but it is intended that the disclosure be illustrative rather than definitive. The invention is defined in the appended claims.

I claim:

1. A table structure comprising parallel longitudinal frame members each having a vertical flange, a guide bar of circular cross section arranged against the vertical flange of each frame member, fastening elements passing through said frame members and radially into said guide bars to secure the latter in position, and means appurtenant to the use of the table structure comprising a split sleeve receiving each of said guide bars and slidable therealong, each of said sleeves having above and below the split thereof flat alined faces engageable with the adjacent vertical flange to prevent turning movement of said sleeves on said guide bars.

2. A table structure comprising parallel longitudinal frame members, a guide bar arranged outwardly of and against each of said frame members, fastening elements passing through said frame members and into said guide bars to secure the latter in position, and means appurtenant to the use of the table structure comprising a split sleeve receiving each of said guide bars and slidable therealong, a bar member rigidly connected at its lower end to each of said sleeves and projecting upwardly therefrom, a horizontal rod slidable in the upper end of each of said bar members and extending inwardly therefrom transversely of said frame members, and an appurtenance carried by the inner end of each rod.

3. A table structure comprising parallel longitudinal frame members, a guide bar arranged outwardly of and elongated longitudinally of each of said frame members and contacting therewith throughout its length, each guide bar being of uniform circular cross section from end to end, each frame member transversely thereof being substantially wider than the adjacent guide bar to project on opposite sides thereof, and means appurtenant to the use of the table comprising a split sleeve slidably receiving each of said guide bars and having surfaces slidably engaging the portions of the adjacent frame member projecting on opposite sides of the associated guide bar to prevent such sleeve from rocking about the adjacent guide bar.

4. A table structure comprising parallel longitudinal frame members, a guide bar arranged outwardly of and elongated longitudinally of each of said frame members and having an inner portion contacting therewith throughout its length, each guide bar at a point spaced from the associated frame member being thicker than said inner portion thereof, means fixing said inner portion of each guide bar to the associated frame member, and means appurtenant to the use of the table comprising a sleeve split at the side thereof adjacent said fixing means and corresponding in shape to each guide bar to be slidable throughout the length thereof, each guide bar being of uniform cross sectional shape from end to end and having its ends fully exposed for the sliding of one of said sleeves thereon from either end thereof.

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