

Jan. 17, 1961

M. SHANKMAN

2,968,050

ADJUSTABLE BED DEVICE

Filed June 4, 1958

3 Sheets-Sheet 1

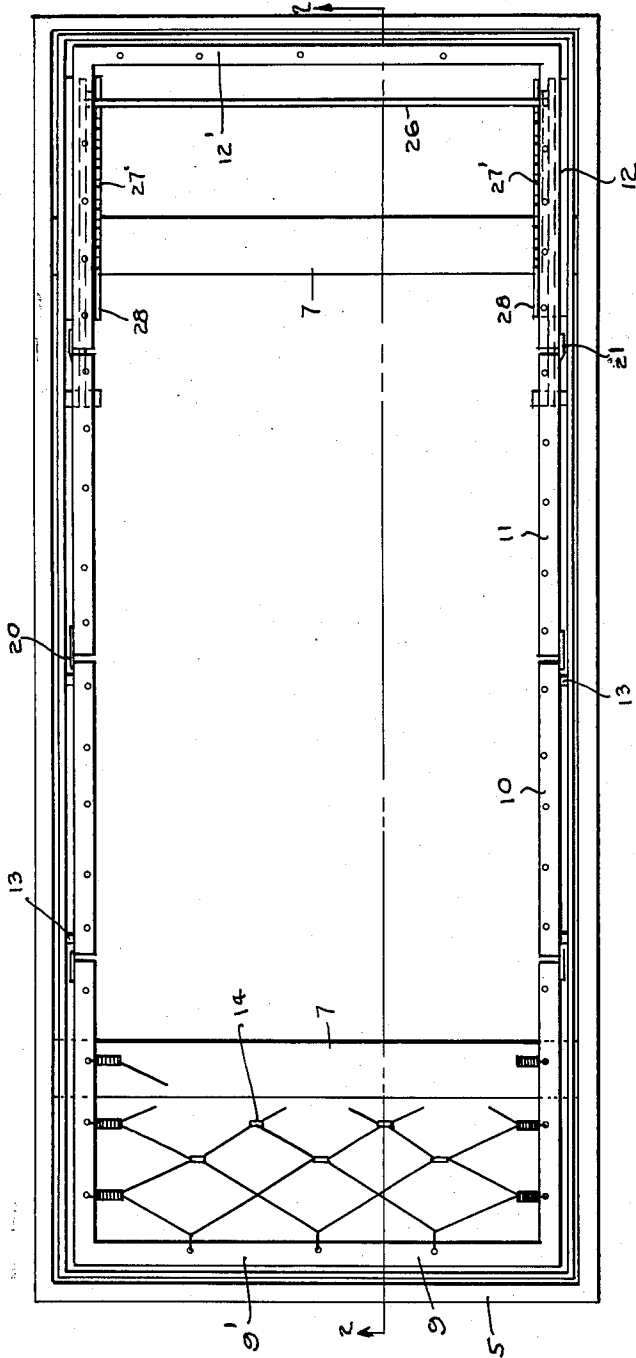


FIG. 1.

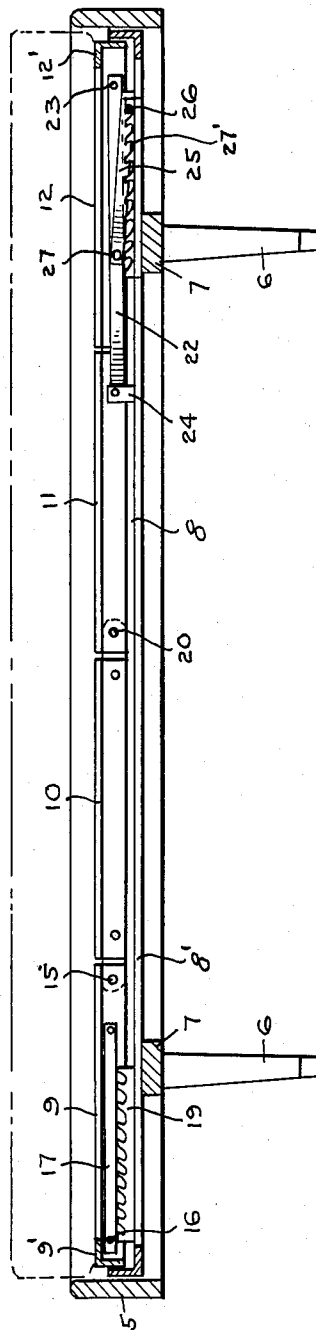


FIG. 2.

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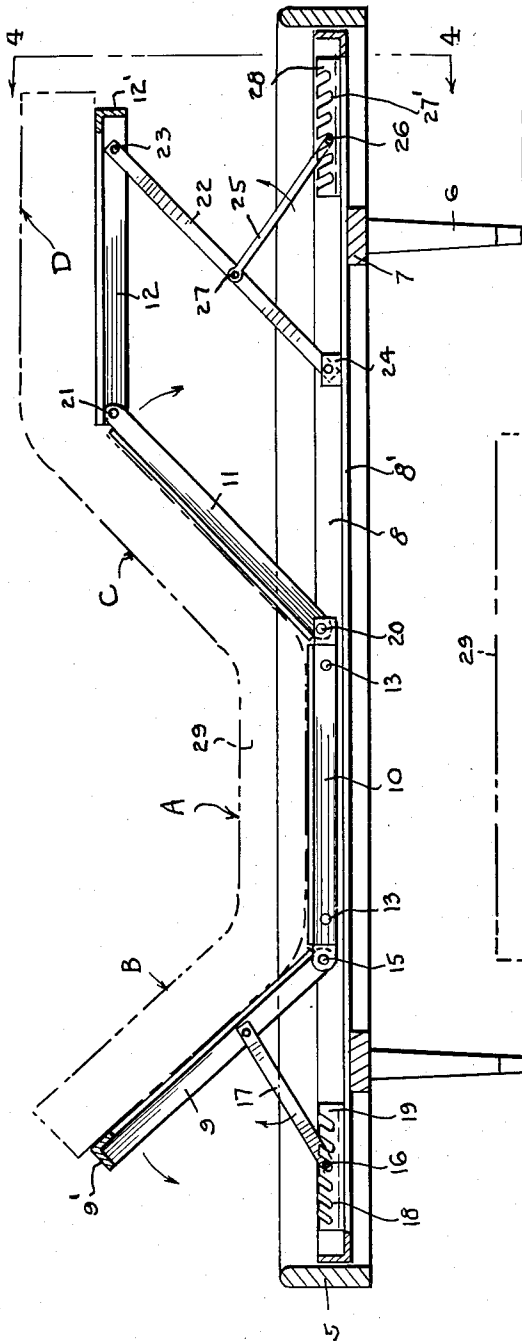


FIG. 3.

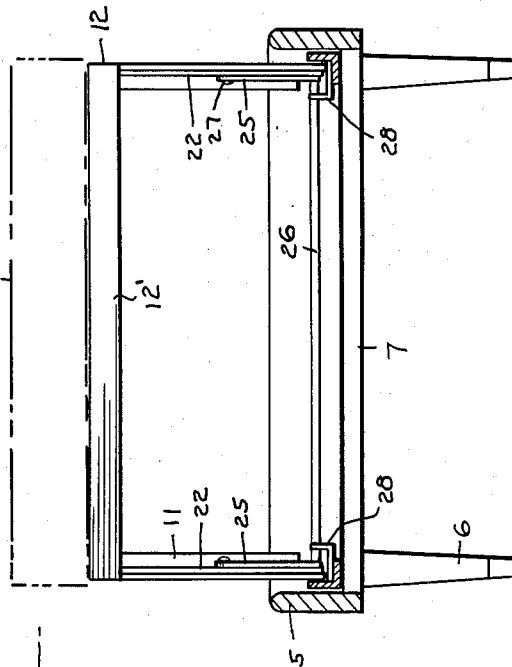


FIG. 4.

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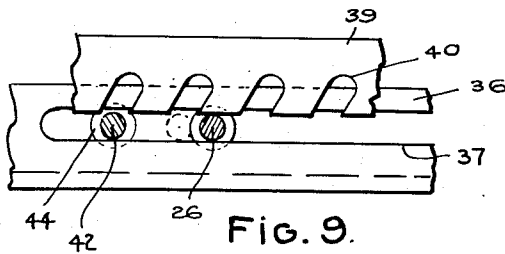
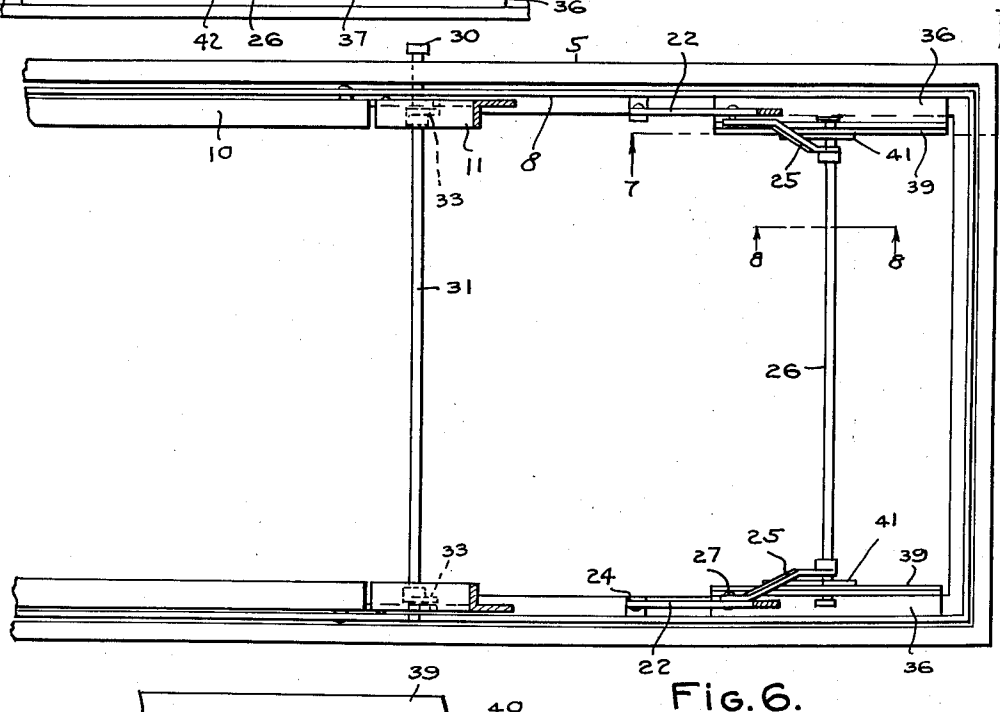
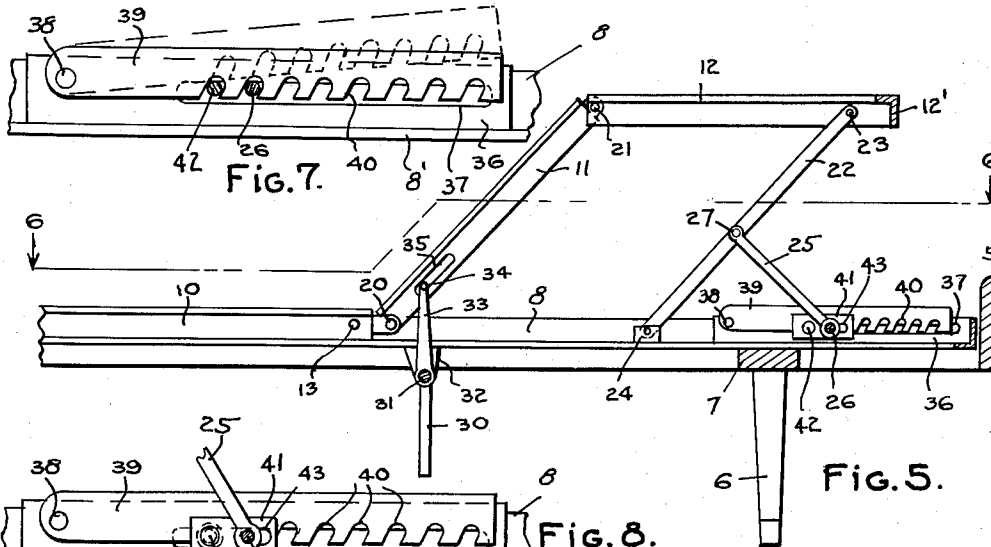
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3 Sheets-Sheet 3



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2,968,050

ADJUSTABLE BED DEVICE

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2 Claims. (Cl. 5—69)

This invention relates to a bed or couch device that supports a mattress and with the device being formed to include transversely connected frames for the support of the mattress and with the frames being adjustably connected in a manner whereby certain of the frames may be elevated and inclined to form a generally body conforming or contour rest.

The device embodies a main frame in which is disposed supplemental frame sections, with one frame member being elevated to an inclined position to form a back rest, a fixed intermediate section that is non-adjustable and a pair of frame sections constituting the leg rests being elevated to incline one section and with a terminal section being maintained in a horizontal position that is parallel to the supporting structure for the bed throughout its movement to and from a contour forming position.

Medical authorities appreciate the importance of supporting the legs of the user in a contour bed or contour chair so that the thighs of the legs will be on an incline, while the calf of the legs will be supported in a horizontal manner, functioning to create a proper circulation of the blood and otherwise greatly increasing the comfort and physical rejuvenation of the user. Contour devices heretofore employed have been adjustable to support the back of the user at an incline and to dispose the legs over a usually V-shaped frame support whereby the legs bend at the knees, disposing the lower portions of the legs at a downward incline with respect to the thighs, creating a condition at the joints of the knees that retards the proper circulation of blood. In the device of this invention, the structure is such that the body of the user is supported in a natural position that enhances the proper circulation of the blood and creates a general bodily relaxation, relieving muscular aches and pains and to improve the general welfare of the user.

The device of the present invention contemplates the use of the well known foam rubber mattress, such being most desirable for a device of this type, since the mattress will readily conform to the angularity of the bed device as adjusted to contour form, while a conventional inner spring mattress would of necessity require that it be hinged at the points of bending, since mattresses of this type will not readily bend upon a short radius.

The device contemplates a novel frame arrangement for the support of a foam rubber mattress and with the back rest and the leg rests being manually lifted or adjusted to their respective positions and latched and braced against accidental movement to a flat position.

The invention also contemplates the use of mechanical means for shifting the leg supporting members to a contour form while the user is occupying the bed, the back rest being at all times manually adjustable.

Novel features of construction and operation of the device will be more clearly apparent during the course of the following description, reference being had to the accompanying drawings wherein has been illustrated the preferred forms of the device and wherein like characters

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of reference are employed to denote like parts throughout the several figures.

In the drawings:

Figure 1 is a plan view of a bed constructed in accordance with the invention.

Figure 2 is a longitudinal vertical section taken substantially on line 2—2 of Figure 1, parts being omitted for sake of clearness,

Figure 3 is a view similar to Figure 2 but illustrating the mechanism as shifted to a contour forming position,

Figure 4 is a transverse section taken on line 4—4 of Figure 3,

Figure 5 is a fragmentary longitudinal section illustrating a modified form of the device,

Figure 6 is a horizontal section taken substantially on line 6—6 of Figure 5,

Figure 7 is a section taken substantially on line 7—7 of Figure 6 illustrating a latch mechanism,

Figure 8 is a view taken substantially on line 8—8 of Figure 6 and,

Figure 9 is an enlarged fragmentary side elevation, parts being omitted and illustrating a release means for the latch.

Referring specifically to the drawings, the numeral 5 designates a main supporting frame, formed of wood or other desirable material and having legs 6, whereby to space the frame at a desired elevation above the floor. The frame 5 is of generally rectangular form and carries a pair of transverse members 7, forming the connecting means for the legs 6.

Disposed within the frame 5, to rest upon the cross members 7 is a metallic frame 8, formed of angled iron and having dimensions whereby it will have adequate clearance to engage within the frame 5, to rest upon the members 7. Mounted with respect to the frame 8 is a supplemental metallic frame embodying sections 9, 10, 11 and 12. The sections 9—12 inclusive are formed of angled iron and with the sections 9 and 12 being U-shaped to have closed end portions 9' and 12'. The section 10 is fixedly connected to the vertical flange of the frame 8, by rivets or the like fastening devices 13 and whereby the section 10 is held against movement with respect to the frame 8 and also held parallel to the frame 8. Each of the frame sections 9—12 inclusive are interlaced with conventional springs 14, and with the springs 14 extending for the full length of the device. The frame section 10 and its associated springs 14 constitutes a seat portion. The frame section 9 is hingedly connected to the frame section 10 at 15, and whereby the frame section 9 may swing in a vertical direction to constitute a back rest. The frame section 9 is held in adjusted position in its back rest forming position by a rod 16, carried by bars 17 and with the bars 17 being pivotally connected to the side members of the frame section 9 to swing toward and from the frame section 9 and to constitute a brace for holding the section 9 in a selected angularity. The rod 16 is adjustably engaged within notches 18, carried by brackets 19, fixed upon the horizontal flange 8' of the frame 8. The frame section 11 is pivotally connected at 20 to the frame section 10 whereby the frame section 11 and its connected spring portion 14 are angled upwardly to constitute an angled rest for the thigh portions of an individual supported upon the device. The frame section 12 is pivotally connected at 21 to the frame section 11 and swings upwardly with the frame section 11 under the influence of a pair of oppositely disposed bars 22, pivoted at their upper ends to the side rails of the frame section 12, as at 23 and pivotally connected to a bracket 24 carried by the frame 8. The bars 22 constitute the means for simultaneously moving the frame sections 11 and 12 upwardly whereby to dispose the frame sections 11 at a desired angle and

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with the frame section 12 being disposed at a horizontal and parallel relation with respect to the frame 8. Brace members 25, carrying a cross rod 26, are pivotally connected at 27 to the bars 22. The rod 26 has selected engagement within notches 27', formed in bracket plates 28, rigidly connected with the lower flange 8' of the frame 8. The several frame sections 9-12 inclusive are covered by preferably foam rubber pad or mattress, shown in dotted lines at 29. The mattress 29 readily conforms to angularity of the frame sections 9 and 11.

In this form of the invention, when the device is to be used as a bed, the structure is fully collapsed as shown in Figure 2, with the bars 17 and brace 25 released from their engagement with the brackets 19 and 28, permitting the frame sections 9, 11 and 12 to move downwardly so that they are disposed in parallel relation to the frame 8 and, in such position they are parallel with respect to the frame 5 and at a level below the upper edge of the frame 5. Thus, the mattress 29 lies inwardly of the frame 5 and is fully supported by the frame sections 9-12 inclusive. Now, when the device is to be adjusted to form a contour support for the body of the user, the operator first lifts the frame section 9, and swings the bars 17 and the connecting rod 16 downwardly to engage a selected notch in the oppositely disposed brackets 19, thus holding the frame section 9 and its overlying mattress at an angle with respect to the horizontal. The frame section 10 is of course fixedly held and cannot shift under the influence of the movement of the movable frame sections 9, 11 and 12. With the back rest in adjusted position, the operator then lifts upon the cross member 12' of the frame section 12, such action moving the frame section 11 and the bars 22 upwardly simultaneously, maintaining the frame section 12 in a horizontal position. The brace members 25 and the rod 26 are then swung downwardly to engage a selected notch 27' in the oppositely disposed brackets 28, thus securely supporting the frame sections 11 and 12 in the leg supporting position and throughout the movement of these frame sections 11 and 12, the mattress 29 automatically conforms thereto. In the adjusted position of Figure 3, there has been formed a seat section A, a back rest B, an incline leg rest C and with the leg rest also including the horizontal portion D that is horizontally arranged and serves as a proper support for the calf portions of the legs of the user, creating a very desirable stimulating contour arrangement for supporting the body of the user to stimulate the flow of blood and to generally cause a relaxation of the body and leg muscles. The retraction of the device is obviously a reverse movement with respect to the bars 17 and brace members 25, and, when the rods 16 and 26 are released from their respective brackets, the frame sections 9, 11 and 12 will move downwardly under the combined weight of the frame members and the mattress 29 until they assume the original horizontal position.

In the form of the invention illustrated in Figures 5-7 inclusive, there has been provided the same frame 5, legs 6, cross member 7, frame 8, frame sections 9, 10, 11 and 12 that are supported upon the frame 8. Since this structure is substantially the same as the first form of the invention, the head portion has not been illustrated, since the modification resides primarily in the adjustable means for the foot or leg section. The frame section 12 is also elevated and lowered through the medium of the bars 22 under the influence of the brace members 25 carrying the cross rod 26. This form of the invention utilizes mechanical means for the elevation of the frame sections 11 and 12, while the frame sections 11 and 12 and associated elements, in the first form of the invention were manually lifted to assume the particular elevation and angularity. In this modified form of the device, it is contemplated that the frame sections 11 and 12 shall be mechanically elevated by the user of the device while in a reclining position. For this purpose, there has been provided a lever 30, disposed upon a rock shaft 31 that is journaled at op-

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posite sides of the frame 8 in bearings 32. The lever 30 is preferably disposed outwardly of the side members of the frame 5 whereby it may be in easy reach for an individual lying upon the device. The rock shaft 31, at opposite inner sides of the frame 8 is provided with crank arms 33, having pins 34 at their upper ends and with the pins operating in slots 35 formed in each of the side rails of the frame section 11. Movement of the lever 30, will cause the cranks 33 to swing in an arc and, when the cranks are actuated, they will elevate the frame section 11, together with the section 12, movement of the lever 30 in an opposite direction causes the sections 11 and 12 to shift downwardly to their normal parallel relation to the frame 8 and in such position, forming a conventional bed.

Means are provided to latch the sections 11 and 12 in an upper adjusted position, comprising angle irons 36, that are welded to the lower flange 8' of the frame 8. As shown in Figures 7, 8 and 9, the angle iron 36 has its vertical flange slotted, as shown at 37. Pivotaly connected to the outer flange of the angle iron 36 as at 38 is a rack bar 39. The rack bar is shiftable in a vertical plane, in a manner to be presently described and has its lower edge provided with a plurality of downwardly opening teeth 40. The teeth 40 normally substantially span the width of the slot 37. Slidable in the slots 37 of the angle irons 36 at opposite sides of the frame 8 are the terminal portions of the rod 26. It will be apparent, that when the cranks 33 are actuated to swing the frame sections 11 and 12 upwardly, it will cause the rod 26, through the medium of the bars 22 and the brace member 25, to progressively engage and slide beneath the teeth 40, causing the bar 39 to rise and fall as the rod 26 passes beneath the teeth and the frame sections 11 and 12 will be held positively in the adjusted position by the rod 26 engaging the teeth at the opposite sides of the frame. In the first form of the invention, the brace members 25 also carry the cross rod 26 and in that form of the invention, the brace members 25 and the rod were bodily lifted from the racks 27.

Means are now provided to cause an automatic release with respect to the rod 26 and the teeth 40, without the necessity of the individual upon the bed being required to get up and manually shift the device. To provide for automatic means as a release with the rod 26, there has been provided a flat plate 41, carrying a pin 42, having a diameter substantially equal to the diameter of the rod 26. The pin 42 projects through the slot 37 and the plate overlies the bar 39, thus disposing the pin 42 to traverse the teeth 40 with the rod 26. The plate 41 is also provided with a relatively short slot 43, through which passes the ends of the rod 26. The pin 42, inwardly of the vertical flange of the angle iron 36, is provided with an enlarged head 44 whereby to prevent displacement of the pin and the plate. It will be apparent, that since the rod 26 passes through the slot 43, that the plate 41 and the rod 26 are relatively movable, while the plate 41, the rod 26 and the pin 42 are movable in a horizontal plane so as to engage the pin 42 and the rod 26 in the teeth 40. When the sections 11 and 12 are elevated under the influence of the cranks 33, the bars 22 cause the braces 25 to move the rod 26 rearwardly, such movement causing the rod 26 to initially shift to one end of the slot 43, disposing the rod 26 and the pin 42 in a definite spaced relation, corresponding to the spacing of the teeth 40 thus, as the rod 26 and the plate 41 are moved rearwardly under the influence of the brace members 25, the rod 26 and the pin 42 have alternate engagement into the teeth 40, sliding from one pair of teeth to another pair until the sections have been elevated the desired height, and it will be apparent, as the brace members move the rod 26 and the pin 42 rearwardly, the bar 39 rises and falls as the rod and the pins 42 override the teeth thus, upon stopping the further movement of the cranks 33, the pins 42 and the rod 26 will immediately

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lock into a pair of teeth at each side of the frame, positively holding the bars 22 in their parallel angle relation with respect to the section 11 under the influence of the brace members 25. Movement of the mechanism to retract the sections 11 and 12 is accomplished, by the operator swinging the lever 30 in a direction to elevate the sections, thus moving the plates 41, the bar 26 and the pins 42 an additional distance rearwardly, until they simultaneously rest upon the flat ends of a pair of adjacent teeth, thus holding the bar 39 elevated. Now, the lever 30 is shifted in a direction to cause the sections 11 and 12 to be lowered, such action causing the brace members 25 to initially move the rod 26 forwardly and, in such initial movement, the rod 26 has moved to the opposite end of the slot 43 in the plates 41. In this position, the rod 26 and the pins 42 are spaced apart a distance greater than the spacing of the teeth 40, such being illustrated in Figure 9. Now, a continued movement of the lever 30, causes the cranks 33 to swing the sections 11 and 12 progressively downwardly and the movement of the bars 22 and the brace members 25, continuously hold the rod 26 at the forward ends of the slots 43, preventing the rack bar 39 from engaging either the pins 42 or the rod 26 since the spacing of these members always maintains either the pins 42 or the rod 26 upon the tops of the teeth 40 and as long as the rod 26 is being shifted forwardly, the spacing of the rod and the pins 42 will prevent any engagement within the teeth 40, thus, permitting the complete lowering of the sections 11 and 12.

The operation is believed to be clearly apparent in the foregoing paragraph. It is apparent, that the latch mechanism embodying the rack bars 39, the fixed angle iron 36 and with the pins 42 and the rod 26 traversing the slot 37 to progressively engage the teeth 40 for a latching movement, causing the bar 39 to rise and fall as the teeth are successively engaged and to permit the same mechanism to be automatically released and shifted along the slot 37 in a manner that prevents the engagement of the pins 42 and the rod 26 within the teeth in a direction to lower the frame.

It will be apparent from the foregoing that a very novel form of contour forming bed has been provided. The structure is simple, quickly and easily adjusted to the contour position, is cheap to manufacture, is strong, durable and most effective as a means to establish a relaxing position for the occupant of the device and, as before pointed out, the device is extremely beneficial to individuals having muscular or nervous conditions, and is extremely beneficial in the relief of circulatory difficulties, and particularly the legs of the individual. The structure readily adapts itself to various types of supporting frames and, while disposed within a particular supporting frame having legs 6, it will be apparent that the device could be quickly and easily assembled with respect to other frames, such as that employed in single types of beds or the like and also performs the functions of well known and very complicated types of hospital beds.

It is to be understood that the invention is not limited to the precise construction shown, but that changes are contemplated as readily fall within the spirit of the invention as shall be determined by the scope of the subjoined claims.

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

1. A contour forming bed device including a main frame and a supplemental frame, a plurality of frame sections that are pivotally connected together transversely

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and with the several sections in end to end relation constituting a full length support for a flexible mattress, one of said sections being a head-end section and being swingable in a vertical plane to constitute an inclined back rest, prop means for supporting the back rest in a desired degree of angularity, the said prop means being adjustably connected with respect to the supplemental frame, a second frame section adjacent to the head-end section and being fixedly connected with the supplemental frame, a third frame section connected to the second section and being swingable in a vertical plane, a foot-end frame section being pivotally connected to the third frame section to be shiftable in a vertical plane and with the foot-end frame section being at all times parallel with the supplemental frame, bars connected with the supplemental frame and with the outer end portion of the foot-end frame section and that constitutes the means for swinging the foot-end frame section and the third frame section in a vertical plane, and to maintain the foot-end frame section horizontally throughout its movement, brace arms connected with the bars and with the brace arms at their free ends being connected by a cross rod, the said cross rod adapted to engage in toothed rack bars carried by the supplemental frame and whereby to maintain the bars and the frame sections in a predetermined degree of adjustment, the said foot-end and third frame sections constituting leg rests, the said rack bars being pivotally connected with respect to the supplemental frame, the rack bars having downwardly directed inclined teeth, a slide device adapted to traverse the rack bar and with the cross rod being carried by the slide device, the terminal ends of the rod extending beyond the slide device to be disposed in a path to engage the teeth of the rack bars and means carried by the slide that also projects beyond the slide to engage the teeth of the rack bar, the spacing of the projecting ends of the rod and the said means being such as to provide for relative movement between the ends of the rod and parts of said means to actuate the bar in a vertical plane for a release movement of the brace arms when the third frame section is manually lifted upwardly and whereby to progressively release the brace arms and their associated rod and slide device to raise or lower the third frame section.

2. The structure according to claim 1 wherein the said means carried by the slides comprises a pin that is parallel with the extended ends of the rod, the spacing of the pins with respect to the extended ends of the rod being such that when the extended ends of the rod are in underlying relation to the tops of the teeth, the pins will be disposed in registry with an opening of the teeth and whereby to progressively engage the extended ends of the rod within a selected tooth of the rack bars and guide means carried by the supplemental frame for causing the extended ends of the rod and the pins to traverse the rack bars in a horizontal path.

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