Jan. 11, 1938. H. H. HOWELL ET AL 2,104,745

ROCKING HOSPITAL BED

Filed April 17, 1936 2 Sheets-Sheet 1

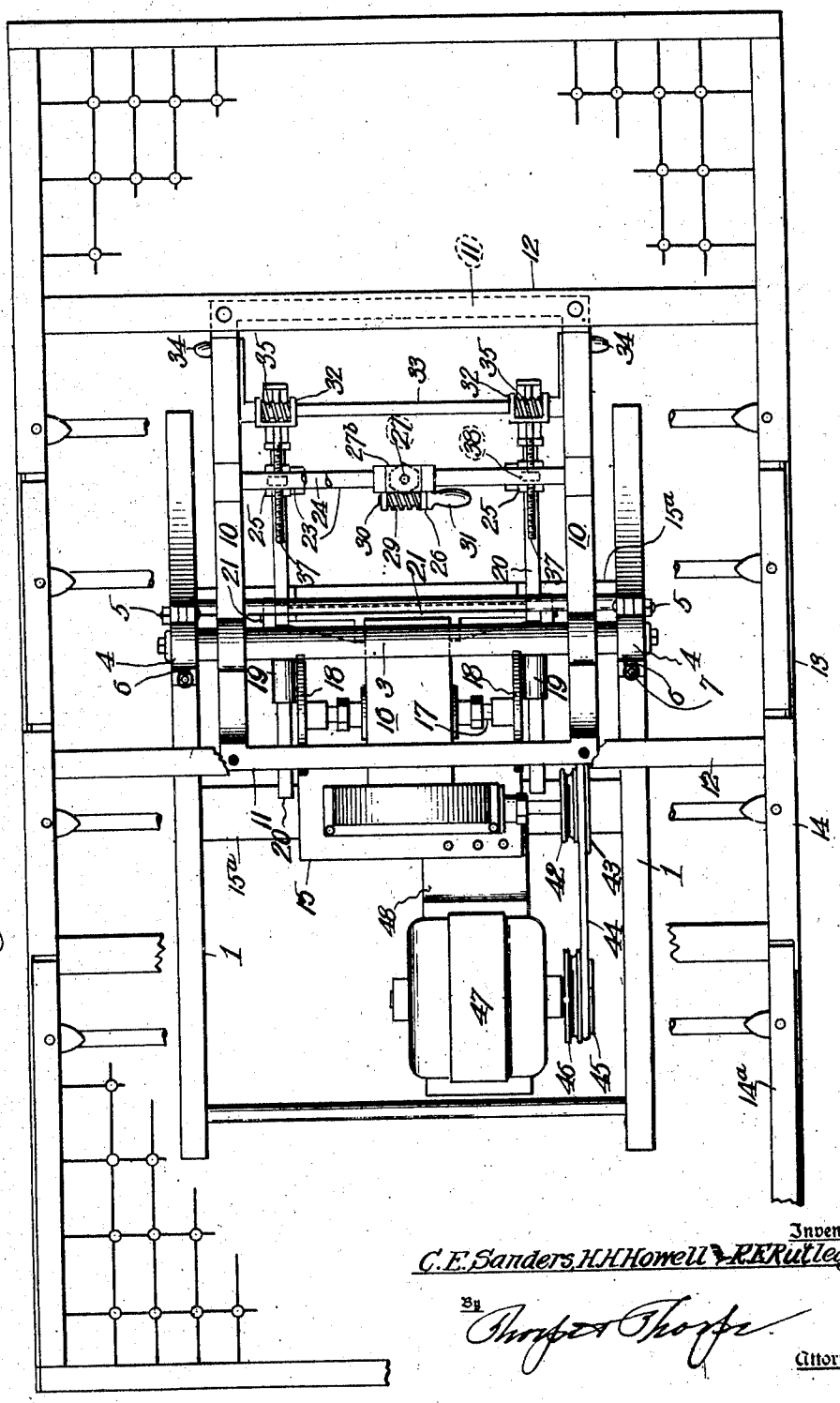


Fig. 1.

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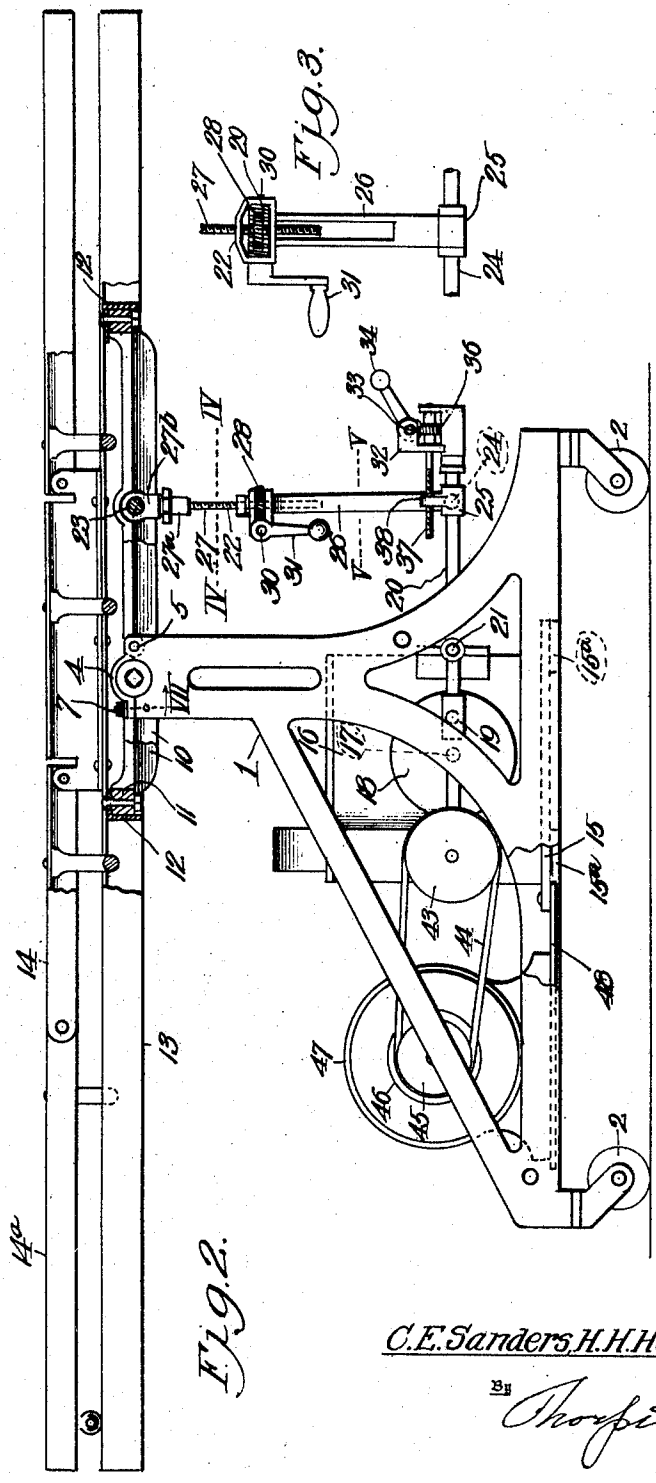


Fig. 2.

Fig. 3.

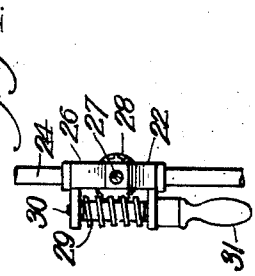


Fig. 4.

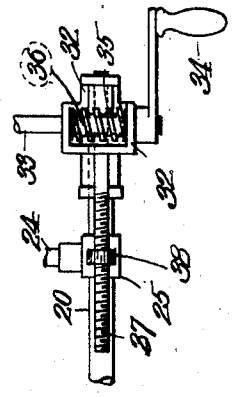


Fig. 5.

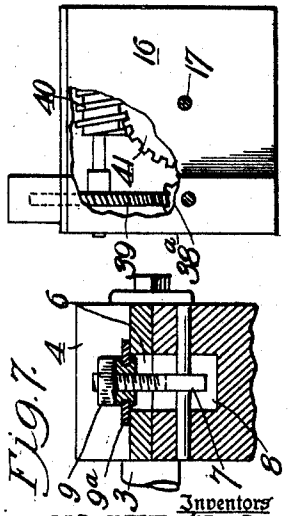


Fig. 6.

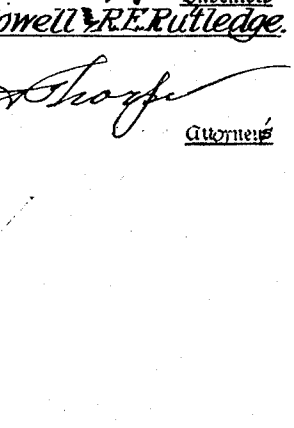


Fig. 7.

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UNITED STATES PATENT OFFICE

2,104,745

ROCKING HOSPITAL BED

Harry H. Howell, Richard E. Rutledge, and Clarence E. Sanders, Kansas City, Mo., assignors, by direct and mesne assignments, to Clyde Leavengood, trustee, Kansas City, Kans.

Application April 17, 1936, Serial No. 74,932

3 Claims. (Cl. 128—33)

This invention relates to oscillatory or rocking beds or the like, for utilizing gravity as an assistant to heart action for circulating of the blood of a patient suffering from diseases or troubles which may be advantageously treated or relieved by thorough and complete blood circulation.

The primary objects of the invention are twofold, the avoidance of chance of injury, and the provision of a unitary construction, that is, one requiring no part which must be attached to or detached from the bed to secure limited or extended or full oscillation respectively, of the patient. A further object is to provide a toggle connection including two worm-gearing mechanisms or the like for respectively shifting the arc and range of oscillation of the patient. Another object is to provide an electric motor to operate the appliance through a belt transmission for quietness of operation and to yieldingly support the motor to utilize its weight in keeping the belt properly tensioned for effective service.

With the objects named in view, the invention consists in certain novel and useful features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawings, in which:—

Figure 1 is a plan view of an appliance, embodying the invention, the bed frame being broken away to more clearly disclose certain underlying features otherwise partly obscured.

Figure 2 is a side elevation with part of the bed frame in longitudinal section.

Figure 3 is an enlarged detail of the upper member of a toggle connection, the view being taken at right angles to the side view of said member as it appears in Figure 2.

Figure 4 is a section taken on the line IV—IV of Figure 2.

Figure 5 is a horizontal section taken on the line V—V of Figure 3.

Figure 6 is a broken side view of a housing disclosing a worm gear transmission for effecting slow oscillation of the bed frame.

Figure 7 is a fragmentary section on the line VII of Figure 2.

Referring now to the drawings, in which corresponding parts are similarly characterized in all of the figures, 1 are similar sides of a rigid base frame, preferably mounted on casters 2. In the upper ends of the sides is journaled a cross shaft 3, the caps 4 of the bearings being hinged at one end to the respective sides at 5, and longitudinally kerfed at their opposite ends at 6. To clamp the last named ends of the caps upon the sides, bolts 7 are pivoted in notches 8, of the sides and equipped with nuts 9 carrying swiveled washers 9a which, when the bolts are in upright position and extend through the kerfs and cap slots, can be clamped down upon the caps, or reversely adjusted to permit the bolts to swing out of the kerfs and slots and leave the shaft free to be lifted from the frame.

In the axial plane of and mounted on shaft 3, between the sides of the base frame, is a rectangular rock frame consisting of side-bars 10 and spaced end bars 11, and bolted upon the end cross bars 11, are cross bars 12 of a hospital bed frame 13 of a type in common use and hence not described in detail herein, except to state that the legs of the bed frame are dispensed with and the usual sectional mattress frame 14 surmounts the bed frame, the head section 14a of the mattress frame being hinged to the body-portion thereof for adjustment to raise the head of a patient occupying the mattress frame. The special character of the bed frame, however, constitutes no part of this invention.

A platform 15 is secured upon cross bars 15a of the base frame as a support for a gear housing 16 through which extends and in which is journaled a cross-shaft 17, equipped at opposite sides of the housing with disks 18 on and at the outer sides of which are swiveled sleeve wrist pins 19, fitting slidingly on rods 20 extending longitudinally of the structure and fulcrumed on transversely-alined pivots 21 secured to the housing, the rods being capable therefore of rocking in a vertical plane and the swivelled wrist pin sleeves being capable of sliding on the rods toward or from the fulcrum points 21, whereby rotary action of the disks effects oscillation of the rods. The rods 20 constitute similar members of a toggle connection, the other member of said connection, in the preferred construction being an upright sectional member 22, connected at its upper and lower ends respectively, to a cross shaft 23 connecting the sides of the rectangular rock-frame, and a cross shaft 24, connected to sleeves 25 slidingly mounted on toggle rods 20, outward of the fulcrum points 21 thereof. By this arrangement, the toggle member 22 is disposed centrally between the toggle rods 20, for economical and simplicity of construction. The toggle member 22 is adjustable as to length, to enable one to initially set the bed frame in a horizontal position or inclined longitudinally to dispose the head end thereof above or below the plane of the foot end, it being noted that by lengthening or shortening the toggle member 22, the range of

rocking movement of the bed frame is unaffected but the arc of travel is shifted. The member **22** comprises a horizontally and vertically slotted casting **26** pivoted upon and rising from the cross shaft **24**, a screw rod **27**, connected to a union **27a** detachably secured to a sleeve **27b** pivoted on cross shaft **23**, the rod **27** extending downward through the horizontal and into the vertical slot of member **26**, and threaded through a worm wheel **28** confined within the horizontal slot, and enmeshed with a worm **29** on a horizontal shaft **30** journaled in the casting and equipped at one end with a crank handle **31**, which, when properly turned, effects elongation or shortening of member **22**, and thus brings the bed frame to a horizontal position or tilts it to dispose the head end in a higher or lower plane than the foot end.

To increase or decrease the range of rock movement of the rock frame, longitudinal adjustment on toggle rods **20**, of the lower end of toggle member **22** is effected. As shown, an angle bracket **32** is secured on the outer end of each toggle member **20**, and a cross shaft **33** is journaled in said brackets and equipped with a crank-handle **34** at one or both ends, and a pair of worms **35**. The latter mesh with worm wheels **36** on the outer ends of longitudinally disposed screw rods **37** journaled on said brackets and threaded in lugs **38** of sleeves **25**, the arrangement being such that by turning the worms by either crank handle **34**, the worm wheels turn the screw rods and the lower end of toggle member **22** is adjusted toward or from the fulcrum point of toggle member **20**. If toward the fulcrum point, the range of rocking movement of the bed frame diminishes, whereas opposite adjustment increases such range.

To oscillate the bed frame, any suitable gearing may be employed, that shown being a worm **38a** meshing with a worm wheel **39**, a second worm **40** rotatable with the worm wheel **39**, is enmeshed with a second worm wheel **41** on shaft **17** carrying the disks **18**. The shaft of worm **38a** carries a pair of belt wheels **42—43** of different diameter, and a belt **44** leads from one of them to one of a pair of belt wheels **45—46**, preferably of different diameter, mounted on the shaft of a motor **47** or the like, and the motor is secured on a yielding platform **48** secured at one end to platform **15**, the arrangement being such that the weight of the motor is utilized to keep the drive belt tensioned at all times.

Operation

Assuming equipment (not shown) for operation of the motor and for controlling its speed of rotation, is provided, the belt and engaged belt wheels, transmit power through the worm gearing in the housing to cause the wrist pin sleeves to oscillate the members **20** of the toggle on the fulcrum and thereby raise and lower toggle member **22**, and incidentally expand and contract the toggle connection. This action, through the speed reducing worm gearing, slowly oscillates the bed frame around the axis of shaft **3** to simultaneously raise the head end and lower the foot end of the bed frame, and then reverse such action, the rate of operation being changed by control of the motor speed without arresting the oscillation of the bed frame. The speed of oscillation can also be altered by shifting the belt from one set of belt wheels to the other, or in any other suitable way. Generally, it is desirable to cause the bed frame to complete one oscillation in approximately four minutes, but some patients need a faster rate of oscillation and others a slower rate. The physician in charge determines the rate and range or extent of oscillation. The range of oscillation, as explained, is determined by shifting the lower end of toggle member **22** toward or from the fulcrum of toggle member **20**, by rotation of crank handle **34**, and the arc of oscillation by lengthening or shortening toggle member **22** by turning crank handle **31**, either or both of the crank handles being adapted for operation without arresting the oscillation of the bed frame. It will thus be apparent that the appliance is unitary in character.

From the above description, it will be apparent that we have produced a construction embodying all of the features of advantage set forth as desirable, and while we have described and illustrated what now appears to be the preferred embodiment of the invention; it is to be understood that we reserve the right to make all changes within the spirit of the invention and without the ambit of the prior art.

We claim:—

1. A hospital bed having head and foot ends and rockingly mounted intermediate its ends for swinging its ends in relatively wide arcs, an oscillating driven lever, a link connecting said lever to the bed for rocking the latter, means for longitudinally extending the link to adjust the angular relation of the head and foot ends of the bed with respect to the horizontal, and means to shift the point of connection between the link and the rocking lever to vary the amplitude of rocking movement imparted to the bed.

2. A hospital bed having head and foot ends and rockingly mounted intermediate its ends for swinging said ends in arcs, a pair of oscillating driven levers, a cross shaft connecting said levers and having its ends longitudinally adjustable of said levers, and an extensible link carried by the cross shaft and pivotally secured at its opposite end to the rocking bed.

3. In a hospital bed having head and foot ends and rockingly mounted intermediate its ends for swinging said ends in arcs, an oscillating driven lever, and connections between said oscillating lever and bed for rocking the latter; said connections having means for adjusting the amplitude of rocking movement imparted to the bed, and means operable during such rocking movement for adjustably correlating the limits of arcuate movement of the head and foot ends with respect to the horizontal without changing the amplitude of such rocking movement.

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