April 16, 1929. W. M. LOXLEY 1,709,137

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Filed July 8, 1925 2 Sheets-Sheet 1

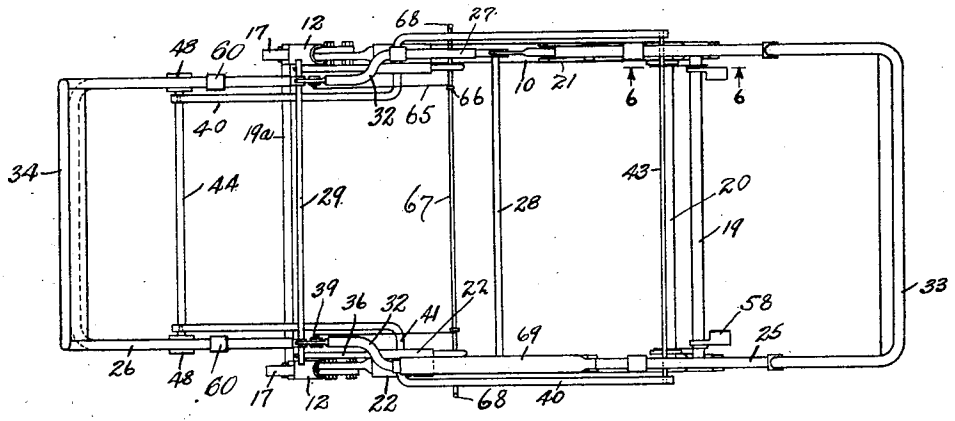

Fig. 1

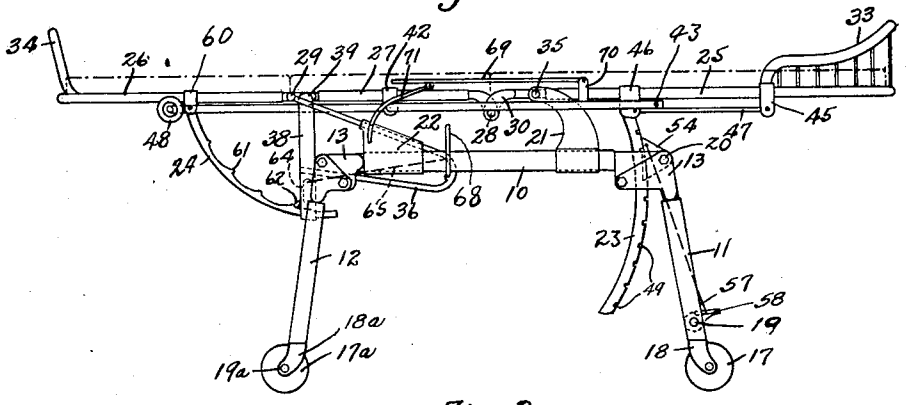

Fig. 2

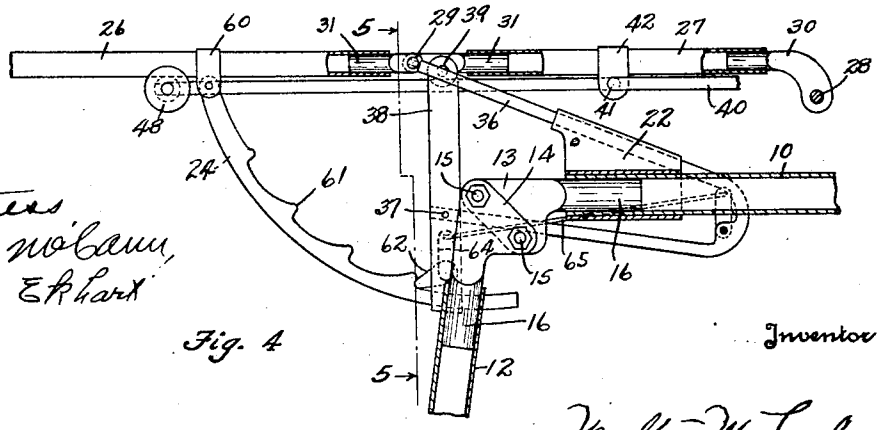

Fig. 4

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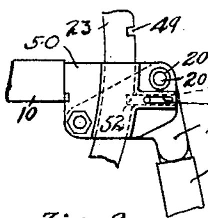

Fig. 8

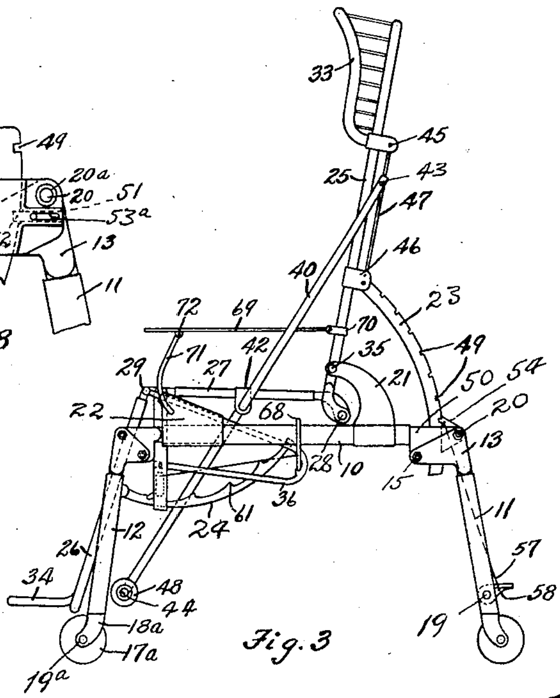

Fig. 3

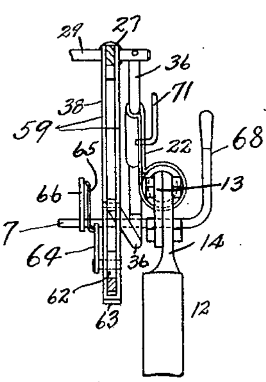

Fig. 5

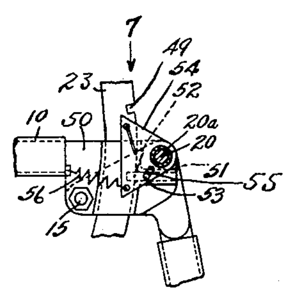

Fig. 6

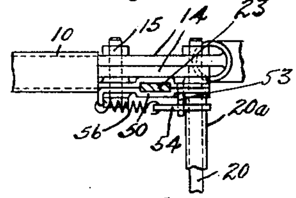

Fig. 7

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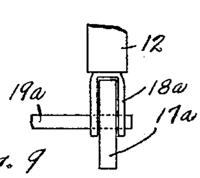

Fig. 9

Patented Apr. 16, 1929. 1,709,137

UNITED STATES PATENT OFFICE.

WALTER M. LOXLEY, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF TO GEORGE B. McCANN, OF DAYTON, OHIO.

INVALID BED.

Application filed July 8, 1925. Serial No. 42,249.

This invention relates to beds, particularly adapted to the use of sick or helpless persons.

Its objects are to enable the occupant to assume different positions with ease and comfort, and facilitate the manipulation of the bed by an attendant.

The invention consists in a bed having a sectional body frame, the several sections of which are jointed together and mounted on a pedestal in such manner that they may be adjusted to various positions without discomfort to the occupant and with a minimum of effort. It further consists of the combinations and details of construction fully set forth in the ensuing detailed description, illustrated in the drawings and defined in the appended claims.

In the drawings, in which like parts are designated by like reference characters throughout the several views:

Fig. 1 is a plan view of the bed frame extended to support an occupant in horizontal recumbent position;

Fig. 2 is a side elevation thereof;

Fig. 3 is a side elevation of the bed adjusted to sustain an occupant in sitting position;

Fig. 4 is a side elevation, partly in section, of a fragment in the position of adjustment shown in Fig. 2;

Fig. 5 is a cross-sectional view of a detail, the section having been taken on line 5—5 of Fig. 4;

Fig. 6 is a section on line 6—6 of Fig. 1, illustrating a locking mechanism for locking the head section of the bed in various positions;

Fig. 7 is a plan view of the detail illustrated in Fig. 6;

Fig. 8 is an elevation of one of the segment guides and bolt casings at the head end of the pedestal; and

Fig. 9 is a front elevation of a fragment of one of the pedestal legs and a tie rod at the front end of the pedestal.

As the invention resides in the frame, springs and mattress have been omitted from the drawings for clearness of illustration, except that a sectional mattress is indicated by dotted lines in Fig. 2.

The bed frame forming the subject of this application, consists of a body frame comprising three sections pivoted together, said sections being supported on a four-legged pedestal terminating in wheels or rollers, so that the entire structure may be easily moved; and of equipment whereby the body frame sections may be adjusted and locked at different inclinations with respect to each other, according as the comfort or convenience of the invalid or other occupant of the bed may require. The equipment by which the several adjustments are effected and the various proportions and relationships to each other of the several parts of the frame are such as to enable an attendant to effect the adjustments with ease and facility.

The pedestal is quadrilateral in outline, viewed from above. It comprises two parallel side bars 10, ranging fore-and-aft, each of which is supported by two legs 11 and 12 joining, respectively, the head and foot ends of the bar 10 at an obtuse angle, so that the feet are separated by more than the length of the bar to afford a substantial base area, while permitting the upper part of the pedestal to occupy less space than would otherwise be required, thus rendering the structure more compact, convenient and graceful in certain positions of adjustment. Bars 10 and legs 11 and 12 may be made of any suitable material or cross-sectional shapes. It is preferred to make them of metal tube sections which may be joined in any suitable manner by cast metal or other connections. For purposes of exemplification, there have been shown connections 13 composed of two members provided with overlapping flattened portions 14 inserted, respectively, in the ends of the tube sections which constitute the main portions of the bars and legs. Wheels 17 and 17ª, which constitute the leg terminals or feet, may each be journaled between the sides of the forked members 18 and 18ª, each of which has a shank inserted in the extremity of a tubular leg. It is contemplated that the wheels at the head end shall be casters. and that, accordingly, the forked members 18 at that end shall be swiveled in the legs, whereas the forked members 18ª at the other end are intended to be secured rigidly to the legs. The head end legs 11 are tied together by transverse tie rods 19, disposed a little above the wheels 17, and by rod 20 disposed at the angle where the legs 11 join the bars 10. Besides having the function of tie rods, said rods 19 and 20 have other functions, to be hereafter set forth. The two legs 12 are spaced and tied by a tie rod 19ª, the ends of which serve as journals for the wheels 17ª at the foot end of the

pedestal. The sectional body frame is supported on the described pedestal by brackets 21, slide bearings 22, and rack segments 23 and 24, as will be presently explained.

The body frame consists principally of a head section 25, a foot section 26 and a middle section 27. Said head section 25 is pivoted to the middle section 27 on a transverse pintle rod 28, which preferably lies below the plane of said sections when they are horizontal, the adjacent ends of the frame members of which the sections are formed being turned downward and, in the form illustrated, flattened and perforated for receiving the ends of said pintle rod 28. Said foot section 26 is pivoted to the middle section 27 by a transverse pintle rod 29, the ends of which extend through and project at each side of the joint. The described sections may be made of any desired rod-like material, but are shown made of pipe or tube bent to the desired form. In case tubing is used for the sections, connection may be effected between sections 25 and 27 by means of solid members 30 having round shanks inserted in the ends of the tubing and interlacing hinge ends perforated to receive pintle pins. Straight members 31, likewise with round shanks and flattened exposed ends, may serve as the hinge members connecting sections 26 and 27, tie rod 29 serving as the pintle for such members. Head section 25 is of U-shape and may be so formed by bending, if made of tubing as shown. So, also, is foot section 26; but this section is preferably narrower than section 25, as may be seen by referring to Fig. 1. Middle section 27 is narrowed adjacent its pivotal connection with section 26, the narrowing being effected by bends 32 in the bars or tubes of which it is composed. Head section 25 may be equipped with a head or pillow guard 33, and foot section 26 with a footboard or rest 34.

Brackets 21, heretfore said to be mounted on side bars 10 of the pedestal, may have divided upper ends to receive the side members of the U-shaped section 25 near their ends. Fulcrum or pivot pins 35 connect said section 25 to said brackets, so that said section may assume the horizontal position in which it is illustrated in Fig. 2, or the inclined position illustrated in Fig. 3, or any one of a number of intermediate angular positions, as may be desired.

Brackets 22 constitute guide bearings and supports for the guides 36. Each guide 36 consists of a rod of approximately U-shape, the end of one limb of which is connected to a projecting end of pintle rod 29, while the end of the other limb is pinned, or otherwise secured, at 37 to an arm 38, which depends from the end of one side member of section 27 near the pivot pintle 29, as indicated at 39. Bracket 22 may be formed of sheet metal. It has a large opening by means of which it surrounds and is secured to pedestal side bar 10, and a guide opening oblique thereto in which the guide 36 slides, as clearly shown in Fig. 5. When the head section 25 is raised, it will be perceived that sections 27 and 26 must move toward the head end by reason of the relative position of pivots 35 and 28. Bracket 22 and guide 36, slidingly mounted in it, permit this movement, allowing the middle section at the same time to assume a slightly-inclined position as indicated in Fig. 3.

The distance between the fulcrum 35 and the upper surface of the pedestal body represented by the top of side bars 10, is greater than the distance between said fulcrum and the ends of the side bars of sections 25 and 27. The oblique guide opening in each bracket 22 is elevated above the side bars 10 and lies in a vertical plane slightly inside of the bar 10. This provides ample space between the bars 10 and the sides of section 26 in all positions, permitting the lever 40, hereinafter described, to be pivoted as shown, preventing pinching of the bed clothing, interfering of the bed clothing with the movements of the body frame and minimizing danger of accidental catching the hand of attendant or occupant between relatively moving parts during adjustment.

When the head section is lowered to horizontal position, as shown in Figs. 1 and 2, the foot section 26, if the latter is at that time lowered to the position shown in Fig. 3, will be elevated to horizontal position. This relative movement is caused by movement of the pivoted foot-section-elevating lever consisting of two rods 40, each having a right-angle bend at 41 which is pivoted on the side bars of section 27, preferably in a bearing member 42 disposed about midway of the side bars. The head ends of rods 42 are connected by a cross-tie rod 43 and the foot ends by a cross-tie rod 44. As shown, those portions of rods 40 that extend from the bend 41 toward the head of the the bed frame, lie outside of the frame, while those portions that extend from said bend toward the foot end, lie inside said frame. The tie rod 43 is slidably engaged in two ways which may be formed between two clips 45 and 46 on each side member of section 25, and a guide strip 47 connected to said clips. Thus, the head end of the foot-section-elevating lever moves when the head section moves. The tie rod 44 at the foot end of the elevating device is equipped with grooved rollers 48, one at each end, these rollers being positioned in the vertical plane of movement of the side members of foot section 26; and when the foot end of the elevating device is raised by the depression of head section 25, the rollers engage beneath the side members of section 26, if the latter is in the position illustrated in Fig. 3, and elevate said foot section. It will also be evident that said elevating device assists in holding the three sections of the bed frame adjusted in horizontal posi-

tion, or in holding the sections at the desired relative angles in positions intermediate the horizontal and that shown in Fig. 3.

Head section 25 may be held in any angular position within the range desired, by two segments 23 having substantially rectangular notches 49 cooperating with bolts on the pedestal. Each segment 23 is pivoted, as to a clip 46, on a side member of head section 25. Each segment is guided in a curved passage formed in a guide member 50 secured to the pedestal by one of the bolts 15, and tie rod 20, which connects the two side members of the pedestal. As indicated by dotted lines in Figs. 6 and 8, there is a lock-bolt guide 51 formed in each guide member 50, in which a bolt 52 is slidably mounted, so that it may be urged into engagement with one or another of the notches 49 in segment 23, or may be withdrawn. Bolt 52 has an attached pin 53 projecting laterally through a suitable slot 53^a in guide member 50. Two rock levers 54 are secured, resepectively, to opposite ends of a rock shaft formed by a tube 20^a which surrounds tie rod 20. Each lever 54 has a slot 55 in which pin 53 engages. Rocking of either lever 54 will, therefore, slide both bolts 52. Each lever 54 is biased by spring 56 in such direction as to urge bolts 52 into engagement with the segments 23. In order that each bolt 52 may be conveniently withdrawn from engagement with one of the notches in segment 23 to permit raising or lowering of head section 25, each lever 54 is connected, in the embodiment illustrated, by a wire 57 to one of two pedal levers 58 pivoted, respectively, adjacent a leg 11 on the tie rod 19, as shown in Fig. 1. Pressure of the foot of attendant on either pedal lever 58 withdraws the bolts 52, so that thereafter the head section may be moved.

Foot section 26 may also be supported in horizontal position, or at any angle below the horizontal within its range of movement, by notched segments 24, which may be pivoted to clips 60 secured to the side bars of said section. Each segment 24 is provided with ratchet-like teeth 61, as distinguished from the rectangular notches 49 of the head segments 23. These ratchet-like teeth are engageable by a pivoted dog 62 which locks the segment against downward movement, but does not prevent it from moving upward. Each dog 62 is pivoted to a member 38, before mentioned, which is rigid with middle section 27 of the bed frame. Each member 38 consists of two parallel side members 59 between which dog 62 is pivoted, as shown in Fig. 5. Between the dog 62 and a cross-yoke 63, which connects the spaced sides of member 38, the segment 24 is guided. The dog 62 is rigid with a lever arm 64, to which one end of an operating rod 65 is connected. The other end of operating rod 65 is connected to an arm 66 on rock shaft 67, the ends of which are pivoted in the yoke portions of the U-shaped guides 36, before described. Therefore, as the middle section 27 moves toward the head, carrying with it depending members 38 and dogs 62, the rock shaft 67 also moves to the same extent. On the ends of the rock shaft 67 are lever handles 68, which may be pushed toward the head end of the frame, in order to disengage the dogs 62 from the teeth 61 of racks 24, whereupon the foot section 26 may be lowered.

For the comfort of the occupant of the bed when adjusted to position illustrated in Fig. 3, arm rests 69 may be provided. Each arm rest may be pivoted, as to a clip 70, secured to a side member of head frame 25. An elevating support 71 for each arm rest, is pivoted at one end to the underside of said arm rest at 72, and at its other end in the bracket 22. When the arm rest 69 is elevated, the support 71 assumes a substantially upright position and holds the arm rest as shown in Fig. 3 When the sections are horizontal, said arm rest and supports fold to the position shown in Fig. 2. This operation ensues automatically, since the pivotal points of each arm rest 69, head section 27 and support 71 are at the four corners of a parallelogram, whereby a parallel-movement device results. In Fig. 1, the right-hand arm rest has been omitted, in order to show parts that would otherwise be concealed by it.

If the bed frame in horizontal position sustains a recumbent occupant, and it is desired to elevate the head and shoulders of the occupant without lowering his feet, the attendant, standing at the head end of the bed, with hands grasping the head section, will depress one of the pedals 58, thereby releasing bolts 52 from the segments 23, and will then lift the head section to the position desired. When this position has been attained, releasing pressure on the pedal, allows the bolts to advance into the appropriate notches in the segments. The weight of occupant's body will assist in elevating the head section, owing to the relation of pivot 28 to fulcrum 35. As the head section rises, the adjoining end of middle section 27 lowers slightly, and, with the foot section, moves bodily toward the head end. The inclined position assumed by the middle section resists any tendency for the occupant's body to slide toward the foot of the bed and gives a position of comfort.

If it is desired to adjust the occupant to a sitting position, the attendant will move one of the handles 68 thus releasing dog 62 from engagement with a tooth 61 of segment 24, whereupon section 26 will drop, provided the section 35 is in elevated position, at which time the rollers 48 on the foot end of lever arms 40 are in a lowered position.

The body frame may be adjusted from the position illustrated in Fig. 3, to that shown

in Fig. 2, by lowering the head section, because rollers 48 on lever arms 40 will then lift the foot section. The foot section cannot be lowered unless the head section is elevated; but, if the head section is elevated, the foot section may be placed in either a horizontal or inclined position.

The body frame is intended to be supported at sufficient height above the floor to enable the bed clothing to be arranged and the invalid, or other occupant, to receive attention from the attendant without requiring the latter to stoop to an extent that would make the tasks difficult. The oblique downward-sliding movement of sections 26 and 27, when the head section is elevated, brings the footboard adjacent to the floor, so that from a sitting position the occupant may more easly step to the floor. Thus, the construction described lightens the labor of the attendant, without increasing the difficulty which an occupant might otherwise have of getting from the bed to the floor; it also conforms in all positions of adjustment, with the natural positions assumed by the body of an occupant for greatest comfort in sitting or reclining, or in intermediate positions, advisable to be assumed temporarily at times.

Having explained the principle of my invention, and having illustrated and described a specific embodiment thereof, which is the best now known to me, what I claim and desire to secure by Letters Patent is:

1. In a bed, the combination of a pedestal, a sectional body frame adjustably supported thereon, said body frame comprising a head section pivotally connected to the adjacent section and fulcrumed on the pedestal about an axis between its head end and the pivotal connection of said sections to each other; fixed guide bearings on the pedestal having guide ways inclined downward toward the head end and guide rods on the foot end of said adjacent section slidable longitudinally in said guide bearings.

2. In a bed, the combination of a pedestal having side bars; a sectional body frame comprising a head section pivotally connected at one end to the adjacent section and fulcrumed on the pedestal about an axis between its head end and the pivotal connection of said sections to each other; guide bearings on the pedestal having guide ways inclining downward toward the head end, said guide bearings comprising sheet metal brackets having tubular portions embracing the side bars of the pedestal and tubular portions constituting said guide ways and guide rods on said adjacent section moveable longitudinally in said guide ways.

3. In a bed, the combination of a pedestal; a sectional body frame adjustably supported thereon, said body frame comprising a head section, a middle section and a foot section pivotally conected, said head section being fulcrumed on said pedestal on an axis adjacent its pivotal connection with the middle section, and between said pivotal connection and the head end; said middle section being supported on the pedestal by means permitting it to move endwise and bodily downward toward the head end when the head section is elevated; means operable for supporting the foot section at any angle of a plurality of positions of adjustment only after the head section is fully elevated; and means for supporting said head section at any angle of adjustment within its range of movement.

4. In a bed, the combination of a pedestal; a sectional body frame comprising a head section having a lever guideway, a middle section and a foot section pivotally connected end to end; means for supporting said head section on the pedestal between its head end and its pivotal connection with the middle section in such manner that it may be angularly adjusted, a lever pivotally supported on the middle section, one end of which engages said guideway and the other end is adapted to bear against the under side of the foot section so as to bring said sections into horizontal alinement when said head section is adjusted to a horizontal position; means for supporting said foot section in horizontal position, if desired, when the head section is elevated, said means comprising a locking segment on the foot section and a one way dog on the middle section.

5. In a bed, the combination of a pedestal; a sectional body frame supported thereon, said body frame comprising a head section fulcrumed on the pedestal, a middle section pivoted to the head section, and a foot section pivoted to the middle section; means slidably supported on the pedestal for supporting the middle section on said pedestal so that it may move toward and longitudinally of the pedestal when the head section is raised; a guide member depending rigidly from said middle section and braced rigidly thereon by said slidably supported means so as to move with the middle section; a rack segment attached to said foot section, said rack segment being guided in said depending guide member; and a dog on said guide member for engaging the rack.

6. In a bed, the combination of a pedestal; a sectional body frame supported thereon, said body frame comprising a head section fulcrumed on the pedestal, a middle section pivoted to the head section, and a foot section pivoted to the middle section; a guide bearing on the pedestal; a guide member depending from said middle section; a U-shaped guide member, one limb of which is slidably mounted in said guide bearing, one end being secured to said middle section and the other to said depending guide member; a rack connected to said foot section, said rack being guided in said depending guide member; and

a dog on said depending guide member for engaging said rack.

7. In a bed, the combination of a pedestal having a transverse tie rod at the head end, a sectional body frame having a head section pivoted on the pedestal; a locking segment at each side of the head section; a bolt at each side of the pedestal for engaging said segments; a tubular rock shaft surrounding said tie rod, said rock shaft being operatively connected to said bolts, and a manual controlling device for moving said rock shaft and bolts.

8. In a bed, the combination of a pedestal having an upper and a lower tie rod at the head end; a sectional body frame having a head section pivoted on the pedestal, a locking segment at each side of said head section, a bolt at each side of the pedestal for engaging said segments, a tubular rock shaft surrounding said tie rod, said rock shaft being operatively connected to said bolts, and a pedal fulcrumed on the lower tie rod for moving the rock shaft and bolts.

9. In a bed, the combination of a pedestal having supporting legs at the head end inclining downward toward the head end, a tie rod connecting the legs near their lower ends, a sectional body frame having a head section pivoted on the pedestal; a locking segment at each side of the head section; a bolt at each side of the pedestal for engaging said segments, connections between said bolts whereby the operation of one causes the operation of the other, and a pedal fulcrumed on the tie rod adjacent each end, each pedal being operatively connected with both of said bolts.

In testimony whereof I hereto affix my signature.

WALTER M. LOXLEY.