

Aug. 28, 1951

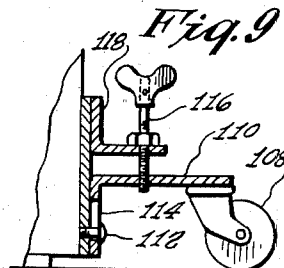
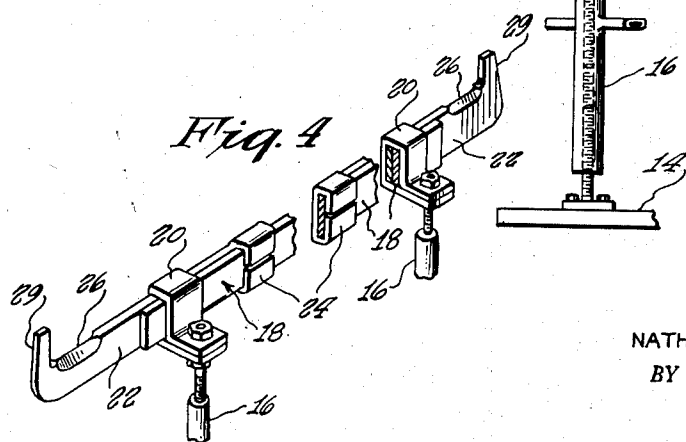
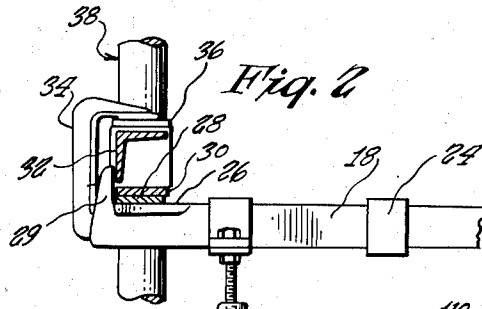
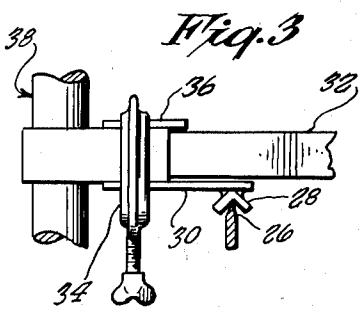
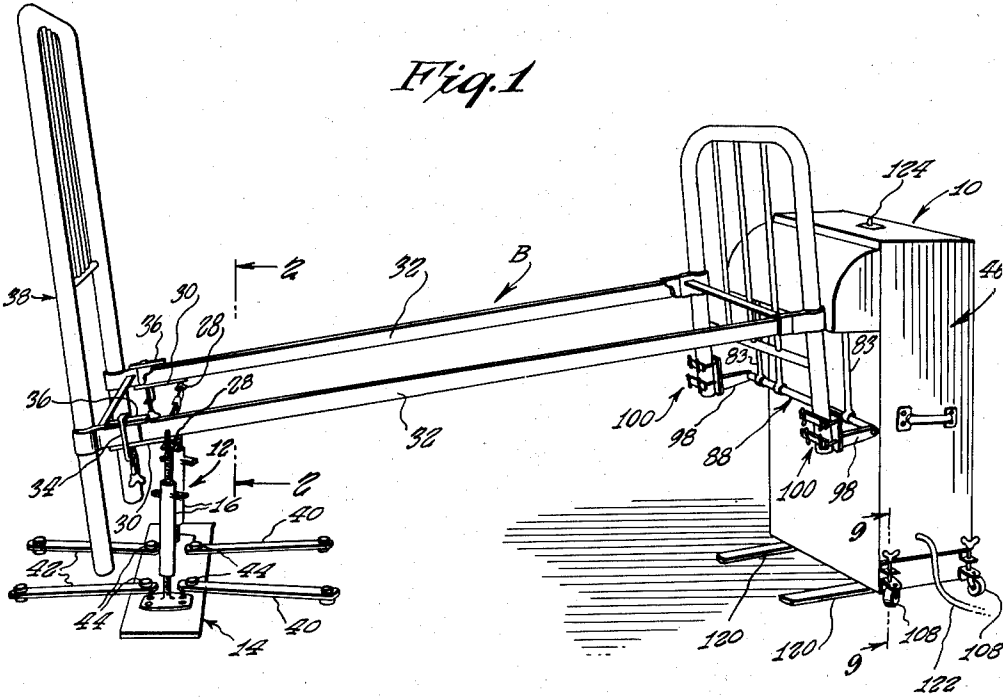
N. D. MININBERG

2,566,239

OSCILLATOR APPARATUS FOR BEDS

Filed March 19, 1948

2 Sheets-Sheet 1



INVENTOR.
NATHAN D. MININBERG
BY

ATTORNEY

Aug. 28, 1951

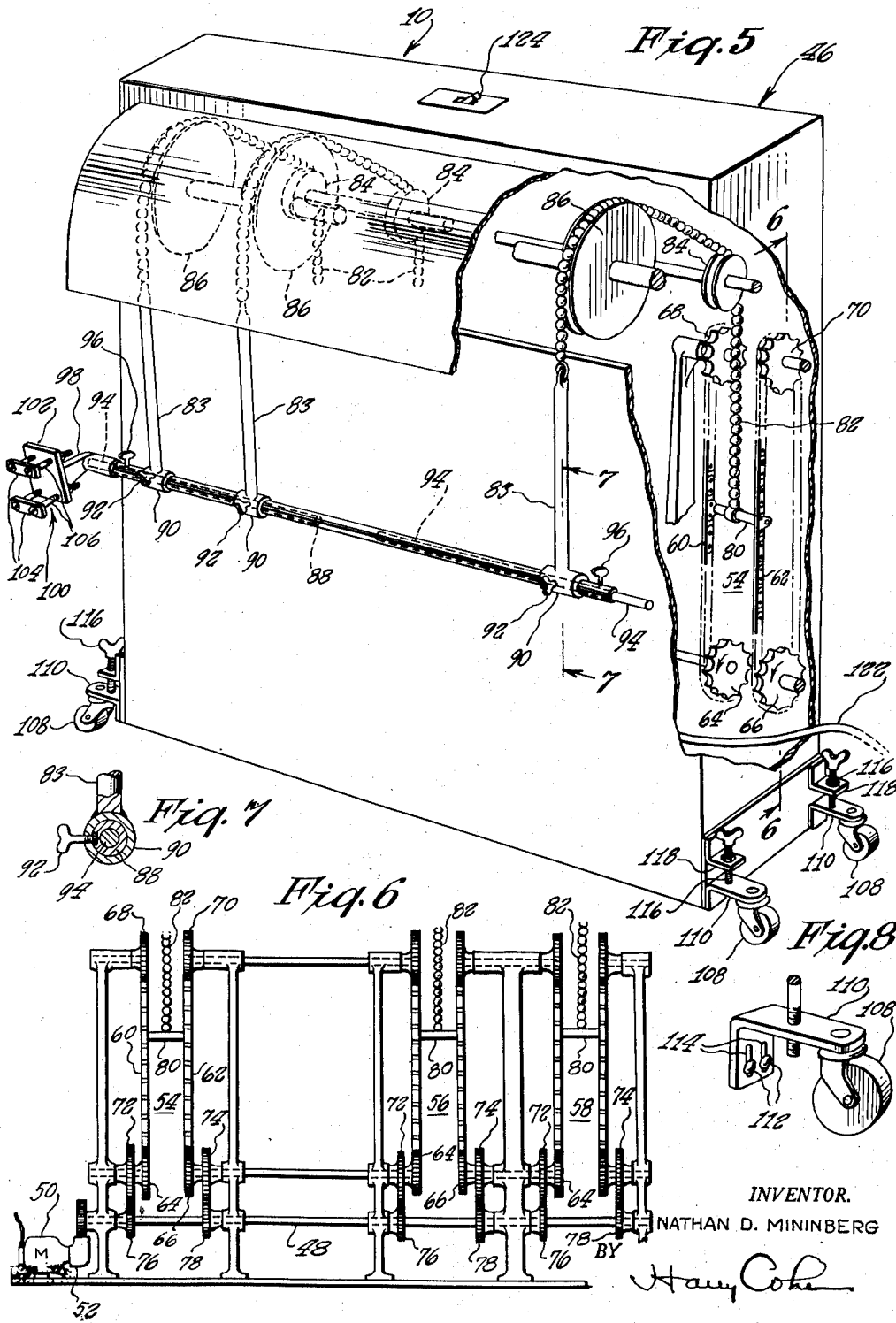
N. D. MININBERG

2,566,239

OSCILLATOR APPARATUS FOR BEDS

Filed March 19, 1948

2 Sheets-Sheet 2



INVENTOR.
NATHAN D. MININBERG

Harry Cohen

ATTORNEY

UNITED STATES PATENT OFFICE

2,566,239

OSCILLATOR APPARATUS FOR BEDS

Nathan D. Mininberg, New York, N. Y.

Application March 19, 1948, Serial No. 15,923

12 Claims. (Cl. 128—33)

1

The present invention relates to therapeutic oscillation apparatus and more particularly to apparatus for oscillating a bed for subjecting the occupant thereof to oscillation therapy.

One object of the present invention is the provision of apparatus which may be readily attached to a conventional bed for oscillating the latter, thus obviating the necessity for providing special beds either in the hospital or in the home and making it possible to convert any bed into an oscillatory bed.

Another object is the provision of apparatus which is mobile so that it may be readily moved from place to place in a hospital or for use in the home.

Another important object of the present invention is to provide means for oscillating a bed in such manner as to obviate subjecting the patient or other occupant of the bed to jolts or other abrupt movements. Conversely, in accordance with this object of the invention provision is made in the apparatus for imparting a smooth oscillatory motion to the bed.

The above objects, features and advantages of the present invention will be fully understood from the following description, reference being had to the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a side perspective view of a conventional bed provided with oscillation apparatus embodying the present invention;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a side view, partly in section, of the fulcrum support for the bed at one side thereof;

Fig. 4 is a perspective view of part of the fulcrum support, portions being cut away for the purpose of illustration;

Fig. 5 is a perspective view of the oscillating apparatus, removed from the bed, a part of the housing being cut away for the purpose of illustration;

Fig. 6 is a side view, in elevation, of the mechanism within the housing, as viewed on the line 6—6 of Fig. 5;

Fig. 7 is a detail sectional view on the line 7—7 of Fig. 5;

Fig. 8 is a perspective view of one of the wheels or castors on which the bed-oscillating apparatus is supported;

Fig. 9 is a detail sectional view on the line 9—9 of Fig. 1.

Referring now to the drawings in detail the bed-oscillating apparatus 10 embodying the present invention is shown operatively connected to a

2

conventional bed B for oscillating the latter about a horizontal axis provided by the adjustable fulcrum means 12 which is preferably of a construction forming a part of the present invention. The fulcrum means 12 is connected to the bed at or near the head end thereof, and the oscillating apparatus 10 is connected to the foot end of the bed so that when the bed is oscillated, the motion of the head end of the bed is of small amplitude in comparison with the amplitude of oscillation of the foot end of the bed, thus obviating excessive movement of the head of the patient or other occupant of the bed.

The fulcrum means 12 of the present invention comprises a base 14 carrying the vertically adjustable jacks 16 by which the head end of the bed may be raised above the floor of the room. The upper ends of jacks 16 are connected to a rigid rod 18 by means of brackets 20 which are fixed to said rod longitudinally thereof. Fulcrum bars 22 are slidably fixed to rod 18 for adjustable movement longitudinally thereof, said bars being held by brackets 22 and by auxiliary collars 24. Said fulcrum bars 22 are provided with pivots 26 on which the V-shaped members 28 are pivotally movable about the horizontal axis of oscillation of the bed. Bars 22 are provided with upwardly extending end portions 29 to prevent movement of the bed from off the fulcrum means 12. Members 28 are fixed to companion plates 30 which are fastened to the adjacent side runner 32 of the bed, releasably, by companion removable clamps 34. Upper plates 36 are provided in overlying relation to the joints between the runners 32 and the head frame 38 of the bed so as to prevent disengagement of the runners from the head frame of the bed. It will be noted that clamps 34 secure the top plates 36 in position and also secure the pivot plates 30 in position. Arms 40 and 42 are fastened to base 14 so that when they are positioned as shown in Fig. 1, they stabilize the fulcrum means 12 and prevent the latter from turning or tilting during the oscillation of the bed by the oscillating apparatus 10. Arms 40 and 42 are pivotally connected to base 14 as indicated at 44, so that said arms may be turned from their extended position to retracted positions when said fulcrum means is not in use. It will be noted that fulcrum bars 22 are movable longitudinally of the supporting bar 18 so that the pivots 26 of said fulcrum bars may be positioned properly to engage members 28 for beds of different widths.

The bed oscillating apparatus 10 is in the form of a mobile unit and comprises a mobile frame or housing 46 in which the bed-oscillating mecha-

nism is mounted. As best shown in Figs. 5 and 6, the means for oscillating the bed comprises a rotary shaft 48 driven by an electric motor 50 through suitable reduction gearing indicated at 52 in Fig. 6. Shaft 48 is operatively connected to each of a plurality of mechanisms 54, 56 and 58 which are of the same construction, so that a description of one of these mechanisms will apply to each of said other mechanisms. Accordingly, referring to mechanism 54 arbitrarily selected for the purpose of description, it will be noted that said mechanism comprises the laterally spaced endless sprocket chains 60 and 62 which are in engagement with the lower companion sprocket wheels 64 and 66, respectively, and with the upper sprocket wheels 68 and 70 respectively. The lower sprocket wheels 64 are rotated by shaft 48 and for that purpose the shafts of said sprocket wheels are provided with gears 72 and 74 which are engaged by companion gears 76 and 78, respectively, as shown in Fig. 6. The lower sprocket wheels 64 and 66 of each of the other mechanism 56 and 58 are similarly driven by companion gears 72, 76 and 77, 78.

The laterally spaced sprocket chains 60 and 62 of each set are connected to a cross member 80 for moving the latter in an endless path. A longitudinal flexible member, here shown as a cable or chain 82, is connected at one end thereof to member 80 and at its opposite end to a vertical rod 83 which is disposed externally of the housing 54. Each flexible member 82 passes over the companion guide pulleys 84 and 86. The lower ends of rods 82 are connected to a horizontal cross member 88, and for that purpose said members 82 are provided with hubs 90 in which tubular member 88 is supported being secured thereto in any suitable way as by wing screws 92. Rods 94 are adjustably mounted in supporting member 88 being releasably secured in adjusted position by wing screws 96, so that the effective length of supporting member 88 may be adjusted to suit the requirements of beds of different widths. The outer end of each rod 94 has a bracket arm 98 fixed thereto, each of said bracket arms having adjustable clamping means 100 for securing member 88 to the companion legs at the foot end of the bed. As here shown, each of the clamping devices 100 includes a clamping member 102 fixed to bracket arm 98 and companion movable clamping members 104 adjustable toward and away from clamping member 102 by clamping bolts 106.

It will be understood that when shaft 48 is rotated by motor 50, the companion sprocket chains 60, 62 of each of the mechanisms 54, 56 and 58 travel in unison and continuously in the same direction, and concomitantly with the movement of said companion sprocket chains, cross members 80 move in unison in the same direction and in so doing move alternately up and down, thereby raising and lowering rods 83 in unison by reason of the connections of flexible members 82 to their companion rods. The raising and lowering of rods 83 impart a corresponding up and down movement to supporting member 88 and the latter, being connected to the foot of the bed causes the bed to oscillate about the horizontal axis provided by the pivots 26 of the fulcrum supporting means 12. It will be noted that cross members 88, in moving with the companion sprocket chains 60, 62, do not change their direction of motion abruptly but on the contrary in moving from an upward direction to a downward direction, or vice versa, move through an arcuate

path, with the adjacent portions of the sprocket chains while the latter are passing around the lower sprocket wheels 66 and while the latter are passing around the upper sprocket wheels 68, 70. Accordingly, as supporting member 88 approaches its high and low points it decelerates and its change of direction is accomplished gradually and smoothly, thus obviating jerking or jolting of the bed. It should be noted further that the mechanisms have no dead center.

It will be noted that the three laterally spaced mechanisms 54, 56 and 58 provide a factor of safety in that if one of said mechanisms is damaged so as to be ineffective to support the foot end of the bed, the other two laterally spaced mechanisms are effective to support the foot end of the bed. Further it will be observed that the fulcrum means 12 and the oscillating means 10 may be connected to the bed while the occupant is lying therein.

The housing frame 46 of the oscillating apparatus is mobile so that it may be conveniently moved from one place to another for attachment to a bed in any particular part of the hospital. For this purpose housing 36 is provided with wheels or casters 108 which are preferably retractable so that said housing may be supported directly on the floor of the hospital room and thus prevented from moving while in operation for oscillating the bed. The retractable wheels or casters may be of any suitable construction, but as here shown it may be noted that each caster is carried by the bracket 110 which is adjustably mounted on the housing 46 by screws 112 which pass through companion slots 114 (Figs. 8 and 9) in bracket 110 and are fastened to the adjacent side wall of the housing frame 46. Brackets 110 are engaged by adjustable wing screws 116 which are adjustable in companion brackets 118 fixed to the adjacent side wall of the housing frame 46. It will be understood that brackets 110 may be raised and lowered by turning wing screws 116 so that the housing may be supported either on the caster wheels 108 or directly on the floor. As indicated in Fig. 1, stabilizing members 120 are fastened to the housing frame 46 and extend from the latter so as to prevent tilting of the oscillating apparatus 10 during the operation thereof for oscillating the bed. Members 120 are preferably pivotally connected to the bottom of housing frame 46, as will be readily understood, so that they may be moved to a retracted position when the apparatus is not connected to the bed.

As indicated in Fig. 1 the oscillating apparatus 10 is provided with an electric supply cord 122 for connecting electric motor 50 to an electric supply outlet in the room in which the apparatus is to be operated. A switch 124 is provided on housing 46 for turning motor 50 on and off.

Thus it is seen that the apparatus provided in accordance with the present invention is well adapted to accomplish the objects thereof. In particular it will be noted that any bed may be converted into an oscillating bed merely by supporting the same for pivotal movement on the fulcrum member 88 and by connecting oscillating apparatus 10 to the foot of the bed. It will be understood that the number of oscillations per minute may be determined according to the gear ratio of reduction gearing 52, and that it is within the scope of the present invention to provide a variable gear mechanism, although ordinarily each oscillating apparatus may have a definite speed of oscillation according to the purpose for which it is intended to be used.

5

While I have shown and described the preferred embodiment of my invention it will be understood that the latter may be embodied otherwise than as here specifically illustrated or described and that various changes in the details of construction and in the arrangement of parts may be made without departing from the underlying idea or principles of this invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. Apparatus for oscillating a bed about a horizontal axis, comprising pivot means for supporting one end of the bed for pivotal movement about said axis, means movable vertically in opposite directions and adapted to be connected to the bed for oscillating the latter about said axis, said vertically movable means comprising laterally spaced members, means movable in an endless path continuously in the same direction, said last mentioned means comprising a plurality of sets of laterally spaced vertically disposed endless chain members and companion laterally spaced gear wheels around which said endless members pass and which actuate said chain members, the axes of said wheels being horizontal and parallel to said axis of oscillation, means connected to the endless members of each set and movable therewith in said endless path, and means operatively connecting said last mentioned means of said sets to said members, respectively of said first mentioned vertically movable means so as to move the latter in unison.

2. Apparatus of the character described, comprising means for pivotally supporting the head end of a bed on a horizontal pivot, means movable vertically in opposite directions and adapted to be connected to the foot end of the bed for raising and lowering the latter whereby to oscillate the bed about a horizontal axis on said pivotal supporting means, and means movable in an endless path continuously in the same direction and operatively connected to said first mentioned means to move the latter in said opposite directions, said last mentioned means comprising endless members and companion spaced driving wheels around which said endless members move, and means connected to said endless members and movable therewith in said endless path and connected to said first mentioned vertically movable means.

3. Apparatus of the character described for oscillating a bed, comprising means for pivotally supporting the head end of a bed on a horizontal pivot, and means for oscillating the bed about said pivot, said bed-oscillating means comprising means movable vertically in opposite directions and adapted to be connected to the foot end of the bed for raising and lowering the latter whereby to oscillate the bed about a horizontal axis on said pivotal supporting means, and comprising means movable in an endless path continuously in the same direction and operatively connected to said first mentioned vertically movable means to move the latter vertically in said opposite directions, said bed oscillating means being in the form of a mobile unit for movement from place to place for releasable connection as a unit to any one of a plurality of different beds.

4. Apparatus of the character described, comprising means for pivotally supporting the head end of a bed on a horizontal pivot, means movable vertically in opposite directions and connected to the bed so as to oscillate the latter about a

6

horizontal axis on said pivotal supporting means, said last mentioned means comprising a horizontal member and means movable in an endless path continuously in the same direction and operatively connected to said first mentioned horizontal member means to move the latter in said opposite directions, said last mentioned means comprising endless members and companion spaced driving wheels around which said endless members move and which move said endless members in said endless path, and means connected to said endless members and movable therewith in said endless path and connected to said first mentioned vertically movable means for moving the latter in said opposite directions.

5. Apparatus of the character described, comprising means for pivotally supporting the head end of a bed on a horizontal pivot, said means for pivotally supporting the head end of the bed comprising vertically adjustable means for raising the head end of the bed above the floor, means movable vertically in opposite directions and adapted to be connected to the foot end of the bed for alternately raising and lowering the latter whereby to oscillate the bed about a horizontal axis on said pivotal supporting means, and means movable in an endless path continuously in the same direction and operatively connected to said first mentioned vertically movable means to move the latter vertically in said opposite directions.

6. Apparatus for oscillating a bed about a horizontal axis, comprising a plurality of laterally spaced mechanisms, each of said mechanisms comprising a pair of laterally spaced lower sprocket wheels, a pair of laterally spaced upper sprocket wheels in line with said lower sprocket wheels, respectively, laterally spaced endless sprocket chains engaging said lower and upper sprocket wheels for movement thereby, a cross member connecting said sprocket chains and movable therewith in an endless path in the space therebetween, flexible cable means connected to said cross member, guide means positioned above said upper sprocket wheels and over which said flexible cable means is directed, said cable means extending upwardly from said cross member, over said guide means, and downwardly from the latter, means for operatively connecting the downwardly extending part of the cable means of each of said mechanisms to the bed at laterally spaced points so as to prevent tilting of the bed about its longitudinal axis while it is oscillated about said horizontal axis, and power operated means for rotating the lower sprocket wheels of all of said mechanisms in unison.

7. Apparatus for oscillating a bed about a horizontal axis, comprising a plurality of laterally spaced mechanisms, each of said mechanisms comprising a pair of laterally spaced lower sprocket wheels, a pair of laterally spaced upper sprocket wheels in line with said lower sprocket wheels, respectively, laterally spaced endless sprocket chains engaging said lower and upper sprocket wheels for movement thereby, a cross member connecting said sprocket chains and movable therewith in an endless path in the space therebetween, flexible cable means connected to said cross member, guide means positioned above said upper sprocket wheels and over which said flexible cable means is directed, said cable means extending upwardly from said cross member, over said guide means, and downwardly from the latter, means for operatively connecting the downwardly extending part of the cable means of each of said mechanisms to the bed at

laterally spaced points so as to prevent tilting of the bed about its longitudinal axis while it is oscillated about said horizontal axis, said connecting means comprising a rigid cross member supported by said cable means, and means for connecting said cross member to the bed.

8. Apparatus for oscillating a bed about a horizontal axis extending transversely of the bed and located near the head end of the bed, comprising means for pivotally supporting one end of the bed for pivotal movement about a horizontal axis, vertically movable means adapted to be connected to the other end of the bed for raising and lowering the latter, and means for moving said bed-raising and lowering means repeatedly in said opposite directions, said last mentioned means comprising a plurality of laterally spaced mechanisms, each of said mechanisms comprising a pair of laterally spaced lower sprocket wheels, a pair of laterally spaced upper sprocket wheels in line with said lower sprocket wheels, respectively, laterally spaced endless sprocket chains engaging said lower and upper sprocket wheels for movement thereby, a cross member connecting said sprocket chains and movable therewith in an endless path in the space therebetween, flexible cable means connected to said cross member, guide means positioned above said upper sprocket wheels and over which said flexible cable means is directed, said cable means extending upwardly from said cross member, over said guide means, and downwardly from the latter and connected to said vertically movable means, said vertically movable means having provision for connection thereof to laterally spaced points of the bed so as to prevent tilting of the bed about its longitudinal axis during the raising and lowering of said other end of the bed.

9. Apparatus for oscillating a bed about a horizontal axis extending transversely of the bed, comprising two similar mechanisms disposed laterally of each other in axial alignment parallel to said horizontal axis, each of said mechanisms comprising a vertically movable flexible member and endless belt means operatively connected to said vertically movable member at one end thereof for reciprocating the latter in a vertical plane while said endless belt means moves continuously in the same direction, and means for operatively connecting the other ends of said vertically movable members of said two mechanisms to one end of the bed at laterally spaced points of the bed for raising and lowering said end of the bed to oscillate the latter about said axis while preventing tilting of the bed about its longitudinal axis.

10. Apparatus for oscillating a bed about a horizontal axis extending transversely of the bed, comprising two similar mechanisms disposed laterally of each other in axial alignment parallel to said horizontal axis, each of said mechanisms comprising a vertically movable flexible member and endless belt means operatively connected to said vertically movable member at one end thereof for reciprocating the latter in a ver-

tical plane while said endless belt means moves continuously in the same direction, and horizontal rigid means connecting the other ends of said vertically movable members to each other and to one end of the bed for raising and lowering said end of the bed to oscillate the latter about said axis while preventing tilting of the bed about its longitudinal axis.

11. Apparatus for oscillating a bed about a horizontal axis extending transversely of the bed, comprising horizontal pivot means for mounting the bed for pivotal movement about said axis, and actuating means for oscillating the bed on said pivot means, said actuating means comprising two similar mechanisms disposed laterally of each other in axial alignment parallel to said horizontal axis, each of said mechanisms comprising a vertically movable flexible member and endless belt means operatively connected to said vertically movable member at one end thereof for reciprocating the latter in a vertical plane while said endless belt means moves continuously in the same direction, and means for operatively connecting the other ends of said vertically movable members of said two mechanisms to one end of the bed at laterally spaced points for raising and lowering said end of the bed to oscillate the latter about said axis while preventing tilting of the bed about its longitudinal axis.

12. Apparatus for oscillating a bed about a horizontal axis extending transversely of the bed, comprising horizontal pivot means for mounting the bed for pivotal movement about said axis, and actuating means for oscillating the bed on said pivot means, said actuating means comprising two similar mechanisms disposed laterally of each other in axial alignment parallel to said horizontal axis, each of said mechanisms comprising a vertically movable flexible member and endless belt means operatively connected to said vertically movable member at one end thereof for reciprocating the latter in a vertical plane while said endless belt means moves continuously in the same direction, and horizontal rigid means connecting the other ends of said vertically movable members to each other and to one end of the bed for raising and lowering said end of the bed to oscillate the latter about said axis while preventing tilting of the bed about its longitudinal axis.

NATHAN D. MININBERG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
761,862	Wallman	June 7, 1904
897,791	Seeber	Sept. 1, 1908
1,328,802	Anderson	Jan. 27, 1920
1,637,078	Hill	July 26, 1927
1,803,887	Barnes	May 5, 1931
2,433,548	Ecks	Dec. 30, 1947