

L. W. WARD.
 INVALID BED.
 APPLICATION FILED DEC. 10, 1909.

961,273.

Patented June 14, 1910.

2 SHEETS—SHEET 1.

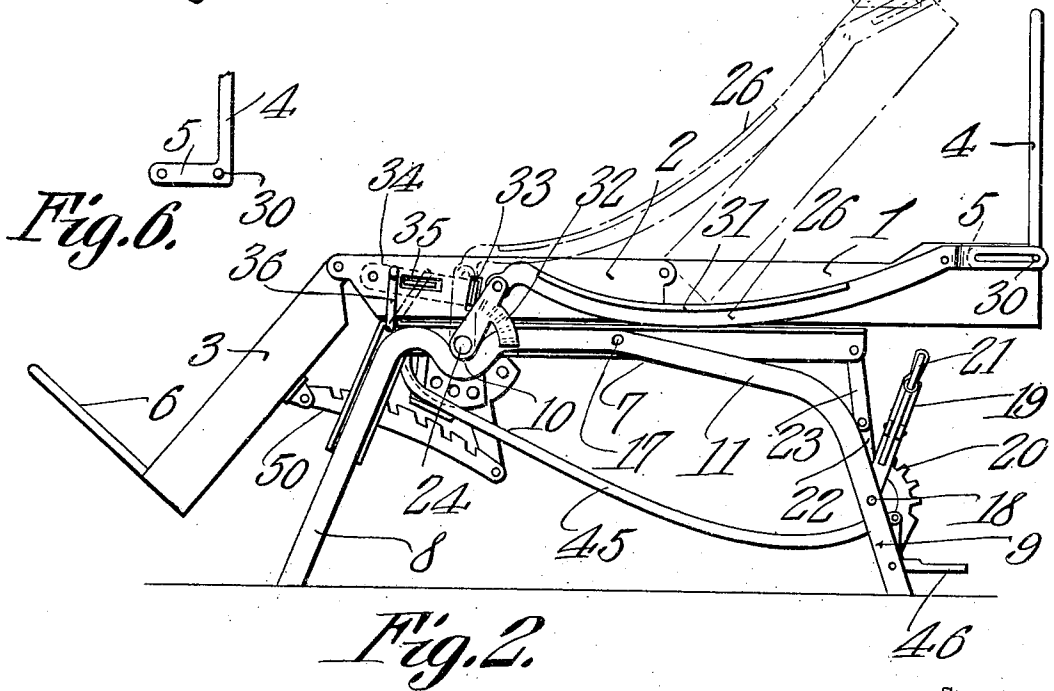
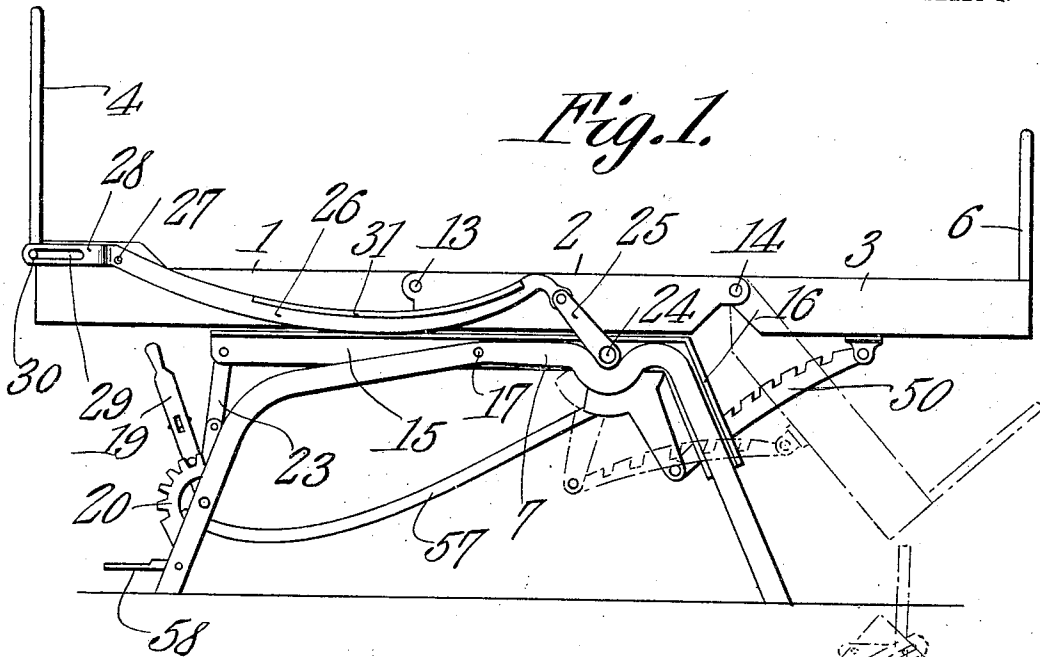


Fig. 6.

Fig. 2.

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2 SHEETS—SHEET 2.

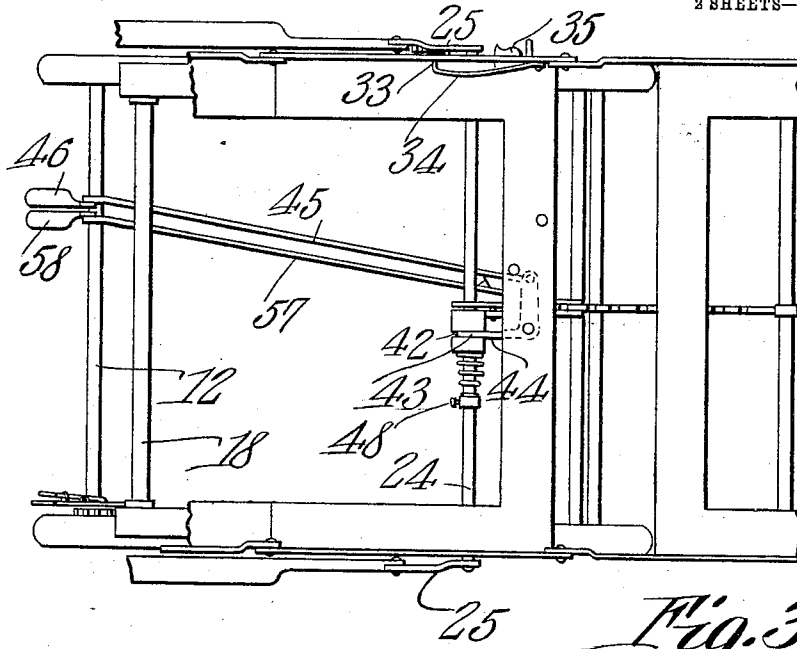


Fig. 3.

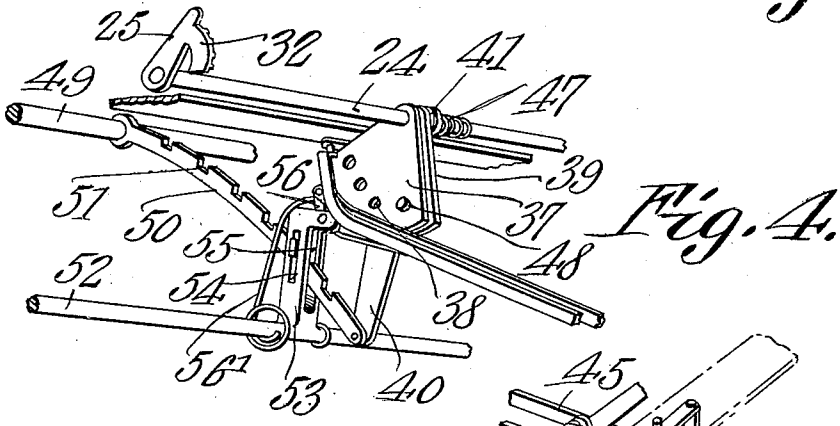


Fig. 4.

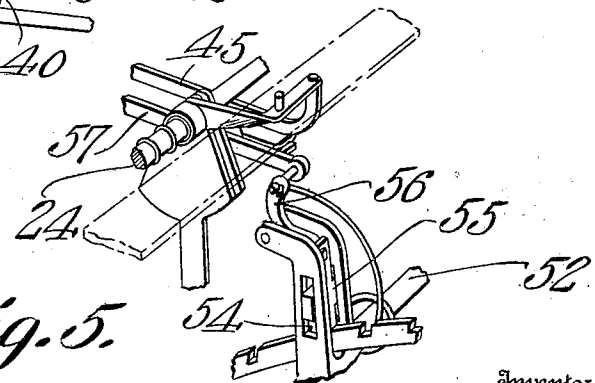


Fig. 5.

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UNITED STATES PATENT OFFICE.

LLOYD W. WARD, OF BUCKHANNON, WEST VIRGINIA, ASSIGNOR OF ONE-THIRD TO C. E. WHITE AND ONE-THIRD TO ROBERT LANG, BOTH OF BUCKHANNON, WEST VIRGINIA.

INVALID-BED.

961,273.

Specification of Letters Patent. Patented June 14, 1910.

Application filed December 10, 1909. Serial No. 532,434.

To all whom it may concern:

Be it known that I, LLOYD W. WARD, a citizen of the United States, residing at Buckhannon, in the county of Upshur and State of West Virginia, have invented a new and useful Invalid-Bed, of which the following is a specification.

This invention has reference to improvements in invalid beds and is designed to provide a bed frame particularly adapted for handling a patient or invalid resting on the bed so that an operator may at will change the bed from an extended level position to various inclined positions and also at will vary the relation of either or both the head and foot of the bed to the central portion thereof, thus making it possible to arrange the invalid in any one of a great variety of positions for examinations and for the comfort of the invalid.

The invention will be best understood from a consideration of the following detail description taken in connection with the drawings forming a part of this specification, in which drawings—

Figure 1 is a side elevation of the bed in the elongated position and in a level plane, also showing the position of the foot of the bed when depressed. Fig. 2 is a side elevation of the structure of Fig. 1 when viewed from the opposite side with the foot end depressed and the head end shown level but also shown in the elevated position in dotted lines. Fig. 3 is a plan view of the head end of the bed with parts omitted to show some of the structure underneath. Fig. 4 is a perspective view of a portion of the operating mechanism. Fig. 5 is a perspective view of a portion of the structure of Fig. 4 from another view-point. Fig. 6 is a detail view of the pivot end of the head board of the bed.

Referring to the drawings there is shown a bed frame composed of three sections, 1, 2, 3, the section 1 constituting the head section, the section 2 constituting the middle or body section, and section 3 constituting the foot section. In practice the head 1 of the bed is made of such length as to accommodate the body of the patient from the head to the hips, the body section 2 is made

of sufficient length to accommodate the person of the patient from the hips to the knees, and the foot portion of the bed frame is made of sufficient length to accommodate the legs of the patient from the knees to the feet, the bed resembling in this respect the type of chairs having back and foot sections movable from the upright to the recumbent position.

The head portion 1 is provided at the head end with a head board 4 having at each end an angle extension 5 pivoted at its free end to the side members of the head section 1. The head board 4 is capable of movement about its pivot into different angular relations with the head section 1 of the bed body by means to be described hereinafter.

The foot section 3 is provided with a foot board 6 which however is in fixed relation to the foot section 3 and retains such relation irrespective of the movement of the foot section 3 in the manner to be described.

The bed body is supported upon a basic frame made up of side members 7, preferably of tubular or angle construction for strength and lightness as well as cleanliness. These side members have legs 8, 9 at the two ends, while the connecting yoke between the legs is formed within a depression 10 near the leg 8 and an inclined portion 11 merging into the leg 9. The legs 8 and 9 are joined by cross bars 12.

Each section 1, 2 and 3 is formed of angle metal preferably in the shape of a rectangular frame thus producing a structure of great lightness and strength as well as one easily kept in a clean condition. The meeting ends of the sections 1 and 2 are pivoted together as shown at 13 and the meeting ends of the sections 2 and 3 are pivoted together as shown at 14, the arrangement being such that considering the section 2 as stationary, the section 1 may be moved in an upward direction with its head end moving through an arc about the pivot 13 as a center, while the foot section 3 may move downward through an arc about the pivot 14 as a center.

Fast to the under part of each side of the middle section 2 is an angle strip 15 having one end bent downwardly as indicated at 16 to lie, in one position, against the legs 8.

The angle strips 15 are pivoted to the yoke portion of the frame 7 at the junction of the inclined portions 11 with the horizontal portions, by pivots 17, so that the body portion 2 may be rocked about a horizontal axis determined by the pivot 17 in a direction to carry the head end lower than the foot end, but a movement of the body portion in the other direction beyond the level position is prevented by the engagement of the downwardly bent ends 16 of the angles 15 with the legs 8 of the supporting members 7.

Extending between the legs 9 and journaled therein is a shaft 18 above the brace rod 12 and at one end this shaft 18 has fast thereon a lever 19 movable along a rack segment 20 fast to the corresponding leg 9 and this lever is provided with a latch lever 21 adapted to the rack segment 20. The shaft 18 has a radial arm 22 fastened thereon near one end and this arm is connected to the corresponding end of one of the angle bars 15 by a link 23, the construction being such that by a proper manipulation of the lever 19 the angle bar or strip 15 together with the body portion 2 of the bed and the end portions 1 and 3 thereof may be moved about the pivots 17 to any angle of inclination within the range of movement of the structure, to be there locked by the engagement of the latch lever 21 with the rack segment 20. The purpose of the lever 19 and its connection with the bed bottom is to maintain the bed in a horizontal position or in any inclination with the head end lower than the front end, such positions being necessary for some purposes.

Journaled in the angle strips or bars 15 at points coincident with the depressed portion 10 of the side members 7 is a shaft 24 extending beyond the side members of the bed bottom. This shaft carries at each end beyond the said bottom member 2 a rock arm 25 and each rock arm is connected by a curved lever 26 to the head end 1 of the bed bottom near the head 4, this lever being there pivoted as shown at 27. Beyond the pivot 27 each lever 26 has a short arm 28 in which there is a longitudinal slot 29 receiving a pin 30 at the angle portion of the head 4 of the said bottom. The curved part of each lever 26 is formed for a portion of its length with an outwardly extending flange 31 which not only serves to strengthen the lever but when the head portion of the bed is raised as indicated by dotted lines in Fig. 2 the curved portions of the levers 26 with the flange 31 serve as arm rests for the occupant of the bed.

One of the rock arms 25 is formed on the inner face with rack teeth continued on a segmental extension 32 of the arm, and these rack teeth may be engaged by the end 33 of an elastic pawl 34 fast to the corresponding

side of the portion 2 of the bed bottom, the end 33 extending through an appropriate passage through the corresponding side of the central portion 2 of the bed bottom. Formed on the elastic pawl 34 between its point of connection with the bed bottom and the end 33 is a notched tooth 35 also extending through an appropriate passage in the side of the bed bottom to the exterior thereof and this notched tooth 35 may be engaged by a rock arm 36 mounted to turn in suitable bearings in the portion 2 of the bed bottom.

The normal tendency of the spring pawl 34 is to move toward the corresponding side of the bed bottom so that the tooth or end 33 is projected outside of the bed bottom into engagement with some one of the teeth of the rack of the arm 25 adjacent thereto. The engagement of the end 33 of the spring pawl 34 with the rack of the corresponding arm 25 will maintain the shaft 24 in any adjusted position and so hold the head 1 of the bed in any elevated position to which it may be moved, this being irrespective of any other fastening devices. It is at times desirable or necessary to maintain the head of the bed in a position to which it is adjusted, thus permitting other parts to be independently adjusted.

If it be desirable to throw the pawl 34 out of action then the rock arm 36 is moved into engagement with the notched tooth 35, this resulting in moving the end 33 out of the path of the ratchet teeth on the corresponding arm 25 and there holding it.

About midway of its length the shaft 24 carries a segment 37 near the periphery of which there is formed a curved series of perforations 38. Mounted on the shaft 24 adjacent to the segment 37 is another segment 39 provided with a central radially projecting arm 40. The segment 39 is mounted upon a sleeve 41 carried by the shaft 24 and this sleeve is provided with a circumferential groove 42 receiving the end 43 of an angle lever 44 the other end of which is connected by a link 45 to a treadle lever 46 mounted on the cross bar 12 between the legs 9 of the side frame members 7 so that when pressure is applied to the treadle lever 46 motion is imparted by the link 45 to the lever 44 in a direction to move the sleeve 41 along the shaft 24, but this movement is resisted by a spring 47 on said shaft between the corresponding ends of the sleeve 41 and a top member 48 on the shaft 24. The tendency of the spring is to urge the segment 39 into engagement with the segment 37 and in order to move the segment 39 away from the segment 37 sufficient force must be exerted to compress the spring 47. The segment 39 carries pins 48 adapted to enter the perforations 38 in the segment

37. A single pin 48 may be used, or more than one pin may be used and in such case the pins are properly spaced to engage the perforations 38, so that the segments 37 and 39 may be rocked relative one to the other, and then when brought together a pin or pins 48 will engage a corresponding number of the perforations and so lock the said segments together against independent movement, such movement being permitted only when the segment 39 is moved away from the segment 38 in the direction of the length of the shaft 24 by force applied to the foot treadle 46 to operate in the manner already described.

The arm 40 is connected to a rock shaft 49 journaled to the foot end 3 of the bed bottom about midway of the length of the latter, by means of a curved link 50 having notches 51 produced in its upper edge. The downturned ends 16 of the angle strips or bars 15 are connected by a rod 52 and about midway the length of this bar or rod 52 there is secured a pair of guide plates 53, or these guide plates may constitute parallel extensions of a suitable block made fast on the rod 52, the said guide plates flanking the link 50 which is movable between them. The guide plates are each slotted longitudinally as indicated at 54 for the reception of extensions of a sliding tooth 55 adapted to the notches 51 in the link 50. This tooth is connected to one end of a small bell crank lever 56 under normal control of a spring 56' fixed at one end to the rod 52 and at the other end this lever is connected by a link 57 to a treadle lever 58 mounted on the rod 12 adjacent to the treadle lever 46. The normal tendency of the tooth 55 is to lock the links 50 in any position of adjustment, but the tooth 55 may be withdrawn from the notches of the link 50 by a suitable manipulation of the treadle lever 58.

If it be assumed that the bed bottom is in the horizontal position shown in Fig. 1 and that it be desirable to lower the foot portion 3 then the treadle lever 58 is depressed and through the link 57 causes a rocking of the angle lever 56 on its pivot support in the outer ends of the plate 53 thus moving the locking tooth 55 away from the notch 51 in the link 50, this tooth normally holding the link so that the foot end 3 of the bed bottom may not drop. At the same time the treadle lever 46 is depressed and this may be done at one operation since the two treadle levers are placed close to each other so as to be engaged both by one foot of the operator, and the movement of the treadle lever 46 acts through the link 45 and angle lever 44 to shift the sleeve 41 against the action of the spring 47 in a direction to disengage the pin 48 from the corresponding holes 38 in the segment 37. The bot-

tom of the foot section 3 is now free and will either gravitate to a lowered position or may be so lowered by an attendant. When the desired depression of the foot section 3 has been attained then pressure is relieved from the treadle levers 46 and 58 when the spring 56' will return the tooth 55 into engagement with a notch 51 of the link 50 and the segment 39 will move toward the segment 37 until a pin or pins 48 engage in appropriate perforations 38.

If it be desired to cause the raising of the head section 1 and at the same time to lower the foot section 3 then the treadle lever 46 remains undisturbed and the shaft 24 is rocked on its longitudinal axis because of the connection of the foot section therewith through the link 50, arm 40, segments 39 and pin or pins 48.

If it be desirable that at the same time the foot section 3 is depressed the head section 1 be raised then the treadle lever 46 remains undisturbed and the treadle lever 58 only is actuated. Under these circumstances the segment 39 remains in engagement with the segment 37 and the two are moved together by the connection of the foot section through the link 50 and arm 40 with the segment 39 so that the shaft 24 is rocked on its longitudinal axis and through the arms 25 and levers 24 cause the free end of the head section to move upwardly about the pivots 13.

If it be desirable to move the foot section to a greater extent than the head section then both treadle levers 46 and 58 are manipulated but before the foot section has been moved to the full extent desired the treadle lever 46 is released so that the segment 39 becomes locked to the segment 37 and further movement of the foot section 3 is participated in by the head section which may thus be raised to a less extent than under the conditions first assumed.

If it be desired to manipulate the head section without disturbing the foot section whether the latter be in the horizontal position or in any depressed position to which it may have been adjusted then the treadle lever 46 only is manipulated to unlatch the head section from the foot section by causing a movement of the segment 39 away from the segment 37 until the pin or pins 48 are disengaged from the said segment 37. Now the head section may be moved to any desired extent and on the release of the treadle lever 46 the head section will become again locked to the foot section by the return movement of the segment 39 toward the segment 37 under the action of the spring 47.

As before explained the head section may be locked in any desired position by the spring pawl 34 and then the foot section may be manipulated as desired without disturb-

ing the head section. The spring pawl 34 also serves to lock the head and foot sections in any desired position of relative adjustment but this locking of the head section will not prevent individual movement of the foot section if the operator so desires. It will thus be seen that an almost unlimited series of conjoint or individual adjustment of the head and foot sections is possible.

If it be desired to tilt the bed body upon the axis determined by the pivots 17, this may be done by a proper manipulation of the lever 19 irrespective of the relative positions of the head and foot sections 1 and 3 respectively. This adds to the series of adjustments to which the bed bottom is adapted.

All the various adjusting devices with the exception of the lever 19 and its connection to the main portion 2 of the bed bottom are independent of the supporting members 7 so that the several adjustments of the head and foot sections 1 and 3 respectively with relation to the central section 2 may be brought about without respect to the general position of the bed bottom with relation to the supporting members 7 so that it is immaterial whether the bed bottom be horizontal or tilted so far as the individual or conjoint adjustments of the head and foot sections are concerned.

It will be seen that the head may be adjusted for a recumbent position of the occupant or with the feet lower than the body, or with the body elevated from the hips upward, or with the body elevated as just described and with the feet dependent or the bed bottom as a whole may be tilted on its axis determined by the pivots 17 whatever be the position of the occupant. Furthermore the several parts are locked in the adjusted positions in such manner as to prevent any accidental movement of the parts of the bed after being once adjusted except at the will of the operator.

What is claimed is:—

1. In an invalid bed, a bed bottom frame comprising a head section, a foot section and an intermediate section pivotally connected one to the other, means for adjusting the foot section from a horizontal position to an intermediate depressed position, means for adjusting the head section from a horizontal position to an elevated position, means for locking the head and foot sections together for conjoint movement, a support to which the intermediate section is pivotally connected, and means for adjusting the intermediate section on its pivot support without disturbing the adjustment of the head and foot sections with relation to the intermediate section.

2. In an invalid bed, an adjustable head section means for locking the head section

in different positions of adjustment, and side members for holding the head section in adjusted positions and movable with relation to the bed bottom to constitute arm rests.

3. In an invalid bed, a pivoted head section, levers connected to each side of the head section near the head end thereof, a rock shaft having rock arms at the end connected to the ends of said levers remote from their connection with the head section, and a locking means coacting with one of the arms of the rock shaft to lock the head section in adjusted positions.

4. In an invalid bed, a pivoted head section, a head board also pivoted to the head section and provided with angle extensions at the lower ends, levers pivoted to the sides of the head section and each engaging at one end the corresponding angle extension of the head board, a rock shaft provided with arms connected to the other ends of the levers, and means for rocking the shaft to move the head section to different positions of adjustment.

5. In an invalid bed, a bed bottom having a bottom section, a head section pivoted to the body section, a rock shaft carried by the body section and provided with rock arms, levers connected to the rock arms at one end and at the other end to the head section near a head end thereof, means for locking the head section in different positions of adjustment, and a head board pivoted to the head section and connected to and moved by the side levers.

6. In an invalid bed, a bed bottom comprising an intermediate section, head and foot sections pivotally connected to the intermediate section, means for the independent adjustment of the head and foot sections, and means for the adjustment of the bed bottom as a whole without disturbing the relation of the several sections one to the other.

7. In an invalid bed, a supporting structure, a bed bottom pivotally mounted thereon, means for adjusting the bed bottom about a horizontal axis, means for adjusting the foot end of the bed bottom, means for adjusting the head end thereof, and means for locking the head and foot sections together in any position of relative adjustment.

8. An invalid bed having a bottom or body structure adjustable as a whole about a horizontal axis and also provided with head and foot sections independently adjustable, and means for causing the simultaneous relative adjustment of the head and foot sections.

9. An invalid bed having a body portion or bottom adjustable about a horizontal axis and provided with head and foot sections,

means for independent adjustment of the
head and foot sections irrespective of the ad-
justment of the bed bottom as a whole, and
means for the simultaneous movement of the
5 head and foot sections to any position of
relative adjustment.

In testimony that I claim the foregoing

as my own, I have hereto affixed my signa-
ture in the presence of two witnesses.

LLOYD W. WARD.

Witnesses:

J. G. HALL,
C. LILLIAN MOORE.