Feb. 26, 1946. M. T. WALDO 2,395,699

OPERATING MEANS FOR INCLINABLE MATTRESS SECTIONS

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Fig. 1.

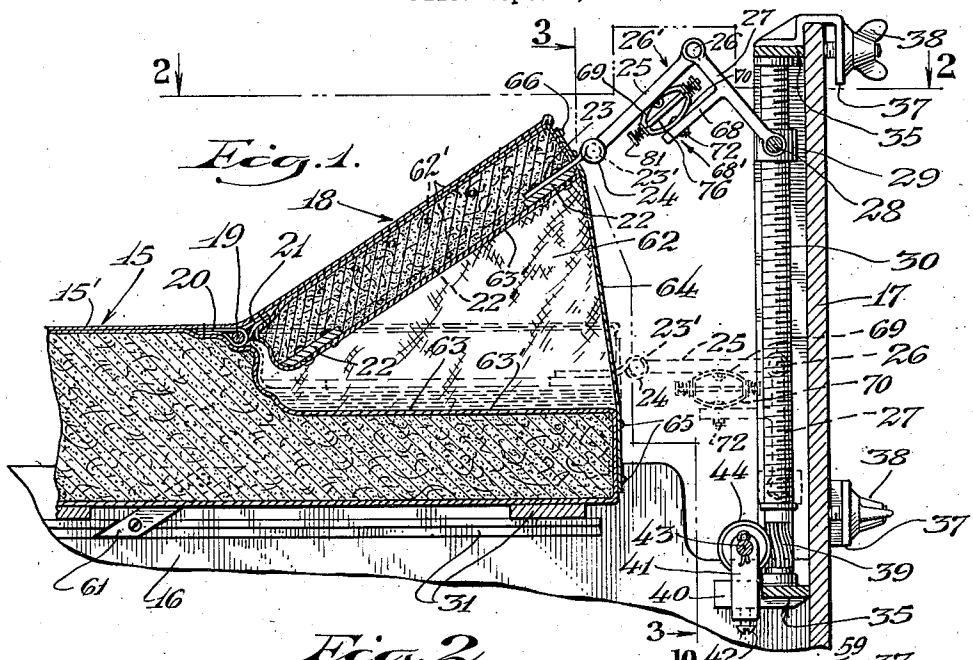
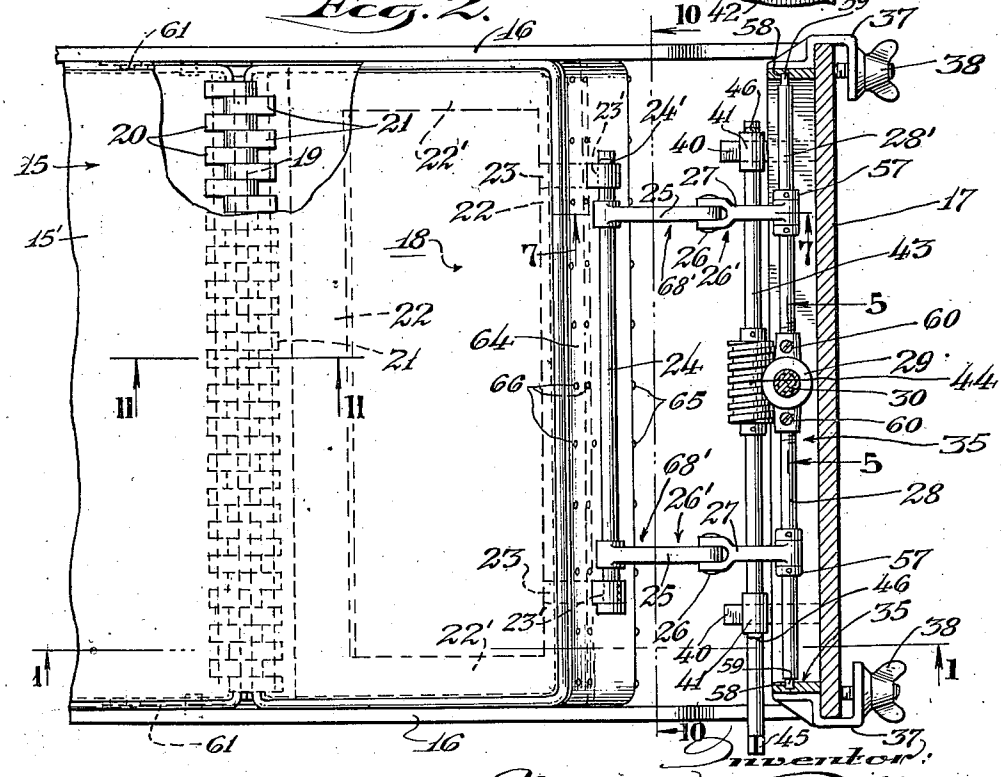


Fig. 2.



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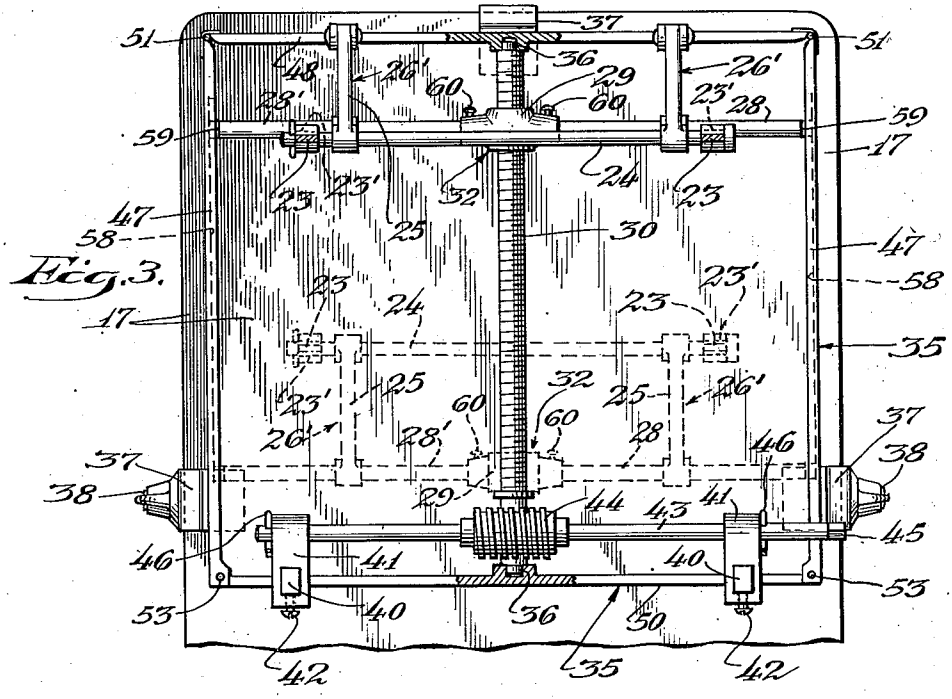


Fig. 3.

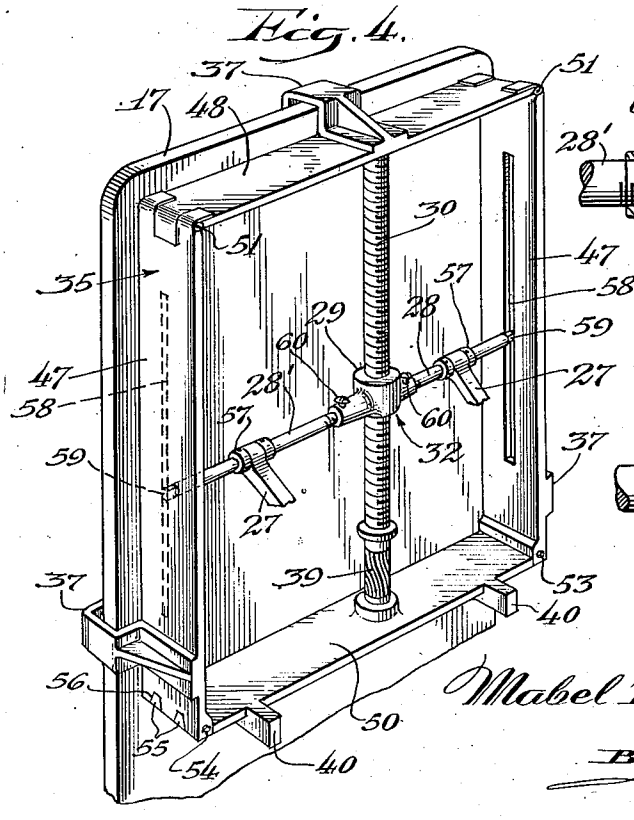


Fig. 4.

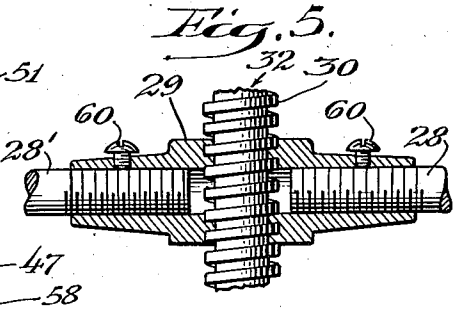


Fig. 5.

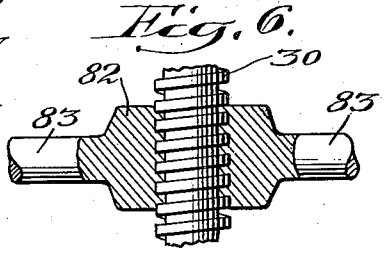


Fig. 6.

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OPERATING MEANS FOR INCLINABLE MATTRESS SECTIONS

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Fig. 7.

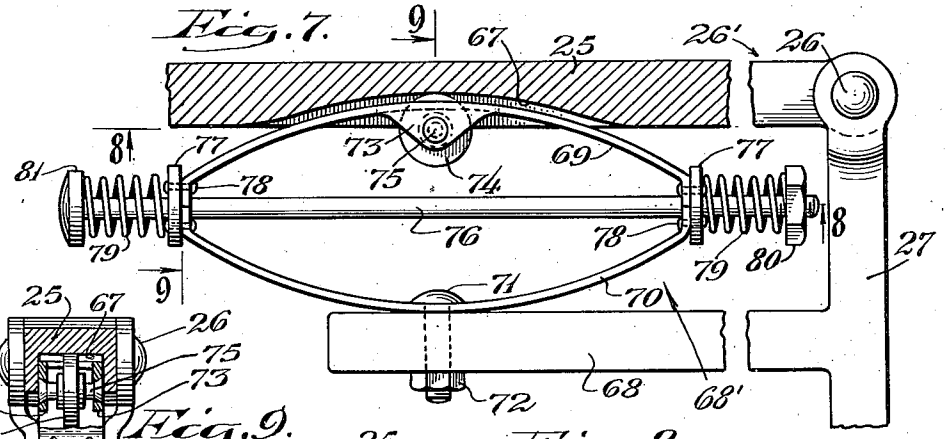


Fig. 9.

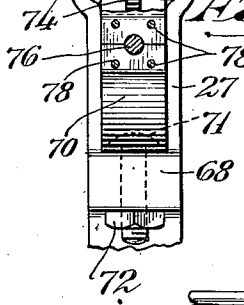


Fig. 8.

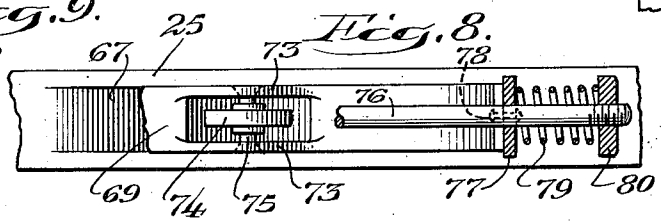


Fig. 10.

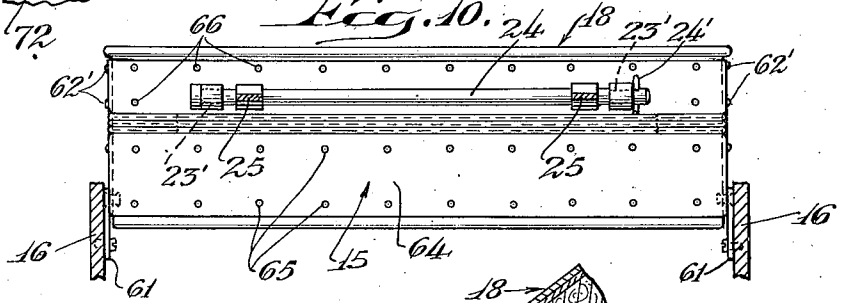
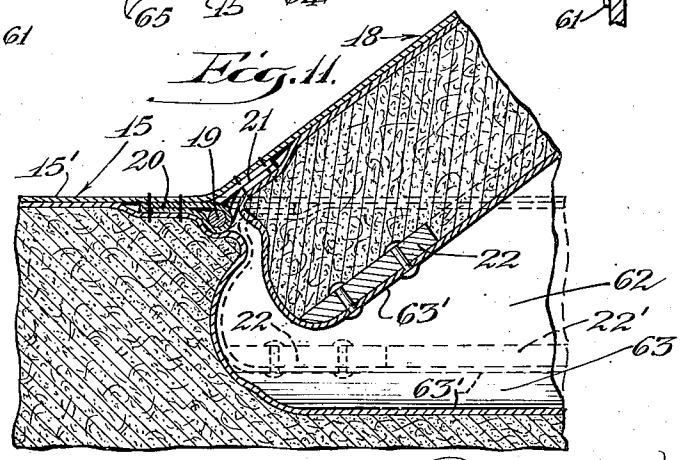


Fig. 11.



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OPERATING MEANS FOR INCLINABLE MATTRESS SECTIONS

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Fig. 12.

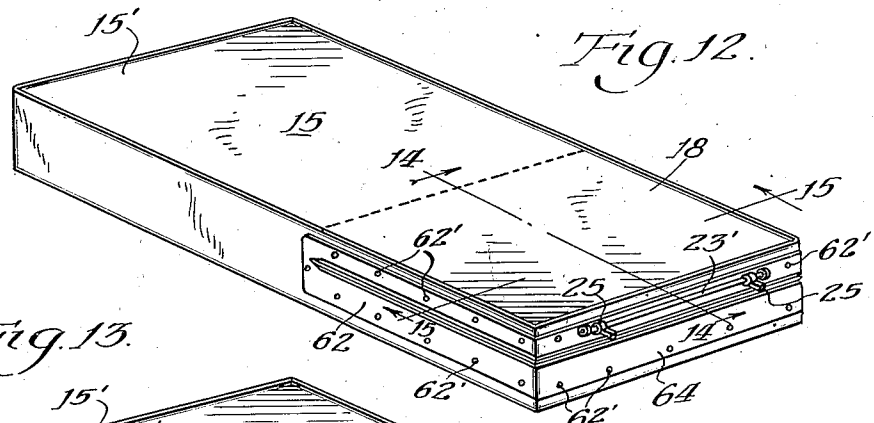


Fig. 13.

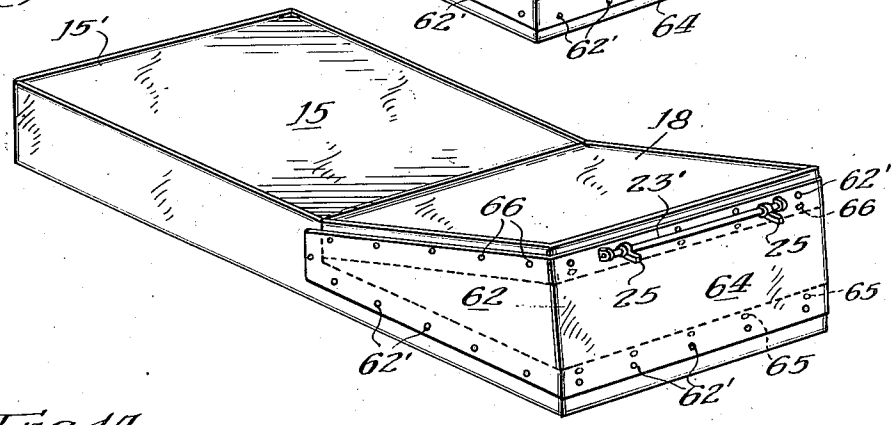


Fig. 14.

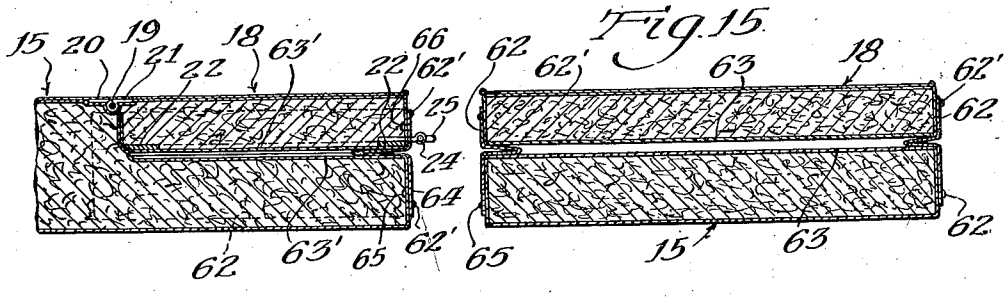
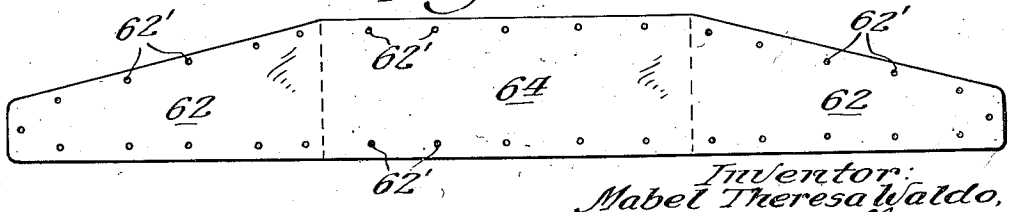


Fig. 15.

Fig. 16.



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Patented Feb. 26, 1946

2,395,699

UNITED STATES PATENT OFFICE

2,395,699

OPERATING MEANS FOR INCLINABLE MATTRESS SECTIONS

Mabel Theresa Waldo, Chicago, Ill., assignor of one-fourth to Harold O. Mulks, Chicago, Ill.

Application September 2, 1941, Serial No. 409,182

2 Claims. (Cl. 5—77)

This invention relates to mattresses, and its objects are:

First: To provide a mattress with a separately constructed section, adapted to support the head, trunk and arms of the occupant, that can be hingedly connected to the stationary part of the mattress in such manner that it can be inclined in a vertical plane, either for comfort, or to meet the needs of invalids or ailing persons.

Second: To provide a manually operative device for inclining and manipulating the inclinable section of a mattress constructed as above described, detachably connected to the mattress, and supported by a frame, detachably connected to the head board of a bed, which will yield a sufficient mechanical advantage to render the inclinable section of the mattress easily manipulatable.

Third: To provide a means for supporting the inclinable section of the mattress when inclined by resilient members, whereby it can be manipulated when occupied, without discomfort to the occupant.

Fourth: To provide a hinged connection between the inclinable section and the stationary section of the mattress that will be durable and stable, and that will restrain lateral motion in the inclinable section, in relation to the stationary section and that will conform substantially with the upper surfaces of the inclinable and stationary sections.

Fifth: To construct a mattress of the character above described in such a manner that it can be completely enclosed by a fluid-proof covering when the inclinable section is inclined and when it is reclined.

With the above specified and other objects in view, this invention consists: in the novel construction of a mattress that is adapted to be supported by a bed frame of ordinary construction, of two sections, in such a manner that one section that is adapted to support the head, trunk and arms of the occupant, may be inclined; and in the novel construction of a fluid-proof covering therefor; and in the novel construction of a hinge joint between the two sections of the mattress; and in the construction of a novel device to manipulate the inclinable section of the mattress; and in the novel construction of resilient members to support the inclinable section of the mattress; and in the novel construction of intermediate connectors, adapted to transmit motion from the manipulating device to the inclinable section of the mattress; as is hereinafter disclosed, described and claimed. It is my intention to claim not only the objects, uses and functions that are herein specifically described and enumerated, but also every object, use and purpose to which this invention and each distinct part thereof may be adapted.

In the drawings:

Figure 1 is a fragmentary longitudinal section, taken on the line 1—1 of Figure 2.

Figure 2 is a fragmentary plan view of the mattress and the manipulating device, partly in section.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a perspective view of the frame, by which the manipulating device is supported, clamped to the head board of a bed.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 2.

Figure 6 is a fragmentary sectional view of the modified form of the transverse member 32.

Figure 7 is a sectional view taken on the line 7—7 of Figure 2.

Figure 8 is a sectional view taken on the line 8—8 of Figure 7.

Figure 9 is a sectional view taken on the line 9—9 of Figure 7.

Figure 10 is a sectional view taken on the line 10—10 of Figure 2.

Figure 11 is a fragmentary sectional view taken on the line 11—11 of Figure 2.

Fig. 12 is a perspective of the mattress in a closed position, enclosed in its cover.

Fig. 13 is a perspective of the mattress in an open position, enclosed in its cover.

Fig. 14 is a sectional view taken on the line 14—14 of Fig. 12.

Fig. 15 is a sectional view taken on the line 15—15 of Fig. 12.

Fig. 16 is a view of the apron which encloses the space between the stationary part of the mattress and the inclinable section.

Referring to the drawings in detail, the numeral 15 designates the stationary or main body portion of the mattress, and 18 designates the inclinable section thereof. The upper head-end portion of the member 15 is provided with a recess, substantially equal in length to the length of the member 18, and to a depth substantially equal to the thickness of said member, and is adapted to receive and support the member 18, when said member is reclined, and the member 18 is hingedly connected to the member 15 on the upper edge of the declivity of the recess formed thereon, as is shown in Figures 1 and 11. The width of the member 18, is substantially equal

to the width of the member 15, and the length of the member 18 is substantially equal to the length of the recess formed on the member 15, and the member 18 is so shaped and dimensioned that its sides, head-end and upper surface are substantially flush, when it is reclined, with the corresponding surfaces of the member 15. The member 18 is connected to the member 15 by a hinge-joint that is formed of the series of transversely apertured lugs 21 that are attached to section 18, by any suitable means, and disposed transversely and substantially equidistantly, and that project longitudinally; and a series of transversely apertured lugs 20, attached to the stationary part 15, by any suitable means, and disposed transversely and substantially equidistantly, and that project oppositely, to series 21, and are so arranged in spatial relation to series 21 that the apertures in one series coincide with the apertures in the other series, and the projections of one series are received in corresponding interstices of the other series, and form thereby substantially a continuous surface. The transverse bar 19 extends through the apertures in the two series of lugs and is compactly secured in position on both sides of the mattress, by any suitable means.

By this means the section 18 may be rotated on the rod 19 as its axis, within limits hereinafter stated, and a hinge-joint is thereby formed that is sufficiently stable and durable to withstand the stresses to which it is subjected, and lateral motion in the section 18 in relation to section 15 is restrained.

Section 18 is supported by a rectangular frame composed of two longitudinal members 22', 22' (one of which is shown in Figure 1), that are connected by any suitable means to the transverse members 22, 22, cross sections of which are shown in Figure 1. The supporting rods 23, 23, with eyes 23', 23' integral therewith, are rigidly secured to an outer transverse member 22 of the frame. A transverse lifting member 24 is inserted through the eyes 23', 23', and is secured in position by a spring cotter 24' in order to provide a means whereby the member 24 can be readily removed, and the manipulating device can be detached from section 18.

A bed frame 16, constructed in the ordinary manner, supports the mattress 15 by transverse members 31. In order to prevent the stationary part of the mattress from being moved when section 18 is being inclined, the part 15 is secured to the frame 16 by straps 61. The head board 17 of the bed is connected to the frame by any suitable means.

To the head board 17 of the bed, a rectangular metallic frame 35 is secured by brackets 37, 37, 37, and wing nuts 38, 38, 38. The frame consists of two upright members 47, 47 that are connected by the hinges 51, 51 to the upper transverse member 48 of the frame, and are detachably connected to the lower transverse member 50 by the tenons 55 and 56, and secured thereto by the rods 53 and 54, or by any other suitable means.

The interior sides of the vertical members 47, 47 of the frame 35 are mortised, as shown at 58, 58, to engage thereby the tenoned ends of the vertically operative member 32, which is apertured annularly, and interiorly threaded at 29, as is shown in Figure 5. The vertically operative member 32 comprises a cross-shaped and interiorly threaded nut 29, which is threadedly connected on either side to adjustable and detachable arms 28, 28' that are secured in position by set screws 60, 60, as is shown in Figure 5. The arms 28, 28' of the member 32 are made adjustable and detachable, in order to provide a ready means for inserting and removing the arms 28, 28' from the mortises 58, 58; but the arms can be made integral with the cross-shaped nut 29, as is shown in Figure 6.

A screw shaft 30 is vertically positioned in the frame 35, so that its axis is substantially in line with the longitudinal axis of the mattress, and is journaled in the upper and lower transverse members of the frame at 36, 36, as is shown in Figure 3. The screw shaft 30 interpenetrates and engages threadedly the cross-shaped nut 29, in the vertically operative transverse member 32, as is shown in Figures 5 and 6. The lower end of the screw shaft 30 is threaded at 39, as is shown in Figures 4 and 1, in order that it may be engaged by the worm 44, that is rigidly secured to the transverse driving member 43.

The horizontal driving member 43 is supported by hangers 41, 41 that form sliding fits with the brackets 40, 40, which are made integrally, with the lower transverse member 50 of the frame. The hangers 41, 41 are secured in position to the brackets 40, 40 by set screws 42, 42. Longitudinal motion is restrained in the transverse member 43, and said member is secured in position by spring cotters 46, 46. The end of the transverse member 43 is squared at 45, in order that it may be engaged by a socket in a wheel or crank, as a prime mover. The vertically operative transverse member 32 from which, by means of intermediate connectors, motion is transmitted to the lifting member 24 that is connected to the inclinable section of the mattress, can thus be manipulated by turning the prime mover.

The linkages 26', 26' are pivotally connected respectively to the member 32, on either side of the vertical member 30, at points substantially equidistant from the axis of said member and pivotally connected to the transverse member 24. Each of the linkages 26', 26', comprises: a bar 25 that is pivotally connected to a bar 27, at 26; and each is provided with an adjustable elliptical spring 68' that is positioned between the interior surfaces of the bars 25 and 27, as is shown on Figures 5, 8 and 9.

Each of the springs 68' is constructed of two semi-elliptical leaves, that are joined at their ends by longitudinal rivets 78, 78, which pass through the leaves and retaining washers 77, 77. Annular apertures are made in the joints at each end to receive the cylindrical rod 76. A helical spring 79 is positioned around the member 76 between the head 81 thereof and a retaining washer 77, at one end of each of the springs 68', and between a nut 80 and a retaining washer 77 at the other end of each of the springs 68'.

One end of each of the members 76 is threadedly engaged by a nut 80, whereby the tension of the spring 68' may be regulated and adjusted. Each of the elliptical springs 68' is rigidly secured to a brace 68 by a bolt 71 that passes through the lower leaf 70 and the brace 68, and is secured on the opposite side by a nut 72. The braces 68, 68, are integrally formed with the links 27.

The undersides of the members 25, 25 are chamfered so as to form arced recesses therein, the length, width and depth of each of which is such that it is adapted to receive, substantially one-half of the periphery of the corresponding leaf 69, as shown in Figure 7.

Rollers 74, 74 are suspended by shafts 75, 75

that extend between the downwardly projecting lugs or hangers 73, 73, 73, 73 that are integrally formed on each edge of each of the leaves 69, 69, substantially at the apexes thereof, as is shown in Figures 7, 8 and 9. Apertures are formed in the members 69, 69, substantially at the apexes thereof, that are adapted to allow segments of the rollers 74, 74 to project therethrough and above the apexes of the members 69, 69, so as to form rolling contacts with the members 25, 25 in the chamfered recesses 67, 67 thereof.

When section 18 is reclined the centers of the pivot pins 26, 26 lie substantially in the plane of the longitudinal axis of the members 30; and the longitudinal axes of the members 25, 25 are substantially perpendicular to the longitudinal axes of the members 27, 27, as is shown in dotted lines in Figure 1. The elliptical springs 68', 68' perform the dual function of rendering the linkage resilient and also of checking and retarding relative motion between the members 25, 25 and the members 27, 27, sufficiently to transmit motion to the transverse lifting member 24 when the screw actuated elevating mechanism is manipulated. When the elevating mechanism is manipulated, the members 25, 25 are thereby subjected to a stress, and each of the springs 68', 68 is compressed and moves in relation to the corresponding member 25 until its tension withstands the stress to which it is subjected. Each of the upper leaves 69, 69 is provided with a roller 74 in order that it can readily move into such position. By turning the nuts 80, 80, the tension of the springs 68', 68' can be varied and adjusted in accordance with the load that is being carried by section 18, and the axes of the members 25, 25 can be thereby caused to remain substantially at right angles to the axes of the members 27, 27, when section 18 is inclined. The springs 68', 68' will check and retard relative motion between the members 25, 25 and the members 27, 27, when the resilient linkage is being elevated and when section 18 is carrying any load that it is designed to carry, as long as the longitudinal axes of the members 25, 25 form substantial angles with a perpendicular. Thus by adjusting the tension of the springs 68', 68', so that the longitudinal axes of the members 25, 25 form angles of substantially 90 degrees with the longitudinal axes of the members 27, 27, the resilient linkage can be elevated as long as the angles formed between the longitudinal axes of the members 27, 27 and the longitudinal axes of the member 30 are substantially less than 90 degrees. The length of the member 30 is such that when the upper edge of the nut 29 is in contact with the upper transverse member 48 of the frame, that the angles formed between the longitudinal axes of the members 27, 27 and the longitudinal axis of the member 30 are substantially less than 90 degrees.

In order to provide a means whereby all parts of the mattress may be protected and preserved in a sanitary condition, when the inclinable section 18 is inclined and when it is reclined, a covering 15' made of any fluid-proof fabric is provided that is dimensioned to fit the mattress as a unit. The cover comprises a casing adapted to cover, enclose and fit the main-body portion of the mattress, and to enclose and fit the recessed head-end of the main-body portion, and a casing adapted to cover, enclose and fit the inclinable section of the mattress, the top of which is integrally formed with the top of the casing for the main-body portion of the mattress. A rectangular apron 62, that is made of the same material as the covering 15', with tapered ends, formed integrally therewith, and adapted to enclose the space between the section 18 and the stationary part 15 when the section 18 is inclined, is detachably connected on its upper edge to the covering 15' by a plurality of studs and grommets 62'. The lower edge of the apron 62 is secured to the covering 15' in a similar manner. Apertures are made in the covering 15', sufficient to allow the supporting rods 23, 23 to project therethrough. The upper part of the covering 15', is secured to the inclinable section 18 by a plurality of studs and grommets 66. The lower part of the covering 15' is secured to the corresponding part of the stationary section 15 of the mattress by a plurality of studs and grommets 65. That part of the stationary section 15, that is adapted to support the inclinable section 18 when reclined, is beveled at 63, on both sides and the end thereof, to form recesses into which the apron 62 can fold when the section 18 is reclined. The apposed surfaces of the inclinable and stationary parts of the mattress are covered with coverings 63', 63', made of any sufficiently durable material. The mouth-end of the mattress is completely covered by the rectangularly shaped part 64 of the apron 62, as is shown in Figure 1.

Having thus completely and accurately described my invention, what I claim is:

1. An articulated mattress of the kind described comprising a main body portion provided with a recess on its upper head-end portion, adapted to receive and to support an inclinable section, an inclinable section hingedly connected to said main body portion on the upper edge of the declivity of said recess, and adapted to be received in said recess, and adapted to be rotated around said hinged connection, and so shaped and dimensioned, that its sides, head-end and upper surface are substantially flush, when it is reclined, with the corresponding surfaces of the main body portion, a frame to support said inclinable section, connected thereto, and connected with a lifting member that is adapted for engagement with a manipulating mechanism, a hinged connection between the inclinable section and main body portion that comprises a series of transversely apertured lugs, transversely disposed, and projecting longitudinally, and secured to the inclinable section; which lugs are received between the interstices of a series of transversely apertured lugs, transversely disposed and projecting oppositely longitudinally, that are attached to the stationary section, and a transverse bar extending through the apertures in the two series of lugs.

2. A device of the kind described, for resiliently manipulating and supporting an inclinable section of an articulated mattress, comprising a rectangular frame composed of two upright members and two transverse members, and adapted to be secured to the interior side of the head board of a bed, and provided with mortises on the interior sides of its upright members for engagement with the ends of a vertically operative transverse member, to restrain rotatory motion of said transverse member; a vertically positioned screw shaft journaled in the upper and lower members of said frame substantially in the center thereof, that interpenetrates and threadedly engages said transverse member, provided with threads on its lower end for engagement with a transversely positioned screw actuating driving member; a two-bar linkage pivotally connected to said vertically-operative transverse member on

each side of said vertically positioned screw shaft, substantially equidistant therefrom, and pivotally connected to a lifting member secured to the inclinable section of the mattress; an adjustable elliptical spring positioned between the interior surfaces of the bars of each of said linkages, whereby the inclinable section of the mattress can be resiliently manipulated and supported by said linkages, the bar of each of said linkages adjacent to said lifting member, being provided with an arced recess adapted to receive a substantial portion of the periphery of the upper leaf of the corresponding elliptical spring, and forming a rolling contact with a segment of a roller projecting through an aperture formed substantially in the apex of said leaf, whereby said bar can move readily into a relation of repose with said corresponding elliptical spring when said spring is compressed.

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