Jan. 11, 1944. H. S. HOLLNAGEL 2,339,075

ADJUSTABLE BED

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Fig. 1.

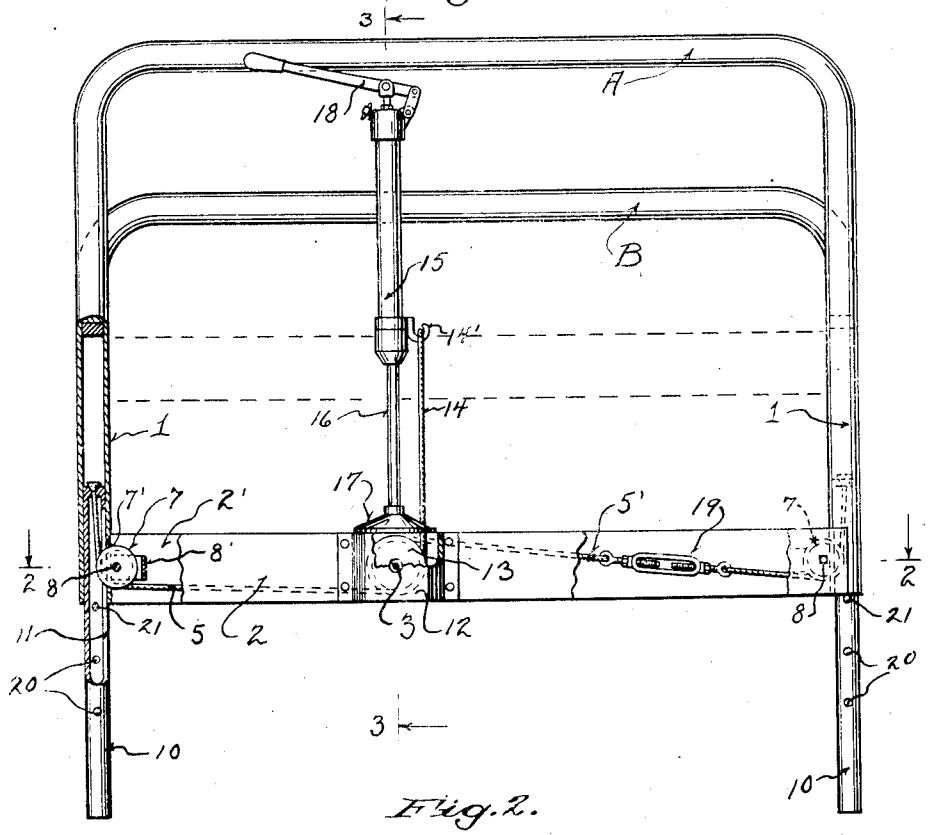
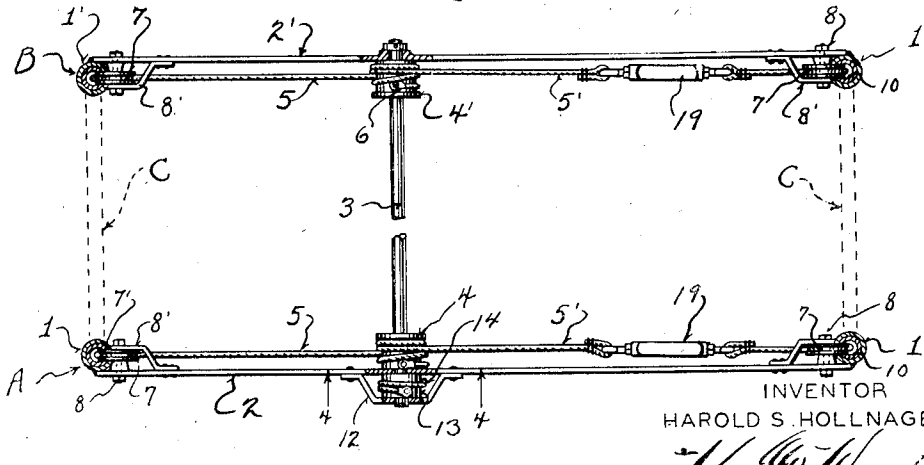


Fig. 2.



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Fig. 3.

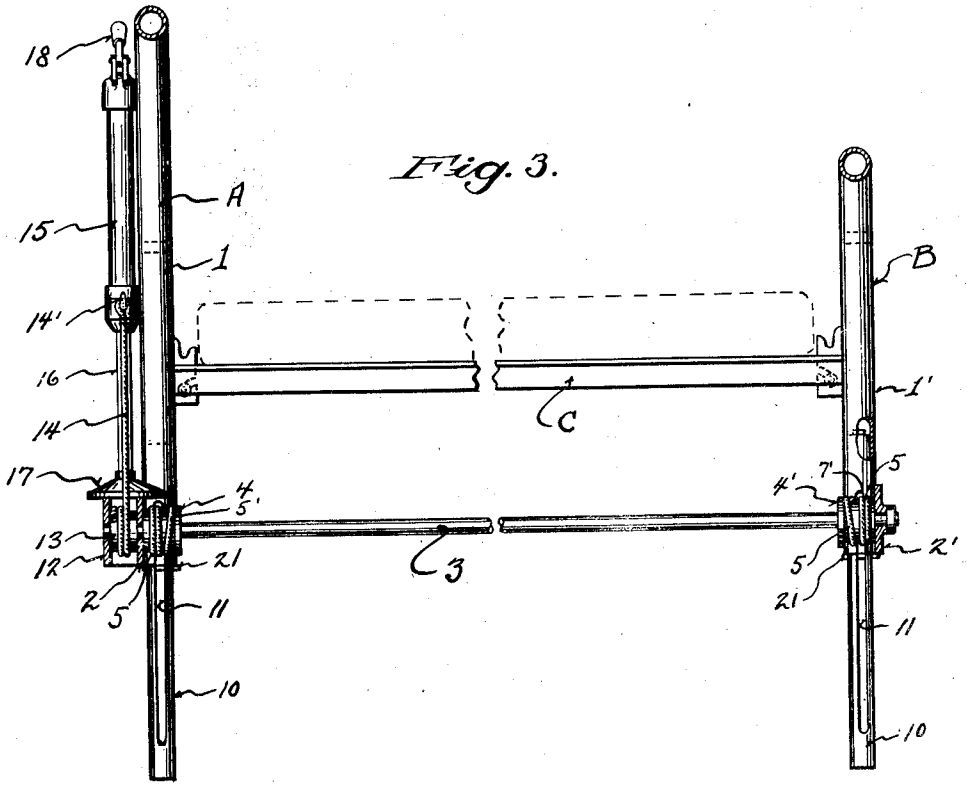


Fig. 4.

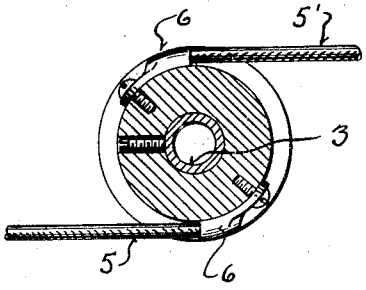
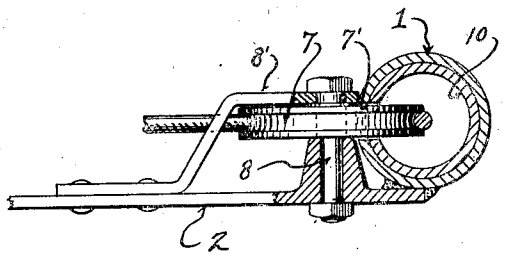


Fig. 5.



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2,339,075

UNITED STATES PATENT OFFICE

2,339,075

ADJUSTABLE BED

Harold S. Hollnagel, Milwaukee, Wis., assignor of one-third to Thomas F. Loughlin and one-third to Josephine Etzel, both of Hartford, Wis.

Application October 10, 1941, Serial No. 414,416

1 Claim. (Cl. 5—63)

My invention refers to beds, and its primary object is to provide a bed having telescopic leg sections under cable control coupled with a manual power unit, whereby the bed may be quickly and simply varied as to height, it being understood that beds of this general type are particularly adapted for modern hospital equipment.

A specific object of my invention is to provide a bed of any standard type equipped with telescopic legs and means for adjusting the same vertically, the said means embodying a main power shaft with cable connections from each leg and a pump jack for imparting rotation to the power shaft through a cable connection.

From actual experience, we have found that a hospital bed which is simple in construction and adjustable as to leg height is universally desirable for convenience in the treatment of patients at hospitals, it being understood that such beds must be economically manufactured in quantity production, to meet the commercial requirements of public and private hospital institutions.

With the above and other minor objects in view, my invention consists in certain peculiarities of construction and combination of parts as will hereinafter be set forth in connection with the accompanying drawings and subsequently claimed.

In the drawings:

Figure 1 represents an end elevation of a bed embodying the features of my invention with parts broken away and in section to more clearly illustrate structural features.

Figure 2 a sectional plan view of the same, with parts broken away and contracted as to dimension, the section being indicated on the line 2—2 of Figure 1.

Figure 3 a longitudinal sectional view of the bed with parts broken away and contracted, the section being indicated by line 3—3 of Figure 1.

Figure 4 a detailed enlarged sectional end view of one of the power shaft pulleys, the section being indicated by line 4—4 of Figure 2, and

Figure 5 an enlarged detailed sectional view illustrating one of the telescopic bed legs with cable and sheave connections, the section being taken also upon the plane of section line 2—2.

Referring by characters to the drawings A indicates in general a head-frame constituting part of a tubular bed, and B the foot-frame of said bed. As shown in Figure 3 of the drawings, these frame pieces are connected by the usual side rails C. The head-frame A is provided with hollow upper leg sections 1, 1 and the foot-frame B, is provided with similar leg section 1'.

The upper leg sections 1, 1' of the head and foot-frames are braced by transversely disposed bars 2, 2' respectively, said bars being secured to the leg sections by welding as shown, for cheapness of construction. Rotatably mounted on these bars is a centrally disposed drive-shaft 3 and rigidly mounted upon the drive-shaft, adjacent the bars, is a pair of cable pulleys 4, 4'. Oppositely wound upon each of the pulleys is a pair of cables 5, 5 and 5', 5' respectively. The ends of said cables are secured to the pulleys by clips 6, as best shown in Figure 4. However, it is understood that these cables may be connected to the pulley in any suitable manner, as for example, a single cable may be substituted for each pair, in which case the single cable would pass through an aperture in the pulley and coiled thereon in opposite directions.

As best shown in Figures 1 and 2 of the drawings, the companion sets of cables from the pulleys 4 are trained under sheaves 7, which as best shown in Figure 5 of the drawings are mounted upon studs 8 carried by the transverse bars 2, 2'. The said sheaves and studs being further reinforced by brace straps 8', which are secured to the bars and offset therefrom.

Referring again to Figure 5, the upper tubular leg section 1, adjacent the bar 2, is provided with a slot 7' through which the sheave extends to a point approximately central of the leg.

Each upper leg tubular section has telescopically fitted therein a lower tubular leg section 10, which leg sections serve as supports for the bed.

Each of the lower leg sections is provided with a longitudinal slot 11, which slot extends from the upper end of said leg section to a point near the bottom end of same, and the side walls of said slots loosely contact the side faces of the sheaves 7, whereby the telescopic union between the upper leg section and the lower leg section serves as a key to eliminate twist with relation to the upper leg section.

The companion sets of cables, after passing under the sheaves 7, extend upwardly through the hollow lower leg sections and are secured to the top end of the same in any suitable manner.

An offset bracket 12 is secured to the transverse-bar 2 and is centrally apertured for the reception of the end of the drive-shaft 3. Between this bracket and the bar there is rigidly secured to the shaft, a pulley 13, and secured to the face of the pulley is one end of an adjusting cable 14, the same being coiled about the pulley and extending upwardly with its opposite end anchored to an eye 14', which eye is carried at the lower

end by a fluid casing 15. The casing is reciprocatively mounted upon a stem 16, that terminates with a foot 17 which rests upon and is secured to the upper edges of the bar 2 and bracket 12. The elements 15 and 16 constitute parts of any standard pump-jack of the fluid or hydraulic type. The casing 15 at its upper end is provided with the usual pump lever 18, whereby the device may be manually operated, it being understood that this pump-jack is positioned close to the head frame of the bed, whereby it is not liable to catch into the clothing of attendants passing about the bed unit. It should be noted that the fluid control jack serves as a cushion suspension means for the bed, whereby the same is capable of slight yield under load strain which feature is particularly advantageous to insure comfort of the patient.

As disclosed in Figures 1 and 2 of the drawings, a pair of the cables in raising and lowering the bed, may be provided with turn buckles 19 for adjusting inequalities in the length of said cables.

As shown in Figure 1 of the drawings, when it is desired to raise or lower the bed from its adjusted position the operator simply manipulates the hand lever 18, whereby the bed may be further heightened or lowered, due to the winding or unwinding of the cables upon the pulleys 4, 4' and 13.

The lower telescopic sections of the legs may also in some cases be provided with a series of apertures 20, for the reception of pins 21, which will serve to lock the bed in its adjusted position to prevent inadvertent settling of same.

Furthermore, in practice, it is important under certain conditions that the bed be angled or inclined from head to foot or vice versa. Under these conditions, the pins 21 may be adjusted to positively lock the bed at an angle to be determined by the surgeon or doctor.

While I have shown one exemplification of my invention minutely as to detail, it is understood that I may vary such details within the knowledge of the skilled mechanics and as defined by a fair interpretation of the claim. To briefly sum the invention, the bed as previously disclosed, can be manufactured at a minimum cost, due to the fact that the parts are practically all standard and therefore can be purchased in open market and thereafter assembled at a minimum cost of skilled workmanship.

I claim:

In a vertically adjustable bed having head and foot frames, longitudinally disposed rails and transversely disposed bars connecting the frames, upper and lower telescopic leg sections carried by the frame, a centrally disposed drive shaft journaled in the frame bars, a pair of pulleys carried by the shaft, sheave guided cables connecting the lower leg sections and pulleys, and a power pulley secured to one end of the drive shaft; the combination of a bed raising and lowering means, including a stem having a foot supported upon one of the bed bars, a fluid controlled pump casing mounted upon the stem and a cable connecting the power pulley and casing, whereby the bed is raised and lowered and cushioned under suspension.

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