

May 18, 1926.

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1,584,781

PORTABLE FRACTURE BED

Filed April 11, 1925

2 Sheets-Sheet 1

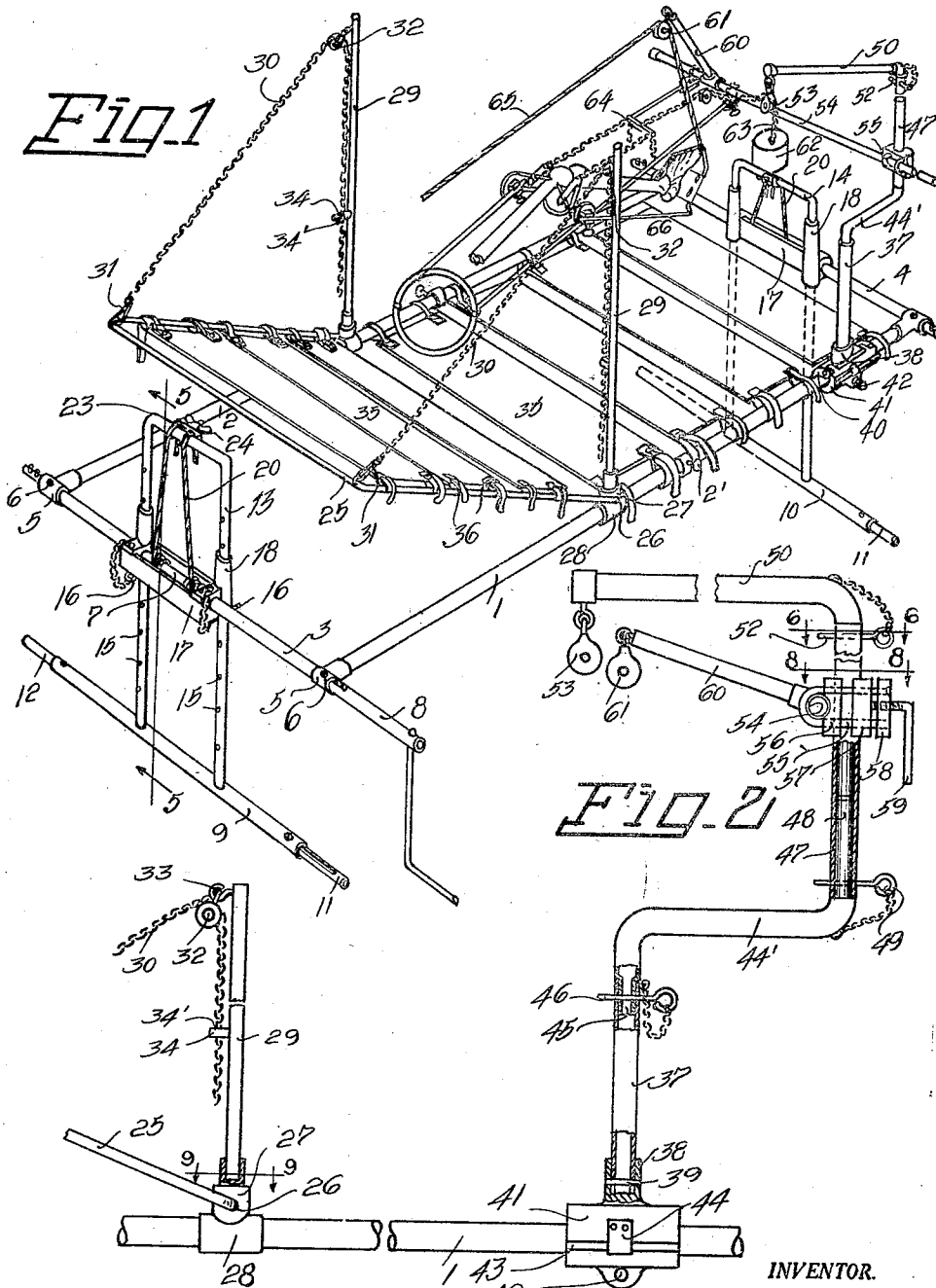


FIG. 2

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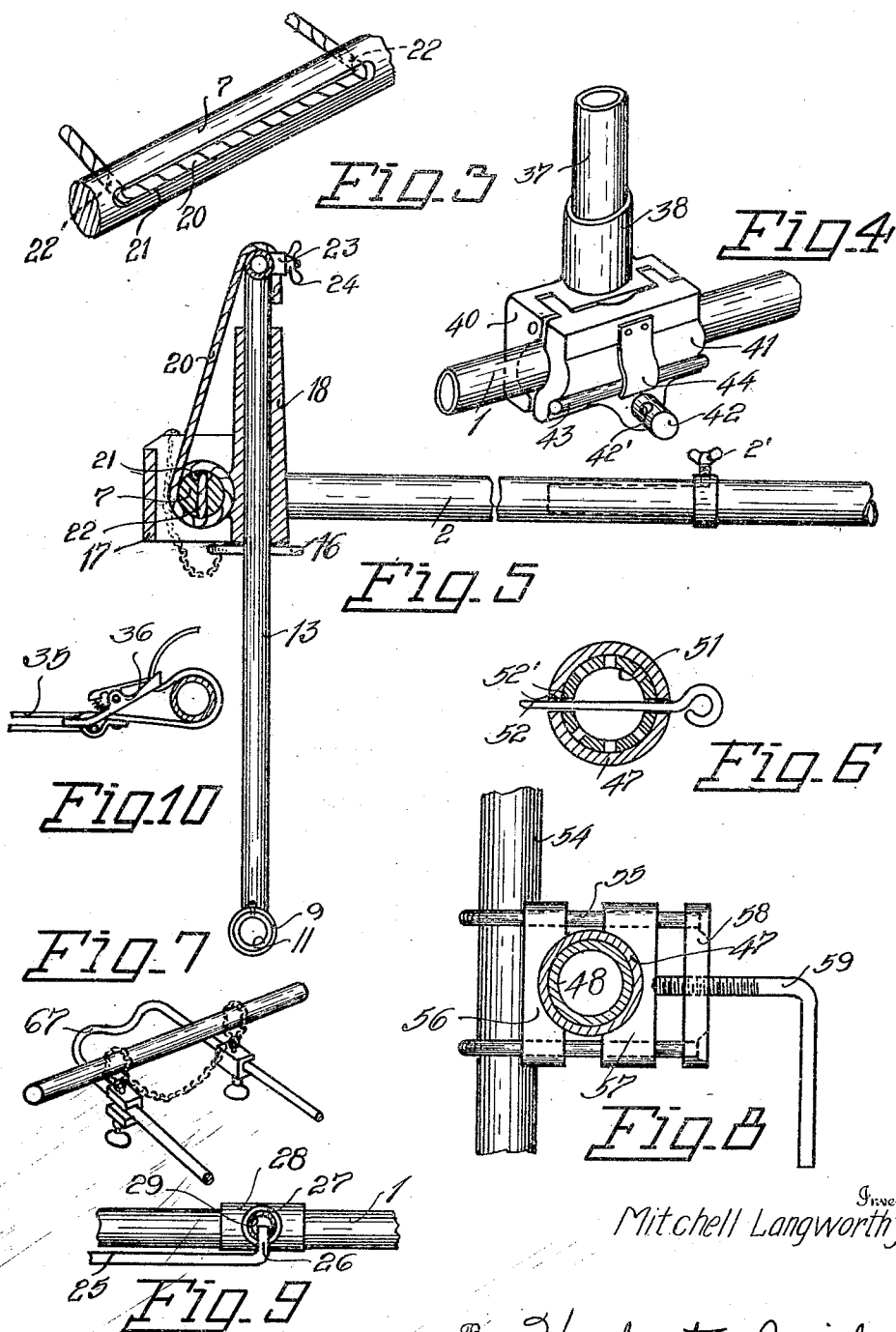
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

MITCHELL LANGWORTHY, OF SPOKANE, WASHINGTON.

PORTABLE FRACTURE BED.

Application filed April 11, 1925. Serial No. 22,338.

My present invention relates to improvements in portable fracture beds designed for surgical use, as in hospitals, and especially adapted for cases where it is desirable and necessary that patient shall be prevented from undue movement while recovering from an operation on a fractured bone.

By the utilization of my invention as embodied in the fracture bed and of its accessories, the patient may receive the necessary attention with respect to toilet, baths and comfort. The bed is adjustable to permit the patient to assume various positions, as sitting up or reclining, and certain accessories may be combined with the bed to permit necessary exercise of the fractured limb, as the femur of the leg, while the fracture is knitting. In the best surgical practice it is necessary, especially with fractures of the leg that the fractured limb after having been set shall be maintained in an immovable position during the process of knitting. And at times the patient must be removed as from the surgery to the X-ray room for observation. For these and other purposes I provide a portable surgical appliance or bed adapted to rest upon a cot and adapted for use as a stretcher frame or stretcher. Means are provided for elevating the bed from the cot preparatory to moving the bed as a stretcher from the cot, and means are provided for adjusting the back portion of the bed or stretcher frame. The invention consists in certain novel combinations and arrangements of parts as will hereinafter be more fully set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged in accordance with the best mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a perspective view of a fracture bed according to my invention illustrated in a position elevated with relation to the cot upon which it is adapted to rest, and adapted to be used as a portable stretcher for the patient.

Figure 2 is an enlarged detail view in side elevation with some parts in section showing the support for the adjustable back-portion of the bed together with a crane device for supporting accessories of the bed.

Figure 3 is a detail perspective view of a

portion of the hoisting or elevating device for the bed.

Figure 4 is a detail perspective view of a detachable supporting bracket for the crane accessories.

Figure 5 is an enlarged detail view partly in section at line 5—5 of Figure 1 showing a part of the elevating device one of which is located at each end of the fracture bed.

Figure 6 is a detail transverse sectional view at line 6—6 of Figure 2 showing a part of the crane.

Figure 7 is a detail view in perspective of a portion of the traction or exercising device used as an accessory of the bed.

Figure 8 is a detail view at line 8—8 of Figure 2.

Figure 9 is a detail view at line 9—9 of Figure 2.

Figure 10 is a detail view of the supporting strap and adjusting buckle.

The fracture bed which is convertible for use as a stretcher is made up of a main frame of rectangular shape comprising longitudinal side bars 1 and 2, which as shown in Figure 5 have telescoping parts so that their length may be varied and secured in adjusted position by means of set screws 2' in said figure of the drawing. At their ends these longitudinal side bars are joined by transverse end bars 3 and 4 that are spaced apart in sections from the longitudinal centers of the end bars and connected with the side bars by corner fixtures 5 and retaining pins 6.

Each sectional end bar is hollow and within each sectional end bar a hoisting or elevating shaft as 7 is encased adapted to be turned as by a detachable crank handle 8 on one end of the shaft.

This rectangular main frame or stretcher frame is suspended so that it may be elevated or lowered with relation to the cot upon which it is designed to rest, and as a support for the suspended frame I utilize two transversely extending, hollow bars 9 and 10. Within these end supporting bars are extensible rods 11 and 12, slidable with relation to the hollow bars 9 and 10 to adapt the fracture bed to different widths of cots.

Each supporting bar has an upright, inverted U-shaped frame as 13 and 14 rigid therewith and provided with transverse openings or holds 15 and retaining pins 16.

Two elevating devices are employed, one

at each end of the fracture bed, and each comprises a housing 17 that rigidly connects the spaced sections of the end bars 3 and 4, leaving the central portion of the hoisting shafts exposed. Each housing is fashioned with a pair of upright slide sleeves as 18, slidable on the arms of the inverted U-shaped frames 13 and adapted to be supported in adjusted position by the several pins 16 inserted in the desired perforations or holes 15 of the U-shaped frames.

For use in elevating the bed I employ hoist cables or cords 20 which are anchored to the central, exposed portions of the shafts 7 as indicated in Figure 3 where a longitudinal groove 21 in the shaft receives a portion of the cable and its two ends are passed through transverse openings 22 in the shaft. The two ends of each cable are anchored to the transverse arm of the U-shaped frame by means of a clamp block 23 and a clamp nut and bolt 24. Thus it will be apparent that either or both ends of the main frame may be elevated by turning the shafts 7 to wind the cable thereon to lift the main frame or bed to the desired elevation above the cot, either for removal of the stretcher or bed from the cot or for other desired purposes.

For the convenience and comfort of the patient the bed is provided with an adjustable back-portion in the form of a U-shaped frame 25, the ends of which are pivoted at 26 to upright sleeves 27 (Figure 9) of the collars 28 fixed on the opposite side bars 1 and 2. Rising from these fixtures or collars 28 are a pair of rigid posts 29 seated in sockets of the upright sleeves 27 and forming supports for two chains 30. One end of each chain is anchored as at 31 to the transverse arm of the back-portion and the chains pass over pulleys 32 suspended as by hooks 33 at the tops of the posts. By pulling on the free ends of these chains the patient or nurse may elevate the free end of the back-portion of the stretcher frame, and a guide sleeve 34 and retaining bolt 34' on each post may be utilized to hold the back-portion in adjusted position as for reclining as in Figure 1.

At suitable intervals along the main frame and back-portion are suspended transversely extending supporting straps 35 for the patient and these straps have detachable suspending devices and adjusting buckles (Fig. 10) as 36 whereby the straps may with facility be removed or adjusted as desired.

In combination with the fracture bed or convertible stretcher, I utilize accessories as traction or exercising devices for the use of the patient, and splints for the fracture, whereby the best possible conditions may be insured for a speedy and successful knitting of the bone as indicated in Figure 1.

For this purpose I employ an upright post 37 adapted to be used on either of the side bars of the main frame and seated at its lower end in a boss 38 and secured therein by a pin 39 passing through registering holes in these members. As best seen in Figure 4 the boss is integral with a jaw 40 having a complementary hinged jaw 41 that is adapted to be frictionally engaged or clamped on the side bar as 1. A clamp screw 42 is used to clamp the free portions of the jaws on the side bar and a turning bar 43 for the screw or bolt is used in customary manner for this purpose by insertion in the bolt hole 42' of the screw bolt. When not in use this turning bar may be housed by the spring keeper 44 secured to the clamp jaw 41.

In the post 37 a crane device is supported. The crane includes a horizontal arm 44' with an angular, reduced end 45 telescoping in the post and a retaining pin 46 is passed through registering holes in the reduced end and post end to hold the crane rigid with relation to its supporting post.

The crane includes additional sections to permit vertical and horizontal adjustment of its parts and a vertical tubular extension 47 rises from the horizontal arm 44' for the reception of a telescopic and adjustable rod 48, both of which are provided with registering holes for the reception of a retaining pin 49. The rod may be adjusted vertically or rotated horizontally to adjusted position for varying the position of the upper part of the crane device, and in all positions will be held by the retaining pin 49.

A horizontal suspending arm 50 is mounted at the top of the crane and provided with a perpendicular reduced head 51 to seat in the top end of the vertical tubular section 47 of the crane and a retaining pin 52 (Figure 6) is passed through registering holes 52' of these concentrically arranged members. In Figure 6 it will be seen that the reduced head of the suspending arm is provided with an annular series of openings in order that the head may be rotated in a horizontal plane to desired position and the pin used to lock it to the section 47.

At the free end of the suspending arm 50 is carried a pulley 53 for suspending an accessory as for instance a splint device and exercising apparatus for the patient as shown in Figure 1.

In connection with the crane I employ a transversely extending bracket arm or supporting bar 54 which is carried preferably by the vertical section 47 of the crane. By reference to Figure 8 it will be seen that the horizontal bracket arm is clamped by means of a horizontal U-bolt 55 to the vertical section 47 and two friction blocks or clamp blocks 56 and 57 are carried by the bolt at

one side of the bracket arm. The ends of the U-bolt are joined by a cross head 58 and an angular clamp screw or bolt 59 is used to securely attach the bracket arm to the vertical section of the crane.

This bracket bar is provided with an angular arm 60 located near one end and a pulley 61 is suspended from the free end of the arm, it being apparent that the bracket bar may be adjusted in its clamp device and U-bolt laterally of the frame or fracture bed. In Figure 1 the splint device and exercising apparatus are shown as supported from the bracket arm and crane respectively. A counterweight 62 is connected at the end of a suspending chain 63 which passes over the pulley 53 of the crane, and this chain suspends the exercising or traction apparatus indicated as 64. Another suspending chain 65 passes over the pulley 61 and suspends the splint device or apparatus 66, of which a knee yoke 67 is indicated in Figure 7.

From the above description taken in connection with my drawings it will be apparent that the appliance as a whole is composed of various detachable and adjustable parts compactly arranged and combined and readily accessible for various purposes. These features provide an apparatus or appliance requiring a minimum amount of labor, and insure convenience and facility on the part of the patient or attendant in the performance of the required services, to assure comfort and best possible conditions for the benefit of the patient and practice of the surgeon.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. The combination in a convertible stretcher-bed with a main frame, of a pair of supporting bars and supporting frames rigid therewith adjustable extensions on the ends of said bars, suspending cables anchored to said supporting frames above the main frame, winding devices on the main frame for said cables, and means for operating the said winding devices to vertically adjust the main frame.

2. The combination in a convertible stretcher-bed with a main frame having end

bars and operating shafts carried thereby, of stationary supports, slidable guide devices on the stationary supports rigid with said end bars, suspending cables anchored to said supports and operatively connected to said shafts, and means co-acting with said slidable guide devices for retaining the main frame in vertically adjusted position.

3. The combination in a convertible stretcher-bed with a main frame having a hollow sectional end bar and an enclosed operating shaft joining the sectional bar, of a stationary support, a suspending cable anchored to said support and operatively connected to said shaft between the spaced portions of the sectional bar, and means for retaining the main frame in adjusted position with relation to the support.

4. The combination with an adjustable frame of a stationary supporting frame having perforations therein, a suspending cable anchored to said supporting frame, a shaft forming part of the main frame and operatively connected with said cable, and detachable pins for co-action with the main frame and perforated supporting frame for retaining the main frame in adjusted position.

5. The combination with a main frame including spaced hollow end sections and an enclosed operating shaft in said sections, of a housing rigidly connecting said sections, a suspending cable, an inverted U-shaped supporting frame to which said cable is anchored, operative connections between said cable and shaft, guide sleeves rigid with the housing for engagement with said U-shaped frame, and means for retaining said main frame in adjusted position.

6. The combination in a convertible stretcher-bed with a main frame having end bars and operating shafts carried thereby, of stationary supports including perforated posts, slidable sleeves on said posts rigid with said end bars, removable pins for coaction with said perforated posts for supporting said sleeves, and suspending cables anchored to said supports and operatively connected to said shafts.

In testimony whereof I affix my signature,

MITCHELL LANGWORTHY.