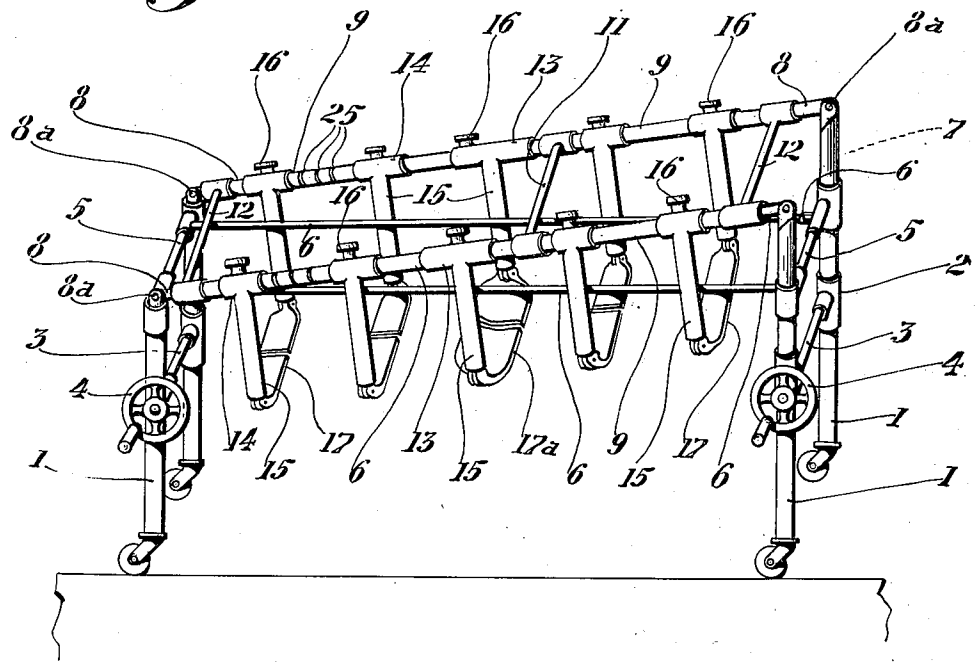
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HOSPITAL BED CRANE

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Fig. 1.



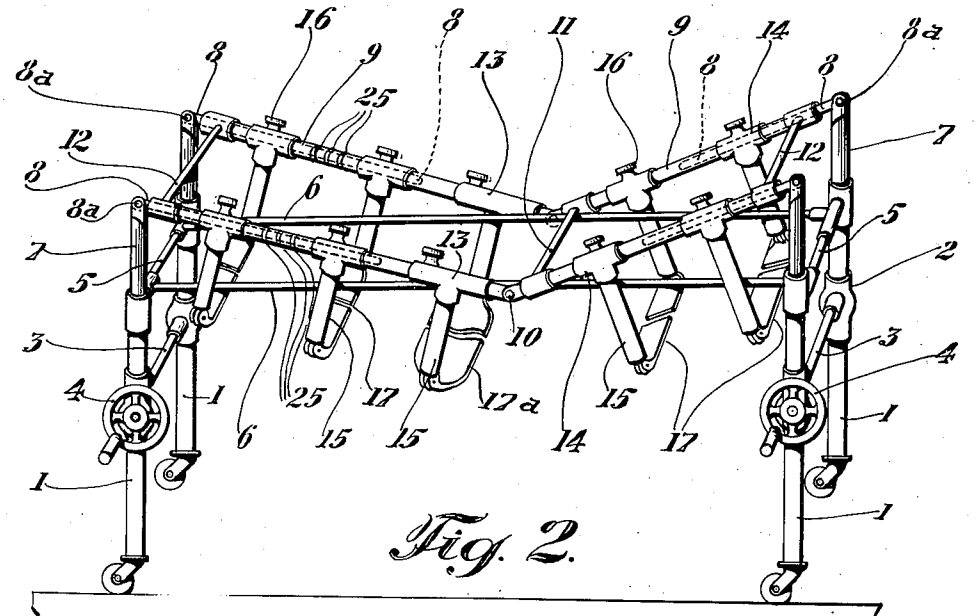


Fig. 2.

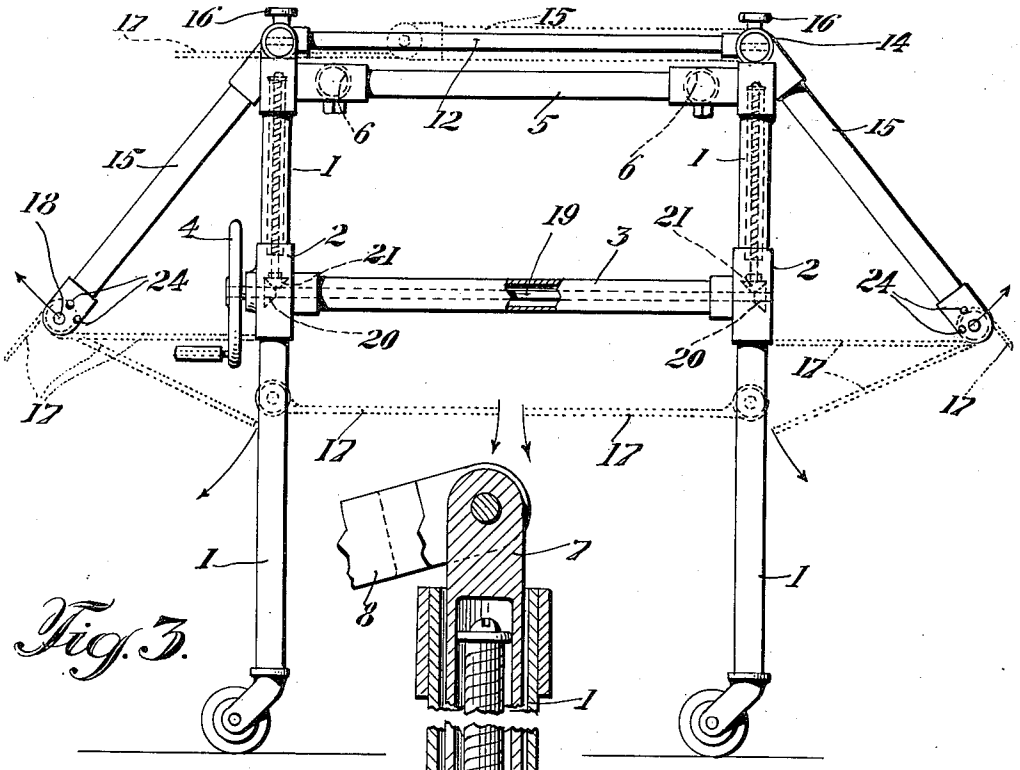
INVENTOR.
Frederick A. Seib

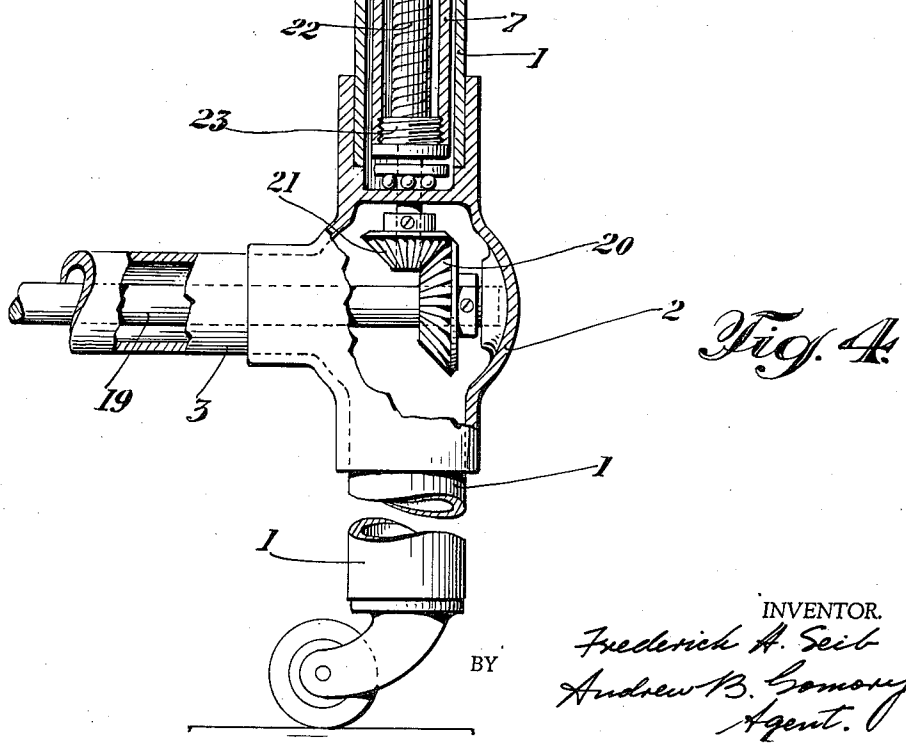
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HOSPITAL BED CRANE

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2,261,297

HOSPITAL BED CRANE

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Application March 3, 1941, Serial No. 381,489

2 Claims. (Cl. 5—81)

This invention relates to a body lifting crane and in particular, to a hospital bed crane for lifting patients.

An object of this invention is the raising and removing from a bed, or the transferring from one bed to another of the human body, in a prone position or with the trunk and leg members in angular relation, within the range of from a prone position to a substantially sitting position. Furthermore, this invention is directed to the provision of means for mechanically raising, removing from, and returning of a patient to a bed with the least disturbance of the general position of the patient's body and in particular, any reclining position, as distinguished from a prone position, which may be dictated by the pathology or the physical nature of the patient's ailment.

Another object is to provide means for judiciously distributing the lifting effort along the body of the patient when it is necessary to avoid placing pressure or strain upon certain areas of the patient's anatomy to avoid possible retardation of therapy and to spare the patient from pain.

A further object is to provide safe, simple and rapid operability by eliminating all wires, straps, belts, pulleys, complicated and exposed gear mechanisms, multiple adjustments, settings and the like.

For a detailed description of the invention, reference will be made to the accompanying drawings in which—

Figure 1 is a perspective view with one end of the lifting frame elevated and the sections of the side bars of the lifting frame locked in straight line positions.

Figure 2 is a perspective view with both ends of the lifting frame elevated and the sections of the side bars of the lifting frame in angular relation to one another.

Figure 3 is an end elevation of the device with various positions of the lifting paddles shown in dotted lines.

Figure 4 is a fragmentary sectional view of a leg member and the associated elevating gear mechanism.

In Figures 1 and 2 the numeral 1 indicates one of four base leg members equipped in a known manner with casters. 2 is a hub positioned between the extremities of each of the base leg members and is adapted to encase a gear drive which will be described in detail infra. 3 is a transverse brace member between adjacent hubs adapted to enclose a drive shaft operatively connected to the gear drive in adjacent hubs 2 and having a hand wheel 4 operatively affixed to one end thereof. 5 is a transverse brace member between the upper extremities of adjacent base leg members and 6 is a longitudinal brace member between opposite transverse brace members 5, 5.

Referring now to Figures 3 and 4 wherein 1 is a base leg member, 2 a hub positioned between the extremities of the base leg member and 3 a transverse brace member between adjacent hubs, 19 is a drive shaft encased in 3 with a driving gear 20 affixed thereto. 21 is a driven gear operatively engaged with the driving gear 20 and is affixed to an elevating screw 22 riding on a suitable thrust bearing in hub 2. 23 is an internally threaded lug rendered unitary with lifting leg member 7 telescopically engaged in base leg member 1 and the said lug is operatively engaged upon the elevating screw 22. When shaft 19 and gear 20 are caused to rotate by turning hand wheel 4 in Figure 3, the gear 21 responds and causes elevating screw 22 to rotate. The internal thread of the lug 23 responds to the drive of the helical spline on the elevating screw 22 and accordingly raises the lifting leg member 7. The drive shaft simultaneously operates an identical elevating screw in the adjacent base leg member thus elevating adjacent lifting leg members simultaneously. To lower leg members 7, the direction of rotation of hand wheel 4 is reversed. Thus the gear drive and elevating gear mechanism are fully encased within the base frame and it is to be understood that the course or effective length of the lifting leg member 7 may be increased by designing the hubs 2 at a lower position along the base leg member 1.

Referring again to Figures 1 and 2, 7 is a lifting leg member telescopically engaged in base leg member 1 and operatively engaged with the elevating gear mechanism as indicated supra, 8 is a male member of longitudinal telescoping lifting members 9 and is pivotally engaged with lifting leg member 7 at 8a. 9 is the outer or female member of the longitudinal telescoping lifting members, with a central pivot 10 and engaged upon male members 8 as shown in Figure 2. A transverse abutment member 11 acts as a fulcrum for the longitudinal telescoping lifting members when the members are employed for lifting a body with the trunk and leg members in angular relation. 12 is a transverse torque brace member which is rendered unitary with adjacent extremities of female members 9 and, in addition to bracing the lifting frame, prevents members 9 from rotating about male members

8. Locking T's 13 are slidably and rotatably engaged upon member 9 when it is desired to effect a lift with the longitudinal telescoping lifting members in a straight angular position, the locking T's 13 are slid over the pivots 10 and fastened to the member 9 by means of a locking pin 16 engaging a suitably positioned orifice in member 9.

Referring now to Figures 1 and 3, 14 is one of a plurality of suspending T's slidably and rotatably engaged upon the member 9. 15 are suspending shanks rendered unitary with the suspending T's 14. 16 is a locking pin adapted to engage suitably spaced orifices along the member 9 to lock the T's 14 with suspending shanks 15 in an operative vertical position. It is to be noted that locking T's 13 also serve as suspending T's. 17 are body supporting members pivotally mounted upon the suspending shanks 15 at 18. These pivotable body supporting members lock either on a line with the axis of the suspending shanks 15 or at an operative right angle with the same by means of locking pins 24 engaging suitably positioned orifices in body supporting members 17.

In Figure 3, the lifting paddles comprising 14, 15 and 17 may be swung from an operative position through 270 degrees and brought to rest on the opposite longitudinal telescopic lifting member 9 with body supporting member 17 locked in straight angular position with shank 15, when it is desired to have all lifting paddles out of way as when approaching a bed with the crane.

Figure 1 is a showing of the crane in a straight angle lift but at an angle with the horizontal as when lifting a body from an inclined plane. It will be apparent that when a straight angle horizontal lift is desired, the opposite ends of the lifting members are raised in unison from an original horizontal position.

Figure 2 is a showing of the crane as when lifting a body from and in a position with the trunk and leg members in angular relation. Such or a greater angular lift up to a substantially sitting position is rendered possible by the telescoping longitudinal lifting members which provide the necessary increase in length of the longitudinal lifting members.

The shape or form of the body lifting members 17 may be varied as in *17a*, Figures 1 and 2, or in any other manner within the spirit and scope of the invention.

When it is desired to employ the crane, it is rolled into position over the bed of the patient, straddling the bed, with all lifting paddles swung up and at rest over opposite longitudinal lifting members. The longitudinal lifting members are then elevated into the desired angular relation to correspond with the position of a patient's or invalid's body whereupon the lifting paddles are individually and selectively swung down and placed under the body to be raised.

Locking pins are spring operated throughout and automatically engage orifices when aligned with the same. On member 9, concentric grooving of the member in a line with the orifices as shown by way of illustration at 25 on Figure 1 is practiced to eliminate the necessity for hunting on the part of the operator. The locking pin, under pressure of a spring, engages a groove as the T member is slid along member 9 and the orifices in member 9 are so positioned that the pin engages the orifice when the lifting paddle is swung into an operative position. To release a pin, the head at 16 is pulled sufficiently to disengage the orifice when the T member is again free to rotate while the grooves 25 are so shallow that mere sliding pressure on a T will pass it from one groove to the next. The body supporting members, also by means of spring operated pins, lock in a lifting position.

The lifting frame is then engaged upon the body of the patient. By operation of the hand wheels in unison, the patient is elevated from contact with the bed whereupon he may be transported away from the bed and returned thereto in a like manner.

I claim:

1. In a bed crane, a mobile base frame comprising base leg members, a hub positioned between the extremities of each of said base leg members adapted to encase transmission gears comprising driving and driven members, transverse brace members between adjacent hubs adapted to encase drive shafts, the said drive shafts operatively connected between adjacent hubs to the driving members of the said transmission gears, elevating screws unitary with the driven members of said transmission gears and encased in said base leg members, hand wheels operatively connected to said drive shafts, transverse brace members between said base leg members at the upper extremities thereof, longitudinal brace members between said last mentioned transverse brace members; and a lifting frame comprising lifting leg members telescopically engaged in said base leg members, internally threaded lugs rendered unitary with the lower extremities of said lifting leg members and operatively engaged upon said elevating screws for vertical displacement, longitudinal telescopic lifting members pivotally engaged with opposite upper extremities of said lifting leg members comprising male members engaged upon said lifting leg members in said pivotal manner and pivotally connected female members engaged upon said male members, a transverse abutment member between said female members and to one side of the central pivots in the same, transverse torque brace members between adjacent ends of said pivotally connected female members, locking T's slidably and rotatably engaged upon said female members adapted to lock said central pivots on said female members in straight line positions; a plurality of lifting paddles comprising suspending T's slidably and rotatably engaged upon said female members, suspending shanks rendered unitary with said suspending T's, including said locking T's for said central pivots on said female members, locking pins in said T's adapted to engage said female members through openings in said female members adapted to lock said T's with said suspending shanks in an operative position, body supporting members pivotally mounted upon said shanks and locking pins in said suspending shanks engaging said body supporting members with said supporting members in operative relation with said shanks

2. In a bed crane, a mobile base frame comprising base leg members, hubs positioned between the extremities of the base leg members and adapted to encase transmission gears comprising driving and driven gear members, transverse brace members between adjacent hubs adapted to encase drive shafts, the said drive shafts operatively connected to the driving members of the transmission gears between adjacent hubs, elevating screws encased and suspended on thrust bearings within the base leg members and

unitary with the driven member of the transmission gears, hand wheels operatively connected to the drive shafts, transverse brace members between the base leg members at the upper extremities thereof and longitudinal brace members between the said last mentioned transverse members; a lifting frame comprising lifting leg members telescopically engaged in the base leg members, internally threaded lugs rendered unitary with the lower extremities of the lifting leg members and operatively engaged upon the elevating screws for vertical displacement; means for lifting the human body with the trunk and leg members in angular relation from a prone position to a substantially sitting position comprising longitudinal telescopic lifting members pivotally engaged with opposite upper extremities of the lifting leg members consisting of male members engaged upon the lifting leg members in said pivotal manner and central pivotally connected female members engaged upon the male members, a transverse abutment member slidably mounted between the female members and to one side of the central pivots in the same, transverse torque brace members between adjacent ends of the central pivotally connected female members, a plurality of lifting paddles comprising suspending T's slidably and rotatably engaged upon the female members, suspending shanks rendered unitary with the T's, locking pins through the T's and orifices in the female members adapted to lock the T's with the suspending shanks in an operative position, body supporting members pivotally mounted upon the lower extremities of the shanks, locking pins through the body supporting members and orifices in the lower extremities of the shanks adapted to lock the body supporting members in operative relation with the shanks.

FREDERICK ANTHONY SEIB.