

- [54] **APPARATUS FOR THE REDUCTION OF BONE FRACTURES**
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[22] Filed: **Feb. 19, 1971**
[21] Appl. No.: **116,821**

- [52] U.S. Cl. **128/84 B, 269/328**
[51] Int. Cl. **A61f 5/04**
[58] Field of Search..... **128/84; 269/328**

[56] **References Cited**

UNITED STATES PATENTS

1,501,120	7/1924	Karrer	128/84 B
2,306,929	12/1942	Bergamini	128/84 B
3,509,876	5/1970	Pilz	128/84
1,126,460	1/1915	Hawley	128/84
1,697,121	1/1929	Knebel	128/84
1,955,017	4/1334	Rankin	128/84
2,658,507	11/1953	Neufeld	128/84
2,443,106	6/1948	Grosso	128/84
3,289,674	12/1966	Platt	269/328 X

FOREIGN PATENTS OR APPLICATIONS

435,995	9/1935	Great Britain	128/84
193,523	10/1906	Germany	128/84

OTHER PUBLICATIONS

Castle Pelvic Anchor Sacral Rest, Wilmot Castle Co. Rochester 7, N.Y. Brochure No. 18, p. 3. Received in U.S. Patent Office July 2, 1954.

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[57] **ABSTRACT**

This disclosure relates to apparatus for the reduction of bone fractures and the surgical fixation by intramedullary pins using X-ray guidance, and particularly C arm X-ray machines, and includes a movable frame having a vertically adjustable radiolucent table top with a cantilevered hip-supporting portion and a pair of traction pieces cantilevered by adjustable bars pivoted at one end to the frame thereby providing a relatively unobstructive operative area into which may be interposed the C arm of the X-ray machine between the respective extremity of the patient and the frame of the apparatus with an adjustable well leg support and an adjustable knee counter support being appropriately positioned (or removed) as desired for particular fracture treatment.

20 Claims, 10 Drawing Figures

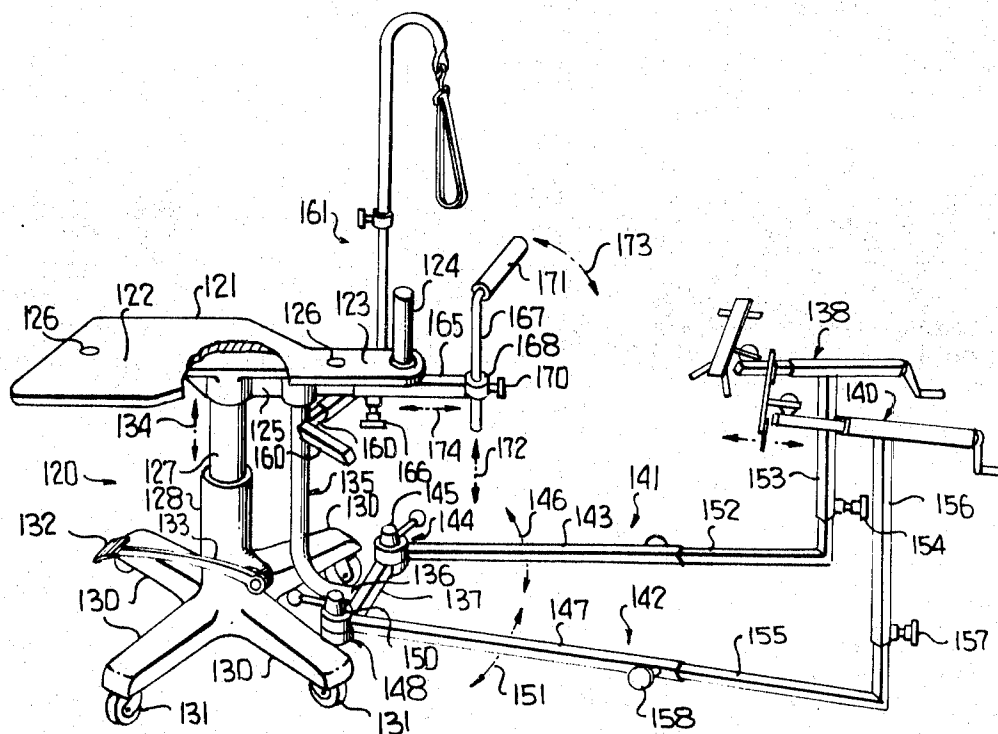


FIG. 1

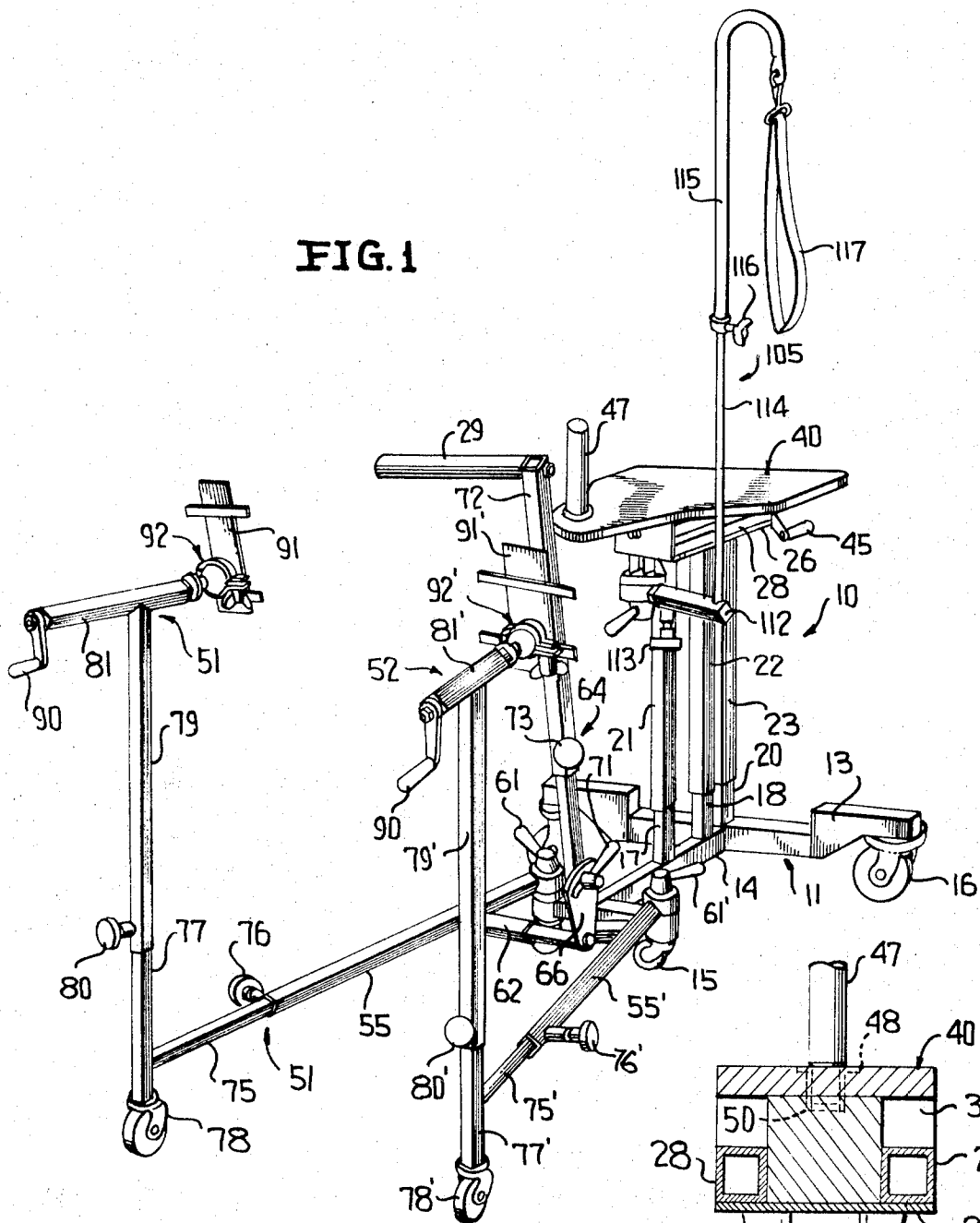
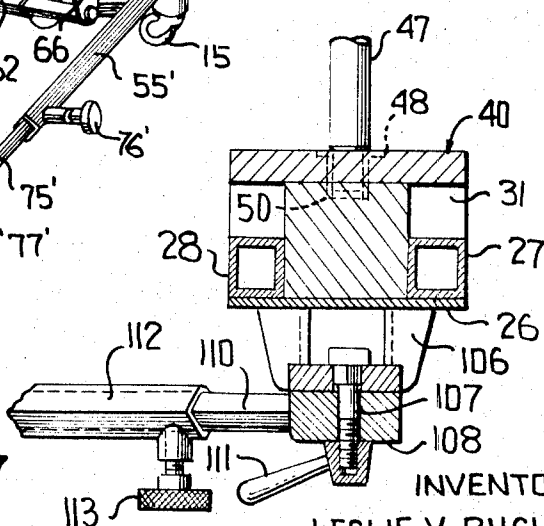
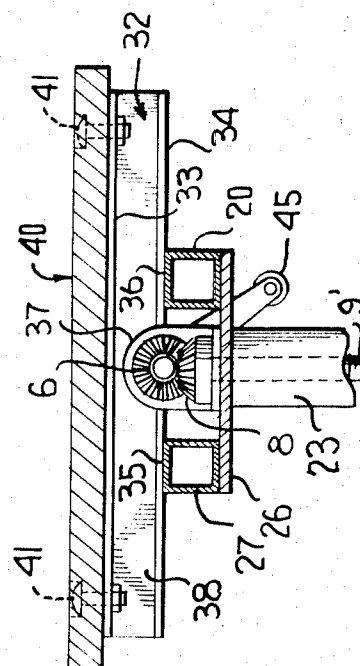
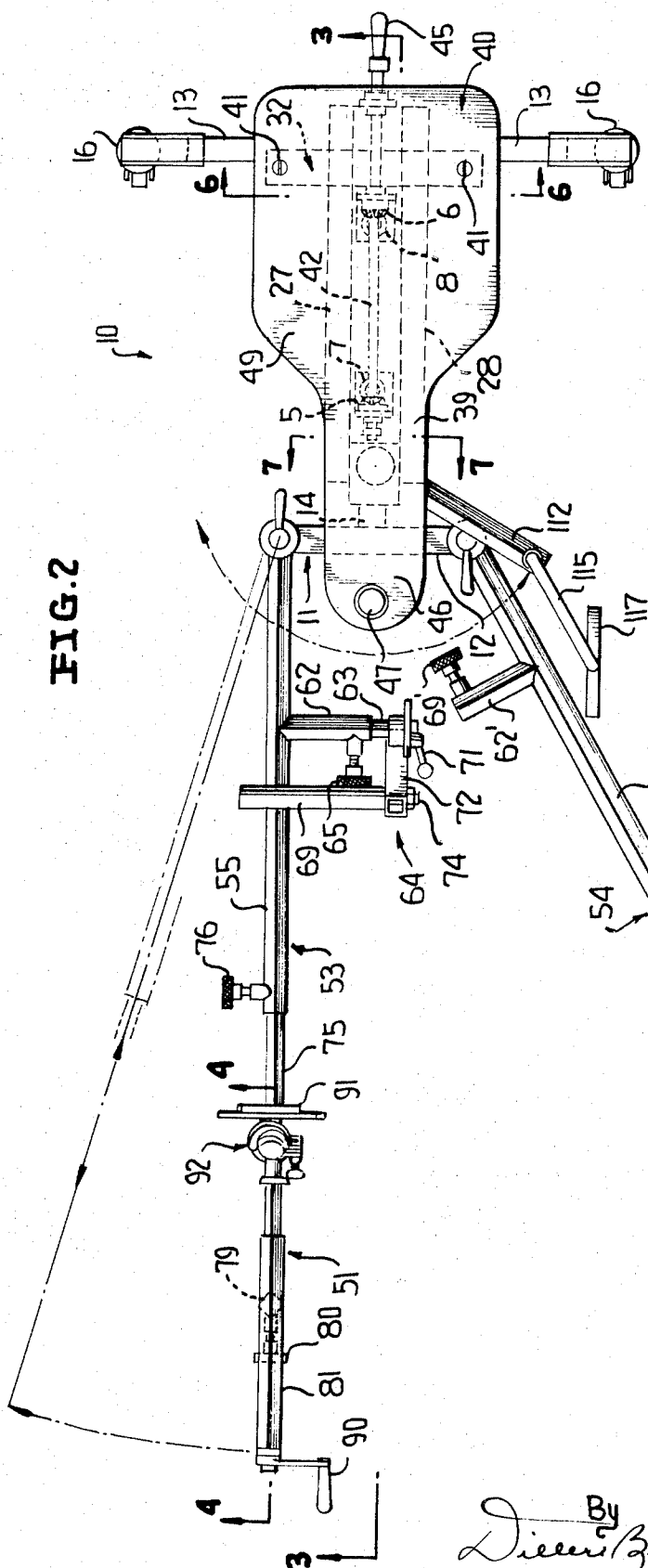


FIG. 7



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FIG. 3

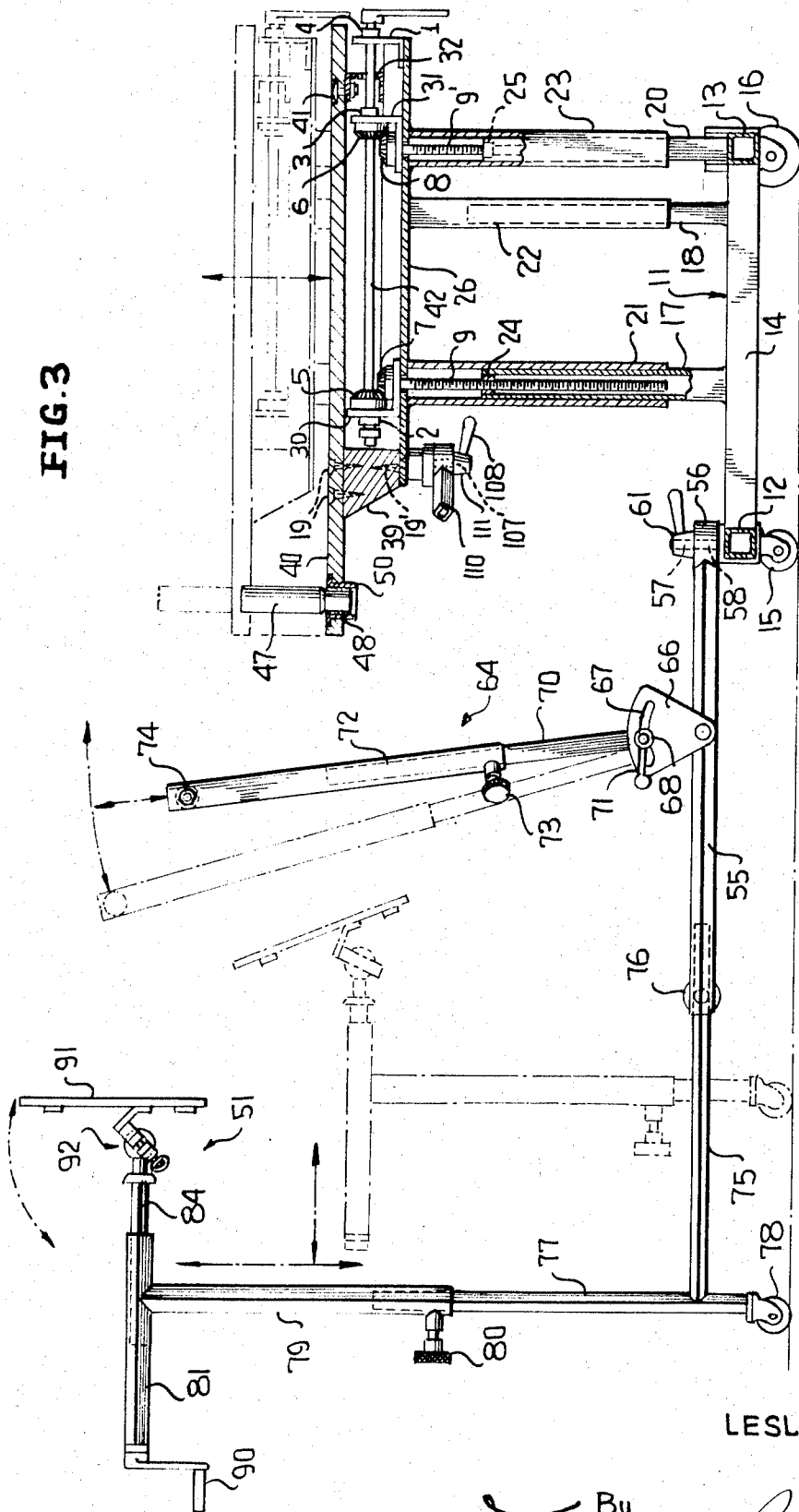


FIG. 5

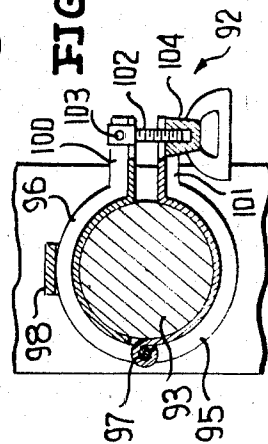
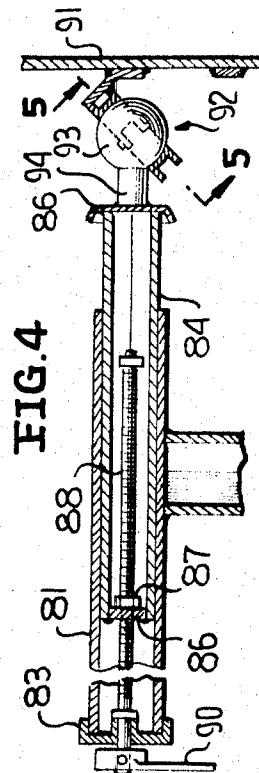


FIG. 4



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FIG. 8

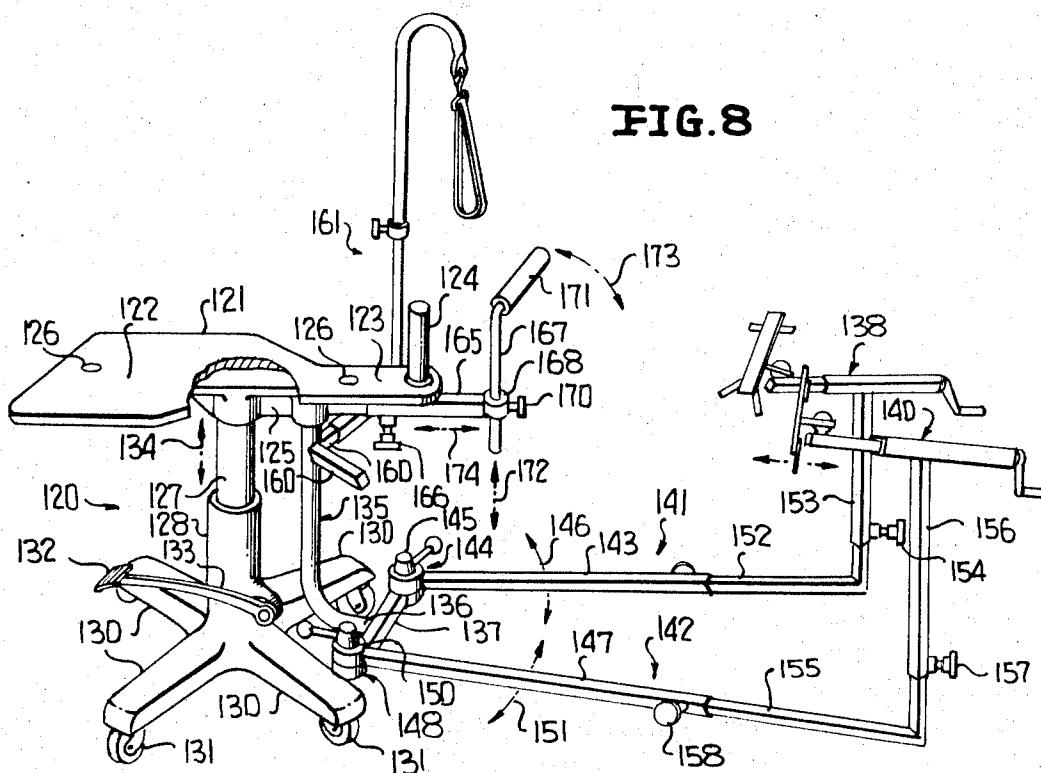


FIG. 10

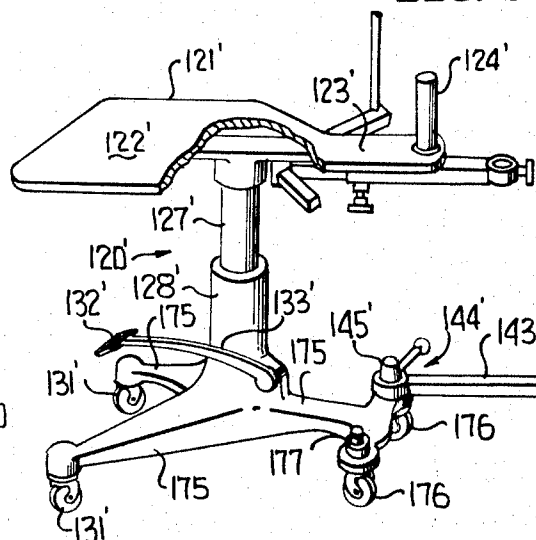
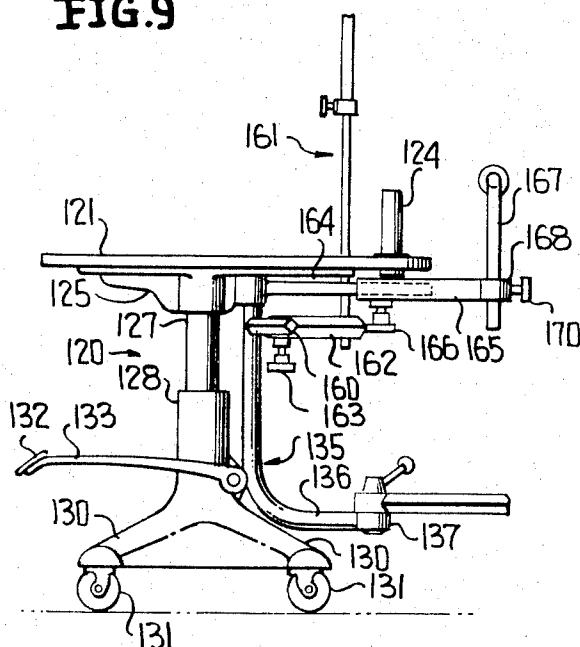


FIG. 9



APPARATUS FOR THE REDUCTION OF BONE FRACTURES

A variety of fracture operating tables have been commercially available for many years, and all provide means for exerting traction upon the extremity of a patient. In the lower extremity, where mostly used, such conventional tables provide abduction and adduction of the hip and rotation of the extremity, with any necessary elevation of the table being mechanically controlled. However, with the advent and perfection of the methods of intramedullary fixation of fractures the whole complexion of fracture treatment has changed to the degree that most of the existing operating fracture tables are now inadequate.

Reduction of fractures under the fluoroscope which proved so dangerous and disastrous to surgeons many years ago has now become relatively safe due to the low voltage image intensifier. The surgeon is now able, with relatively little risk, to view the fractured bones on a television screen during the operative procedure. This is accomplished by means of a mobile X-ray unit equipped with a C arm which can be adjusted to secure views of the extremity in both the anterior-posterior and lateral planes. Unfortunately, until the present invention most conventional fracture tables were designed and expensively built for other technics and are unsuited for intramedullary fixation technics employing C arm X-ray units because the C arm cannot be accommodated between the patient extremity and the fracture table frame. Moreover, even though such conventional fracture tables are being modified to accommodate the C arm of such X-ray units, simply being modifications of outmoded designs they do not provide the simplicity and preciseness of technic for the physiological reduction and operative pinning of long bone fractures.

It is therefore a primary object of this invention to provide a novel fracture reduction apparatus having a frame which allows for the interposition of the C arm of an X-ray unit or the like between an injured extremity and the frame of the apparatus.

It is another object of the present invention to provide a fracture reduction apparatus having cantilevered construction.

It is a further object of the present invention to provide a fracture reduction apparatus having vertical support means for a table, with a hip support area cantilevered, the hip support area being free of vertical posts.

It is yet another object of the present invention to provide a fracture reduction apparatus having one or more traction pieces, each being cantilevered with a long horizontal bar near the floor.

It is yet a further object of the present invention to provide a fracture reduction apparatus having one or more traction pieces, each of which is cantilevered with a long horizontal bar near the floor, the horizontal bar or bars being coupled to a patient-supporting table and being movable with the table.

It is still another object of the present invention to provide a fracture reduction apparatus having a framework which allows for the interposition of the C arm of an X-ray unit or the like between an injured extremity and the framework of the apparatus, the apparatus including a well leg support.

It is still a further object of the present invention to provide a fracture reduction apparatus having a frame-

work which allows for the interposition of the C arm of an X-ray unit or the like between an injured extremity and the framework of the apparatus, the apparatus including a countersupport.

It is still yet another object of the present invention to provide a fracture reduction apparatus having a framework which allows for the interposition of the C arm of an X-ray unit or the like between an injured extremity and the framework of the apparatus, the apparatus including a countersupport and a well leg support coupled to a patient-supporting table.

With the above and other objects in view, as will hereinafter appear, the nature and features of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS:

FIG. 1 is a perspective view of a novel fracture reduction apparatus constructed in accordance with this invention, and illustrates a mobile frame supporting a vertical adjustable radiolucent table top having a cantilevered hip-supporting portion, and a pair of traction pieces cantilevered to the frame by long horizontal bars near the floor whereby the entire upper extremity and lower extremity are made subject to unhindered X-ray examination of a patient's skeleton.

FIG. 2 is a top plan view of the fracture reduction apparatus, and illustrates a knee countersupport removably secured to one of the horizontal bars and a well leg support mounted for pivotal movement beneath the table top.

FIG. 3 is a sectional view taken generally along the line 3—3 of FIG. 2, and illustrates in phantom outline adjusted positions of one of the traction pieces, the knee countersupport, the table, and means for adjusting the position of the latter in a horizontal plane.

FIG. 4 is an enlarged fragmentary sectional view taken generally along line 4—4 of FIG. 2, and illustrates the details of one of the two identical traction pieces and the universal mounting of a foot plate thereon.

FIG. 5 is an enlarged fragmentary sectional view taken along line 5—5 of FIG. 4, and illustrates the details of a universal joint formed by a ball and clamp.

FIG. 6 is an enlarged fragmentary sectional view taken generally along line 6—6 of FIG. 3, and illustrates the manner in which the table top is guidably supported for horizontal sliding movement.

FIG. 7 is an enlarged fragmentary sectional view taken generally along line 7—7 of FIG. 3, and illustrates details of an adjusting mechanism of the well leg support.

FIG. 8 is a perspective view with a portion broken away for clarity of another fracture reduction apparatus, and illustrates a pair of traction pieces joined to a vertically adjustable table for simultaneous movement therewith.

FIG. 9 is a fragmentary side elevational view of the fracture reduction apparatus of FIG. 8, and illustrates details of the mounting of a well leg support and a knee counter-support.

FIG. 10 is a fragmentary perspective view of another fracture reduction apparatus with a portion thereof broken away for clarity, and illustrates a well knee sup-

port and a knee countersupport carried by a vertically adjustable table.

A novel fracture reduction apparatus is best illustrated in FIGS. 1, 2 and 3 of the drawings, and is generally designated by the reference numeral 10. The apparatus 10 includes a movable generally T-shaped base 11 formed by a pair of tubular cross arms 12, 13 joined to each other by a bridging member 14. Conventional rotatable and lockable casters 15, 16 are secured to the ends (unnumbered) of the respective cross arms 12, 13.

A pair of vertical posts 17, 18 are welded to the bridging member 14 and another vertical post 20 is welded to the cross arm 13. Tubular supports 21, 22 and 23 are in external telescopic relationship to the respective posts 17, 18 and 20. The vertical posts 17 and 20 carry respective threaded bushings 24 and 25 at their uppermost ends.

A horizontal plate 26 (FIGS. 3, 6 and 7) is welded to the tubular supports 21 through 23, and has welded to the upper surface thereof a pair of horizontally extending tubular channels 27 and 28. The channels 27 and 28 are welded to brackets 30, 31 (FIG. 3) which are additionally welded to the horizontal plate 26. The channels 27, 28 support a C-shaped bar 32 (FIGS. 2 and 6) which includes upper and lower flanges 33, 34, respectively, as best illustrated in FIG. 6. The lower flange 34 is welded at 35, 36 to the respective channels 27, 28 (FIG. 6). An opening 37 (FIG. 6) is formed in a web 38 of the bar 32, while the upper flange 33 supports a table 40 which is constructed from radiolucent material. The table 40 is preferably secured near one end to the flange 33 of the bar 32 by conventional nuts and bolts collectively designated by the reference numeral 41. The table 40 is secured near its other end by a support member 39 (FIG. 3) by conventional means, such as screws collectively designated by the reference numeral 19. The support member 39 is secured to the horizontal plate 26 by conventional means, such as screws, one of which is shown in FIG. 3 and designated by the reference numeral 19'.

A bracket 1 is welded to the rightmost end of the horizontal plate 26, as best illustrated in FIG. 3. Each of the brackets 30, 31 and 1 are provided respectively with aligned apertures within which bushings 2, 3 and 4 are provided, respectively.

The table 40 is shifted vertically by means of a rotatable member 42 (FIG. 3) which passes through the opening 37 of the web 38 and the bushings 2, 3 and 4 respectively carried in the brackets 30, 31 and 1. A pair of bevel gears 5 and 6 are fixedly connected to the rotatable member 42. The bevel gears 5 and 6 are respectively engaged with bevel gears 7 and 8. Each of the brackets 30 and 31 is provided with an aperture through which a worm 9 and a worm 9' pass, respectively. The worm 9 is fixedly connected to the bevel gear 7, and the worm 9' is fixedly connected to the bevel gear 8. The worm 9 is arranged in threaded engagement with the threaded bushing 24 carried on the uppermost part of the post 17, and the worm 9' is arranged in threaded engagement with the threaded bushing 25 carried on the uppermost part of the post 20. Upon rotating a handle 45 (FIG. 2) connected to the rotatable member 42, the latter rotates worms 9 and 9', via the bevel gears 5-8, to move the table 40 vertically, as diagrammatically shown in phantom in FIG. 3.

The table 40 includes a shoulder supporting portion 49 and a narrower hip supporting portion 46 which has removably secured thereto an upstanding perineal post 47 constructed from radiolucent material. The post 47 is removably secured to the hip supporting portion 46 of the table 40 by a reduced threaded stem 48 (FIG. 3) which passes through an aperture (unnumbered) in the table 40 and is secured therein by a conventional nut and washer combination 50.

A pair of traction pieces or traction means 51, 52 are supported in cantilevered relationship to the table 40 by respective support means 53, 54.

The support means 53 includes a hollow horizontally disposed bar 55 (FIGS. 2 and 3) welded at one end to a hub 56 having a vertical bore 57 which receives a pivot pin 58 whose lower end is welded to the cross arm 12 and whose upper end is threaded and receives a rotatable threaded lock nut 61. When the lock nut 61 is loosened the support means 53 can be pivoted about the axis of the pivot pin 58 in the manner diagrammatically illustrated in FIG. 2.

A hollow tubular support 62 is welded to the bar 55 immediate its ends and removably receives therein a stud 63 of a knee countersupport generally designated by the reference numeral 64. The telescopic position of the stud 63 relative to the tubular support 62 is maintained by a conventional thumbscrew 65 (FIG. 2).

A joint triangular plate 66 of the knee countersupport 64 is secured to the bar 55 and includes an arcuate slot 67 through which projects one end of a threaded pin 68, the opposite end of which is welded to a tubular post 70. A lock nut 71 threaded upon the pin 67 is tightened to lock the post 70 and thus the knee countersupport 64 in any position of adjustment within the limits of the slot 67, as is best evident from FIG. 3 of the drawings.

A tubular support 72 is in external telescopic relationship to the post 70 and a conventional thumbscrew 73 carried thereby locks the post 70 relative to the support 72 in any desired elevated position. A cylindrical knee support 69 is secured to the upper end of the support 72 by conventional threaded connection 74.

Another hollow bar 75 is telescopically received within the bar 55 of the support means 53 and is selectively secured thereto in any position of adjustment by conventional thumbscrew 76. The bar 75 is welded to a vertical post 77 having a conventional rotatable and lockable caster 78 secured at its lower end. The upper end (unnumbered) of the post 77 is received in another tubular support 79 with another conventional thumbscrew 80 being utilized to lock the post 77 relative to the tubular support 79.

The traction piece 51 is supported atop the tubular support 79 by a hollow bar 81 welded thereto and closed at one end by an axially apertured cap 83. A hollow bar 84 is telescopically received within the hollow bar 81 and is closed at opposite ends by a pair of plates 85, 86 the latter of which has welded thereto a threaded nut 87. A screw 88 is threaded in the nut 87 and passes freely through an aperture (not shown) in the plate 86 and through the apertured cap 83. Upon rotation of a handle 90 the screw 88 will rotate to extend or retract the hollow bar 84 relative to the hollow bar 81 thus moving the traction piece 51 toward or away from the table 40.

The traction piece 51 includes a foot plate 91 carried by the hollow bar 84 by means of a ball and clamp

mechanism 92. The ball and clamp mechanism 92 (FIGS. 4 and 5) includes a spherical ball 93 having a stem 94 welded to the cap 86. A pair of clamp members 95, 96 are joined to each other by a pivotal connection 97 with the clamp member 96 being welded to a bracket 98 which is in turn welded to the foot support 91. Generally radial arms 100, 101 of the clamp members 96, 95, respectively, have aligned radially outwardly opening slots (unnumbered). A threaded stud 102 is pivotally secured to the arm 100 by pivot pin 103 while the opposite end of the screw 102 passes through the slot of the arm 101 and threadably receives a locking handle 104. As is relatively apparent from FIG. 5, clockwise rotation of the handle 104 brings the arms 100, 101 closer to each other and thus increases the clamping pressure upon the ball 93 to assure rigid support of the foot plate 91 in a position of adjustment.

In view of the identical construction of the traction pieces 51, 52, and the support means 53, 54 a detailed description of the traction piece 52 and the support means 54 is considered unnecessary for a complete understanding of this invention and thus like primed reference numerals have been applied thereto.

At times it may be necessary or desirable to isolate or immobilize a non-fractured or well leg of a patient and in this regard the fracture reduction apparatus 10 includes a well leg support, generally designated by the reference numeral 105 which is secured to the underside of the plate 26 (FIG. 3) by welding thereto a boss 106 having a threaded pivot pin 107 which passes through an aperture (unnumbered) of a hub 108 to which is welded a tubular stud 110. A lock nut 111 is threaded upon the threaded pivot pin (unnumbered) and tightened to lock the stud 110 in any desired position. A tubular bar 112 is in external protoscopic relationship to the stud 110 and is secured thereto by a set screw 113. A vertical post 114 is welded to the bar 112 and externally telescopically receives an inverted J-shape tubular support 115 which is locked in any desired adjusted position by a thumbscrew 116. An upper terminal end (unnumbered) of the support 115 is apertured for suspending a removable well leg sling 117. Thus due to the pivotal mounting of the hub 108 a well leg can be held in the sling 117 with the well leg support 105 positioned at either side of the hip supporting portion 46 of the table 40 in the manner indicated by an unnumbered headed arrow associated therewith in FIG. 2.

Though the fracture reduction apparatus 10 has been described as including the two traction pieces 51, 52, the knee countersupport 64, the well leg support 105 and the perineal support 47, it is to be understood that the fracture reduction apparatus may be used with or without the knee countersupport 64, with one or both of the traction pieces 51, 52 and the associated support means 53, 54, respectively, and with or without the well leg support 105 and the perineal post 47. For example, when nailing hip fractures the countersupport 64 and the well leg support 105 may be removed with the C arm of the X-ray unit positioned beneath the extremity for operative fluoroscopy in the lateral and anteroposterior planes. Due to the generally C design of each traction piece 51, 52 and its respective support means 53, 54 the entire area between the foot plates 91, 91' and the table top 40 is uncluttered and no structure is present to interfere with the X-ray operation of hip to ankle which is further augmented by the cantilevered

support of the hip-supporting portion 46 of the table 40 beyond the support plate 26 and the construction of the table 40 and perineal post 47 from radiolucent material.

It is also recognized that the keystone to successful reduction of most all fractures of the thigh and leg is dependent upon countersupport beneath the lower femur, and with the exception of fractures of the neck of the femur, all fractures of the lower extremity from the hip to the ankle joint require that traction be exerted with the knee in some degree of flexion. Thus, when the countersupport 64 is properly utilized an enormous number of long bone fractures of the lower extremity can be reduced and pinned without the need for surgical exposure of the fracture site. Here again, the countersupport 64 is of an open C design capable of being supported in a cantilever fashion from either of the tubular supports 62, 62' which permits for the interposition of the C arm of the X-ray unit as well as the X-ray tube end. This is augmented by the adjustable mounting of the countersupport 64 upward, cephalad or distally, and be further augmented by constructing the knee support 69 from radiolucent material.

Referring now to FIGS. 8 and 9, a second embodiment of a fracture reduction apparatus, which incorporates features of the present invention, is designated generally by the numeral 120. The fracture reduction apparatus 120 includes a patient-supporting table 121 constructed of radiolucent material. The table 121 includes a shoulder supporting portion 122 and a narrower hip supporting portion 123. A removable, threadably mounted vertical perineal post 124 extends upwardly from the hip supporting portion 123. The perineal post 124, like the table 120, is made of radiolucent material.

The table 121 is fixedly connected, in a conventional manner, to a robust frame member 125 by countersunk bolts, generally designated by the numeral 126. The frame member 125 is centrally positioned on a single, vertically extending post 127. The vertically extending post 127 is telescopically positioned within an upstanding vertical cylinder 128, the vertical cylinder 128 forming a part of a conventional hydraulic mechanism (not illustrated).

As illustrated, the upstanding vertical cylinder 128 is integral with four, radially extending leg members 130. Each of the radially extending leg members 130 is provided with a floor-engaging lockable caster 131. The hydraulic mechanism (not illustrated) within the upstanding, vertical cylinder 128 is coupled to a foot pedal 132 by a rigid member 133, allowing an orthopedic surgeon or technician to raise the table 121, as diagrammatically illustrated by the arrowheaded line 134 (FIG. 8), by manipulating the pedal 132.

A downwardly extending post 135 is fixedly connected, by conventional means (not illustrated), to the frame member 125 at a point beneath the narrower hip supporting portion 123 of the table 121. The post 135 is curved outwardly, its outermost portion 136 being horizontal from a point beneath the table 121 in close proximity to the floor engaging lockable casters 131.

A tubular cross piece 137 is welded centrally to the end of the outermost portion 136 of the post 135.

A left traction means 138 and a right traction means 140 are supported in cantilevered relationship to the table 121 by respective support means 141 and 142.

The support means 141 includes a hollow horizontally disposed bar 143 welded at one end to a hub 144. The hub 144 is constructed similarly to the hub 56 (FIG. 3) and like the hub 56 is provided with a vertical bore which receives a pivot pin whose lower end is welded to the tubular cross arm 137 and whose upper end is threaded and receives a rotatable threaded lock nut 145. When the lock nut 145 is loosened, the support means 141 can be pivoted about the axis of the pivot pin in the manner diagrammatically illustrated by the arrowheaded line 146.

The support means 142 includes a hollow horizontally disposed bar 147 welded at one end to a hub 148 which, like the hub 144, is provided with a vertical bore which receives a pivot pin whose lower end is welded to the tubular cross arm 137 and whose upper end is threaded and receives a rotatable lock nut 150. When the lock nut 150 is loosened the support means 142 can be pivoted about the axis of the pivot pin in the manner diagrammatically illustrated by the arrowheaded line 151.

The support means 141 includes a bar member 152 telescopically united with the hollow horizontally disposed bar 143. The bar member 152 is provided with a right-angle bend, an upstanding extending portion of the bar 152 being telescopically united with a vertically extending, hollow tubular support 153. A conventional thumbscrew 154 is provided for adjustably fixing the upwardly extending portion of the bar 152 to the vertically extending, hollow, tubular support 153. The tubular support 153 carries the left traction means 138 at its uppermost end. The adjustable traction means 138 will not be described in detail, its construction being identical to the construction of the traction piece 51 and the traction piece 52 described in detail in conjunction with FIGS. 1-3.

The right support means 142 includes a bar member 155 in telescopic engagement with the hollow, horizontally disposed bar 147. The bar 155 is provided with a right-angled bend so that an end portion of the bar 155 extends vertically. The vertically extending, hollow, tubular support 156 is telescopically united with the vertically extending portion of the bar 155, a thumbscrew 157 being provided for adjustably fixing the bar 155 to the vertically extending support member 156. The right traction means 140 is supported by the vertically extending support member 156. The details of the construction of the right traction means 140 will not be described in detail, its construction being essentially identical to the construction of the right and left traction means 51 and 52 described in detail in conjunction with FIGS. 1-3.

The horizontally disposed bar 147 and the bar member 155 may be adjustably fixed by conventional thumbscrew 158. The horizontally disposed bar 143 and the bar member 152 may similarly be adjustably fixed by thumbscrew (not illustrated).

A pair of horizontally extending bars 160 are welded to the vertically extending portion of the post 135, each of the bars extending in differing radial directions from beneath the table 121. The well leg support, generally designated by the numeral 161, is welded to a horizontally extending tubular member 162 which is telescopically positioned over one or the other of the bars 160, as best illustrated in FIG. 9, a thumbscrew 163 being provided for removably fixing the horizontally extending tubular member 162 to one or the other of the hori-

izontally extending bars 160. Thus, the well leg support 161 may be positioned on either side of the table 121 to support one of a patient's lower extremities.

Extending horizontally from the frame 125 beneath the narrower hip supporting portion 123 of the table 121 is a bar member 164 in telescopic engagement with a horizontally extending, hollow support member 165 which is removably fixed to the bar member 164 by a conventional thumbscrew 166 as best illustrated in FIG. 9. A port 167 is adjustably positioned in a bore 168 formed in the outermost end of the horizontally extending, hollow support member 165, being adjustably secured thereto by a conventional thumbscrew 170. The cylindrical knee support 171 is fixedly connected to the uppermost portion of the post 167. The post 167 may be adjusted vertically and radially, as illustrated respectively by the arrowheaded lines 172 and 173, by simply loosening the thumbscrew 170. The position of the cylindrical knee support 171, in a horizontal plane, may be changed by simply loosening the thumbscrew 166, as diagrammatically illustrated by the arrowheaded line 174.

Since the well leg support 161, the cylindrical knee support 171, and the support means 141 and 142 are all cantilevered from the frame member 125, no vertical posts appear in the hip support area. Thus, the entire upper extremity and lower extremity are made subject to unhindered X-ray examination. It will be appreciated that the well leg support 161, the cylindrical knee support 173, with its associated structure, the support means 141 and the support means 142 are all vertically movable with the table 121.

A third embodiment of a fracture reduction apparatus is partially illustrated in FIG. 10, like reference numerals, with prime signs added, designating like parts to those shown and previously described in detail in conjunction with FIGS. 8 and 9. The third embodiment of a fracture reduction apparatus illustrated in FIG. 10 differs from the apparatus illustrated in FIGS. 8 and 9 in that only three horizontally extending leg members 175 are provided, one of the leg members, as shown in FIG. 10, having two spaced-apart floor engaging lockable casters 176 associated therewith. The hub 144' is rotatably mounted on an upstanding stud bolt (not illustrated) which is provided with the locking nut 145'. A hollow horizontally disposed bar 143' is welded to the hub 144'. A second stud bolt 177 is provided for receiving a hub similar to the hub 144'. The remainder of the fracture reduction apparatus illustrated in FIG. 10, but not explicitly shown therein, may be constructed similarly to either the fracture reduction apparatus illustrated in FIGS. 1-3 or the fracture reduction apparatus illustrated in FIGS. 8 and 9.

It will be appreciated that the support means 53 and 54, shown in FIGS. 1-3, and the support means 141 and 142, shown in FIGS. 8 and 9, may be moved through an arc of 180° thereby providing for advantageous positioning for placing the upper extremities of a patient in traction.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A fracture reduction apparatus comprising a main frame having a lowermost frame portion, table means including a table top for supporting a patient, means for raising and lowering said table means relative to said lowermost frame portion, a pair of traction bars, means supporting said traction bars in cantilevered relationship from said table means for permitting said traction bars to be simultaneously raised and lowered with said table means, and said pair of traction bars each defining with said supporting means an upwardly open generally U-shaped profile as viewed in side elevation thereby permitting unhampered use of a C-arm fluoroscope during the reduction and pinning of fractures.

2. The fracture reduction table as defined in claim 1 wherein each traction bar includes horizontally telescoping and vertically telescoping sections.

3. The fracture reduction table as defined in claim 1 wherein each traction bar includes horizontally telescoping and vertically telescoping sections, and a generally L-shaped bridging member common to each associated vertical and horizontal section.

4. The fracture reduction table as defined in claim 1 wherein said supporting means depends from said table means and includes a lowermost portion adjacent said lowermost frame portion, and means for pivotally mounting each of said traction bars to said lowermost supporting portion for pivoting movement about a vertical axis.

5. The fracture reduction table as defined in claim 1 including a countersupport, support means for said countersupport beneath said table top and projecting generally horizontally away therefrom, means for adjusting the degree of projection of said support means, and means between said support means and said countersupport for vertical relative adjustment therebetween.

6. The fracture reduction table as defined in claim 1 wherein each traction bar includes horizontally and vertically disposed sections respectively vertically and horizontally remote from said table means, a pair of foot supports, means supporting each foot support in cantilevered relationship from its associated vertical section, and means adjustably positioning each foot support relative to its associated supporting means.

7. The fracture reduction table as defined in claim 1 including a well leg support, support means for said well leg support beneath said table top for projecting laterally away therefrom, means for adjusting the degree of projection of said well leg support, and means between said support means and said well leg support for vertical relative adjustment therebetween.

8. The fracture reduction table as defined in claim 1 wherein the said traction bars are otherwise unsupported except for the support offered thereto by said cantilevered supporting means.

9. The fracture reduction table as defined in claim 1 wherein said cantilevered supporting means includes a generally L-shaped support element as viewed in side elevation defined by a vertical post and a lowermost horizontally projecting base, and means for pivotally mounting each of said traction bars to said projecting base for pivoting movement about a vertical axis.

10. The fracture reduction table as defined in claim 1 wherein said cantilevered supporting means includes a generally L-shaped support element as viewed in side elevation defined by a vertical post, a lowermost horizontally projecting base, and means for pivotally

mounting each of said traction bars to said projecting base for pivoting movement about a vertical axis, said projecting base is of a generally T-shaped profile as viewed from above, and said pivotally mounting means mounts one of said traction bars to an end of a cross bar of said T-shaped base.

11. The fracture reduction table as defined in claim 2 wherein said supporting means depends from said table means and includes a lowermost portion adjacent said lowermost frame portion, and means for pivotally mounting each of said traction bar horizontal sections to said supporting means lowermost portion.

12. The fraction reduction table as defined in claim 2 wherein said supporting means depends from said table means and includes a lowermost portion adjacent said lowermost frame portion, means for pivotally mounting each of said traction bar horizontal sections to said supporting means lowermost portion, said horizontal and vertical traction bar sections are each of a telescope construction, and a generally L-shaped bridging member common to each associated vertical and horizontal section.

13. The fracture reduction table as defined in claim 2 wherein the said traction bars are otherwise unsupported except for the support offered thereto by said cantilevered supporting means.

14. The fraction reduction table as defined in claim 3 wherein the said traction bars are otherwise unsupported except for the support offered thereto by said cantilevered supporting means.

15. The fracture reduction table as defined in claim 3 including a countersupport, support means for said countersupport beneath said table top and projecting generally horizontally away therefrom, means for adjusting the degree of projection of said support means, and means between said support means and said countersupport for vertical relative adjustment therebetween.

16. The fracture reduction table as defined in claim 9 wherein each traction bar includes horizontally telescoping and vertically telescoping sections.

17. The fracture reduction table as defined in claim 9 wherein each traction bar includes horizontally telescoping and vertically telescoping sections, and a generally L-shaped bridging member common to each associated vertical and horizontal section.

18. The fracture reduction table as defined in claim 10 wherein each traction bar includes horizontally telescoping and vertically telescoping sections.

19. The fracture reduction table as defined in claim 10 wherein each traction bar includes horizontally telescoping and vertically telescoping sections, and a generally L-shaped bridging member common to each associated vertical and horizontal section.

20. The fracture reduction apparatus as defined in claim 1 wherein each traction bar includes horizontally telescoping and vertically telescoping sections, a generally L-shaped bridging member common to each associated vertical and horizontal section, said supporting means depends from said table means and includes a lowermost generally vertical post terminating in a horizontally projecting base of a generally T-shaped profile as viewed in top plan, means for pivotally mounting each horizontal traction bar section to an end of a cross bar of said T-shaped base for pivoting movement about a vertical axis, said traction bars being otherwise unsupported except for the support offered thereto by

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said cantilevered supporting means, a counter support, support means for said counter support beneath said table top, and projecting generally horizontally away therefrom, means for adjusting the degree of projection of said counter support support means, means between 5 said counter support support means and said counter support for vertical relative adjustment therebetween, a well leg support, support means for said well leg support beneath said table top and projecting laterally away therefrom, means for adjusting the degree of pro- 10

jection of said well leg support, means between said well leg support means and said well leg support for vertical relative adjustment therebetween, a pair of foot supports, means supporting each foot support in cantilevered relationship from an associated vertical traction bar section, means for adjustably positioning each foot support supporting means varying distances from said table top, and means for locking all relatively adjustable elements individually as desired.

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