Oct. 9, 1923. 1,470,362

G. W. HAWLEY

SELF FREEING ORTHOPEDIC TABLE

Filed Nov. 4, 1921 5 Sheets-Sheet 1

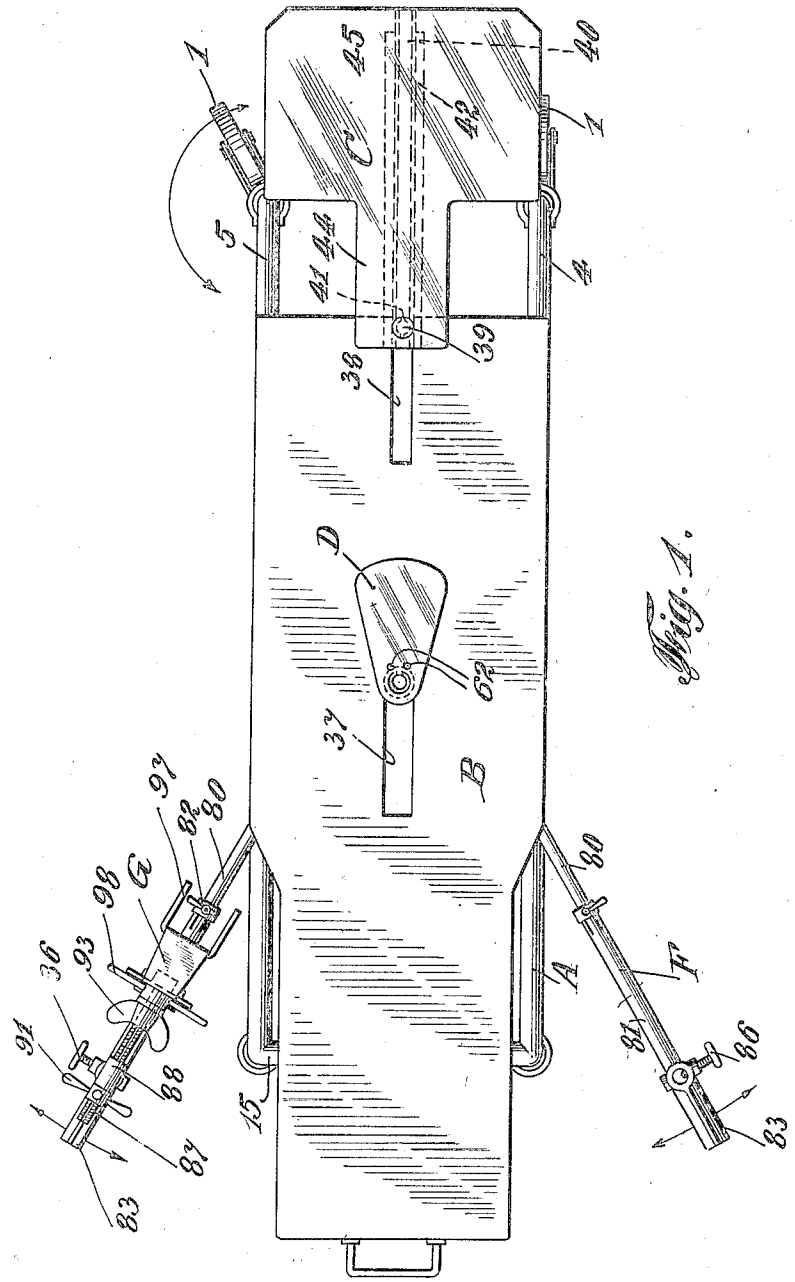


Fig. 1.

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By his Attorney

Oct. 9, 1923. 1,470,362

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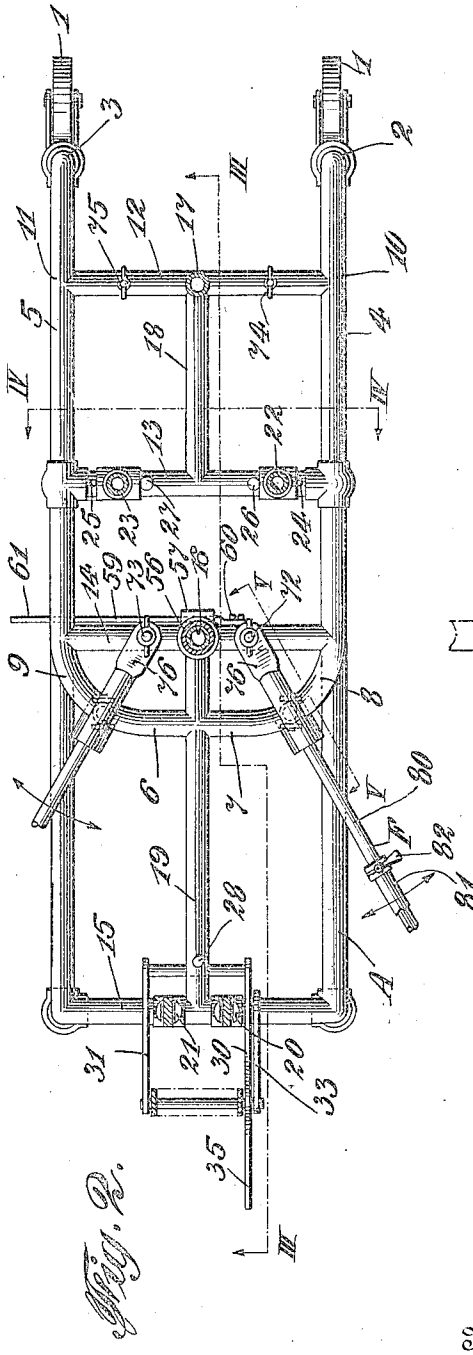


Fig. 2.

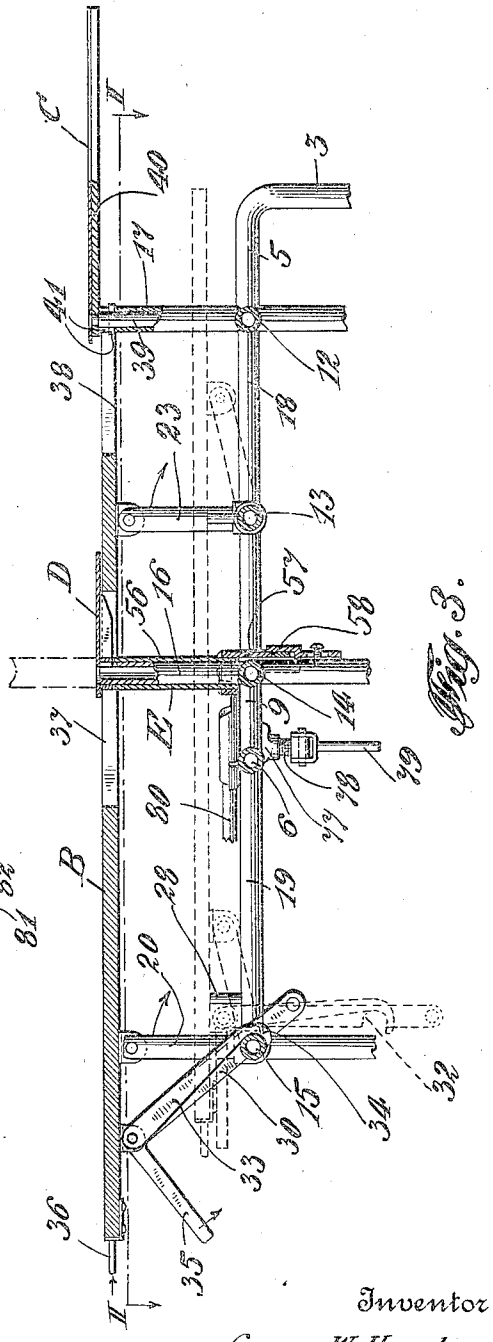


Fig. 3.

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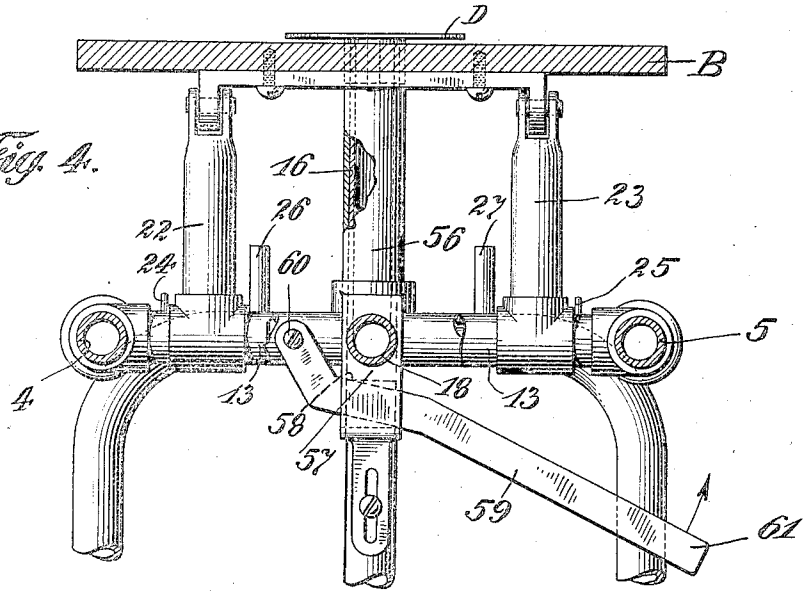
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SELF FREEING ORTHOPEDIC TABLE

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Fig. 4.



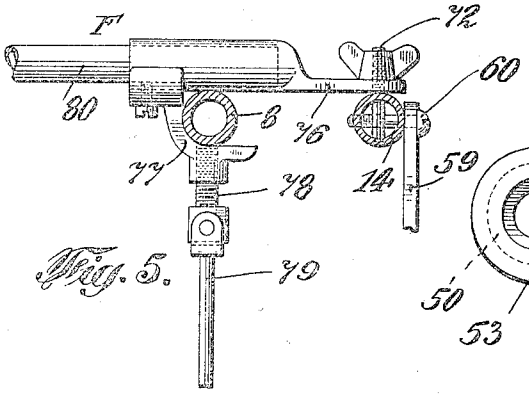
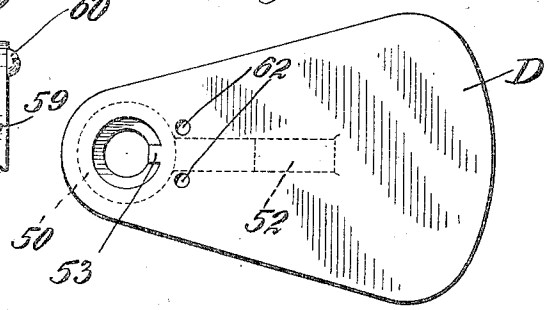


Fig. 5.

Fig. 6.



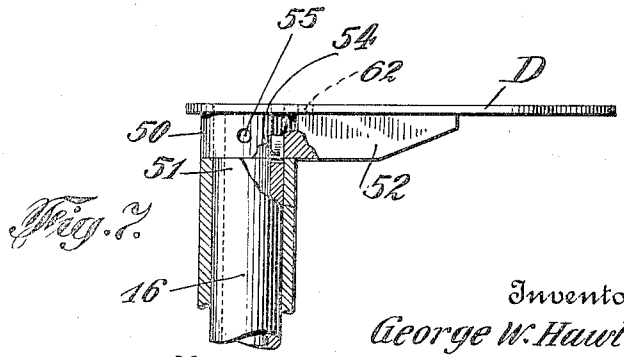


Fig. 7.

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G. W. HAWLEY

SELF FREEING ORTHOPEDIC TABLE

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Fig. 9.

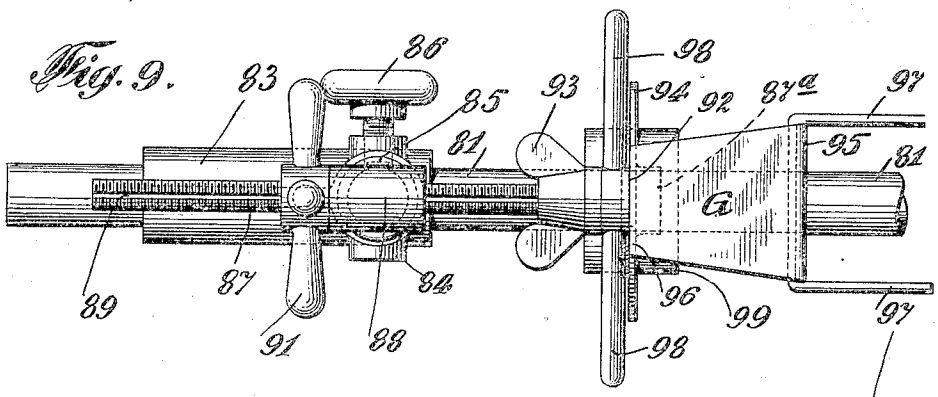


Fig. 8.

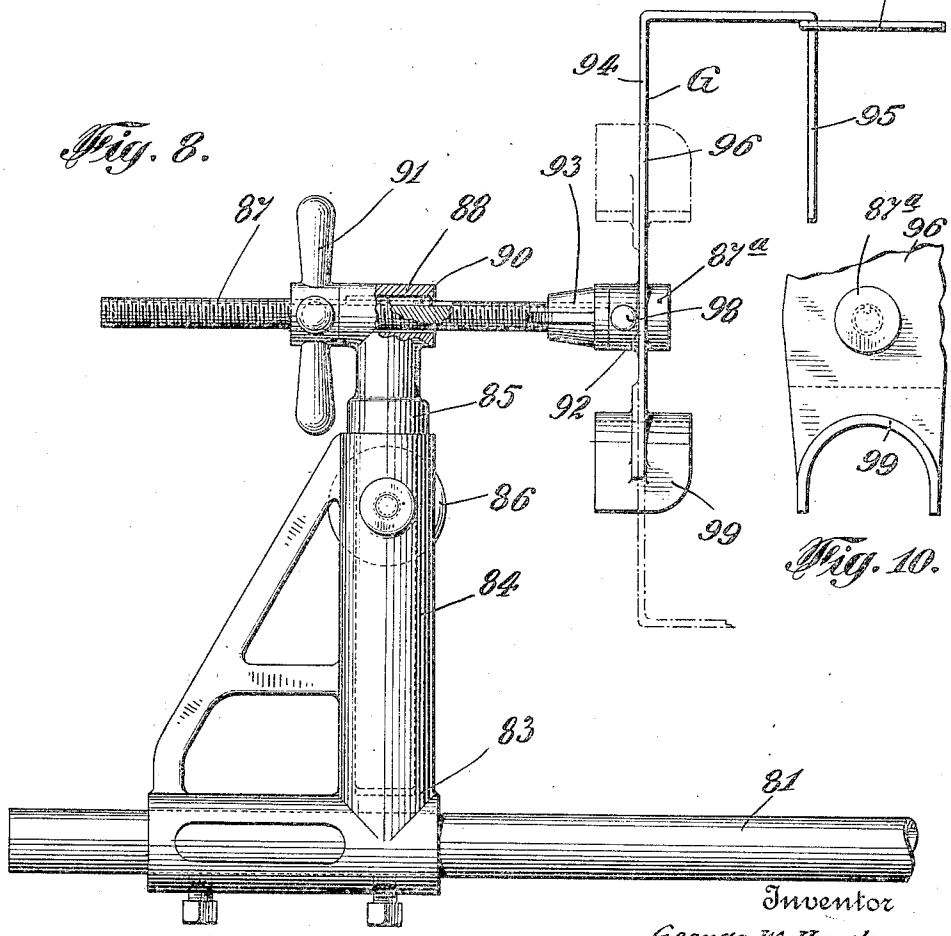


Fig. 10.

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Fig. 11.

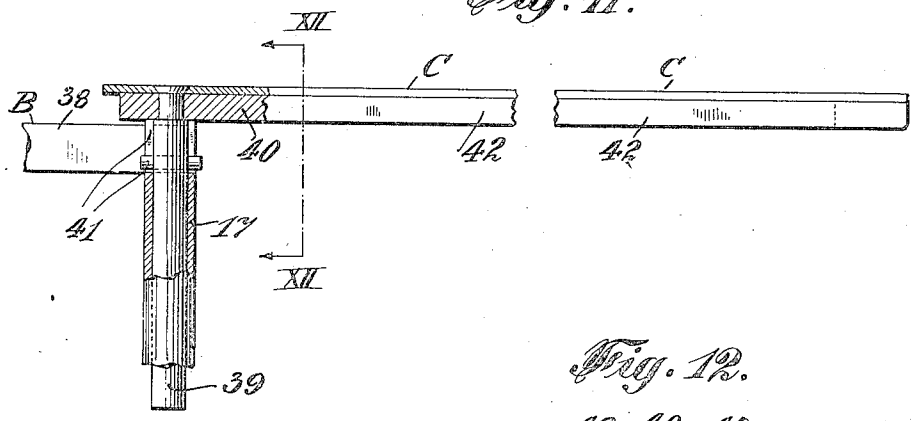


Fig. 12.

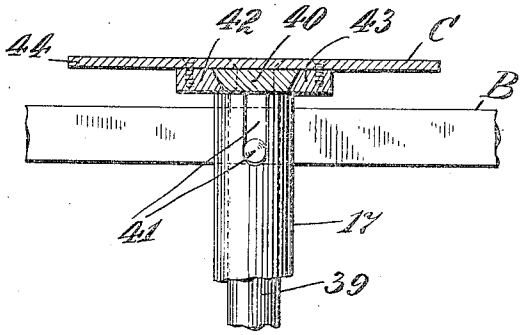
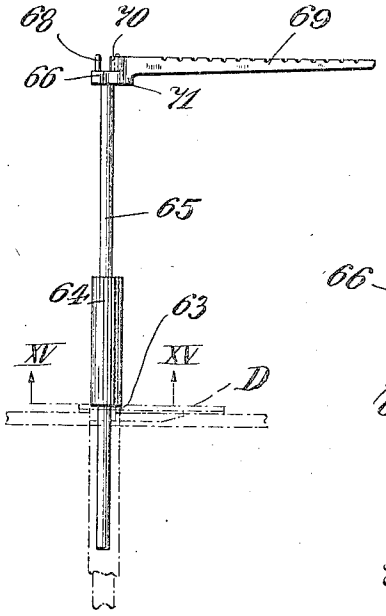


Fig. 13.



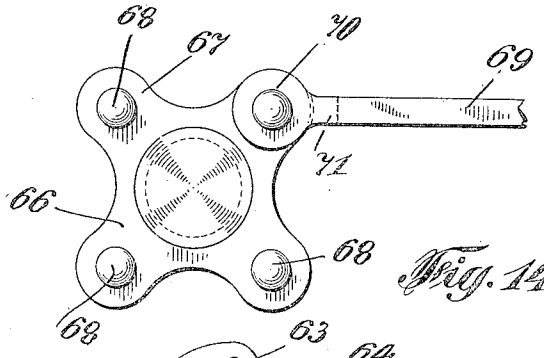


Fig. 14.

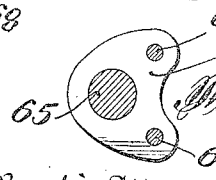


Fig. 15.

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Patented Oct. 9, 1923. 1,470,362

UNITED STATES PATENT OFFICE.

GEORGE W. HAWLEY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE KNY-SCHEERER CORPORATION OF AMERICA, A CORPORATION OF NEW YORK.

SELF-FREEING ORTHOPEDIC TABLE.

Application filed November 4, 1921. Serial No. 512,727.

To all whom it may concern:

Be it known that I, GEORGE W. HAWLEY, a citizen of the United States, and a resident of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Self-Freeing Orthopedic Tables, set forth in the following specification.

This invention relates to orthopedic and fracture tables. The object of the invention is to improve the various elements of such a table functioning to hold and manipulate various parts of the human body; to embody new and improved combinations of such elements; and to improve the mechanical structure generally of such a table, all to the end of minimizing discomfort to the patient and assisting the surgeon in his operation upon the patient.

A further object of the invention is to adapt a single table structure to as many types of operation as possible, for example, to facilitate operation upon the upper limbs as well as the lower limbs.

In the kind of surgery necessitating the employment of an operating table which is the subject of this invention, forcible traction, accurate manipulation and precise fixation are all many times required in the manipulation of both the upper and lower extremities of the patient. After the reduction of a fracture, permanent fixation of the parts by immobilization in plaster, encasing in a plaster spica or jacket and the like are usually necessary. For this purpose particularly exposure of all sides of the part to be encased is required, this being true both of the upper limbs and shoulders as well as the lower limbs and hips.

Heretofore I have produced an operating table of this general type which has many advantageous features, so that it is particularly an object of this invention to improve upon my earlier table described in United States Letters Patents No. 1,126,460, January 26, 1915 and No. 1,239,789, September 11, 1917.

In the application of bandages about the pelvic region when using a table such as described in my prior patents, I have found it convenient and the best practice to involve the pelvic support in the bandaging. This necessitates the removal from the table of the pelvic support together with the patient. One of the improvements of my present table is mechanism for forcibly discharging or disengaging the pelvic support from its supporting post, all without inconvenience to the patient.

I have also improved the suspension bars and the means for supporting the same so as to increase their adaptability for suspending various parts of the body almost without regard to the position of such parts of the body.

Another more particular objective of the invention is to provide for the manipulation of and work upon the upper limbs and shoulders by the provision of adequate supporting means which, at the same time, does not interfere with the necessary surgical work.

Still further objects and advantages of my invention will be pointed out more in detail in the accompanying claims which are directed towards the illustrative embodiment of my invention described in the following specification in connection with the accompanying drawings, which illustrative embodiment is set forth solely for the purpose of illustration and not limitation. In the drawings—

Fig. 1 is a plan view of my complete table;

Fig. 2 is a horizontal section through line II—II of Fig. 3 with parts broken away and with the frame work shown in plan;

Fig. 3 is a staggered vertical section taken through the plane III—III of Fig. 2;

Fig. 4 is a transverse vertical section with parts shown in elevation and parts broken away taken through line IV—IV of Fig. 2;

Fig. 5 is a detail fragmentary section taken through the plane of line V—V of Fig. 2;

Fig. 6 is a plan view of the pelvic support plate;

Fig. 7 is a longitudinal section with parts in elevation of the pelvic support plate and cooperating mechanism;

Fig. 8 is a detail elevation drawn to an enlarged scale of one end of the traction bar with the foot support;

Fig. 9 is a plan view of the parts shown in Fig. 8;

Fig. 10 is a fractional elevation of a portion of the foot support;

Fig. 11 is a longitudinal vertical section taken medially through the shoulder support plate and its supporting mechanism, parts being shown in side elevation;

Fig. 12 is a fractional cross section taken through line XII—XII of Fig. 11;

Fig. 13 is a fractional detail elevation of the perineal post mechanism with suspension bar structure;

Fig. 14 is a plan view of the suspension bar spider; and

Fig. 15 is a section through line XV—XV of Fig. 13 looking in the direction of the arrows.

A strong substantial lower frame work A of steel tubing mounted, if desired and as is usual for operating tables, for example upon casters 1, is provided. This frame work comprises one continuous length of steel tubing providing vertical end legs 2 and 3, horizontal side bars 4 and 5 and the cross bar 6, which itself comprises the 90° arc-shaped bends 8 and 9 between the side bars 4 and 5 and the straight run 7. The arc-shaped bends serve as clampable guideways for the traction bars presently to be described when they are employed for leg traction, as likewise serve the portions 10 and 11 of the bars 4 and 5 when the traction bars are serving for arm traction.

As a part of the lower frame work A are provided preferably a plurality of cross bars 12, 13, 14 and 15. Two tubular upwardly projecting supporting posts, the perineal post 16 and the shoulder post 17 are likewise fabricated as a part of the lower frame work. The perineal post 16 is located centrally of the entire structure and the shoulder post 17 towards one end thereof, both being in the median plane of the table. Suitable struts 18 and 19 are preferably provided.

The main section B or body supporting section of the table top supported from the lower frame work is provided with vertical adjustment. It is preferred that the vertical adjustment be quick-acting between an extreme elevated position and an extreme lowered position indicated in dotted lines in Fig. 3 through the medium of parallel motion links or arms 20 and 21 swiveled to the cross bar 15, and 22 and 23 swiveled to the cross bar 13 between suitable stay pins such as the pins 24 and 25 and the stubs 26 and 27. The third stub 28 is also provided to serve with the stubs 26 and 27 as a three-point support for the body section B in its lowered position.

Latch mechanism for the section B is provided by means of cross-connected links 30 and 31 swiveled at their upper ends to the section B and provided with notches 32 to prevent the downward swing of the section B. The third hook link 33 is swiveled to the table top B and rides on the cross bar 15 so that its hook shaped end 34 will prevent excessive outer swing of the section B. A hand lever 35 serves to release the notch links or arms 30 and 31 to permit a quick lowering of the section B by a thrust on the handle 36. Through the medium of this handle the upward swing of the section B is easily effected. A medial slot 37 permits the section B to clear the perineal post support 16 while a medial notch 38 permits the section B to clear the shoulder support post 17.

The second body supporting section C of the table top is adapted to support the head and shoulders and is provided with longitudinal adjustment but preferably fixed vertically. This shoulder supporting plate C is by preference of general T-shape formation, as shown in plan in Fig. 1. The post 17 serves as a socket to receive the stub pin 39 mounting the track rail 40, which is fixed in the median plane of the table by suitable means such as the slot and pin formation 41. Suitable means such as flanges 42 and 43 cooperate to form a guideway for the plate C upon the track bar 40 so that the plate C may slide longitudinally to accommodate the position of the parts to be supported. The narrow stem-like portion 44 of the plate C gives ample access to the arms and shoulders while the lateral enlarged portion 45 is adapted to receive a pillow or, if desired, the positioning of the plate C, as shown in the figures, may be reversed so that free access to certain parts may be permitted at the location of the narrow part 44 of the plate C.

The pelvic support plate D is preferably provided with a socket 50 which slips snugly over the upper end 51 of tubular post 16. A vertical strengthening rib 52 medially underlies the plate B and projects through the socket 50 to form a spline taking into the notch 53 formed in the upper end of post 16 and resting normally upon the lower wall 54 of said notch.

For some purposes it may be desired to fix the plate D immovably to the post 16. For this purpose aligned perforations 55 to the socket 50 and the post 16 are provided through which a pin may be inserted.

Particularly in view of the fact that the D is inaccessible when a body is in position and many times is involved in bandages, it is of considerable importance to provide for its ready removal from and disengagement from the post 16. To this end suitable automatic mechanism E is provided. The mechanism E comprises preferably a slip sleeve 56 riding on the post 16. To the lower end of the sleeve 56 is attached a downwardly projecting cleat 57 providing a cam 58. A lever 59 is provided with a suitable fulcrum 60 upon the cross bar 14 and its edge cooperates with the cam 58 so that a slight lift upon the hand-hold 61 lifts the sleeve 56, forcibly disengaging the socket 50 from the post 16 so that a patient with the plate D attached may be

rolled onto the wheel stretcher without discomfort, whereas otherwise considerable discomfort would be necessary to remove the perineal plate by a direct hand manipulation.

The plate D also preferably has a pair of perforations 62 to receive the pins 63 of the perineal buttress 64 which is preferably formed as an enlargement upon the vertical shaft or post 65 adapted to fit into the hollow of the tubular post 16 and extend upwardly to form a support for the spider 66. This spider 66 is preferably a cross-shape formation providing four swiveling platforms 67 each forming a 180° circular guideway about a vertical pin 68. Four suspension bars 69, each having a socket 70, a snugly fitting pin 68 and with a heel 71 engaging the circular edge of the platform 67 so as to strengthen the swiveling support of the suspension bar. In this way each of the suspension bars may be given substantially a 180° angular adjustment. Any three neighboring bars may be swung all substantially into close parallel relation and the fourth may occupy any angular position relatively to the first three within the limits of 180° swing. Thus these suspension bars may be employed to support practically any limb or part of the body, regardless of position and, at the same time, simultaneously practically all parts of the body which may be necessary to be suspended. The means of suspension is, as usual, suspension bandages depending from the suspension bars which are notched to prevent the slipping of the bandage.

Four points of attachment for the pair of traction bars F are provided. Two threaded studs 72 and 73 symmetrically positioned on the cross bar 14 and each provided with wing-ends; and two threaded studs 74 and 75 symmetrically positioned on the cross bar 12 and likewise provided with threaded wing ends.

The inner ends of the traction bars F each has a perforated swivel socket 76 to take over one of the studs and likewise has a clamp guide cleat 77 fitting over the appropriate guide bar portion either 8, 9, 10 or 11, and clampable thereto by a set bolt 78 conveniently operated by the swivel hand lever 79. The positioning of the studs 72 and 73 preferably corresponds to the average position of the patient's hip sockets, that is, in vertical alignment therewith. The circular guide-bar portions 8 and 9 provide for a 90° adjustment of the traction bars while the portions 10 and 11, although they are straight, permit a very considerable adjustment for the traction bars when the same are positioned for arm manipulation. Each traction bar preferably comprises the bar proper 80 over which slides a slip sleeve 81, clampable to the bar 80 by suitable set screw mechanism 82 similar to the mechanism 78 and 79.

On the outer end of the sleeve 81 is suitably fixed a bracket or sub-frame 83, adequate swiveling adjustment of which may be provided by the set screw 82 as well as a slide extension adjustment along the bar 80. The bracket 83 provides a vertical guide-tube 84 into which the stem 85 of a T-post fits and may be clamped by means of a suitable set screw 86 which permits both up and down adjustment and angular swiveling adjustment of the stem 85. A traction bolt 87 fits loosely through the cross sleeve 88 of the T-post 85 so far as longitudinal movements therein is concerned, but the bolt 87 is provided with a longitudinal slot or spline-way 89 in which the spline 90, fixed to the head 88, runs to prevent all rotation of the bolt 87 in the head 80. Tension applying hand wheel 91 is threaded about the outer end of the bolt 87. The inner end of the bolt 87 is provided with a fixed head 87^a against which a foot support G freely swivels upon its socket 92. A jamb nut 93 is threaded on the inner end of the bolt 87 to jamb against the sleeve 92 so as to fix the foot support G against rotation upon the bolt 87. The foot support preferably comprises an L-shaped steel plate 94 with a downwardly projecting tongue 95 paralleling the main portion 96. From the upper corners of the tongue 95 project out at right angles a pair of horns 97, particularly useful for the attachment of foot supporting bandages, their positioning parallel to the direction of the leg being noteworthy. Laterally projecting horns 98 are provided as heretofore for the attachment of anklet straps. A semi-circular cuff 99 is preferably provided on each foot support so that a reversal of the foot-support, as indicated in dotted lines, presents this cuff as a receiving grip for the calf or ankle. This is useful particularly in some non-traction operations.

It should be noted that practically without additional equipment a complete table for all leg operations is provided while, at the same time, particularly through the peculiar formation of the shoulder plate C and its single, central support, the mere relocation of the traction bars as upon the studs 74 and 75 transforms the table into a specially designed structure for arm and shoulder manipulation and operation.

What I claim and desire to secure by United States Letters Patent is:—

1. In combination in an orthopedic and fracture table, a lower frame-work providing an upwardly projecting supporting post: a body support vertically movable relatively to said frame-work and supporting post; a pelvic support-plate having a socket connection with said supporting post independently of said body support; and means provided on said lower frame-work for engaging the socket connection of said

pelvic support-plate positively to disconnect it from said supporting post.

2. In combination in a surgical table, a frame-work providing an upwardly projecting post; a removable supporting member adapted to be involved in the wrappings of a patient and having a socket connection with said post; and means provided on said lower frame-work for engaging the socket connection of said supporting member positively to disconnect it from said supporting post.

3. In an orthopedic and fracture table in combination a lower frame-work; a body support vertically movable relatively to said lower frame-work; a post extending upwardly through said body support and independently supported from said lower frame-work; a spider at the top of said post mounting symmetrically a plurality of suspension bars, each having a vertically positioned swiveling pin and socket connection with said spider, providing an angular adjustment for each said bar of approximately 180°

4. In an orthopedic and fracture table in combination a lower frame-work; a body support vertically movable relatively to said lower frame-work; a post extending upwardly through said body support and independently supported from said lower frame-work; a spider at the top of said post mounting symmetrically four horizontal suspension bars, each having a vertically positioned swiveling pin and socket connection with said spider, providing an angular adjustment for each said bar of approximately 180°.

5. In an orthopedic and fracture table in combination, a lower frame-work; a table-top movably supported by and relatively to said lower frame-work; a removable pelvic support-plate having a mounting socket; a supporting post fixed to said frame-work for engaging the socket of said pelvic support-plate; a slip sleeve vertically movable on said supporting post; and lever mechanism for forcibly elevating said slip sleeve to discharge said pelvic support-plate from said post.

6. In combination in an orthopedic and fracture table, a lower frame-work of tubular steel comprising a single integral tubing providing a pair of end-legs, two horizontal side-bars and a cross-connecting bar with arc-shaped portions merging into said side-bars and providing swivel-tracks; a plurality of longitudinally spaced cross-bars provided with symmetrically positioned clamping studs; and a pair of traction bars adapted to connect at their inner ends interchangeably with said studs and having clamps for engaging directly upon said arc-shaped portions and said side-bars of said integral steel tubing to serve according to their position both for the manipulation of legs and arms and to be entirely supported and sustained from said lower frame-work.

7. In combination in an orthopedic and fracture table, a lower frame-work; a vertically movable top section; a pelvic support-post independently mounted on said lower frame-work; a pelvic plate supported by said post for supporting a body independently of said top section; a second support-post upwardly projecting from said lower frame-work centrally of and adapted to project through one end of said top section; and a shoulder plate longitudinally slidable relatively to and supported by said second support-post.

8. In combination in an orthopedic and fracture table, a lower frame-work; a vertically movable top section; an independently fixed pelvic support; and a shoulder supporting plate having longitudinal adjustment and supported solely from a central position by said lower frame-work, whereby free access to the arms and shoulders may be had when said top section is lowered.

9. An orthopedic and fracture table comprising a vertically movable table-top; means independent of said table-top for supporting a body; a T-shaped shoulder-plate; a single centrally positioned post for supporting said shoulder-plate; and a longitudinal guideway centrally positioned relatively to said shoulder-plate and post and permitting longitudinal adjustment of said shoulder-plate.

10. In an orthopedic and fracture table, a lower frame-work; an upwardly projecting post near the head-end of said frame-work; a horizontal medially-positioned trade-bar supported at the top of said post; a shoulder-plate having a medially-positioned guideway slidably engaging said track-bar, all whereby the proper longitudinal adjustment of said shoulder-plate may readily be effected and maximum clearance for manipulation be permitted.

11. In an orthopedic and fracture table, a lower frame-work; an upwardly projecting post near the head-end of said frame-work; a horizontal medially-positioned track-bar supported at the top of said post; a T-shaped shoulder-plate having a medially-positioned guideway slidably engaging said track-bar, all whereby the proper longitudinal adjustment of said shoulder-plate may readily be effected and maximum clearance for manipulation be permitted.

12. In combination in an orthopedic and fracture table, a lower frame-work; a drop top-section having medially positioned slots; parallel motion arms swiveling said top-section to said lower frame-work; a perineal post structure adapted to project upwardly through one of said slots; a shoulder-post centrally positioned at one

end of said lower frame-work and adapted to project through the other of said slots; a shoulder supporting plate having a medially positioned guide and trackway longitudinally adjustably supporting said plate from said shoulder-post.

13. The combination set forth in claim 11 and further characterized by the fact that said lower frame-work is provided with laterally spaced side bars cross connected to said shoulder-post by cross bars which are provided with swivel studs for the attachment of arm traction bars clampable to said side bars.

14. A perineal post for orthopedic and fracture tables comprising a perineal buttress; an upwardly extending stem provided at its top with a spider; a plurality of horizontally extending suspension bars having vertical pin and socket connection with said spider permitting approximately 180° angular adjustment for each said suspension bar.

15. In a foot support for orthopedic and fracture tables, a traction-bolt fixed against angular rotation; an L-shaped plate swiveled upon the end of said traction-bolt; means for fixing the angular position of said L-shaped plate relatively to said traction-bolt; a tongue formed on said L-shaped plate for engaging the ball of the foot and lying substantially parallel with the long leg of said L-shaped plate; and horizontally projecting horns extending out from the upper corners of said tongue to provide for the winding attachment of bandages.

16. A combined foot and ankle support for orthopedic and fracture tables, a traction-bolt; a plate adjustably secured to the end of said traction-bolt; means at one end of said plate for strapping the ball of a patient's foot; and an outwardly facing open cuff at the other end of said plate to serve as an ankle rest when adjusted into an upright position.

17. In an orthopedic and fracture table, a lower frame-work having longitudinally spaced cross-bars; a pair of parallel motion supporting arms swiveled to each said cross-bar; a drop table-top swiveled to the upper ends of said arms; latch mechanism for locking said table-top in its elevated position comprising a pair of arms swiveled to said table-top at a distance from the point of attachment of said supporting arms and having notches to engage one of said cross-bars when the table top is in elevated position and an independent hook swiveled to said table-top and riding upon said cross-bar.

In witness whereof I have signed my name to this specification, this 14th day of October, 1921.

GEORGE W. HAWLEY.