

April 17, 1934.

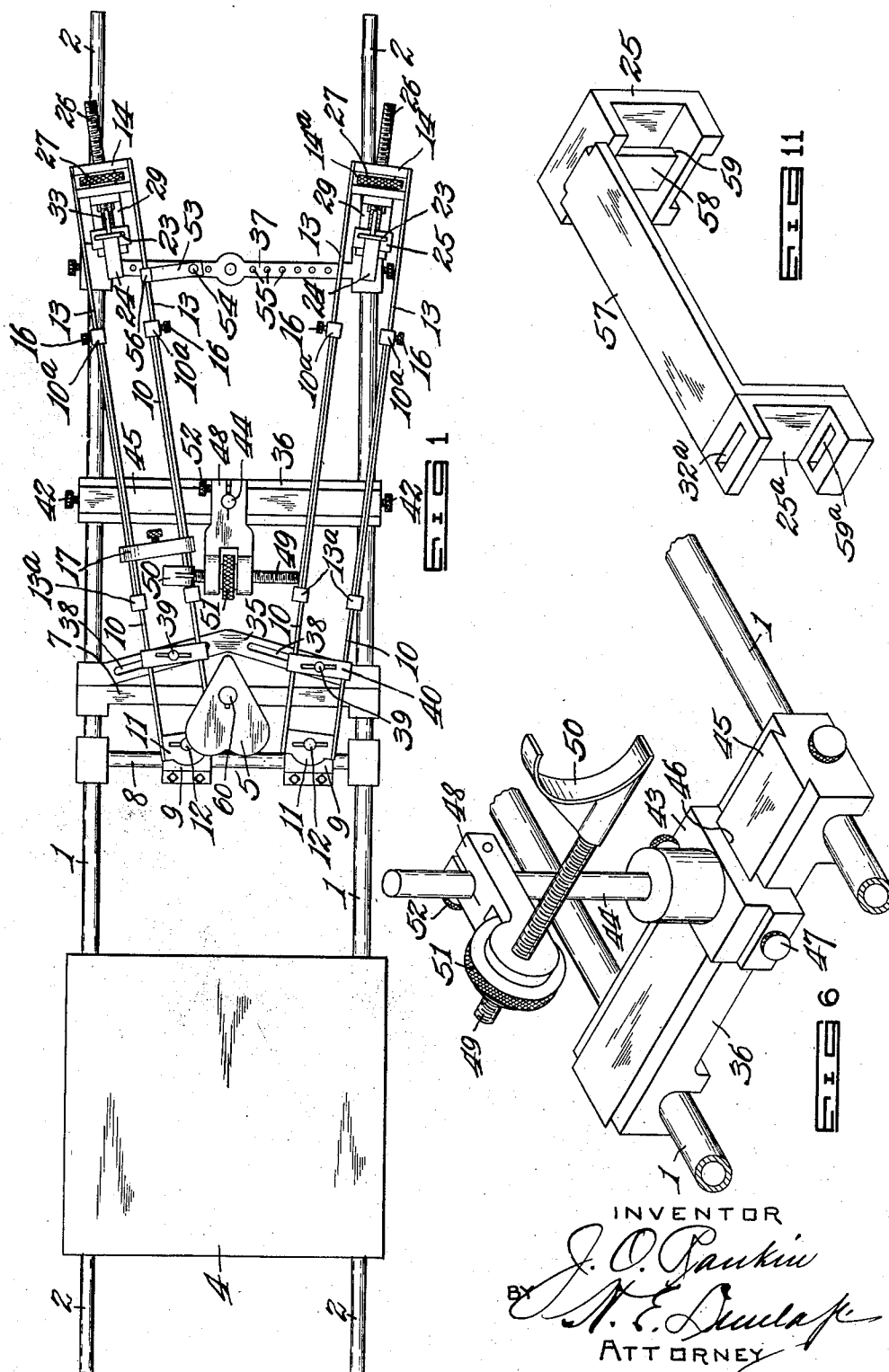
J. O. RANKIN

1,955,017

FRACTURE REDUCING TABLE

Filed Nov. 5, 1931

5 Sheets-Sheet 1



April 17, 1934.

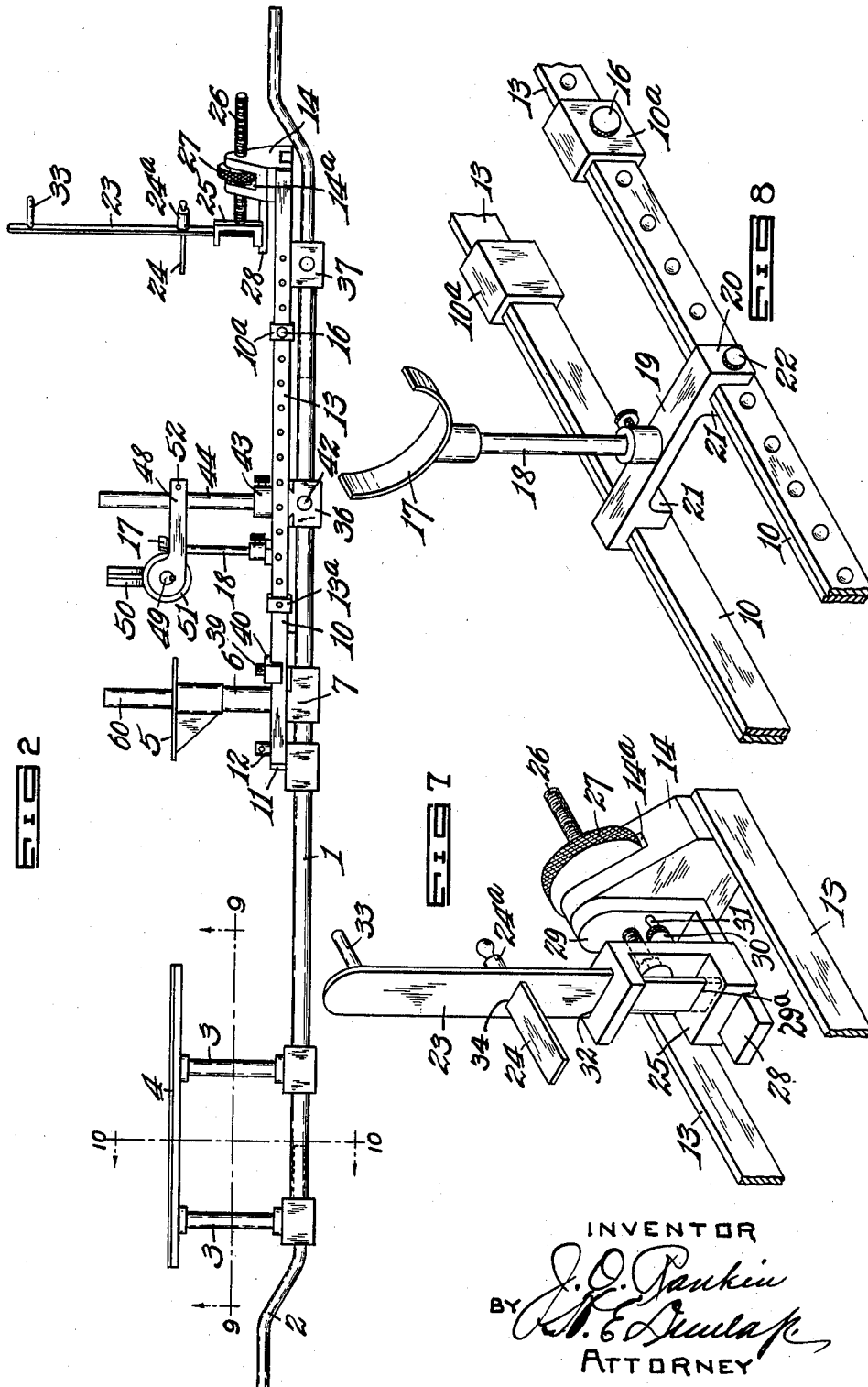
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FRACTURE REDUCING TABLE

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5 Sheets-Sheet 2



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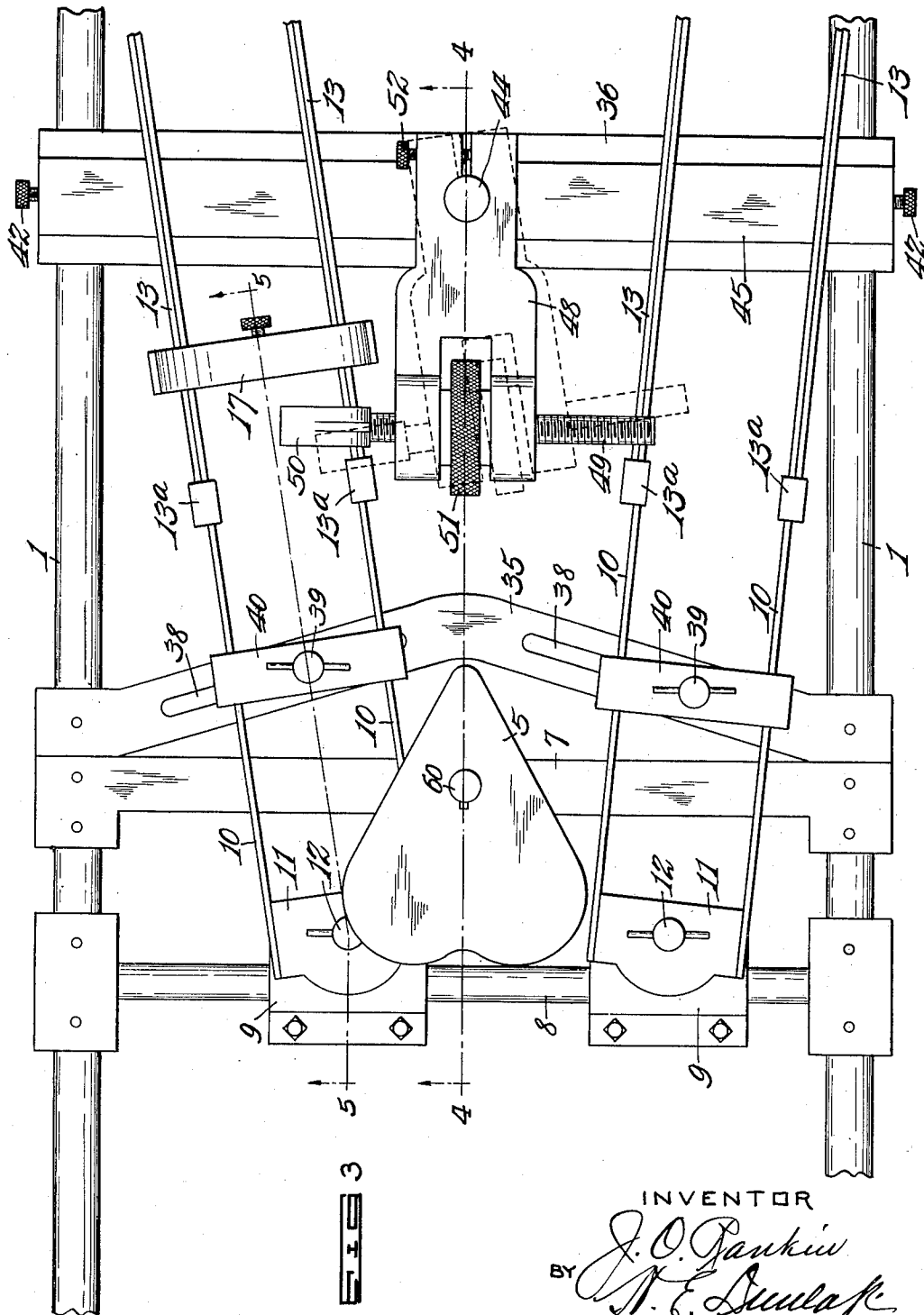
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FRACTURE REDUCING TABLE

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5 Sheets-Sheet 3



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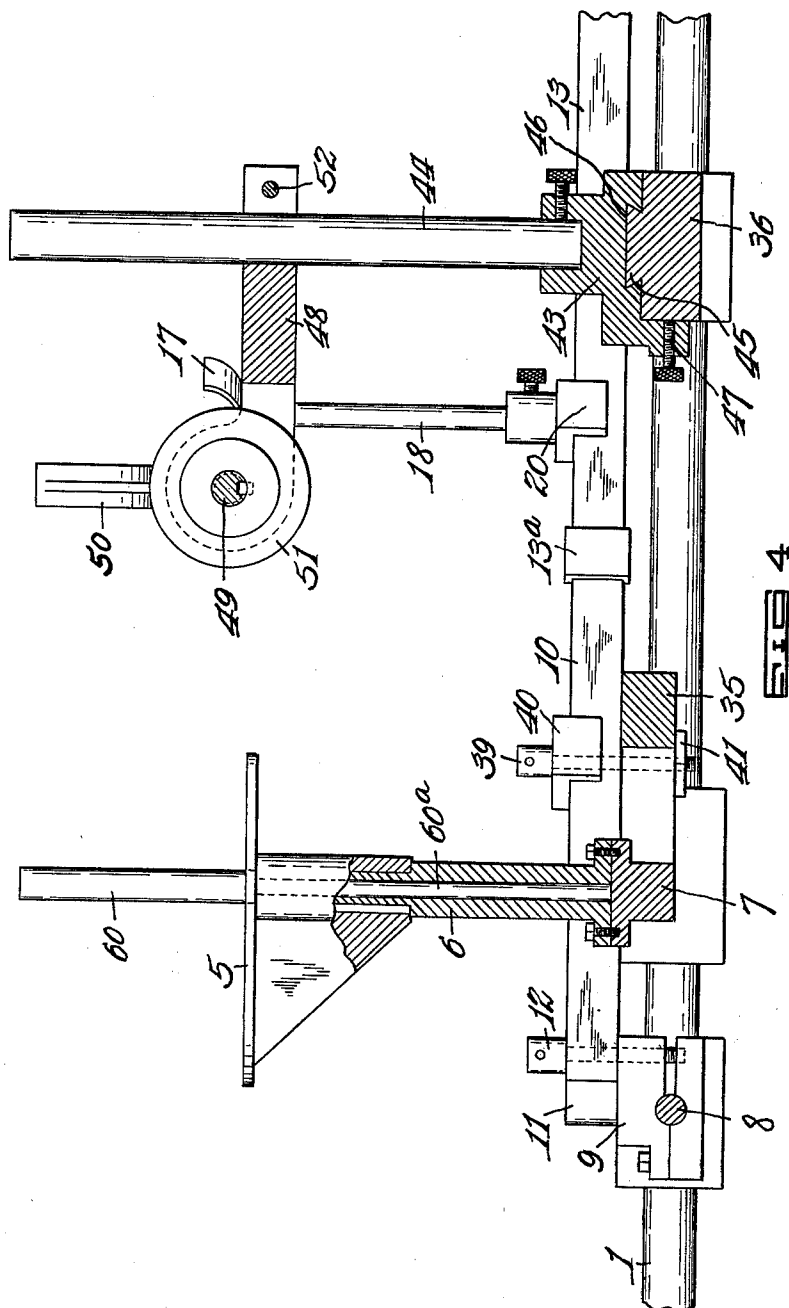
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FRACTURE REDUCING TABLE

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5 Sheets-Sheet 4



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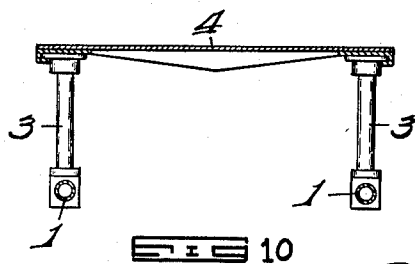
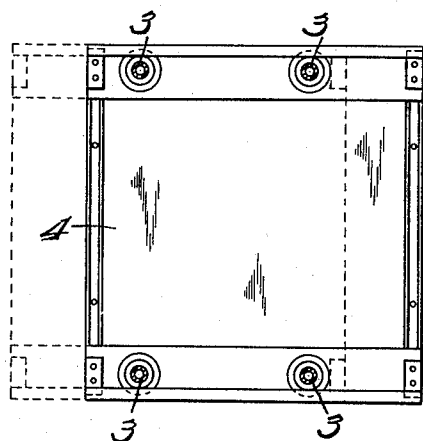
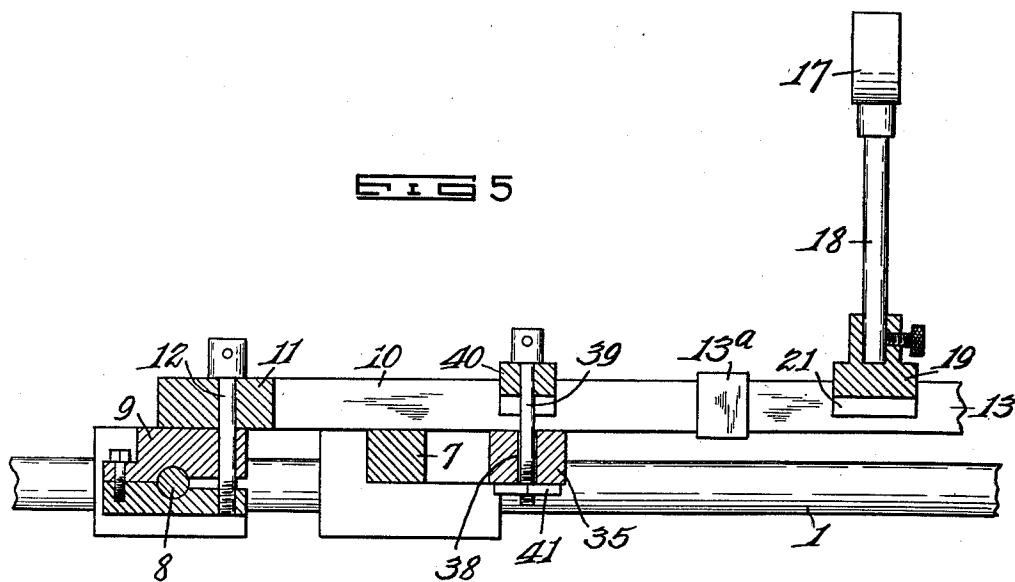
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FRACTURE REDUCING TABLE

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5 Sheets-Sheet 5



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FRACTURE REDUCING TABLE

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9 Claims. (Cl. 128—84)

This invention relates broadly to surgical apparatus, and more specifically to a fracture reducing table or stretcher.

The primary object of the invention is to provide an improved and practical form of portable apparatus designed particularly for use in conjunction with a fluoroscope in the reduction of fractures and in the correction of any malposition of bone ends or fragments.

A further object is to provide a fracture apparatus which is adjustable to meet varying conditions of use and by means of which, under fluoroscopic guidance, broken bones of the legs, pelvis, or spine may be adjusted to proper relation and so maintained during application of the necessary splints, bandages, or casts.

A still further object is to provide a device of the character mentioned embodying means for applying traction to the affected limb or part and also means for applying either the counter traction or pressure necessary accurately to position bone ends in proper or normal anatomical relation and to maintain such relation during the application of the correctional and immobilizing devices.

With these and other important objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of my invention;

Figure 2 is a side elevation of the same;

Figure 3 is an enlarged top plan view of a fragmentary midlength portion of the invention;

Figures 4 and 5 are sections taken substantially on lines 4—4 and 5—5, respectively, of Fig. 3;

Figure 6 is an enlarged perspective view of the counter traction and pressure device;

Figure 7 is a similar view of the foot support and the therewith associated traction exerting mechanism;

Figure 8 is a similar view of the leg support and a fragmentary portion of the leg frame;

Figure 9 is a sectional elevation of the head and shoulder rest, the section being taken on line 9—9, Fig. 2;

Figure 10 is a cross section of the same taken on line 10—10, Fig. 2; and

Figure 11 is an enlarged perspective view of the extension frame for the foot support of the traction device.

Referring to said drawings, 1 designates each of two parallel longitudinally extending members, preferably tubular in form, which constitute the

side rods of a stretcher whereon, as will hereinafter be described, may be disposed the body of a patient to be treated, said members being maintained in rigid relation, as by one or more suitably located cross members hereinafter referred to. Telescopically received by the ends of said tubular members are rods 2 constituting carrier handles for the stretcher and which are preferably readily removable to facilitate unobstructed movements of the operating surgeon and attendants about the ends of the stretcher.

Mounted upon upright posts 3 carried by the side rods 1 adjacent to one end of the latter is a plate 4 which constitutes a rest for the head and shoulders of a reclining patient, while the hips of such patient rest upon a support 5 which is carried by an upright post 6 mounted on a transverse bar 7 which has its ends mounted upon and shiftable along said rods 1. Said transverse bar 7 and said shoulder rest 4 are relatively positioned to suit the length of the body of the patient. Located intermediate said bar and said rest is a cross member or rod 8 rigidly connecting the side rods 1, and shiftable on said rod 8 at opposite sides of said hip support or rest are two head blocks 9, herein shown as of clamp form, upon which are pivotally mounted the adjacent ends of sectional leg supporting frames, one for each leg of the patient.

Each of said leg frames is formed of telescopically related sections, of which one comprises a pair of relatively spaced parallel bars 10 of appropriate length rigidly connected at one end, as by a member 11 which is attached by a vertically disposed pivot pin 12 to the adjacent head block 9. Said pin 12 serves not only as a pivot upon which the leg frame may be swung horizontally to any desired angle relative to the stretcher frame, but also an adjusting screw by means of which the head block 9 is secured in adjusted position on the cross rod 8 and, at the same time, by means of which the angular adjustment of said leg frame is maintained. The other section of each leg frame includes a pair of bars 13 corresponding to the bars 10 and suitably connected at their outer ends, as by an interposed member or block 14.

The bars of the leg sections have fixed upon the free ends thereof keeper-like members 10^a and 13^a, as shown, the keepers of the bars of each section having the bars of the other section slidable therethrough to adjust the length of the leg frame. Set screws 16 are provided in the keeper-like members of at least one of said sec-

tions, whereby said sections may be secured in their adjusted relation.

A leg support 17, preferably of the arcuately curved form shown, is carried by an upright post 18 which is detachably mounted upon a bar 19 arranged for mounting upon either of the leg frames, as may be required. Said bar embodies downwardly extending jaw-like lugs 20 and 21 formed integral with each of its end portions and occupying spaced parallel relation for disposal in straddling relation to the bars 10 and 13 of the leg frame, as is best shown in Fig. 8, set screws 22 being provided in the lugs 20 for impinging upon the bars of the leg frame to secure said leg support in adjusted position. Said leg support is designed for transfer from one of the leg frames to the other, as may be required.

The member or block 14 hereinbefore referred to may be constructed to provide a mounting for a foot support which, as herein shown, comprises an upright post 23 which carries a rest 24 for the heel of the patient's foot and which has its lower end attached to a base 25. Said base is carried in fixed relation to an end of a horizontally disposed threaded bolt or screw 26 which is mounted in or on and longitudinally shiftable with respect to said block 14.

A feed wheel 27 is carried by said bolt 26 within a kerf 14^a provided therefor in said block, and said wheel is rotatable by hand to shift said bolt longitudinally for effecting advance and retraction of the thereby carried foot support. Obviously, the device just described constitutes a conveniently operable means of applying powerful traction for effecting the stretching of a leg of the patient to the extent that the ends of broken bones of said leg may be slightly separated or positioned in alinement. Further, said device provides a means of micrometer-like character whereby stretching of the leg to the required extent may accurately be effected.

The base 25 is herein shown as of substantially U-shape with one of its parallel members seated upon and shiftable along a horizontal arm 28 of an L-shaped bracket 29 which has its opposite or vertical arm mounted upon said bolt 26 between said base 25 and said block 14, the transverse member connecting portion of said base 25 having said bolt fixed thereto, as shown. Said bracket is adapted to be rocked laterally in either direction for applying torsional stress through the supported foot of the patient to dispose the ends of the fractured bone in the required relation. A set screw 30 is adjustable for securing the rockable bracket in adjusted position, said screw being directed through an arcuately curved slot 31 provided therefor in the bracket arm 29 and having its pointed end threaded into the block 14.

The post 23 of the foot support, which is of thin plate form, is removably mounted upon the base 25, having its lower end portion insertable through a slot 32 provided therefor in the upper of the parallel members of said base to a position wherein it seats in a socket 29^a provided therefor in the lower of said members, as shown in Fig. 7. An angularly disposed handle 33 fixed on the back of the post provides convenient means whereby the post may be grasped for inserting it in and withdrawing it from its firmly seated position.

The heel rest 24, provided in flat plate form, is preferably removable, being removably mounted in a slot 34 provided therefor in said post. A rearwardly projecting handle 24^a formed on said

rest provides means whereby the latter may conveniently be grasped for effecting insertion and withdrawal thereof relative to its receiving slot 34.

It is to be understood that in use sections of the leg supporting frame are telescoped to adjust said frame to the approximate length of the leg of the patient which is supported upon the leg rest 17, positioning the foot supporting post for receiving the sole of the patient's foot against the post 23. Following firm attachment or strapping of the foot to the post, the hand operated screwfeed wheel 27 may be rotated to shift the foot support to effect application of the required leg stretching traction; and the required twisting or torsional force is obtainable through rocking of the foot support laterally relative to the leg frame, following which said support is secured in adjusted position by means of the adjusting screw 30.

Following application of a bandage or a cast to the foot, effected by enclosing the post 23 with the foot, said post may be withdrawn in an upward direction without disturbing such bandage or cast.

The sectional leg frames, pivoted at one end, as hereinbefore explained, are supported by and are laterally shiftable upon the top surfaces of the cross bar 7 and of cross members 35, 36 and 37 carried by the tubular members 1 of the stretcher frame, said cross members preferably having their said surfaces located in a common horizontal plane. Said cross member 35, located forwardly with respect to said bar 7, is provided with longitudinal slots 38 in or along which are directed pivot pins 39 through yokes 40 seated upon and engaged with the bars 10 of the pivoted sections of the leg frames. Said pivot pins have nuts 41 threaded upon their lower projecting ends and are adapted for rotation relative to said nuts for clamping said leg frames to said cross member for maintaining said frames in angularly adjusted relation to the stretcher frame.

Located in suitable position between said cross members 35, 37, the latter being positioned adjacent to the forward end of the stretcher frame, is the transverse member 36 which has its opposite ends shiftable mounted on the frame members 1 and which is adapted to be secured in adjusted position by means of set screws 42. Mounted upon and shiftable along said member 36 is a base piece 43 which is socketed for the reception of the lower end of an upright post 44. Said member 36 has formed on its upper face a longitudinally extending rib 45 of dovetail form which is received within a corresponding channel 46 provided in the under side of said base piece 43 and along which said base piece is shiftable. A set screw 47 carried by said base piece is adapted to be manipulated for securing the latter in adjusted position.

Mounted upon said post 44 is a vertically adjustable arm 48 which constitutes a support for a counter traction and pressure device designed for operation to exert a transversely directed force for shifting laterally one of the two ends of the broken leg bone to properly position such end relative to the other. Said device comprises a threaded rod 49 which is mounted transversely in and longitudinally shiftable with respect to the outer end of said supporting arm 48 and which carries on an end thereof an arcuately curved member 50 adapted to be disposed in seated relation to the inner side of the injured leg which is supported over one of the two sectional leg

frames. Said outer end of the arm 48 is bifurcated, and mounted on said threaded rod 49 between the parallel branches is a feed wheel 51 which is rotatable by hand for effecting longitudinal shifting of said rod for exerting force through said leg contacting member 50. Obviously, such force, according to the direction of shifting movement imparted to said rod, may be exerted for applying either pressure or counter traction to the leg of the patient. When the latter, a strap or tape passed about the leg is suitably attached to said member 50.

The arm 48 is secured upon the post 44 substantially as shown, a set screw 52 being provided whereby said arm may be drawn into and released from clamping relation to said post, as is best shown in Figs. 3 and 6. Manifestly, said arm may be shifted to occupy varying positions to accommodate the member 50 to any angular position assumed by the leg which is to be operated upon. Further, it will be understood that the pressure and counter traction device described may be disposed for application to either leg, as may be required, it being necessary only when reversal of position is required, to detach the threaded rod 49 and reverse its position relative to its supporting arm 48.

The cross member 37 may have associated therewith a brace 53 engageable with a bar of either of the sectional leg frames adjacent to the forward end whereby such frame may be held rigidly against lateral swinging movement. Said brace has strap-like form and is adapted to be detachably secured to said member, as by means of a pivot pin 54 directed into one of a plurality of holes 55 provided therefor in said member. The opposite end of said brace has formed thereon a hook 56 adapted to assume overlying partially embracing a relation to the bar which is to be braced, as shown in Fig. 1.

To adapt the foot support for use in treatment of a child, or on persons of such short stature that adjustment of the sectional leg frame to suit the leg length is not otherwise readily obtainable, an extension mounting for the post 23 of the foot support is provided. Said mounting, illustrated in Fig. 11, comprises an extension bar 57 adapted for mounting upon the base 25 of the foot support, said bar having at an end thereof a downwardly extending lip 58 adapted to be directed through the slot 32 to a position wherein its end seats in the socket 59 of said base. Said bar, which is made of appropriate length, extends rearwardly and carries upon its rear end a fixed member 25^a, similar to said base 25 and which is adapted to serve as a support for the detachable post 23, having therein a slot 32^a and a socket 59^a corresponding to the slot and socket, respectively, of said base 25, hereinbefore described. Manifestly, the extension mounting described provides convenient means adapting the leg traction device for employment in cases in which its use would otherwise not be practicable.

The head and shoulder rest 4 is arranged for longitudinal shifting movements relative to its supports to render it adjustable for use by patients of different statures.

In practice, the patient reclines upon the apparatus with the head and shoulders resting upon the support 4 which has previously been adjusted to proper position, and with the hips supported on the plate 5 of the hip rest. The leg to be treated or operated upon is mounted in overlying relation to the corresponding sectional leg frame and rests upon the leg support 17 while

the foot is supported on the heel rest 24. The post 6 is of tubular form and has detachably mounted therein the stem portion 60^a of a crotch pin 60 which projects above the level of the hip rest 5 and constitutes means by which shifting of the patient is prevented under any stress or conditions of use of the traction exerting mechanism as applied to a leg of the patient for purposes of abduction.

It is to be noted that the parts of the sectional leg frames are so disposed relative to a thereby supported leg that vision of the operator is in no wise obstructed in employing a fluoroscope and that the making of X-ray photographs is not interfered with. Said parts are also preferably made of aluminum or an aluminum alloy which will interfere little, if any, with fluoroscopic observation. Further, it will be understood that the parts of the structure and their arrangement are such that ready access to any part of the leg and body, or torso, of a patient for the application of bandages or casts is permitted.

The apparatus may be employed, if and when found desirable, as a portable stretcher whereby the patient may be carried or transferred from place to place, and it is adapted for mounting upon a table or other horizontal support.

What is claimed is—

1. In a fracture reducing apparatus, a main frame, a leg supporting frame adjustable angularly with respect to said main frame, said leg frame consisting of relatively telescopic sections embodying spaced parallel bars, a fixed member mounted on the outer end of the shiftable section, a threaded rod shiftablely carried by said member, a base fixed on said rod and shiftable therewith, an extension member mountable on said base, and a foot supporting post adapted for mounting either upon said base or upon said extension member.

2. In a fracture reducing apparatus, a main frame, a leg supporting frame adjustable angularly with respect to said main frame, said leg frame consisting of relatively telescopic sections embodying spaced parallel bars, a fixed member mounted on the outer end of the shiftable section, a threaded rod shiftablely carried by said member, a base fixed on said rod and shiftable therewith, an extension member mountable on said base in a position wherein it extends rearwardly from the latter, and a foot support mountable interchangeably upon said base and upon said extension member.

3. In a fracture reducing apparatus, a main frame including side rods and cross members, a pair of leg supporting frames pivotally mounted on one of said cross members, each of said leg frames comprising relatively telescopic sections embodying spaced parallel bars, each of said leg frames being independently adjustable angularly relative to said frame, a transverse bar connecting said side rods and being adjustable along said side rods, a base adjustable along said bar, an upright post mounted on said base, an arm adjustable vertically and angularly relative to said post, adjustable means including a threaded member carried on said arm whereby either advancing or retracting force may be exerted at an angle to said rods, a vertically adjustable leg support adapted to be removably mounted on the parallel bars of said leg supporting frames, and a brace having one end thereof pivotally attached to a second cross member, the opposite end of said brace being engageable with one of the parallel bars of the leg frames whereby such frame may

be rigidly held against lateral swinging movement.

4. In a fracture reducing apparatus, a stretcher frame having side rods and cross members connecting the rods, a pair of blocks slidable on one of said cross members, a leg frame for each block, and combined means including a member for pivotally connecting each leg frame to its block and for also rigidly connecting the frame to the block and the latter to the cross member following adjustment of the block and its leg frame.

5. In a fracture reducing apparatus, a stretcher frame having side rods and cross members connecting the rods, a pair of split clamping blocks slidable on one of said cross members, a leg frame for each block, and a pin for pivotally connecting each leg frame to its block and having a threaded portion engaged with the split parts of the block to clamp the latter to the cross member and simultaneously hold the leg frame in its adjusted pivoted position.

6. In a fracture reducing apparatus, a main frame, a leg frame carried by the main frame, a foot rest, a support carried by the leg frame, a threaded rod carried by the support and connected to the foot rest to slide the latter, a bracket pivoted on the rod, means to mount the foot rest for sliding movement on the bracket, and means to hold the bracket in its adjusted pivoted position.

7. In a fracture reducing apparatus, a main frame, a leg frame carried by the main frame, a foot rest, a support carried by the leg frame,

a rockable bracket mounted on the support, means to hold the bracket in adjusted position against rocking, means to slidably mount the foot rest on the bracket, and means to effect sliding movement of the foot rest on the bracket.

8. In a fracture reducing apparatus, a main frame, a leg frame carried by the main frame, a member carried by the leg frame, a supporting element, means connected to said member and to the supporting element for effecting adjustment of the element longitudinally of the leg frame, a foot supporting device, means for connecting the foot supporting device to the element, and an extension member having means to connect the foot supporting device thereto and also having means to interchangeably engage the said means for connecting the foot device to the element upon removal of said foot device from the element.

9. In a fracture reducing apparatus, a main frame including side rods and cross members, a pair of leg frames each including a pair of spaced bars, means to mount each leg frame on one of the cross members for pivotal movement, another of the cross members having spaced openings along its length, a brace interposed in the space between the leg frames and having a part interchangeably engageable with the inner bar of either leg frame to hold the latter against pivotal movement, and means to pivotally mount the brace in a selected one of the openings whereby to enable the brace to be used with either leg frame and in various pivotal positions thereof.

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