March 10, 1953 H. H. VOSS ET AL 2,630,800

THERAPEUTIC TRACTION TABLE

Filed Oct. 27, 1950 4 Sheets-Sheet 1

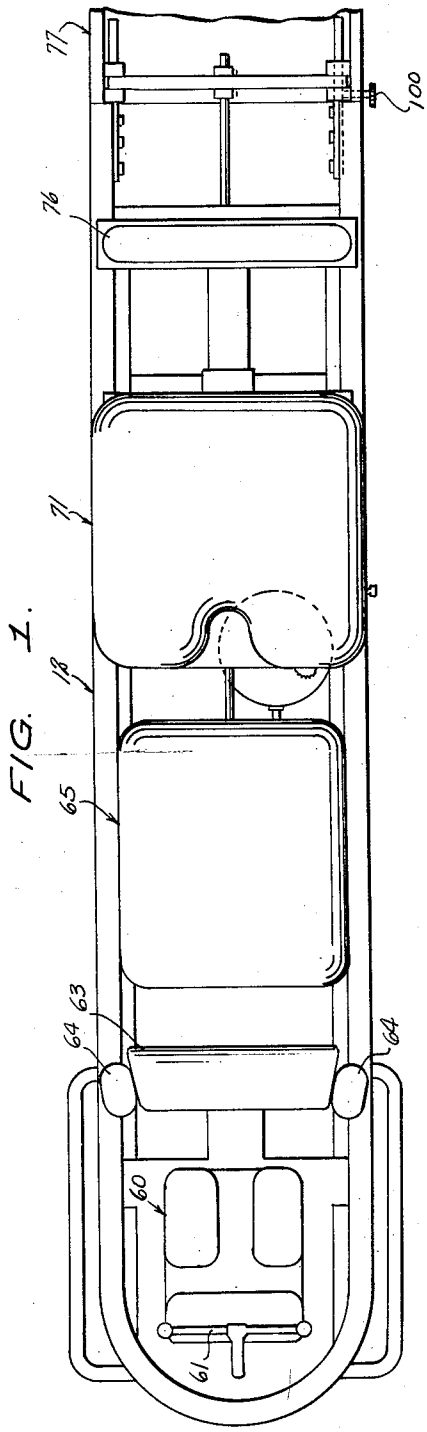


FIG. 1.

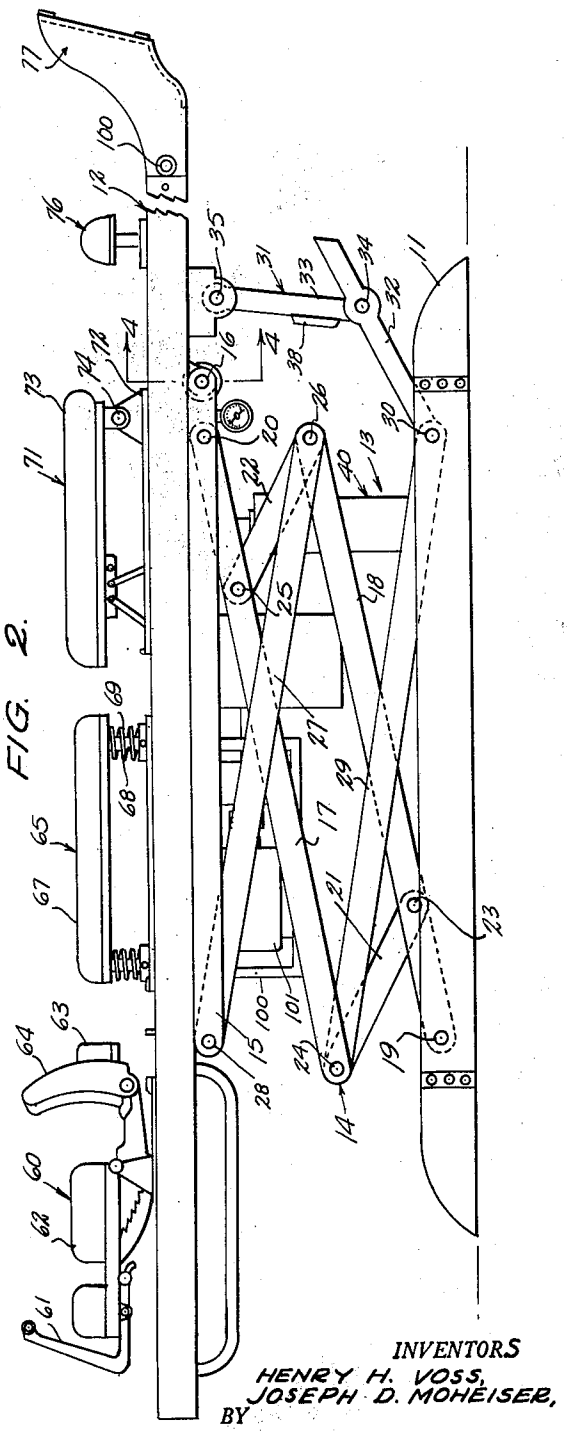


FIG. 2.

INVENTORS
HENRY H. VOSS,
JOSEPH D. MOHEISER,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

March 10, 1953 H. H. VOSS ET AL 2,630,800

THERAPEUTIC TRACTION TABLE

Filed Oct. 27, 1950 4 Sheets-Sheet 2

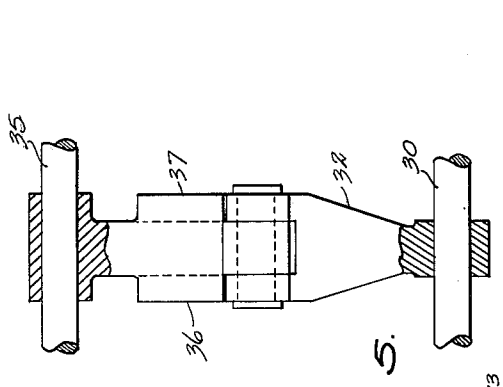


FIG. 5.

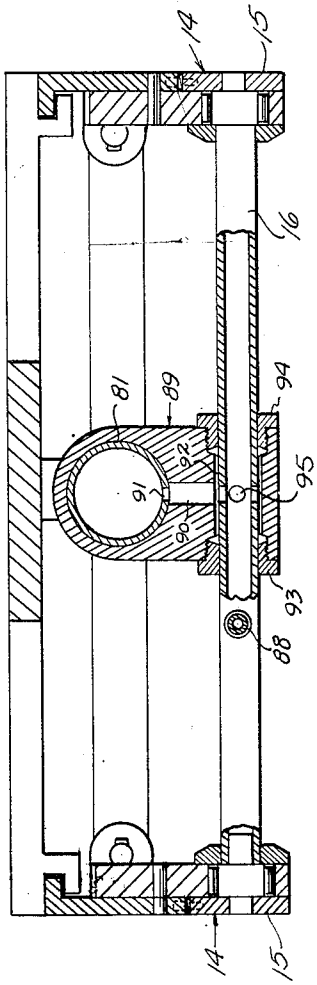


FIG. 4.

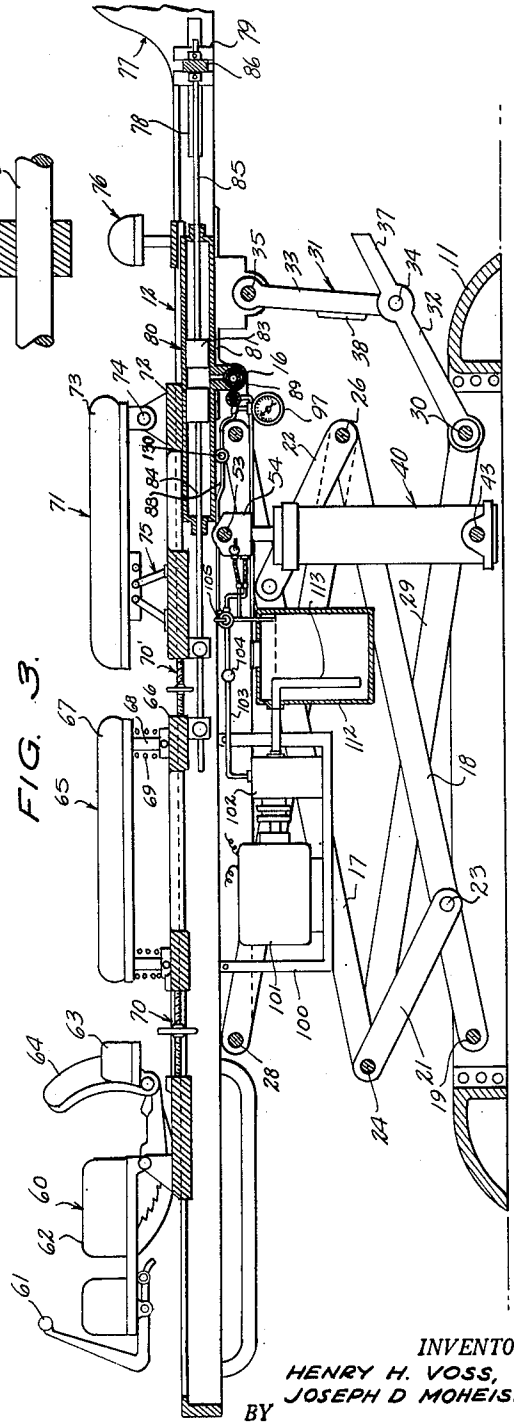


FIG. 3.

INVENTORS
HENRY H. VOSS,
JOSEPH D MOHEISER,
BY
McMorrow, Berman + Davidson
ATTORNEYS.

March 10, 1953 H. H. VOSS ET AL 2,630,800

THERAPEUTIC TRACTION TABLE

Filed Oct. 27, 1950 4 Sheets-Sheet 3

FIG. 6.

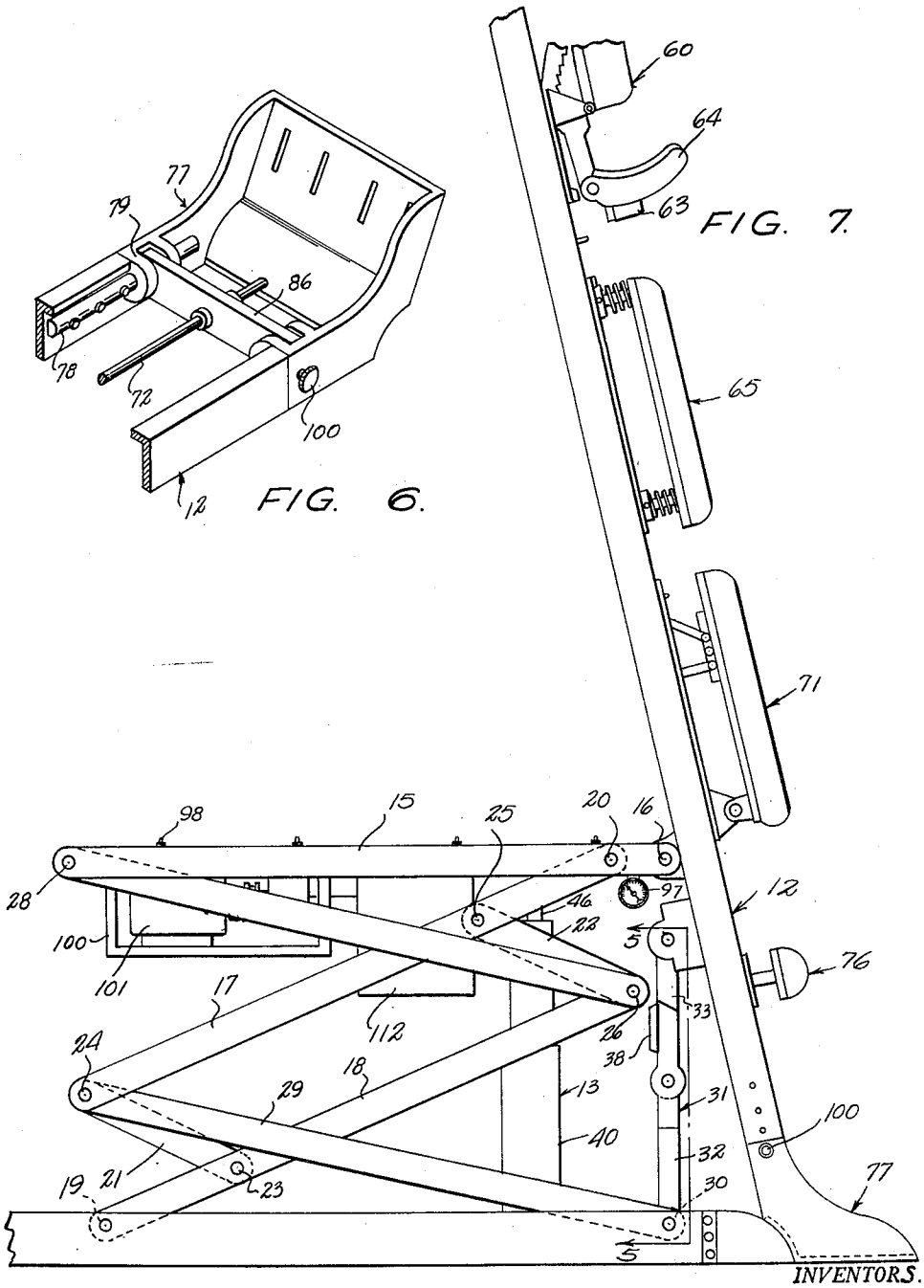


FIG. 7.

INVENTORS.
HENRY H. VOSS,
JOSEPH D. MOHEISER,
BY

McMorrow, Berman & Davidson
ATTORNEYS.

March 10, 1953 H. H. VOSS ET AL 2,630,800

THERAPEUTIC TRACTION TABLE

Filed Oct. 27, 1950 4 Sheets-Sheet 4

FIG. 8.

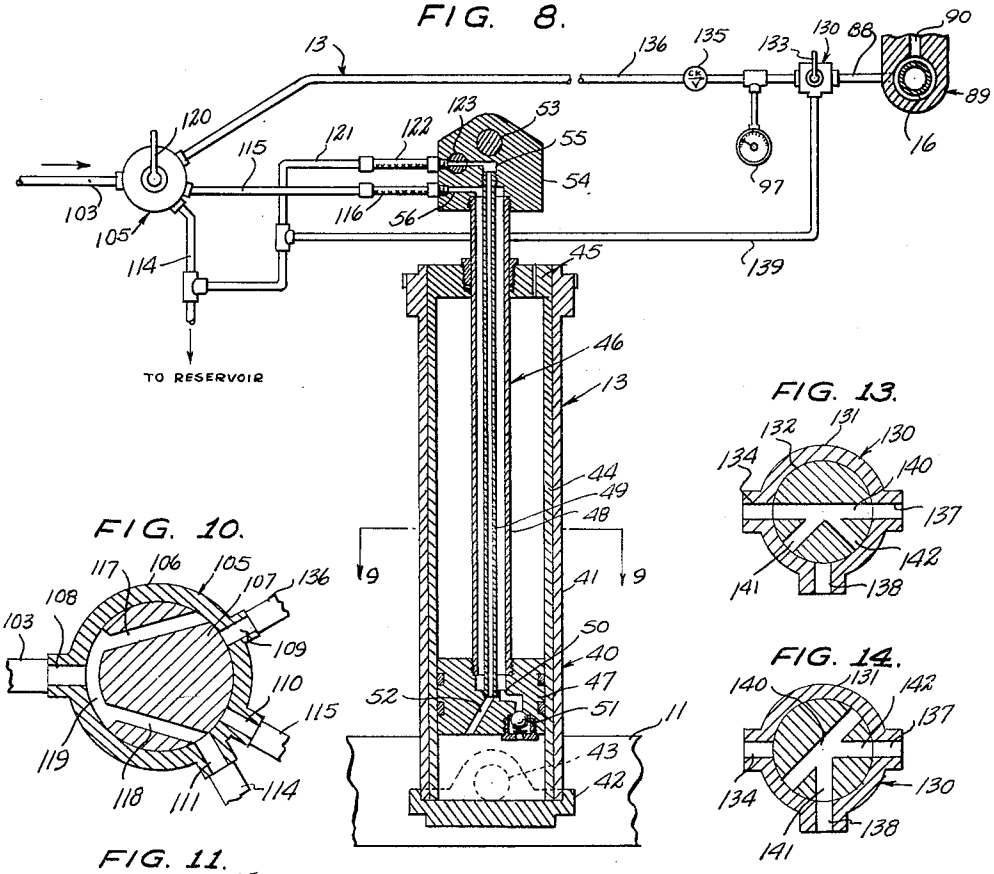


FIG. 13.

FIG. 10.

FIG. 14.

FIG. 11.

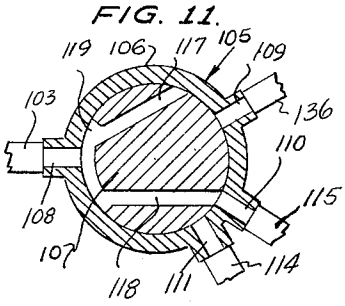


FIG. 9.

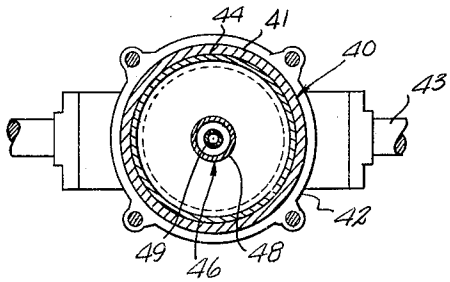
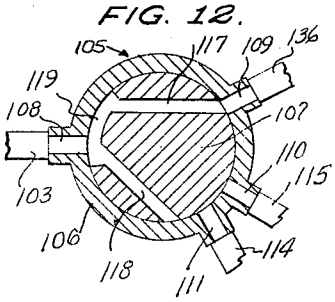


FIG. 12.



INVENTORS.
HENRY H. VOSS,
JOSEPH D. MOHEISER,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

Patented Mar. 10, 1953 2,630,800

UNITED STATES PATENT OFFICE

2,630,800

THERAPEUTIC TRACTION TABLE

Henry H. Voss and Joseph D. Moheiser,
Chicago, Ill.

Application October 27, 1950, Serial No. 192,524

3 Claims. (Cl. 128—73)

1

This invention relates to therapeutic tables, and more particularly to an improved traction table for use in chiropractic or osteopathic techniques.

An object of this invention is to provide a traction table particularly adapted to correct subluxations and displacements of the skeletal structure of the human body, to thereby relieve impingement of nerves, re-educate muscles and ligaments, and to increase the blood supply of associated areas.

Another object of this invention is to provide a traction table which is mounted for movement into a substantially vertical position to receive a patient, and into any one of several horizontal positions wherein the patient can be treated by the chiropractic or osteopathic techniques.

A still further object of this invention is to provide a traction table provided with novel hydraulic means for efficiently applying a predetermined traction to the feet, head or shoulders of a patient.

A still further object of this invention is to provide a traction table which is provided with means for accurately determining the traction being applied to a patient, to thereby permit the practitioner to safely build up to the patient's tolerance.

A still further object of this invention is to provide a traction table which is particularly adapted for use by small or frail practitioners in manipulation of heavy, obese or extremely muscular patients to apply required traction to various portions of the body.

A still further object of this invention is to provide a traction table which can be constructed of light metals to thereby reduce the weight and production costs of the table and still maintain optimum operating conditions.

The above and still further objects and advantages of the invention will become apparent upon consideration of the following detailed description of the invention, when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a top plan view of a traction table according to the present invention;

Figure 2 is a side elevational view, showing the table in a horizontal position;

Figure 3 is a side elevational view of the traction table, with parts broken away and shown in section;

Figure 4 is an enlarged transverse vertical sectional view taken along the line 4—4 of Figure 2, with parts broken away and shown in section;

Figure 5 is an enlarged fragmentary sectional view taken along the line 5—5 of Figure 7;

Figure 6 is an enlarged fragmentary perspective view of the foot end of the traction table of the present invention;

Figure 7 is a fragmentary side elevation, showing the table in a substantially vertical position, to receive a patient;

2

Figure 8 is an enlarged detail view of the hydraulic system of the traction table, with parts broken away and shown in vertical section;

Figure 9 is a fragmentary horizontal sectional view taken along the line 9—9 of Figure 8;

Figure 10 is an enlarged transverse sectional view showing the main control valve in a position for completing a closed flow path to by-pass the oil from the lift cylinder;

Figure 11 is an enlarged transverse sectional view of the main control valve shown in position to complete a closed flow path for the hydraulic lift cylinder;

Figure 12 is an enlarged transverse sectional view of the main control valve shown in position for completing a closed flow path for the double-acting traction table cylinder;

Figure 13 is a transverse sectional view of the auxiliary valve shown in position for completing a closed flow path for the double-acting traction table hydraulic cylinder; and

Figure 14 is a transverse sectional view of the auxiliary control valve shown in position for by-passing the oil from the double-acting traction table hydraulic cylinder to the oil reservoir.

Referring now more particularly to the drawings, wherein like reference numerals have been used throughout the several views to designate like parts, the illustrated traction table embodies a base 11 adapted to be secured on a horizontal supporting surface.

Positioned above the base 11 is a table frame 12 which is mounted on the base for movement from a first or depressed horizontal position to a second or elevated horizontal position spaced above the first horizontal position, and thence into a substantially vertical position for receiving a patient to be treated. A suitable hydraulic system, generally designated by the reference numeral 13, is operatively connected to the table frame 12 for effecting the movement of the table frame into the position desired.

The table frame 12 is mounted on the base 11 by means of lever structures 14 arranged contiguous to each side of the table frame and operatively connected to the table frame and to the base 11. Since each of the parallelogram lever structures 14 are of like structure, it will suffice to describe only one in detail. The lever structure 14 embodies a top horizontal lever 15 which is horizontally disposed beneath the under side of the table frame 12, and has one end pivoted on one end of a table frame cross brace 16. Positioned below the top lever 15 is a first pair of declining levers 17 and 18 arranged in parallel spaced relation to each other. The lower end of the lever 17 is pivoted to the top link 15 by means of the cross brace 20. Arranged in spaced, paral-

lel relation and at the inboard sides of the first pair of levers 17, 18 is a second pair of levers 21, 22 which have their ends pivotally connected to the levers 17, 18. The lever 21 has its lower end pivoted to the lever 18 at a point 23 adjacent to and spaced inwardly of the cross brace 19. The upper end of the lever 21 is pivoted to the lever 17 by means of a cross brace 24. Similarly, the lever 22 has its upper end pivoted to the lever 17 at the point 25 which is spaced inwardly from the cross brace 20.

The lower end of the lever 22 is pivoted to the link 18 by means of the cross brace 26. Extending between a cross brace 28 on the end of the top lever 15 remote from the cross brace 16 and the cross brace 26 and pivoted thereto is a connecting lever 27. Disposed in spaced, parallel relation to the lever 27 is a lever 29 which has its upper end pivoted on the cross brace 24 connecting the levers 17 and 21 and has its other end pivoted on the base 11 by means of a cross brace 30.

Operatively between the table frame 12 and the base 11 is a collapsible locking lever 31, which, in its uncollapsed condition, cooperates with the lever structures 14 to hold the table frame in its vertical position. The collapsible locking lever 31 includes a pair of lever sections 32 and 33 disposed in end-to-end relation with respect to each other and having their inner ends pivotally connected together by means of a bolt or pin 34, the lower end of the lower lever section 32 being pivoted on the cross brace 30, and the upper end of the upper lever section 33 being pivoted on a cross brace 35 secured transversely to the underside of the table frame 12. As clearly shown in Figure 5, the lever section 32 has legs 36 and 37 arranged on opposite sides of the lever section 33 and projecting beyond the inner end thereof to engage one side of a stop plate 38 fixed on and projecting beyond the opposite sides of the lever section 32 when the lever sections are in the aligned relation illustrated in Figure 7, whereby the locking lever is prevented from breaking toward the opposite side thereof.

The hydraulic system 13 for effecting the movement of the table frame 12 with respect to the base 11 includes an upstanding, hydraulic lift cylinder 40 which includes an upstanding outer cylindrical sleeve 41 having its lower end closed by a closure cap 42 which is pivoted on the base 11 by means of the transverse rod 43 which is carried by the base 11. Telescopically received and supported within the outer cylindrical sleeve 41 is an inner cylindrical sleeve 44 which is movable with respect to the outer cylindrical sleeve. The inner cylindrical sleeve 44 has its lower end open and has its upper end closed by the closure and abutment 45 fixed thereto. Disposed axially of the lift cylinder 40 is a tubular piston rod 46 which has one end extending slidably through the abutment and closure 45. Slidably supported within the inner cylindrical sleeve 44 is a piston 47 which is secured to the adjacent end of the piston rod 46. The piston rod 46 includes an outer tube 48 and an inner tube 49 which is concentrically spaced within the outer tube 48. The piston 47 is formed with an inlet passage 50 which has one end in communication with the tube 48 of the piston rod 46 and has its other end opening through the lower end of the piston. Bridging the inlet passage 50 is a one-way spring biased check valve 51 which prevents flow of hydraulic fluid into the cylinder 40 beneath the piston 47. The piston 47 is further formed with an outlet passage 52 having one end in communication with the inner piston rod tube 49 and its other end opening through the lower end of the piston.

The upper end of the piston rod 46 is pivoted to the parallelogram lever structures 14 by means of the main oil transfer block 54 which is pivotally supported on a cross brace 53 which is secured to and extends between the top levers 15. The upper end of the outer piston rod tube 48 is secured to the main oil transfer block 54 in communication with one end of an outlet passage 56, while the inner piston rod tube 49 is secured to the block 54 in communication with one end of the inlet passage 55, the other ends of the passages 55, 56 being connected in the hydraulic system, as hereinafter described.

Suspendingly supported between the top levers 15 is a cage 100 in which is supported an electric motor 101 which operates the circulating pump 102 of the hydraulic system 13.

The main control valve 105 is clearly shown in Figures 8, 10, 11 and 12 and includes a valve body 106 in which is rotatably supported a valve element 107. The valve body 106 includes an inlet port 108 which is connected in communication with the outlet pipe 103 of the pump 102, and further includes outlet ports 109, 110 and 111.

Carried contiguous to and beneath the main control valve 105 is an oil reservoir 112 which has a return pipe 113 supported therein having one end terminating contiguous to the bottom of the oil reservoir 112 and having the other end connected in communication with the low-pressure side of the pump 102. Connected between the port 111 of the main control valve and the reservoir 112 is a pipe 114, and connected between the inlet passage 56 of the main oil transfer block 54 is a pipe 115. It is to be noted that the pipe 115 is connected to the oil transfer block 54 by means of a flexible coupling 116 which permits the movement of the oil transfer block 54 about the pivotal axis 53.

In Figures 7 to 12, inclusive, there are shown the various positions of the valve element 107 for selectively completing a closed flow path to the lift cylinder 40, the oil reservoir 112, and the traction element operating cylinder hereinafter described. The valve element 107 is provided with a pair of convergent passages 117 and 118 which have their convergent ends connected in communication with each other by means of a connecting passage 119. Connected to the valve element 107 at its rotary axis is a handle 120 for effecting the rotary movement of the valve element. In Figure 10, the valve element 107 is shown in position for completing the closed flow path for the oil from the pump 102 into the oil reservoir 112, while in Figure 11, the valve element 107 is shown in position for completing the closed flow path from the pump 102 to the hydraulic lift cylinder 40.

Connected between the outlet passage 56 of the main oil transfer block 54 and the pipe 114 is a pipe 121. It is to be noted that the pipe 121 is connected to the oil transfer block 54 by means of a flexible coupling 122 and completes the closed return path to the reservoir for the lift cylinder 40 through the inner piston rod tube 49, the passageway 55, the coupling 122, the pipe 121, and the pipe 114. Connected in the outlet passage 56 of the oil transfer block 54 is a manually actuated valve 123 for selectively closing the return flow path for the lift cylinder 40. When oil is to be pumped to the lift cylinder 40, the valve 123 is closed and the main control

valve 105 is moved into the position illustrated in Figure 11, whereupon the oil is pumped into the lift cylinder 40. Since the valve 123 is closed, the oil cannot return to the reservoir, and accordingly the piston 47 and the inner cylindrical sleeve 44 are extended out of the cylinder 41. As the piston 47 rises in the inner cylinder sleeve 44, the piston abuts the abutment 45 at the top of its stroke, so that the fluid under pressure in the cylinder 40 beneath the piston 47 and in the inner sleeve 44 causes the inner sleeve 44 to rise out of the outer sleeve so as to extend the upward reach of the piston rod 46. Extension of the piston and the inner sleeve 44 causes the lever structures 14 to be extended upwardly from the position illustrated in Figure 3, until the locking lever 31 is extended. Further upward movement of the piston and/or the inner cylindrical sleeve will cause the table frame 12 to be pivoted about the cross braces 16 into a substantially vertical position, illustrated in Figure 7, wherein a patient can be received on the table.

Positioned contiguous to one end of the table frame 12 is the headrest 60 which is mounted on the table for sliding movement longitudinally thereof. The headrest 60 embodies a removable transverse bar 61 positioned longitudinally outwardly from the headrest pad 62 and detachably secured thereto. The crossbar 61 is particularly adapted to receive a head harness which is to be engaged beneath the chin of the patient when traction is used. Positioned contiguous to the side of the headrest pad 62 opposite from the bar 61 is a breast pad 63 which carries the shoulder pads 64 which are normally maintained in an upright position under a spring tension. The shoulder pads 64, therefore, adjust themselves to various chest widths underneath the arms of the patient to be treated.

Spaced inwardly from the head end of the table is an abdominal support 65 which is mounted on the table frame for sliding movement longitudinally thereof. The abdominal support embodies the base 66, and an abdominal pad 67 spaced above the base and resiliently supported on the latter by means of the upstanding lugs 68 and the springs 69 circumposed about the lugs 68 and normally biasing the abdominal pad 67 upwardly with respect to the base 66.

Interconnecting the headrest and the abdominal support is a turnbuckle 70 which secures the headrest 60 and the abdominal support 65 together for simultaneous movement and for adjustment with respect to each other.

Spaced inwardly from the abdominal support 65 is a hip support 71 which is mounted on the table frame 12 for sliding movement longitudinally thereof. The hip support 71 embodies a base 72, and a hip pad 73 positioned above the base and mounted on the latter for rocking movement about the horizontal axis 74. The hip pad 73 carries any suitable means, generally designated by the reference numeral 75, which are engageable with the base 72 for holding the hip pad in selected positions of its pivotal movement.

Interconnected between the abdominal support 65 and the hip support 71 is a turnbuckle 70' which secures the supports 65 and 71 together for simultaneous movement and for adjustment with respect to each other.

Spaced between the hip support 21 and the foot end of the table frame 12 is a shin pad 76 which is slidably supported on the table frame for movement therealong.

Mounted on the foot end of the table frame 12 is a footrest or board 77 which is mounted on the table frame for movement toward and away from the foot end thereof. As clearly shown in Figure 6, the foot board or rest 77 is mounted for sliding movement by means of the pins 78 which are secured contiguous to each side of the table frame 12 and project outwardly of the foot end thereof through transversely disposed, inwardly projecting extensions 79 provided on the footrest 77, the extensions being provided with aligned apertures receiving the related ones of the pins 78.

Interconnected between the foot board 77 and the hip support 71 and abdominal support 65 is a double-acting, hydraulic cylinder 80 which is connected to the hydraulic system 13 for moving the assembly of the headrest 60, the abdominal support 65 and the hip support 71 relative to the foot board 77. As clearly shown in Figure 3, the double-acting, hydraulic cylinder 80 includes a cylinder body 81 which is secured longitudinally of and within the table frame 12 with the midpoint of the body 81 overlying the cross brace 16. Slidably confined in the cylinder body 81 are the opposed pistons 82 and 83, the piston 82 carrying a piston rod 84 which is detachably secured to the base 72 of the hip support 71, and to the base 66 of the abdominal support 65. The piston 83 carries the piston rod 85 which is detachably secured to a bearing plate 86 supported transversely of the foot board 77. As clearly shown in Figure 6, the bearing plate 86 has its ends supported between the extensions 79 of the foot board 77 by means of the pins 78 carried by the foot end of the table 12.

A closed hydraulic system is provided for the double-acting, hydraulic cylinder 80 which includes a conduit 88 which has one end connected in communication with the auxiliary control valve 130, and has its other end connected in communication with the crossbar 16, and the oil transfer block 89 which is circumposed about the body 81 of the double-acting cylinder 80 and the adjacent portions of the cross brace 16, as clearly shown in Figure 4. The oil transfer block 89 is provided with a passage 90 which has one end in communication with the port 91 provided in the cylinder body 81 and has its other end in communication with a transversely extending opening 92 provided therein. The opening 92 receives therethrough the adjacent portions of the cross brace 16, the cross brace being received within the opposed journals 93 and 94 carried in the opposed ends of the opening 92. Intermediate its ends the cross brace 16 is provided with circumferentially spaced apertures 95 for the passage therethrough of the oil.

The auxiliary control valve 130 includes a valve body 131 and a rotatable valve element 132. Disposed exteriorly of the valve body 131 and operatively connected to the valve element 132 at its rotary axis is a handle 133 for selectively varying the position of the valve element 132. The valve body 131 includes an inlet port 134 which is connected through a pressure gauge 97 and a one-way check valve 135 to the outlet port 109 of the main control valve 120 by means of the pipe 136. It is to be noted that the one-way check valve 135 permits fluid to flow only from the outlet port 109 of the main control valve 105 to the inlet port 134 of the auxiliary control valve 130. The body 131 of the auxiliary control valve 130 includes a pair of spaced outlet ports 137 and 138, the outlet port 137 being connected

to the oil transfer block 89 by means of the conduit 88, and the outlet port 138 being connected to the oil return pipe 121 by means of the conduit 139. The rotary control element 132 of the valve 130 includes a main passage 140 and the pair of auxiliary passages 141 and 142 which are arranged in convergent relation with respect to each other and have their convergent ends in communication with the main passage 140. The auxiliary control valve 130 is adapted to complete a closed flow path for oil from the main control valve 105 when the valve element 132 is in the position illustrated in Figure 13. When the valve element 132 is in the position illustrated in Figure 14, a closed flow path is provided from the double-acting cylinder 80 to the oil reservoir 112 through the convergent passages 141 and 142, the outlet port 138, the pipe 139, and the return pipe 121.

Connected in the hydraulic system for the double-acting cylinder 80 is a pressure gauge 97 for indicating the intensity of the tractive force that is applied between the various traction elements 60, 65, 71, 76 and 77.

As clearly shown in Figure 7, the upper edges of the top levers 15 of the lever assemblies 14 are provided with pluralities of longitudinally spaced spring detent pins 98 which are arranged to be received within detent sockets provided in the under side of the table frame 12 to impart horizontal stability to the table frame when the latter is disposed in any one of its horizontal positions.

Any suitable lock means 100 is carried by the footrest or board 77 and is selectively engageable with the adjacent pin 78 carried by the table for detachably securing the footrest 77 in adjusted position relative toward the foot end of the table. The lock means 100 is usually employed to detachably secure the footrest with respect to the table when the table is to be brought into the substantially vertical position to receive a patient.

Under actual operating conditions, the main control valve 105 can be operated from the neutral or closed position into one position for providing a closed flow path for the hydraulic lift cylinder 40, another position for providing a closed flow path for the double-acting traction cylinder 30, and still another position for forming a closed flow path to by-pass hydraulic fluid to the oil reservoir 112. The auxiliary control valve 130 can be operated from the position illustrated in Figure 13 providing the closed flow path from the outlet port 109 of the main control valve 105 to the double-acting cylinder 80 to the position illustrated in Figure 14, by-passing the oil from the traction cylinder to the oil reservoir. When hydraulic fluid is passed into the lift cylinder 40, the piston 46 and the inner cylindrical sleeve 44 are extended to thereby raise the table frame 12 into various horizontal positions with respect to the base. Upon the extension of the piston and inner cylindrical sleeve to the point where the collapsible lever 31 assumes its upright position, further upward movement of the piston or sleeve will effect the movement of the table toward the vertical position illustrated in Figure 7. When the vertical position has been achieved, the patient may be received on the table, whereupon the table can be returned to any one of its horizontal positions for the application of tractive forces to the patient.

Although only one embodiment of the therapeutic tractive device of the present invention has been described, it is readily apparent that

numerous modifications can be made without departing from the spirit of the invention as set forth in the appended claims.

What we claim is:

1. In a therapeutic table, a base, a lever assembly comprising a horizontal top lever, first declining levers having elevated ends pivoted to said top lever at longitudinally spaced points of said top lever, said first declining levers being crossed but unconnected to each other, second declining levers having elevated ends pivoted to the depressed ends of said first levers, said second levers being crossed but unconnected to each other and having depressed ends pivoted on said base at longitudinally spaced points of said base, a third lever pivoted at one end to the depressed end of one of said first levers at the point of connection thereof with the elevated end of one of said second levers, said third lever being pivoted at its other end to one of said first levers at a point spaced upwardly from the depressed end thereof, a fourth lever having one end pivoted to one of said first levers at a point spaced below the elevated end thereof, said fourth lever having its other end pivoted to the elevated end of one of said second levers, a table frame normally overlying said lever assembly and resting horizonally upon said top lever, said table being pivoted at a point intermediate its ends to said top lever at a point spaced longitudinally outwardly from the pivotal connection of the elevated end of one of said first levers, a collapsible locking lever having pivotally connected upper and lower lever sections, said upper lever section being pivoted to said table frame at a point spaced longitudinally outwardly from the pivotal point of the table frame on the top lever of the lever assembly, the lower lever section being pivoted to the base at a point adjacent to the pivotal connection of the lower end of one of said second levers to the base, and operating means positioned between said base and said top lever, said operating means being vertically extensible to raise said top lever and the table frame thereon from a depressed position to an elevated position wherein said table frame seats horizontally upon said top lever, said operating means being further vertically extensible to raise said top lever to a further elevated position above the point of pivotal connection of the upper locking lever section to the table frame whereby said table frame is tilted upwardly on the axis of its pivotal connection with the top lever of the lever assembly into a vertical position.

2. In a therapeutic table, a base, a vertically extensible lever assembly mounted on said base, a table frame normally resting upon said lever assembly in a horizontal position, pivot means pivoting said table frame to one end of said lever assembly at a point intermediate the ends of the table frame, a locking lever comprising pivotally connected upper and lower lever sections, said lower lever section being pivoted to said base at said end of the lever assembly and said upper lever section being pivoted to said table frame at a point at the side of said pivot means remote from said end of the lever assembly, and operating means connected to said base and said lever assembly for extending said lever assembly upwardly to raise said table frame from a depressed horizontal position to an elevated horizontal position, and extending said lever assembly further upwardly so as to produce vertical tilting of said table frame over said end of the lever assembly into a vertical position.

3. In a therapeutic table, a base, a vertically extensible lever assembly mounted on said base, a table frame normally resting upon said lever assembly in a horizontal position, pivot means pivoting said table frame to one end of said lever assembly at a point intermediate the ends of the table frame, a locking lever comprising pivotally connected upper and lower lever sections, said lower lever section being pivoted to said base at said end of the lever assembly and said upper lever section being pivoted to said table frame at a point at the side of said pivot means remote from said end of the lever assembly, and operating means connected to said base and said lever assembly for extending said lever assembly upwardly to raise said table frame from a depressed horizontal position to an elevated horizontal position, and extending said lever assembly further upwardly so as to produce vertical tilting of said table frame over said end of the lever assembly into a vertical position, said upper and lower lever sections being pivoted out of alignment with each other in said depressed and

elevated positions of the table frame and being arranged to move in one direction into alignment with each other as the lever assembly is extended upwardly beyond said elevated position, said lever sections having cooperating means thereon preventing movement of the lever sections out of alignment with each other in the opposite direction.

HENRY H. VOSS.
JOSEPH D. MOHEISER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,205,649	Miller	Nov. 21, 1916
1,239,522	La Rock	Sept. 11, 1917
1,626,471	Miller	Apr. 26, 1927
2,091,014	Saak	Aug. 24, 1937
2,283,549	Galbraith	May 19, 1942
2,472,675	Mueller	June 7, 1947