

Sept. 29, 1953

R. COOPERSMITH

2,653,329

SOFA BED

Filed Oct. 11, 1948

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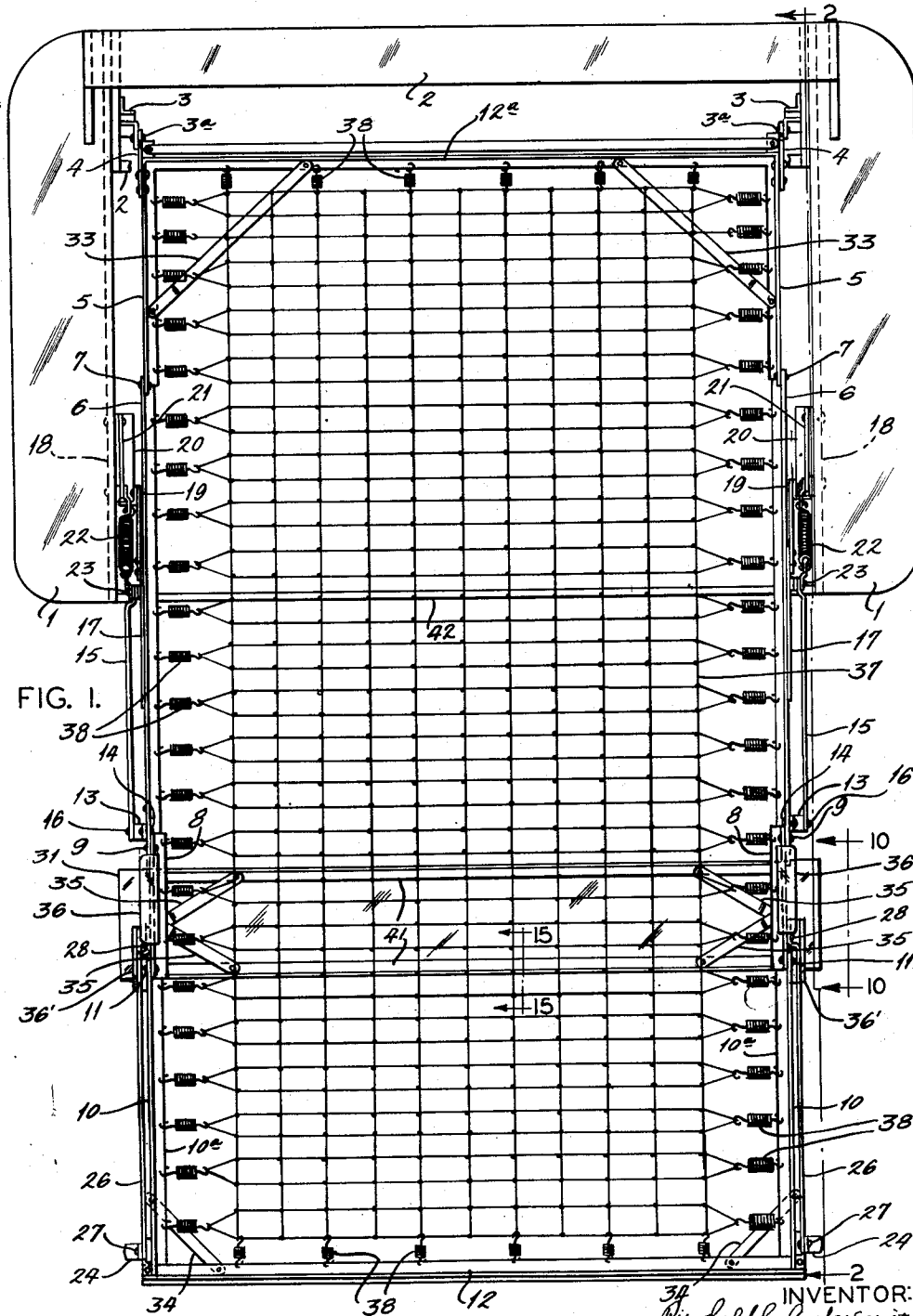


FIG. 1.

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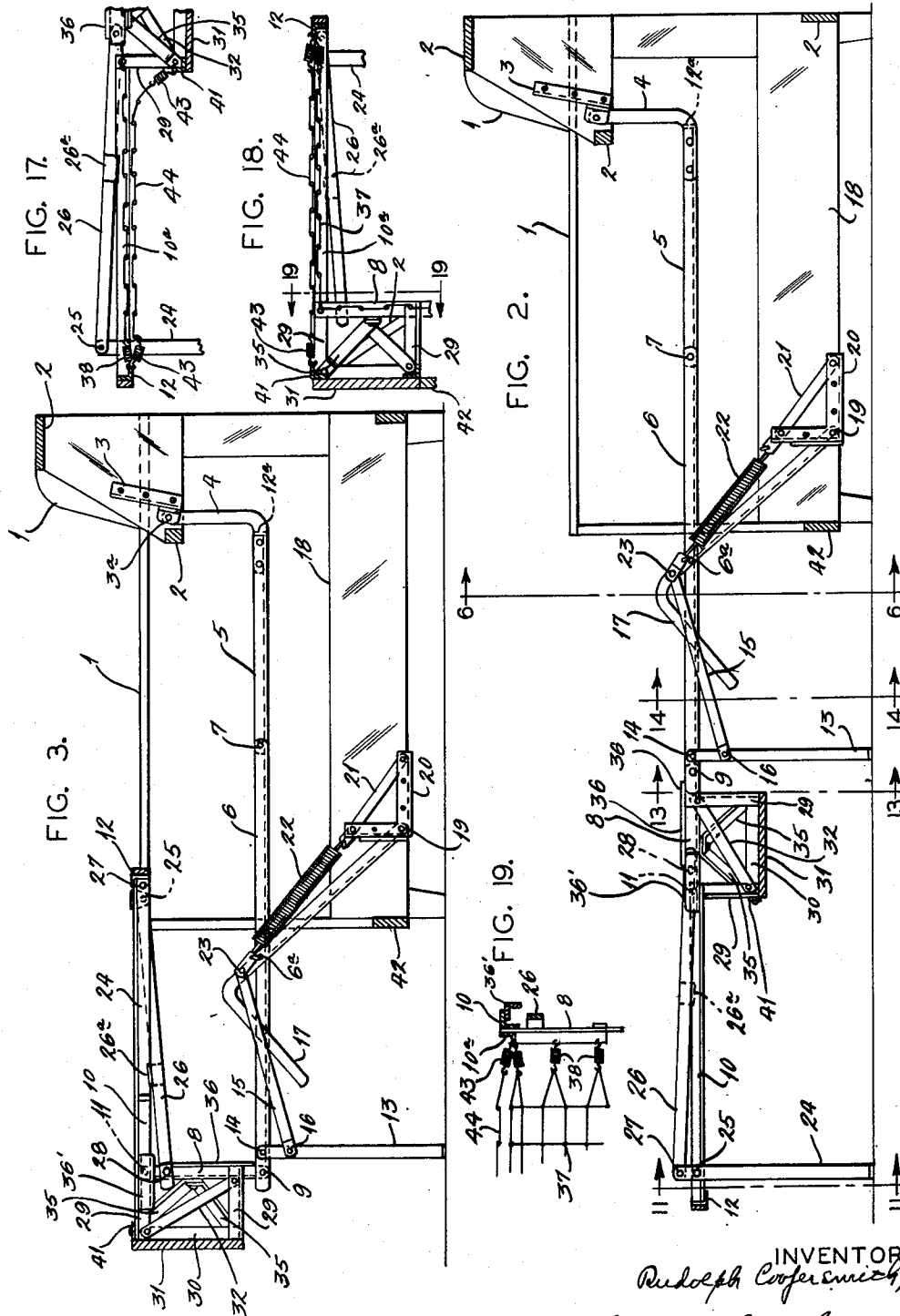
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5 Sheets-Sheet 2



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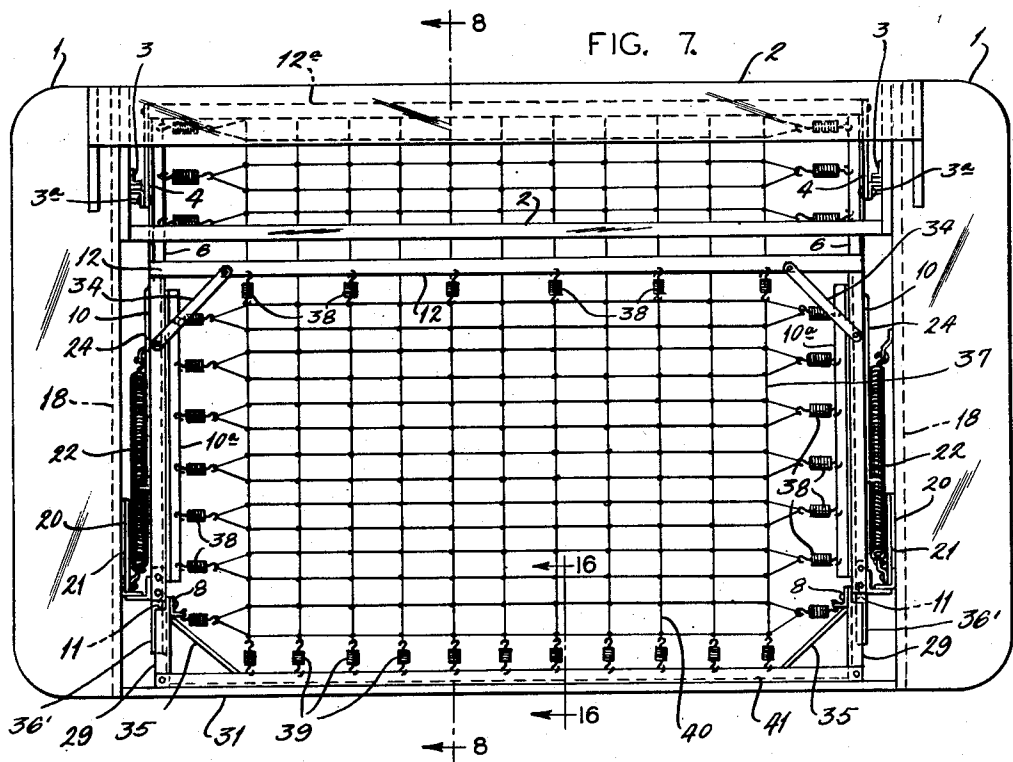
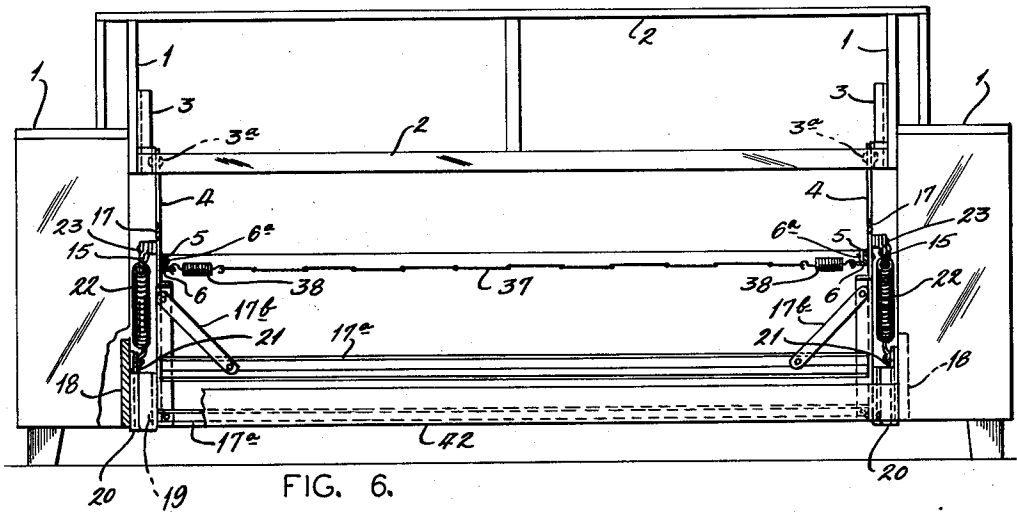
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5 Sheets-Sheet 4



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FIG. 8.

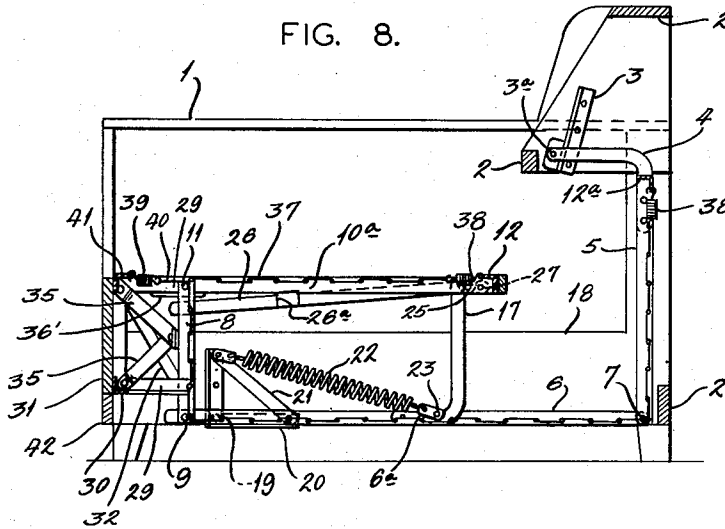


FIG. 11.

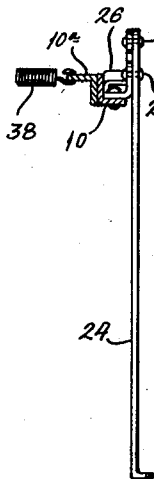


FIG. 12.

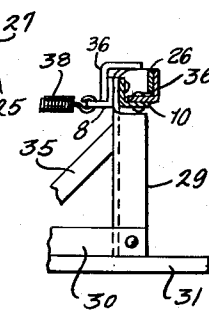


FIG. 13.

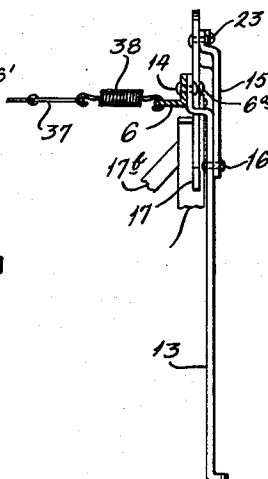


FIG. 14.

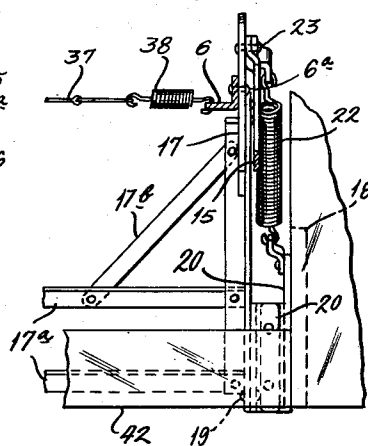


FIG. 15.

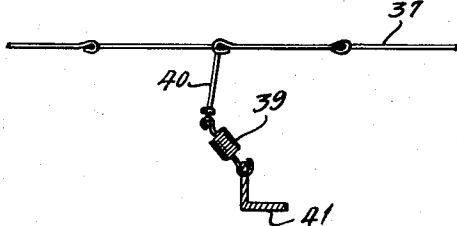
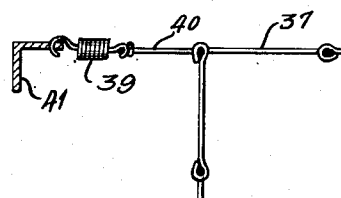


FIG. 16.



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UNITED STATES PATENT OFFICE

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SOFA BED

Rudolph Coopersmith, Clayton, Mo.

Application October 11, 1948, Serial No. 53,783

7 Claims. (Cl. 5-29)

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This invention relates to sofa beds and is more particularly directed to a structure therefor that provides support for that portion of a foldable mattress supporting frame that is used as a base for the sofa seat cushions when it is folded within the framework of the sofa.

The invention comprises a series of suitable bar members pivoted together to form a rectangular frame having a spring-supported wire fabric secured to the pivoted bar members thereof, all of which can be folded into the framework of the sofa bed and, when extended, the frame is supported on legs pivoted to the frame of the extensible member so that the frame and fabric are capable of supporting a mattress. Provision is made in the frame so that when it is folded, certain parts of the wire fabric are maintained taut and supported so that when the seat cushions rest upon these certain parts, the frame and fabric will not yield under the weight that is imposed thereon. The part of the fabric which is held taut when the frame is folded, is released when the frame is extended for the purpose of supporting a mattress. The unpivoted end of said support structure or leg part engages the frame to support same and a front upholstery board carried by a non-collapsible box is incorporated in the frame.

The object of the invention is to provide a foldable frame for a sofa bed in which the most remote portion of the frame, when folded, forms a base for and constitutes the support for the seat cushions of the sofa, and also provides a support for the unsupported end of the remote portion of the frame when folded into the sofa frame; also to provide means for spring supporting all sides of the portion of fabric suspended between the frame parts upon which the seat cushion rests when the frame is folded into the sofa framework and for rigidly supporting an upholstery board that forms a part of the front of the sofa when the frame is folded into the sofa framework.

In the drawings:

Fig. 1 is a plan view of a sofa bed showing the mattress supporting framework in unfolded position.

Fig. 2 is a side view thereof taken substantially along the line 2-2 of Fig. 1,

Fig. 3 is a side elevational view showing a portion of the framework parts after the first step of folding the framework,

Fig. 4 is a side elevational view showing the position of the framework parts after folding to an intermediate position,

Fig. 5 is a side elevational view showing the framework parts in completely folded position within the framework of the sofa,

Fig. 6 is a front elevational view taken substantially along the line 6-6 of Fig. 2,

Fig. 7 is a plan view of the sofa with the frame-

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work parts in the completely folded position of Fig. 5,

Fig. 8 is a section taken substantially along the line 8-8 of Fig. 7,

Fig. 9 is an enlarged detailed plan view of a portion of the extensible framework,

Fig. 10 is an enlarged side elevational view of the structure shown in Fig. 9 and taken substantially between the lines 10-10 of Fig. 1,

Fig. 11 is an enlarged detailed view of a portion of the extensible framework taken substantially along the line 11-11 of Fig. 2,

Fig. 12 is an enlarged detailed view of the extensible framework taken substantially along the line 12-12 of Fig. 10,

Fig. 13 is an enlarged sectional view of another portion of the framework taken substantially along the line 13-13 of Fig. 2,

Fig. 14 is an enlarged sectional view of another portion of the extensible framework taken substantially along the line 14-14 of Fig. 2,

Fig. 15 is a sectional view taken substantially along the line 15-15 of Fig. 1,

Fig. 16 is a sectional view taken substantially along the line 16-16 of Fig. 7,

Fig. 17 is a side elevational view of the outer end of a modified form of the foldable frame for a sofa bed,

Fig. 18 is a view of the structure illustrated in Fig. 17 when folded into the sofa; and

Fig. 19 is a plan view of a portion of the modified foldable frame.

The invention is embodied in a sofa having a framework that comprises side arms 1 and rearward longitudinal members 2 connected between the side arms 1 to space them apart. Other suitable connecting members are provided between the two side arms, as is customary in the art and as will be hereinafter set forth.

Appropriately secured to each of the side arms are brackets 3, one bracket being secured to each arm 1. Each bracket has pivoted thereto by means of a pin 3a, one end of an arm 4, each arm being provided with a right-angle bend. Each bar 5 has one end rigidly secured to the other end of each of the arms 4. The other end of each of the bars 5 is pivoted to one end of each of the bars 6 by means of pins 7. The other end of each of the bars 6 is pivoted to one end of each of the bars 8 by means of pins 9, the bar 8 constituting one member of an upholstery board supporting structure to be described in greater detail hereinafter, and the other end of each of the bars 8 is pivoted to one end of each of the bars 10 by means of pins 11. The unpivoted ends of bars 10 are rigidly connected together in order to maintain them in suitably spaced relationship by means of an angle bar 12, and a similar bar 12a is connected across the other frame between the pivoted ends of bars 5. The bar 12 preferably

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has a piece of wood secured thereto to be used for upholstery purposes.

Supporting legs 13, only one being shown, for the bars 6, are pivoted thereto at a point adjacent pins 9 by means of pins 14, and bars 15 have one end of each pivoted to each of the legs 13 by pins 16 located a suitable distance from pins 14. The other end of each of bars 15 is pivoted to each of the supporting bars 17 that have right angular bends therein with the outer ends of the longer arms of each bar being pivoted to each of the structural members 18 constituting a part of side arm 1, by means of pins 19. Bars 17a and bracer 17b (Fig. 14) are connected between bars 17 in order to make them move in unison. Suitably secured to the structural members 18, forming a part of each side arm 1, are right angle brackets 20 provided with reinforcing arms 21. One end of springs 22 is secured to one end of each of arms 21 and the opposite ends of the springs are secured to pins 23 that connect one end of each of arms 15 with each of the bars 17. Each of bars 17 is also pivoted to each of the bars 6 by means of pins 6a.

Legs 24 are pivoted to each of bars 10 by means of pins 25 fixed in suitable brackets secured to the bars 10, and each of bars 26 has one end thereof pivoted to the upper ends of legs 24, as viewed in Fig. 2, by means of pins 27 and the other ends of each of bars 26 being pivoted to each of bars 8 by means of pins 28 secured to each of bars 8 at a point near pins 11. A suitable bracket 26a is secured to each bar 26 in order to limit rotational movement of legs 24 relative to bars 10 and 25.

The portion of the foldable frame that forms part of the front of the sofa constitutes a pair of bars 29, one end of each bar being suitably secured to a bar 8 and the opposite end of each of the bars 29 being rigidly connected by means of bars 30 to which a suitable upholstery supporting board 31 is connected. Diagonal bracing for bars 29 and 30, if so desired, may be provided by means of bars 32 that extend diagonally across the rectangular frame for the supporting board 31. Suitable bracing is provided at the corners of the foldable frame by means of bars 33 in the portion thereof that is disposed within the sofa, and the shorter bars 34 are diagonally disposed across the corners of the extremities of the frame and additional reinforcing is provided for the rectangular support for the upholstery board in the form of bars 35 disposed upon each end of the board 31 supporting framework. Longitudinal spacing of bar 8 is accomplished by means of bars 41 connected between bars 29 at the ends thereof.

An auxiliary support 36' is secured to the inner ends of each of the bars 10 and extending beyond each pivot 11. Another auxiliary support 36 is secured to each of the bars 8 intermediate the ends thereof. Each of the bars 26 has an angular or dog leg bend 26b therein adjacent the pivot 28 so that the part of the bar adjacent the pivot 28 lies flat against the bars 8. As viewed in Fig. 4, one of the upholstery board frame braces 29 extends over and is engaged on the under side by the auxiliary support 36' when the sectional frame of the bed is folded into the sofa frame and thereby prevents collapse of the unpivoted end beyond the horizontal during the folding operation. When the frame is extended as shown in Figs. 1, 2, 9 and 10, the end of each of the bars 26 extending beyond the pivots 28 extends under the supports 36 while the ends of each of the

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bars 6 beyond the pivots 9 engage under the other end of each of the supports 36 to strengthen and prevent collapse of the frame when in extended position, and when folded as in Fig. 5, the support 36 is in vertical position with the lower end engaging the horizontal bar 6 to further aid in supporting the unpivoted end of the sectional frame during the folding operation and when in folded position.

A wire fabric 37 is suspended between the several side bars 5, 6, 8 and 10 of the framework and is connected thereto by a plurality of springs 38, one end of each of which is disposed in loops formed in the ends of the fabric and whose other end is hooked in suitable apertures cut in said side bar members. Side bars 10 have auxiliary bars 10a thereon to which springs 38 are secured. The ends of the wire fabric are also supported by springs 38, one end of each hooking about the end wires of the fabric whose opposite ends are hooked in suitable apertures cut in the end bar members 12 and 12a.

Provision is made for support of the wire fabric when the frame is folded into the framework of the sofa so that there will be adequate support for that portion of the wire fabric on which the cushions rest when the frame is folded between the side arms 1. This support comprises a series of secondary spring elements 39, one end of each of which may be secured to a link 40 that is connected to one end of the cross wires of the fabric 37, the other ends of the springs 39 being inserted through an aperture cut in one of the bar members 41. The springs 39 are in tensioned condition when the frame is folded into the sofa, as illustrated in Fig. 16, and when it is unfolded for supporting a mattress, springs 39 are in released condition, as illustrated in Fig. 15. The fabric 37 follows the fold lines of the pivots of the frame by reason of the connection to the bar 41, thereby eliminating sagging thereof when the frame is folded.

When it is desired to convert the article of furniture from a bed to a sofa, the outer bar 12 is grasped and lifted upward so that the bars 10 are pivoted about pins 11, all of which are folded to the Fig. 3 position, in which condition legs 24 will be folded against the bars 10a. The upholstery board 31 supporting framework is then lifted and moved to the Fig. 4 position wherein bar 6 pivots about pins 6a, 7 and 9 and simultaneously causes bars 4 and 5 to pivot about pins 7 and 3a, respectively, and moved until they assume the Fig. 4 position. When the parts have been moved to this position, bars 17 will be pivoted about pins 19 and 23 so that bars 17 will be moved underneath bars 10. When pins 16 and 23 have moved past the vertical plane through pins 19, the board 31 and the frame to which it is secured is then moved downwardly so that it assumes the Fig. 5 position wherein the board 31 aligns itself with and rests on board 42 which is part of the frame that connects the side arms 1 at the base thereof. The right-angular portion of the bars 17 now support the unpivoted ends of bars 10 and the spring 22 has been tensioned so that the entire frame is rigid and in condition to support cushions so that the article of furniture may be employed as a sofa. The reverse motion of the several parts is performed when it is desired to open the foldable frame so that it may support a mattress.

A modified form of foldable framework is illustrated in Figs. 17 to 19, which show the unpivoted end thereof. A fabric 44 is positioned between

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the end bar 12 and the bar 41 mounted on the upholstery board frame with springs 43 connecting the fabric 44 to the bars 12 and 41 and to the side bars 10^a. The fabric 44 extends under that portion of the fabric 37 between the upholstery board frame and the end bar 12 when the frame is unfolded, and when the free end section of the frame is folded into the sofa frame the free end section moves 180°, thus reversing the fabrics so that the fabric 44 is now above that part of the fabric 37 between the upholstery board frame and the end bar. The hooks on the springs 43 connecting the fabric 44 to the framework have been so turned as to extend downwardly, thereby preventing the tearing of cushions. By virtue of the fact that the auxiliary fabric 44 is connected to the bar 41 on the upholstery board frame and which upholstery board frame remains rigid with respect to the section 8 of the side bars, tension is placed upon the springs 43, thus causing the auxiliary fabric 44 to become taut and presenting a smooth surface on which to place the sofa cushions.

What I claim is:

1. A sofa bed comprising a sofa frame; a frame consisting of a plurality of sections pivoted together and foldable into said sofa frame; a non-collapsible upholstery board supporting frame secured to one of said sections for stiffening the frame; means for pivoting one end of said sectional frame to said sofa frame, the other end of said sectional frame being unpivoted; a metal fabric spring suspended from the sides of said sectional frame; a bar extending across said supporting frame and secured thereto parallel to said unpivoted end and displaced therefrom; and spring means for connecting the metal fabric to said bar and for supporting the fabric when the sectional frame is folded into the sofa frame, the fabric suspended between said bar and the unpivoted end of said frame being adapted to support cushions for the sofa.

2. A sofa bed comprising a sofa frame; a frame foldable into said sofa frame consisting of a plurality of bar members pivoted together for forming said frame into a plurality of sections; means for pivoting one end of said frame to said sofa frame; a non-collapsible rectangular upholstery and cushion supporting frame secured to one of said frame sections and including a pair of bars extending across said foldable frame; a mattress supporting fabric spring suspended from said frame; and spring means connected between one of said bars and said fabric for supporting same adjacent to said bar for providing an additional cushion support when the frame is folded into said sofa frame, the fabric suspended between said bar and the unpivoted end of said frame being adapted to support cushions for the sofa.

3. A sofa bed comprising a sofa frame; a foldable frame comprising a plurality of bar members pivoted together and forming said frame into a plurality of sections; a wire fabric; spring means for suspending said fabric from said bars and within said frame; means for pivoting one end of said frame to said sofa frame; a rigid front upholstery board frame secured to one of said sections and including a pair of bars extending across said foldable frame; means for laterally and vertically supporting a portion of said frame and upholstery board frame members for enabling said board supporting frame to support seat cushions; and spring means for supporting said wire fabric from one of said bar members

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for enabling the wire fabric to support seat cushions.

4. A sofa bed comprising a sofa frame, a board secured to said sofa frame, a sectional frame consisting of a plurality of laterally spaced bars pivoted together for forming sections of a mattress supporting frame and foldable into said sofa frame, means for pivoting one end of said sectional frame to said sofa frame, the other end being unpivoted, a rigid frame secured to one of said sections for stiffening said sectional frame, means on one of said sections engaging means on the section to which said rigid frame is secured for bracing said sectional frame when the sectional frame is unfolded; and an upholstery board secured to said rigid frame alignable with and resting on said board secured on said sofa frame when the sectional frame is folded.

5. A sofa bed comprising a sofa frame, a foldable frame made up of a plurality of laterally spaced side bar members pivotally connected for making the frame sectional and having lateral bars at the extreme ends of said side bar members, means for pivoting one end of said frame to said sofa frame, means for supporting said frame in both its folded and unfolded condition, a wire fabric in said frame, springs for suspending said fabric from said frame, a bar in the outermost section spaced from the lateral end bar therein, a cushion supporting fabric in the outermost section; and spring means for suspending said cushion supporting fabric from the side and end bars of the outermost section.

6. A sofa bed comprising a sofa frame, a foldable framework consisting of four sections pivoted one to the other and to said sofa frame, an upholstery board, a non-collapsible frame supporting said board on one of the sections and stiffening said foldable framework, the board forming a part of the front of the sofa when the framework is folded into the sofa frame, a metal fabric structure in one of the sections for supporting the mattress when unfolded, means connecting the fabric structure to the section to support and tension the fabric structure therein when unfolded and means between the fabric structure and the non-collapsible frame to support and tension the fabric structure when folded to support the sofa cushion thereon.

7. A sofa bed comprising a sofa frame, a frame consisting of a plurality of sections, said sections being pivoted together so that when unfolded they will form a support for a mattress, means for pivoting one end of said sectional frame to said sofa frame, the other end being unpivoted, a rigid, non-collapsible frame secured to one of the sections for stiffening said sectional frame, an upholstery board secured to said non-collapsible frame, and means on another of said sections engaging an element of the non-collapsible frame for rigidly bracing the sectional frame when being folded.

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