July 4, 1939. E. E. WOLLER 2,164,438

ARTICLE OF FURNITURE

Filed July 31, 1936 3 Sheets-Sheet 1

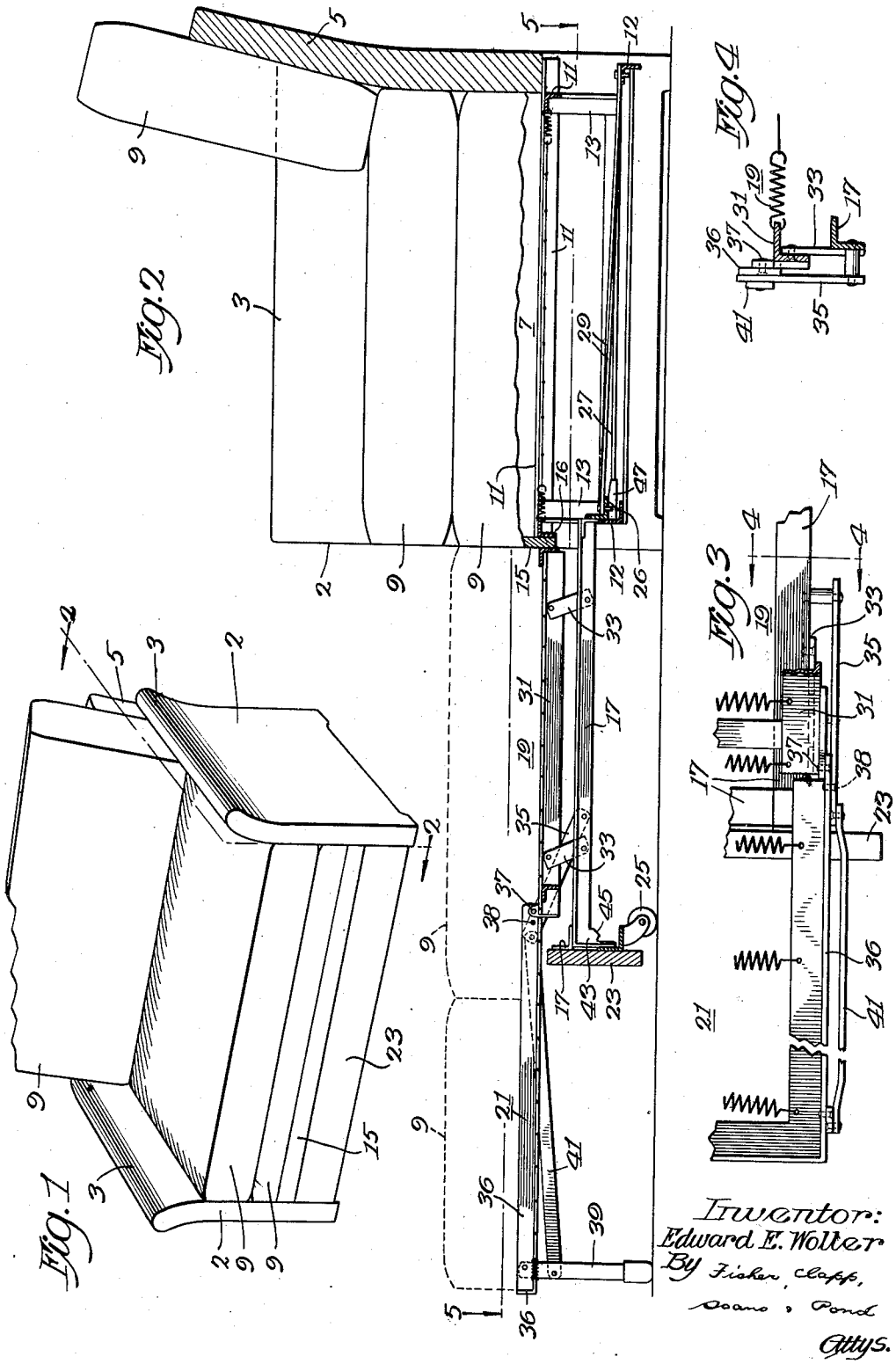


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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ARTICLE OF FURNITURE

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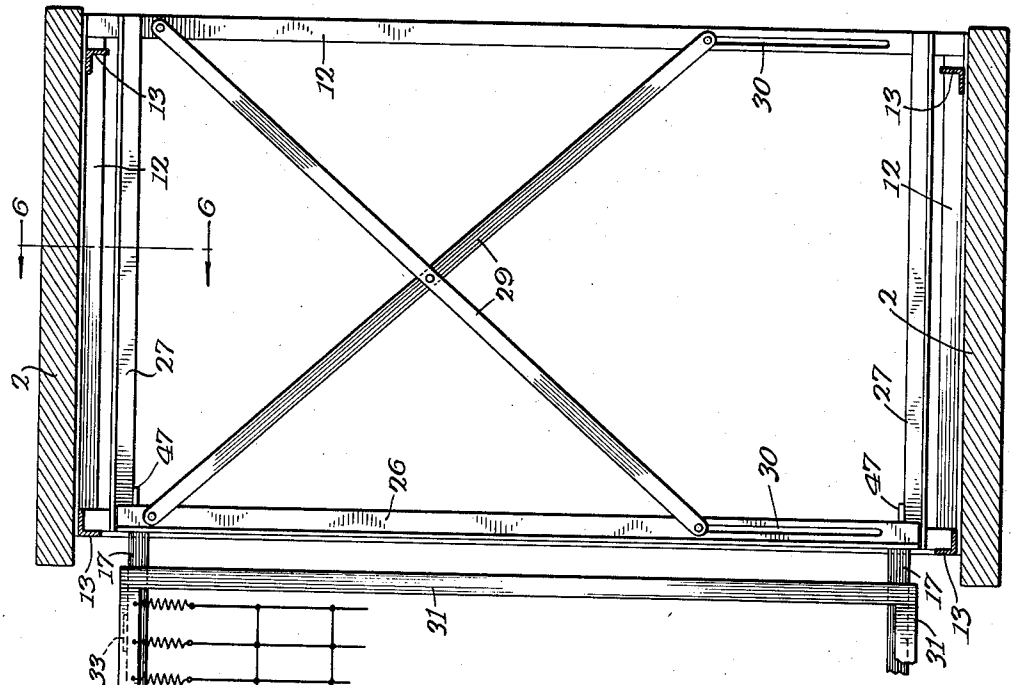



Fig. 5

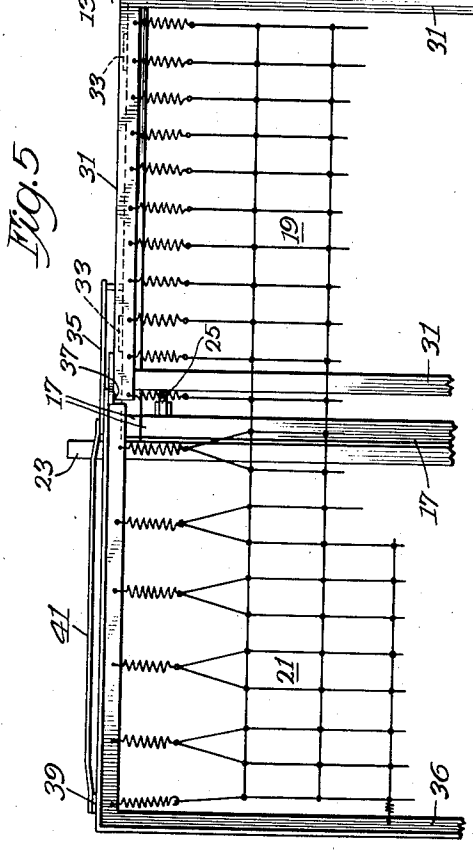
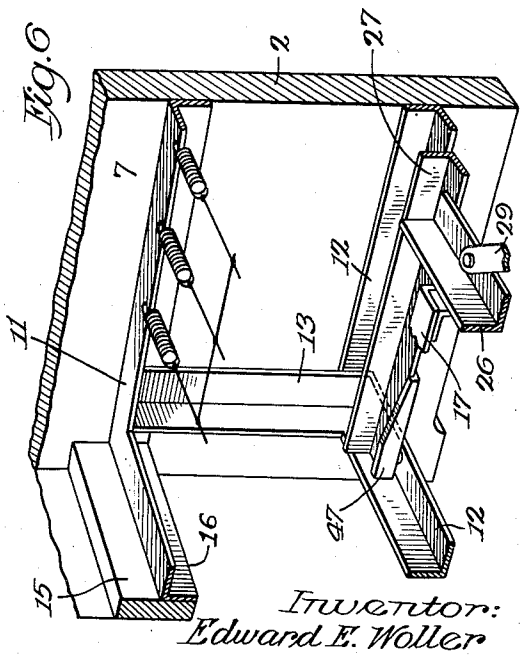



Fig. 6




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ARTICLE OF FURNITURE

Filed July 31, 1936 3 Sheets-Sheet 3

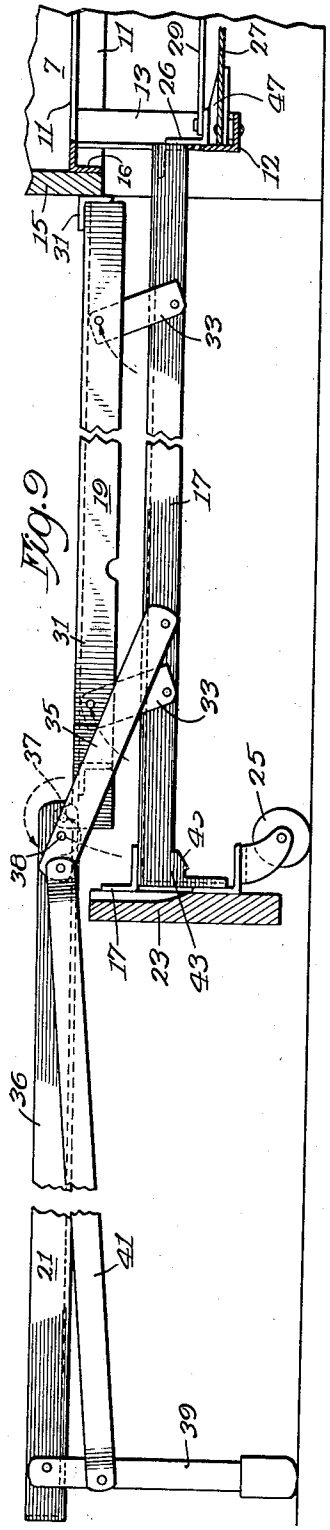


Fig. 9

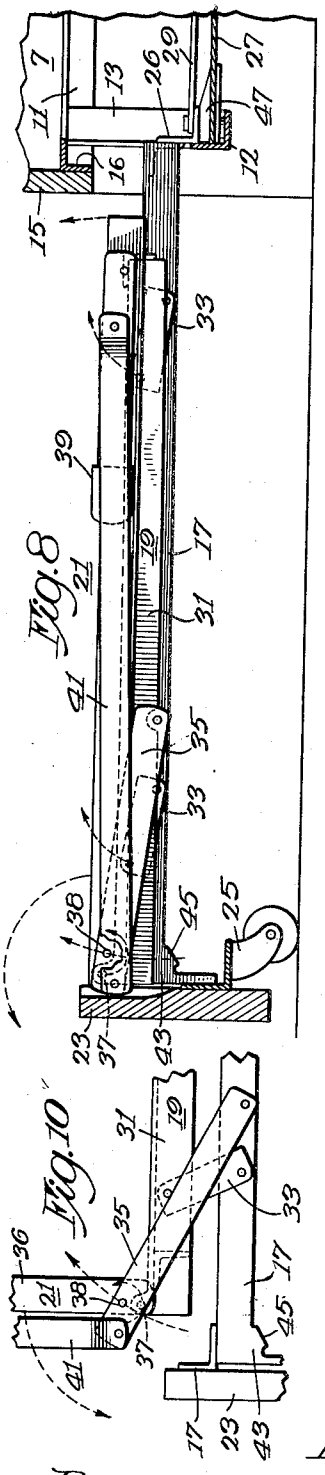


Fig. 8



Fig. 10

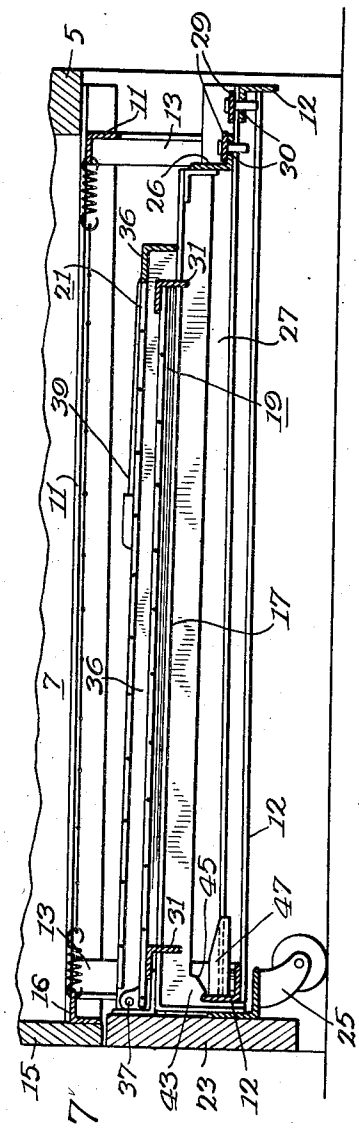


Fig. 7

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Patented July 4, 1939

2,164,438

# UNITED STATES PATENT OFFICE

2,164,438

## ARTICLE OF FURNITURE

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Application July 31, 1936, Serial No. 93,578

9 Claims. (Cl. 5—21)

The present invention relates generally to furniture of the type which may be converted from its normal and ordinary function of serving as a love seat or davenport into a bed, and particularly to the bed forming structures utilized in furniture of this type.

The principal object of the invention is to provide an improved bed forming unit for use with furniture of this type which shall occupy less space, shall operate more easily and efficiently, and shall provide a more comfortable bed foundation than the structures heretofore known to the art. More specifically, it is an object of the present invention to provide a bed forming unit which, when embodied into a love seat or short davenport, shall be capable of forming a full size bed; to provide a bed forming unit of the subject type which shall utilize a plurality of foldable bed sections normally disposed beneath the seat section of the article with which the unit is used and which shall be automatically operable when the bed sections are unfolded to bed position to raise these sections into co-planar relation with the seat section; to provide a simple means for locking the bed sections of a bed forming unit of the subject type against movement when in the bed position; to provide an improved convertible love seat or short davenport wherein a plurality of similarly dimensioned cushions normally forming a part of the love seat structure may be used as a mattress when the device is employed as a bed; and generally to improve the features of construction and mode of operation of devices of the subject type.

A preferred form of the invention is illustrated in the accompanying drawings wherein—

Figure 1 is a perspective view of a love seat embodying the features of the present invention;

Figure 2 is an enlarged sectional view on the general line 2—2 of Figure 1 showing the love seat opened up into bed position;

Figure 3 is an enlarged fragmentary view of a portion of the bed forming unit used in conjunction with the love seat illustrated in Figures 1 and 2;

Figure 4 is a fragmentary sectional view on the general line 4—4 of Figure 3;

Figure 5 is a sectional plan view on the general line 5—5 of Figure 2;

Figure 6 is a fragmentary perspective view on the general line 6—6 of Figure 5 showing the features of under frame construction of the love seat;

Figure 7 is an enlarged, fragmentary, elevational view, partially in section, showing the bed forming unit in its normal position beneath the seat section of the love seat;

Figure 8 is an enlarged elevational view, similar to Figure 7, showing the bed forming unit withdrawn from beneath the seat section to an intermediate position in the bed forming operation;

Figure 9 is an enlarged, fragmentary, elevational view similar to Figures 7 and 8 showing the bed forming unit in the fully opened or bed position; and

Figure 10 is a fragmentary view showing the relative position of certain of the linkages for controlling the movement of the bed sections of the bed forming unit at a position intermediate that illustrated in Figures 8 and 9.

As mentioned previously, the article of furniture illustrated in the drawings is normally used as a love seat, the present invention having particular relation to furniture structures of this type. A love seat, as distinguished from a davenport, is an article of furniture intended primarily to seat not more than two persons and having a length not in excess of about five feet, three inches. Davenports are capable of seating three persons and have a length equal to, or greater than, six feet, three inches.

Referring particularly to Figures 1 and 2, the love seat therein illustrated includes a pair of vertically arranged end sections 2, preferably of wood, which terminate vertically in outwardly extending arms 3, a back supporting section 5 of suitable form, an angle iron strengthening frame which serves to interconnect the end and back sections and which includes a seat forming section 7 of spring fabric, and three generally rectangularly shaped cushions 9, two of which are normally disposed on top of the seat forming section 7, and the other of which normally rests against the back support 5 of the love seat. The vertical end supports 2, the back rest 5, and the cushions 9 are preferably covered with cloth or like material, as is well known in the art, and if desired, the cushions 9 may be of the inner spring type, this form being particularly satisfactory for use as mattresses.

The inner frame structure of the seat is preferably of welded construction and includes, as is shown particularly in Figures 2, 5, and 6, upper and lower frame sections 11 and 12 which are rectangular in outline. These sections 11 and 12 are supported in spaced relation by suitable corner struts 13, and the entire structure is permanently affixed to the vertical end supports and

the back rest portion of the love seat by any suitable fastening means (not shown). The spring fabric which defines the seat section 7 is resiliently attached to the upper frame section 11 in the conventional manner. A rather heavy strut member 15 which may be of wood extends horizontally across the front of the love seat co-extensive with the adjacent portion 16 of the upper frame section 11 and serves to interconnect and brace the two vertical end sectons 2. This horizontally extending strut 15, as will be explained later, is also used as a stop means for holding the bed sections against movement when the love seat is arranged for use as a bed.

The bed forming unit comprises a unitary structure and includes a suitable angle iron frame 17 which is generally rectangular in outline and a pair of hingedly connected bed sections 19 and 21. The bed sections 19 and 21 are covered with spring fabric similar to the seat section and are normally disposed in folded, superposed relation with the lower section 19 resting upon the frame 17, as is shown in Figures 7 and 8. A horizontally extending member 23, which is preferably of wood and which may be covered with cloth, is affixed to the front of the bed forming unit in order that the love seat may present a finished appearance when in its normal position.

The bed forming structure is adapted to slide as a unit from beneath the seat section 7 of the love seat, and to facilitate this movement, the outer portion of the bed forming structure is provided with a pair of castors 25 one of which is positioned adjacent each end thereof. The inner longitudinally extending member 26 of the frame 17 of the bed forming structure is adapted to slide upon a pair of spaced, generally parallel angle iron guides 27 which are permanently supported in suitable position upon the strengthening frame of the love seat proper, as is illustrated particularly in Figures 5 and 6.

To permit the bed forming unit to be moved from beneath the seat section 7 with the minimum of friction and without binding, and to assure the proper relative positioning of the bed sections 19 and 21 with respect to the seat section 7 during the unfolding of the bed sections, a lazy tong linkage 29 is interposed between the strengthening frame of the love seat and the frame 17 of the bed forming unit, as is illustrated particularly in Figure 5. To accommodate the endwise movement of the two link members making up this linkage, suitable slots 30 are provided in the inner longitudinal member of the strengthening frame of the love seat and in the inner member 26 of the frame 17 of the bed forming unit.

In order that the bed which is formed when the bed sections 19 and 21 are unfolded to bed position shall be as comfortable as possible, it is highly important that the bed sections when in the bed position shall be co-planar with each other and with the seat section 7. The accomplishment of this in devices of the subject type has heretofore presented a very troublesome problem to the art, for the reason that the bed forming sections must be disposed beneath the seat section when the device is used as a love seat. In the structure disclosed in the drawings, the two bed sections 19 and 21 are raised into coplanar relation with respect to each other and with respect to the seat section automatically as an incident to the unfolding of those sections. This highly desirable operational characteristic is accomplished by the use of a pair of parallel bar linkages extending between the frame 17 of the bed forming unit and the frame 31 of the lower bed section 19, and a suitable means for actuating these linkages to accomplish the desired raising of the bed sections during the unfolding operation.

Each of the parallel bar linkages includes a pair of relatively short link members 33 disposed at either end of the bed forming unit, one end of each of the links 33 being pivoted to the frame 17 of the bed forming unit and the other end of each link 33 being pivoted to the frame 31 of the lower bed forming unit 19, the arrangement of the links being clearly shown in Figures 2, 4, 8, 9, and 10. The actuation of the parallel bar linkages during the unfolding operation is accomplished by means of a pair of somewhat longer link members 35 each of which is pivoted at its lower end to the frame 17 of the bed forming unit, and at its upper end to the frame 36 of the upper bed section 21 at a point 38 spaced some distance from the hinge pivot 37 of the two bed sections. The links 35 and the portions of the upper bed section frame 36 between the hinge pivot point 37 and the pivot point 38 at which the links 35 are connected that frame form, in effect, a pair of symmetrically positioned toggle linkages which, when the bed sections 19 and 21 are unfolded, serve to rotate the pivots 37 and 38 about each other thereby simultaneously raising the bed sections and moving both of those sections in the direction of the seat portion of the love seat. This upward and rearward movement is controlled by the parallel bar linkages at either end of the seat forming structure, and by a proper proportioning of the several linkages, it is possible to cause the bed sections 19 and 21 to move into substantially co-planar relation with each other and with the seat section 7 during the unfolding operation. The direction of movement of the several structural elements about their respective pivots is indicated by arrows in Figures 8, 9 and 10. As mentioned before, this operational characteristic is of the greatest value in making possible a comfortable bed structure.

In order that the bed sections may be securely locked against lateral movement when in the unfolded or bed position, the proportions of the bed forming unit are so arranged that the rear element of the frame 36 of the lower bed section is moved into contact with the horizontally extending strut 15 forming a part of the main support of the love seat proper at the termination of the unfolding operation. This engagement is shown clearly in Figures 2 and 9. The large mechanical advantage of the toggle linkages which raise the bed sections prevents upward displacement of the upper bed section 21 when that section is in the unfolded position, and to support the outer end of this section from downward movement a pair of legs 39 are pivotally connected to the frame 36 of the upper bed section adjacent the ends of the outer or unhinged side thereof. The legs 39 are adapted to extend generally parallel to the frames 31 and 36 of the bed sections when those sections are in the folded position, and hence do not interfere with the movement of the bed forming structure beneath the seat section 7 of the love seat. A link member 41 extends between the end of each of the links 35 used for accomplishing the raising of the bed sections during the unfolding operation and one of the legs 39, this member serving to automatically control the movement of

these legs during the folding and unfolding of the bed sections.

When the device is being used as a love seat, it is highly desirable that the bed forming unit shall be securely latched in place beneath the seat section. This latching is accomplished by means of a pair of notched latching members **43** each of which is affixed to one end of the frame of the bed forming unit adjacent the outer side thereof. When the bed forming unit is in place beneath the seat section **7**, the notch in the latching members is adapted to engage the outer longitudinally extending member forming a part of the lower section **12** of the strengthening frame of the love seat proper, as is shown particularly in Figure 7. A cam surface **45** is formed adjacent the notch for facilitating the latching operation.

A pair of wedge shaped lifting plates **47** are positioned adjacent the outer end of the guide members **27**, as is shown particularly in Figures 2 and 6. When the bed forming unit is being withdrawn from beneath the seat section **7** and nears the fully withdrawn position, the inner horizontally extending frame member **26** rides upon these wedge shaped plates **47** and is thereby raised a predetermined amount.

When the device is being used as a bed, the upper seat cushion and the back cushion are superposed upon the bed sections to form a mattress, as is illustrated by the dotted lines in Figure 2. By virtue of the fact that the cushions are of the same thickness, and the seat and bed sections are substantially co-planar with each other, a most comfortable bed structure is made possible.

From the foregoing, it will be seen that I have disclosed the details of a novel type of bed forming structure which is particularly suitable for use in conjunction with love seats and similar articles of furniture for the purpose of adapting those articles for use as a bed. The bed forming structure according to the present invention embodies the novel concept of a plurality of hingedly connected bed sections which are normally disposed beneath the seat section of the article of furniture with which the structure is combined in folded, superposed relation and means operable when the bed forming sections are being unfolded to bed position to raise those sections into substantially co-planar relation with the seat section, thereby making possible a much more comfortable bed structure than has heretofore been attained. By virtue of the fact that the present invention permits the utilization of a plurality of folded bed sections, a relatively short article of furniture such as a love seat may be converted into a full length bed.

I have also disclosed certain novel structural arrangements particularly intended for the improvement of articles of furniture of the type to which the present invention relates. For example, I have disclosed a simple mechanical arrangement of novel design for accomplishing the raising of the bed sections during the unfolding operation, a novel means for guiding and directing the bed forming structure while it is being withdrawn from beneath the seat section with which it is associated so as to minimize binding and friction, and to assure the proper relative positioning of the several structural elements during the bed forming operation, a novel latching arrangement for retaining the parts in normal position, and other novel structural combinations of particular value in accomplishing the invention.

The principles of the present invention may be embodied into various structural arrangements, and it is my intention, therefore, that the accompanying claims shall be accorded the broadest reasonable construction consistent with the prior art.

I claim the following as my invention:

1. In a unitary structure for use in converting a love seat or like article of furniture into a bed, a frame which is generally rectangular in outline, a pair of generally rectangular, hingedly connected bed sections normally resting upon said frame in folded, superposed relation, said bed sections being unfoldable into substantially co-planar relation for use as a bed, the lower of said bed sections normally resting directly upon said frame and being connected to said frame by a parallel linkage system which permits said bed sections to be raised vertically with respect to said frame, and at least one link member pivotally connected at one of its ends to said frame and pivotally connected at the other end to said upper bed section at a point spaced some distance from the point at which that section is hingedly connected to the lower section, said last mentioned link being actuable during the unfolding of said bed sections to actuate said parallel linkage system, thereby raising said bed sections with respect to the said supporting frame therefor.

2. In a unitary structure for use in converting a love seat or like article of furniture into a bed, a frame which is generally rectangular in outline and a pair of generally rectangular bed sections, each of which includes an outlining frame and a spring fabric central portion, normally resting upon the frame of said unit in folded, superposed relation, said bed sections being unfoldable into substantially co-planar relation for use as a bed, means for supporting the lower of said bed sections in such manner that it may be raised vertically with respect to the frame of said unit comprising spaced link members extending between the frame of said lower bed section and said main frame at both ends thereof so as to form parallel linkages, and means for actuating said parallel linkages to accomplish the raising of said bed sections with respect to said main frame during the unfolding of said bed, said means including a pair of link members each of which is pivotally joined at one of its ends to the frame of said unit, and is pivotally joined at the other of its ends to said upper bed section at a point spaced some distance from the hinge connection between said bed sections.

3. In a unitary structure for use in converting a love seat or like article of furniture into a bed, a frame, a pair of hingedly connected bed sections adapted to normally rest upon said frame in folded, superposed relation, said bed sections being unfoldable into a substantially coplanar bed position, a linkage comprising parallel bars connecting the lower bed section and the frame of said unit, and at least one linkage connecting the frame of said unit and the upper bed section at a point spaced some distance from the hinge pivot point, said last mentioned linkage being operable during the unfolding of said bed sections, in conjunction with said connecting linkage, to effect the elevation of said bed sections relative to the frame of said unit and also to move said bed sections rearwardly relative to said frame towards said seat.

4. In a unitary structure for use in converting a love seat or like article of furniture into a bed,

a generally rectangularly shaped main frame, a pair of hingedly connected bed sections, each of which is provided with a generally rectangular frame, normally resting upon said main frame in folded, superposed relation, a pair of parallel bar linkages, each of which connects one end of the frame of the lower bed section and the main frame of said unit, and at least one linkage connecting the main frame of said unit and the frame of the upper bed section at a point spaced some distance from the hinge point of said bed sections, said linkages being actuable when said bed sections are unfolded to bed position to raise said bed sections relative to the main frame of said unit.

5. In a unitary structure for use in converting a love seat or like article of furniture into a bed, a frame, a pair of hingedly connected bed sections adapted to normally rest upon said frame in folded, superposed relation, said bed sections being unfoldable into a substantially coplanar bed position, a parallel bar linkage connecting each end of said lower bed section with the frame of said unit, each of said parallel bar linkages consisting of a pair of single link members pivoted at one end to the frame of said unit and at the other end to said lower bed section, and at least one link member pivoted at one of its ends to the frame of said unit and at the other of its ends to the upper bed section at a point spaced some distance from the hinge pivot point, said last mentioned link being operable during the unfolding of said bed sections, in conjunction with said parallel bar linkages, to effect the elevation of said bed sections relative to the frame of said unit.

6. In a device of the class described; a main frame; a seat section supported thereon in a generally horizontal, raised position; a unitary structure normally disposed beneath said seat section and capable of being withdrawn therefrom as a unit to permit said device to be converted into a bed; and stop means for limiting the outward movement of said unitary structure relative to said main frame and said sea section; said unitary structure including a secondary frame, a pair of hingedly connected bed sections normally resting upon said secondary frame in folded, superposed relation, means supporting the said bed sections on said secondary frame in such manner that said bed sections may be raised vertically relative thereto, and means comprising at least one single element link member pivotally connected at one end to said secondary frame and at the other end to said upper bed section which is actuable in conjunction with said support means, upon the unfolding of said bed sections, to elevate said bed sections relative to said secondary frame into substantially coplanar relation with said seat section, and to move both of said bed sections rearwardly relative to said secondary frame into engagement with the main frame of said device, thereby providing, in conjunction with said stop means, a lock for preventing relative movement of said bed sections and said seat sections when said device is used as a bed.

7. In a device of the class described; a main frame; a seat section supported thereon in a generally horizontal raised position; a unitary structure normally disposed beneath said seat section and capable of being withdrawn therefrom as a unit to permit said device to be converted into a bed; and stop means for limiting the outward movement of said unitary structure relative to said main frame and said seat section; said unitary structure including a secondary frame, a pair of hingedly connected bed sections normally resting upon said secondary frame in folded, superposed relation, a parallel bar linkage connecting each end of the lower bed section with said secondary frame, and means, comprising at least one linkage connecting said secondary frame with the upper bed section at a point spaced some distance from the hinge point of said bed sections, which is automatically actuable upon the unfolding of said bed sections to elevate said bed sections relative to said secondary frame into substantially coplanar relation with said seat section, and to move both of said bed sections rearwardly relative to said secondary frame into engagement with the main frame of said device, thereby providing, in conjunction with said stop means, a lock for preventing relative movement of said bed sections and said seat sections when said device is used as a bed.

8. In a unitary structure for use in converting a love seat or like article of furniture into a bed, a generally rectangularly shaped main frame, a pair of hingedly connected bed sections, each of which is provided with a generally rectangular frame, normally resting upon said main frame in folded, superposed relation, a pair of parallel bar linkages, each of which connects one end of the frame of the lower bed section and the main frame, and at least one link member connected at a lower end to the main frame and at a point inwardly of the upper end thereof to the frame of the upper bed section at a point thereon spaced some distance from the hinge point of said sections, said parallel linkages and said link member being actuable when said bed sections are unfolded to bed position to raise said bed sections relative to the main frame, a leg pivotally connected to the free end of the upper section, and a leg operating link connected at one end thereof to said leg and, at the other end thereof, to the upper end of the link member.

9. In a device of the class described, a seat section supported in a horizontal raised position, a unitary structure normally disposed beneath said seat section and capable of being withdrawn as a unit from beneath said seat section to permit said device to be converted into a bed, said unitary structure including a generally rectangularly shaped main frame, a pair of hingedly connected bed sections, each of which is provided with a generally rectangular frame, normally resting upon said main frame in folded, superposed relation, a pair of parallel bar linkages, each of which connects one end of the frame of the lower bed section and the main frame, and at least one link member connected at a lower end to the main frame and at a point inwardly of the upper end thereof to the frame of the upper bed section at a point thereon spaced some distance from the hinge point of said sections, said parallel linkages and said link member being actuable when said bed sections are unfolded to bed position to raise said bed sections relative to the main frame, a leg pivotally connected to the free end of the upper section, and a leg operating link connected at one end thereof to said leg and, at the other end thereof, to the upper end of the link member.

EDWARD E. WOLLER.