

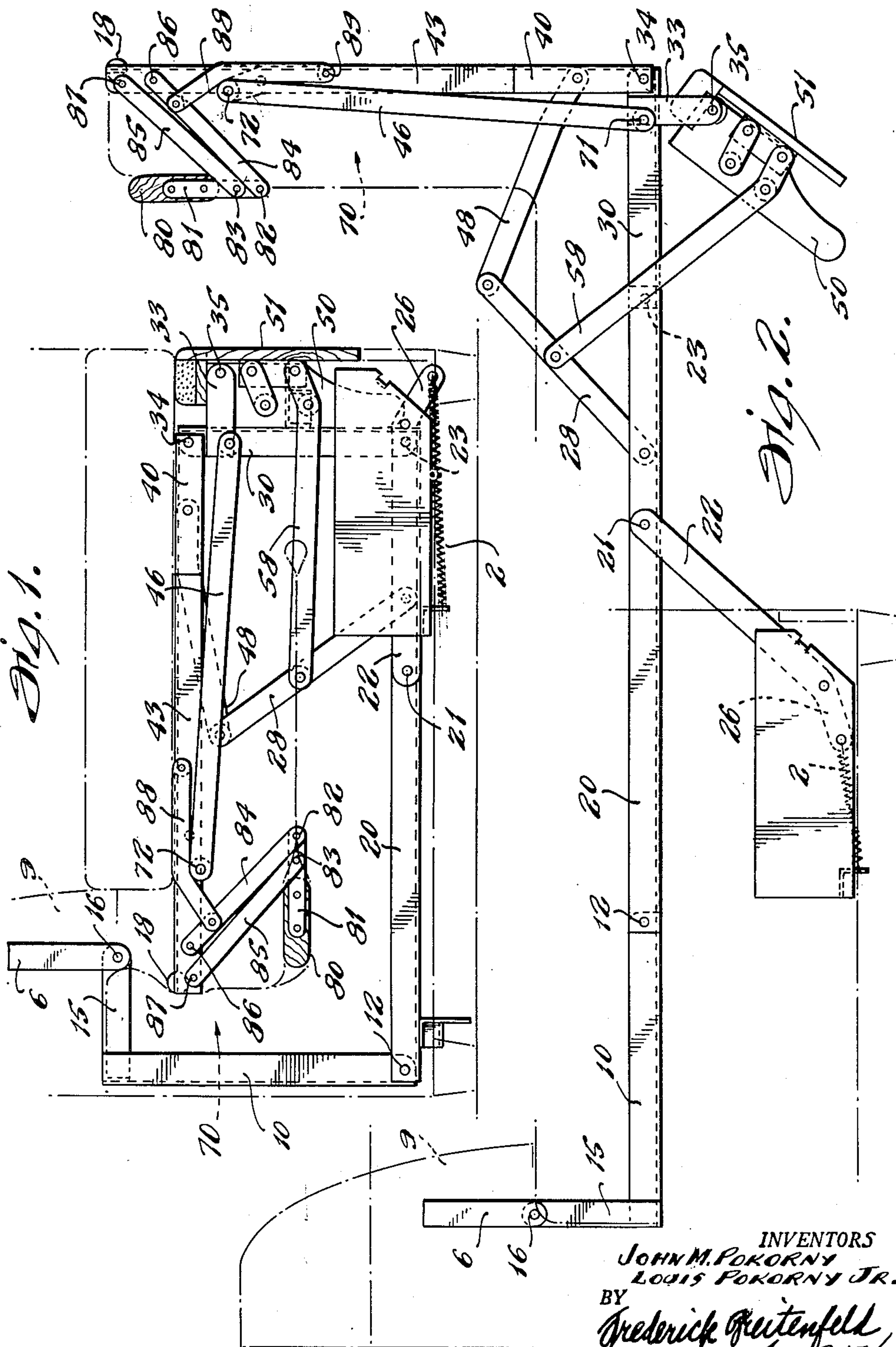
Jan. 27, 1953

J. M. POKORNY ET AL
SOFA BED PROVIDED WITH AUTOMATIC
MATTRESS-CLAMPING MEANS

2,626,406

Filed May 18, 1950

2 SHEETS—SHEET 1



INVENTORS
JOHN M. POKORNY
LOUIS POKORNY JR.
BY
Frederick Reitenfeld
ATTORNEY

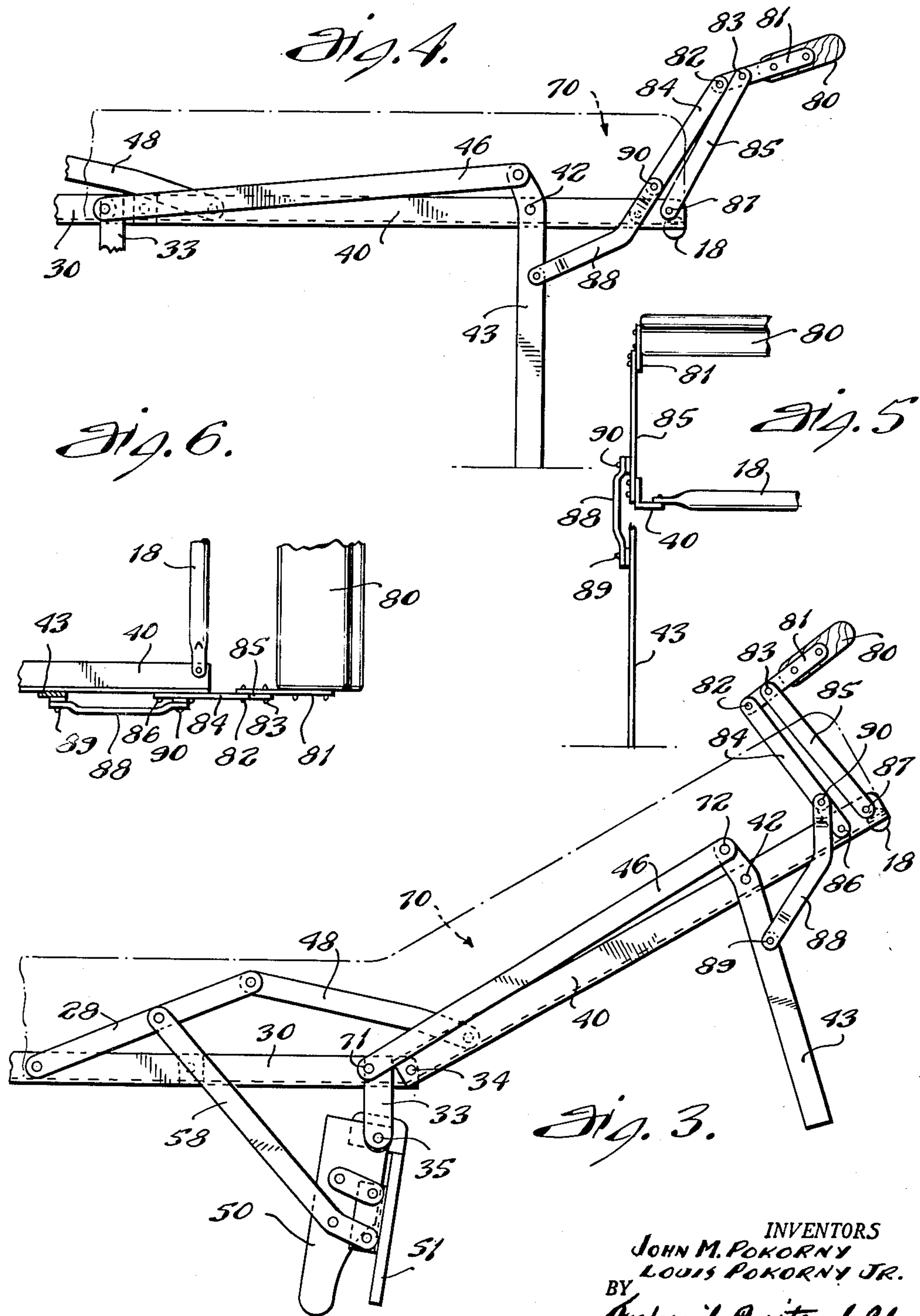
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SOFA BED PROVIDED WITH AUTOMATIC
MATTRESS-CLAMPING MEANSJohn M. Pokorny and Louis Pokorny, Jr.,
Ronkonkoma, N. Y.

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Our present invention relates generally to articles of furniture and has particular reference to an adjustable structure which in its closed position forms a sofa and which may be adjusted into an open position in which it defines a bed.

Structures of this type are illustrated in Patents No. 2,445,241 and 2,505,989. A series of hinged frame sections are adjustable from a relatively compact relation to an aligned extended relation. These sections include an end section which defines the seat of the sofa when the frame is folded closed and which swings through about 180° to an outer horizontal position when the frame is unfolded. An adjacent section assumes a front vertical disposition when the frame is closed and swings through about 90° to a horizontal position when the frame is opened. A mattress is associated with the frame in such a way that it lies flat on the extended frame when the structure is opened to define a bed, and doubles upon itself when the frame is folded to define a sofa.

It is an object of the present invention to provide an improved means for helping properly to secure the mattress in position, especially during the folding and unfolding of the frame. More particularly, it is an object of the invention to achieve the desired result without the use of straps or similar elements for tying the mattress to the frame. Such straps add to the cost of the mattress, it is an inconvenient procedure to tie them and untie them, and they frequently impede the proper functioning of the various links and other elements of the adjustable frame. Moreover, by avoiding the necessity for straps or tying elements, it is possible to use a mattress which is entirely independent of the frame and which can be freely turned or reversed whenever desired.

In accordance with our invention, a mechanical means is provided for automatically engaging the mattress and holding it against the end section of the frame whenever the frame during the folding thereof is started on its adjustment from unfolded to folded condition, and for releasing the mattress whenever the frame during the unfolding thereof approaches its fully unfolded condition.

Another object of the invention is to achieve the clamping of the mattress by a board or element which in its mattress releasing position is so disposed at one end of the frame that it may conveniently serve either as a pillow-rest or as a footboard, as may be desired.

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One way of achieving these general objects and advantages, and such other objects and advantages as may hereinafter appear or be pointed out, is shown in the preferred embodiment of our invention illustrated in the accompanying drawings, in which:

Figure 1 is an end view of the device in closed position, certain parts having been omitted or shown in dot-and-dash lines in order to reveal the frame in its folded condition;

Figure 2 is a similar view, showing an intermediate stage in the unfolding of the frame;

Figure 3 is a similar view, showing some of the frame sections in a further stage of unfolding;

Figure 4 is a similar view of the elements at the outermost end of the bed, in the relationships they assume when the frame is completely unfolded;

Figure 5 is an end view, partially broken away, taken substantially from the right of Figure 4; and

Figure 6 is a plan view of the elements shown in Figure 5.

Before entering upon a description of the present invention, the device as a whole will be briefly described. The device is shown in Fig. 1 in its closed position defining a sofa represented in dot-and-dash lines, having a back 9. When fully opened (see Fig. 4, and also Fig. 5 of Patent No. 2,445,241), the device defines a bed, the frame of which is made up of four sections. When the frame is in closed position, as in Fig. 1, these four sections assume dispositions different from their horizontal dispositions when opened out to form the bed; and for facility in terminology, the four sections will be given descriptive appellations based upon their respective dispositions in closed position, Fig. 1. Thus, section 10, which is nearest the back 9 of the sofa and is vertical, will be referred to as the "rear vertical section"; section 20 which is horizontal and lower (compared with section 40, which is also horizontal) will be referred to as the "lower horizontal section"; section 40 will be termed the "upper horizontal section"; and section 30, which is vertical (like section 10) but which is at the front of the sofa, will be referred to as the "front vertical section."

The three sections 20, 30 and 40 are straight-line members, while rear vertical section 10 is angular, having an arm 15 pivotally articulated at 16 to a short vertical bar 6 secured to the frame of the sofa. The lower end of rear vertical section 10 is articulated, at 12, to the rear end of lower horizontal section 20. The forward

end of section 20 is articulated, at 23, to the lower end of front vertical section 30, the upper end of which is articulated, at 34, to the front end of upper horizontal section 40.

The parts 10, 20, 30, 40 have been spoken of as "sections" rather than mere members because each section 10, 20, 30, 40 has a companion part or member at the respective right and left ends of the sofa. The particular sections 10, 20, 30, 40 shown in the present figures represent only the companion parts at one end of the sofa (the left end as viewed in Fig. 5). The corresponding parts of the sections at the opposite end of the sofa have been omitted from the drawings since they are merely counterparts of those shown.

The elements forming the sections 10, 20, 30, 40 are angle irons, as indicated most clearly at 40 in Figs. 5 and 6. Extending transversely across the device at suitable intervals are cross-bars, such as that shown at 18, to hold the companion parts of each section together as a structural unit. Also extending transversely across the device (but not shown in the present drawings) is a bed spring or its equivalent to support the mattress 70 (shown in dot-and-dash lines). The spring may be supported in any well-known manner between the opposite members of the frame sections.

The device includes a pair of middle legs, one associated with each set of members at the left and right of the sofa. One of these legs is shown at 50. It is a plate or casting of somewhat irregular shape and is articulated at its upper portion, at 35, to a short arm 33 rigidly secured to section 30 and projecting from it. A frontboard 51 extends across the sofa and is articulated to the middle legs. The nature of this articulation forms no part of the present invention.

The device is opened by lifting the frontboard 51 and pulling it upwardly and away from the sofa. This causes a turning of rear section 10 about fixed pivot 16 and brings about a raising of the lower horizontal section 20 and also of the other sections 30 and 40. (The relationship of the parts in this first stage is best shown in Fig. 3 of Patent No. 2,445,241.) This raising of section 20 is assisted by an elevator arm 22, pivoted to section 20 at 21 and provided with a short lever arm 26 whose free end is secured to an elevator tensile spring 2.

The device is then further opened by turning front vertical section 30 about the pivotal connection 23 through about 90° from the vertical position of Fig. 1 to the horizontal position of Fig. 2 in alignment with lower horizontal section 20; and by turning upper horizontal section 40 through about 180° to bring it from the sofa position of Fig. 1 through the intermediate positions of Figs. 2 and 3 to the bed position of Fig. 4.

In the closed condition of the device, Fig. 1, the middle leg 50 is parallel and close to the front vertical section 30, and lies between this section and the frontboard 51. In the fully open condition of the device the middle leg 50 is perpendicular to front vertical section 30, the leg having been automatically turned 90° relative to section 30 about its pivotal connection 35 by the linkage shown at 28, 48 and 58.

In the unfolded condition of the frame, the end section 40 is supported by a front leg 43, it being understood that a counterpart of this leg is carried at the opposite side of the device. The leg 43 is pivoted to the section 40 at 42 and is actuated by member 46. This member is pivoted at its rear end 71 to the frame section 30, and at its

front end 72 to the upper end of the leg 43. The parts are so mounted that when the frame is folded the leg 43 lies parallel to and alongside the frame section 40, as shown in Figs. 1 and 2. During the unfolding of the frame, the actuating member 46 exerts a pull upon the leg 43 at 72, thus causing the leg to assume the operative vertical position shown in Fig. 4 when the frame is completely unfolded.

The specific improvement to which the present invention is directed lies in the provision of a mattress clamping board 80 extending transversely across the frame adjacent to the free end of the section 40. For structural reasons, the board 80 carries at each end a projecting arm 81. Pivoted to this arm, at the adjacent pivot points 82 and 83, are the links 84 and 85 arranged in side by side relation. The opposite ends of these links are pivoted at the adjacent pivot points 86 and 87 to the frame section 40. Extending between one of these links, such as the link 84, and the leg 43 is an actuating member 88. This member is pivoted to the leg 43 at 89 and to the link 84 at 90.

During the unfolding of the frame, the actuating member 88 swings the link 84 from the rearwardly-inclined position shown in Figs. 1 and 2 to the forwardly-inclined position shown in Fig. 4. An intermediate position is shown in Fig. 3. The link 85 partakes of a similar swinging movement.

In the closed or folded condition of the frame, the board 80 is held relatively close to the section 40, and is in fact drawn toward the latter, thus serving to engage the mattress and to clamp it against the section 40. As the frame approaches its fully unfolded condition, the board 80 is transported into the relatively removed position shown in Fig. 4, the mattress having been completely released.

The links 84 and 85 are of such lengths and are so arranged that when the board is in its mattress-clamping position it is substantially parallel to the frame section 40, thereby engaging the mattress flatwise, and when the board is in the mattress-releasing position (Fig. 4) it is not only oblique to the section 40 but is positioned outwardly beyond the section 40. In this position the board 80 can serve as a pillow-rest or as a footboard. In any case, it will be noted that the mattress 70 is completely released and rests freely on the extended frame.

To achieve the results indicated above, a preferred design of the links 84 and 85, as shown in the present drawings, makes them substantially equal in length but arranges them slightly out of true parallelism.

One of the features of the invention lies in the fact that the mattress is not only automatically engaged, when the frame is started from its unfolded toward its folded condition, but is engaged relatively promptly. That is, the frame section 40 will have risen barely 45° from the horizontal when the board 80 seats itself against and clamps the mattress. The extent to which the board travels during the initial closing motion of the frame section 40 is best shown by comparing Figs. 3 and 4. In Fig. 4 the links 84 and 85 are in their extreme forwardly-inclined positions. In Fig. 3 they have already swung toward the rear, and long before the section 40 has reached the vertical position shown in Fig. 2, the links 84 and 85 will have drawn the board 80 down against the mattress 70 to hold it against shifting movement. It is then retained in this position during the remainder of the adjustment of the frame into the folded condition of Fig. 1. Similarly, during the return adjustment from

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folded to unfolded condition, the mattress is firmly held until the end section 40 approaches its fully horizontal disposition, and only then is the mattress fully released.

In general, it will be understood that those skilled in the art may readily make changes in the details herein described and illustrated without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

Having thus described our invention and illustrated its use, what we claim as new and desire to secure by Letters Patent is:

1. In a sofa-bed, a frame foldable to define a sofa and unfoldable to define a bed, said frame comprising companion members at each side constituting sections, one of said sections being an end section which defines the seat of the sofa when the frame is folded and swings to an outer horizontal position when the frame is unfolded, a mattress-clamping board extending transversely across the frame adjacent to the free end of said section, and a means for drawing said board toward said section when the frame is folded and moving it away from said section when the frame is unfolded, said means including a pair of links extending side-by-side between said board and section, the links being articulated to said board at pivot points lying substantially in a plane parallel with the top surface of said board, a leg pivoted to said section and lying along side said section when the frame is folded, means for moving said leg to a position at right angles to said section when the frame is unfolded, and an actuating member extending between said leg and one of said links.

2. In a sofa-bed, a frame foldable to define a sofa and unfoldable to define a bed, said frame comprising companion members at each side constituting sections, one of said sections being an end section which defines the seat of the sofa when the frame is folded and swings to an outer horizontal position when the frame is unfolded, a mattress-clamping board extending transversely across the frame adjacent to the free end of said section, and a means for drawing said board toward said section when the frame is folded and moving it away from said section when the frame is unfolded, said means including a pair of links extending side-by-side between said board and section, a leg pivoted to said section and lying alongside said section when the frame is folded, means for moving said leg to a position at right angles to said section when the frame is unfolded, and an actuating member extending between said leg and one of said links, said links being of such lengths and being so arranged that the swinging movements of the links will transport said board between a disposition substantially parallel and relatively close to said section when the frame is folded and a disposition slightly oblique to and relatively removed from said section when the frame is unfolded, said links being articulated to said board at pivot points lying substantially in a plane parallel with the top surface of said board.

3. In a sofa-bed, a frame foldable to define a sofa and unfoldable to define a bed, said frame comprising companion members at each side constituting sections, one of said sections being an end section which defines the seat of the sofa when the frame is folded and swings to an outer horizontal position when the frame is unfolded,

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a mattress-clamping board extending transversely across the frame adjacent to the free end of said section, and a means for drawing said board toward said section when the frame is folded and moving it away from said section when the frame is unfolded, said means including a pair of links extending side-by-side between said board and section, a leg pivoted to said section and lying alongside said section when the frame is folded, means for moving said leg to a position at right angles to said section when the frame is unfolded, and an actuating member extending between said leg and one of said links, said links being substantially equal in length but slightly out of parallelism so that the swinging movements of the links will transport said board between a disposition substantially parallel and relatively close to said section when the frame is folded and a disposition slightly oblique to and relatively removed from said section when the frame is unfolded, said links being articulated to said board at pivot points lying substantially in a plane parallel with the top surface of said board.

4. In a sofa-bed, a frame foldable to define a sofa and unfoldable to define a bed, said frame comprising companion members at each side constituting sections, one of said sections being an end section which defines the seat of the sofa when the frame is folded and swings through about 180° to an outer horizontal position when the frame is unfolded, the adjacent section being a front vertical section which swings through about 90° to a horizontal position when the frame is unfolded, a leg pivoted to said end section, an actuating member extending between said front vertical section and said leg for moving said leg from a position alongside said end section when the frame is folded to a position at right angles to said end section when the frame is unfolded, a mattress-clamping board extending transversely across the frame adjacent to the free end of said end section, a pair of links extending side-by-side between said board and end section, the links being articulated to said board at pivot points lying substantially in a plane parallel with the top surface of said board, and an actuating member extending between said leg and one of said links for moving said board between a mattress-clamping disposition relatively close to said end section when the frame is folded and a pillow-rest or footboard disposition relatively removed from said end section when the frame is unfolded.

JOHN M. POKORNY.
LOUIS POKORNY, JR.

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