Aug. 29, 1961 J. M. HEUMANN 2,997,724

EXTENSIBLE SOFA BED

Filed Dec. 22, 1958 4 Sheets-Sheet 1

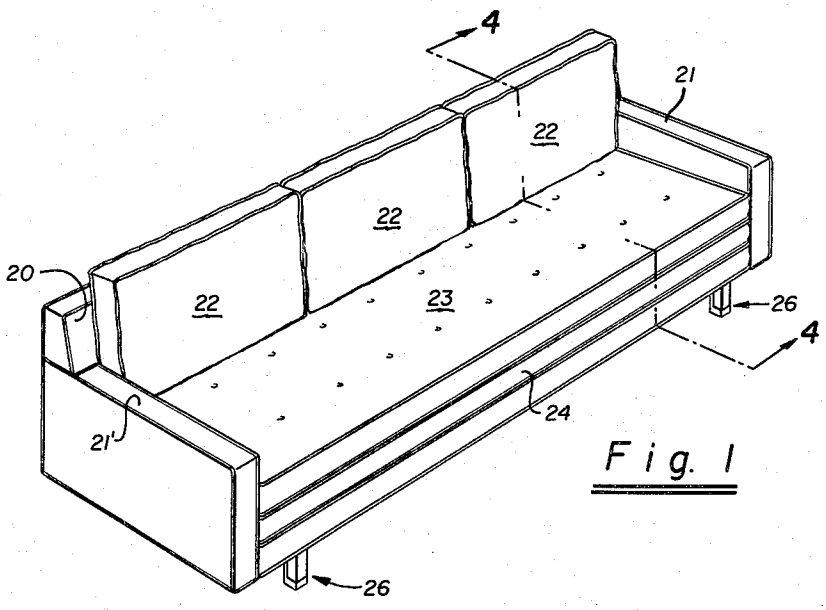


Fig. 1

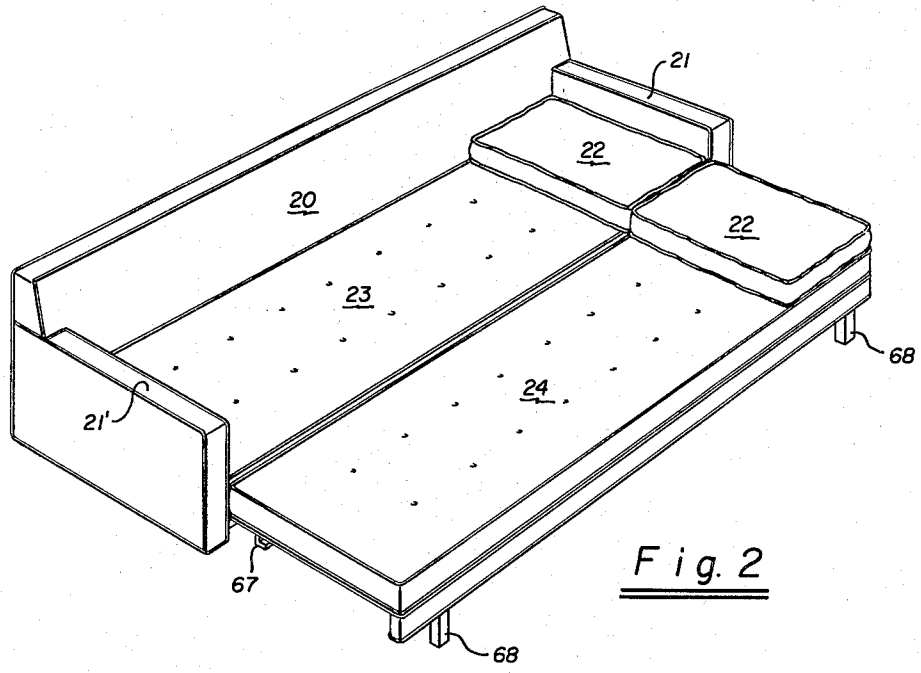


Fig. 2

INVENTOR.
Jules M. Heumann

BY
Fryer & Johnson
Attorney

Aug. 29, 1961 J. M. HEUMANN 2,997,724

EXTENSIBLE SOFA BED

Filed Dec. 22, 1958 4 Sheets-Sheet 2

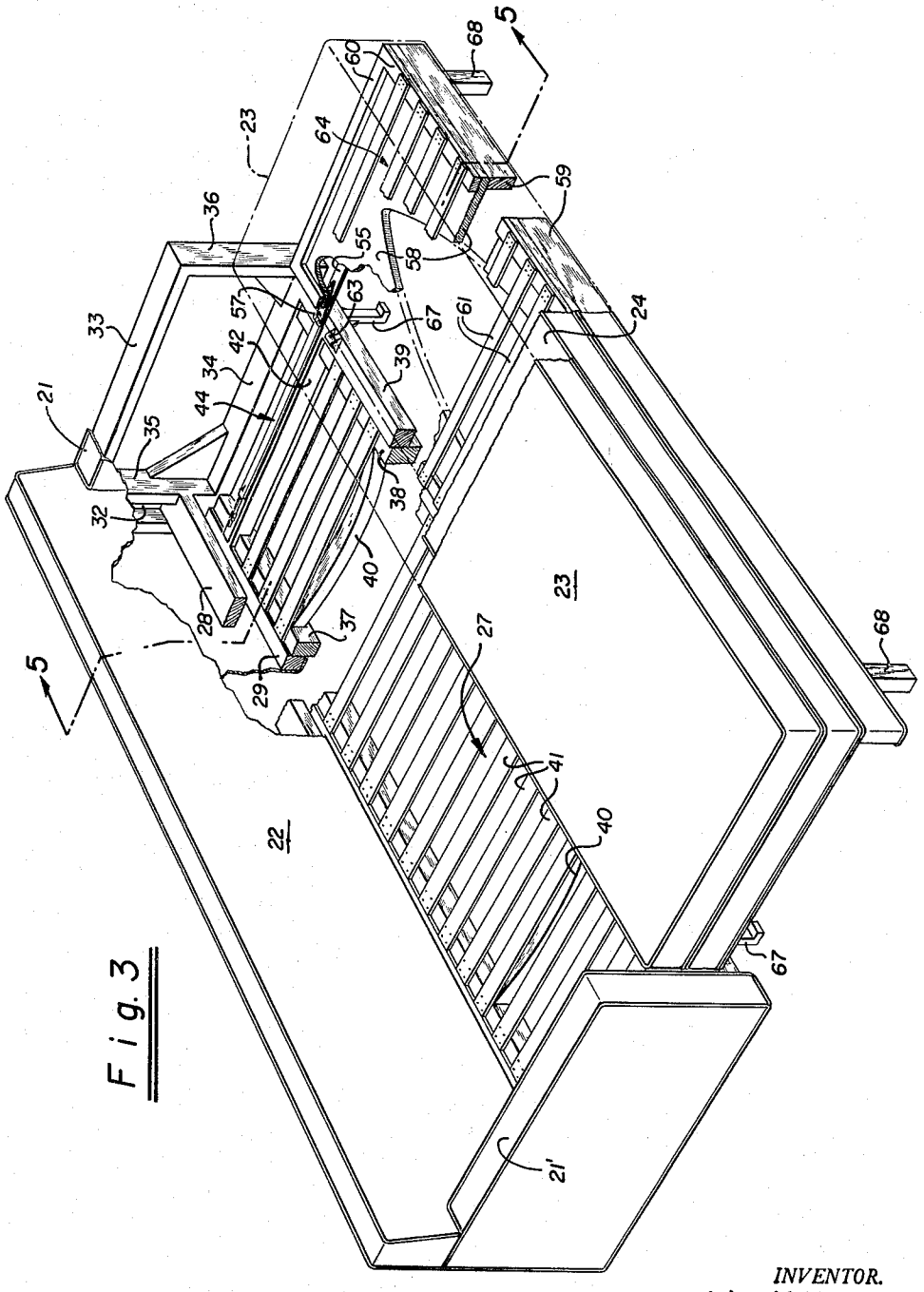


Fig. 3

INVENTOR.
Jules M. Heumann

BY
Fryer & Johnson
Attorney

Aug. 29, 1961 J. M. HEUMANN 2,997,724

EXTENSIBLE SOFA BED

Filed Dec. 22, 1958 4 Sheets-Sheet 3

Fig. 4

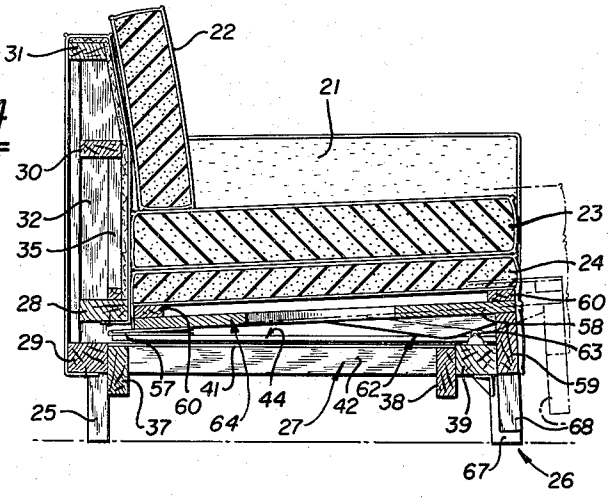


Fig. 5

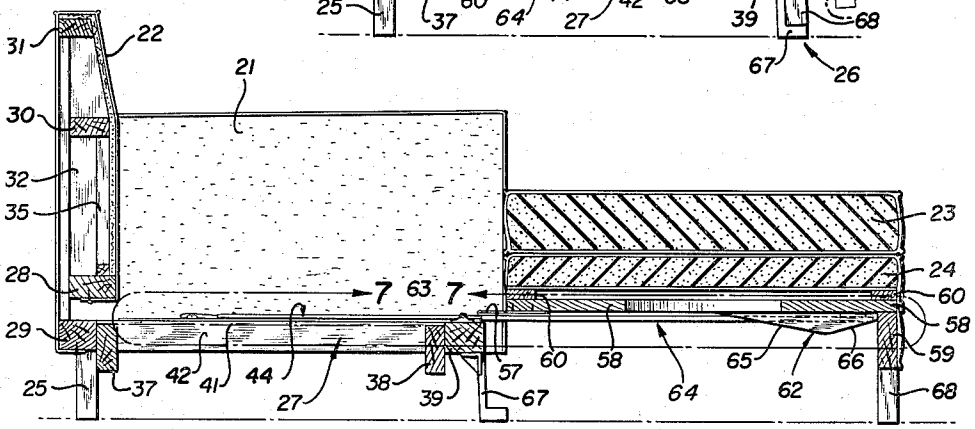
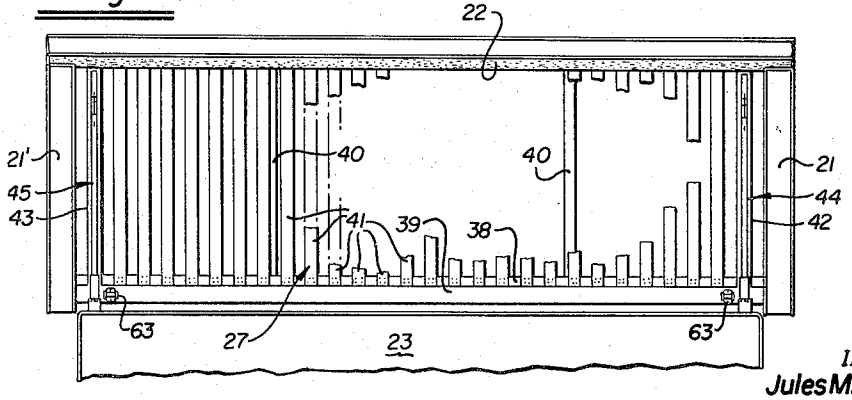


Fig. 6



INVENTOR.
Jules M. Heumann

BY
Fryer & Johnson
Attorney

Aug. 29, 1961 J. M. HEUMANN 2,997,724

EXTENSIBLE SOFA BED

Filed Dec. 22, 1958 4 Sheets-Sheet 4

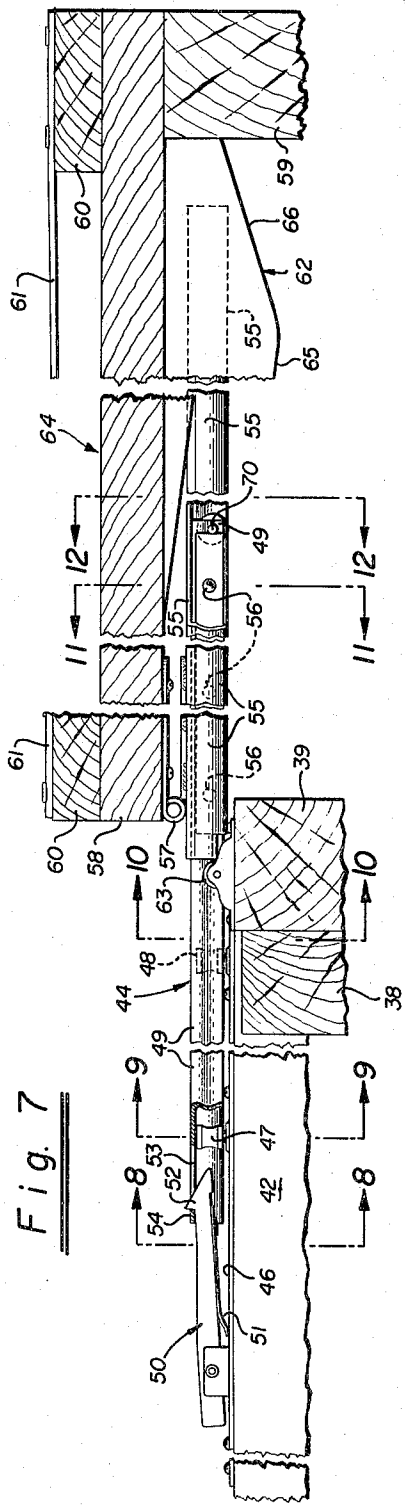


Fig. 7

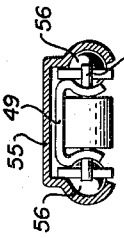


Fig. 12

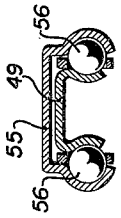


Fig. 11

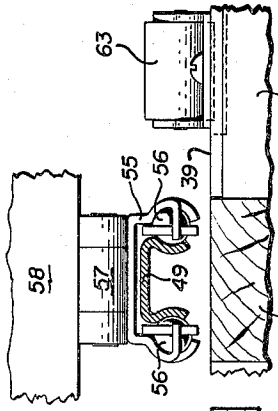


Fig. 10

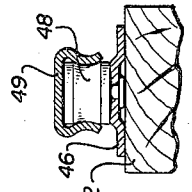


Fig. 9

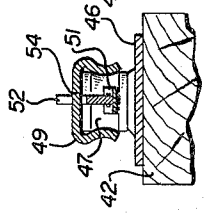


Fig. 8

INVENTOR.
Jules M. Heumann

BY
Fryer & Johnson
Attorneys

United States Patent Office 2,997,724 Patented Aug. 29, 1961

2,997,724

EXTENSIBLE SOFA BED

Jules M. Heumann, San Francisco, Calif., assignor to Metropolitan Furniture Manufacturing Company, South San Francisco, Calif., a partnership

Filed Dec. 22, 1958, Ser. No. 782,026
7 Claims. (Cl. 5—18)

This invention relates to a sofa unit of the type which is capable of being extended, or opened to form a double bed. It is more particularly directed to a sofa of this type having a pair of overlying bed members running lengthwise of the unit and so constructed that the uppermost of said members slides forwardly as the sofa is opened for sleeping purposes, thus exposing the lower member and providing an adjacent bed structure suitable for double occupancy.

The design of a sofa which is capable of being opened for use as a bed poses many difficult problems. First, the unit must be one having both a graceful appearance as well as comfort in both the retracted and the open position. Thus, it would be desirable to provide a structure wherein the seat had a moderate downward slope toward the rear when the unit is closed, and which also afforded a perfectly flat bed structure when opened. The downward slope towards the rear renders the sofa bed comfortable to sit in when it is in the closed position. Also, the flat bed structure in the opened position is essential for sleeping comfort. The construction of the sofa should be such that it permits easy, almost effortless extension and retraction of the outlying bed member and yet firmly retains such member in its superposed position when the sofa is closed for use as a seat.

Still another problem is to provide a structure which, when closed, offers a frontal leg structure of the most simple and unimpeded type, and yet which provides an attractive appearance.

Having in mind the foregoing problems, it is an object of this invention to provide an extensible sofa bed structure which meets all the desired criteria of comfort and appearance as well as of operating ease and control. A further object is to provide a sofa structure which has a high degree of durability and cannot be damaged even when repeatedly opened and closed in a vigorous manner. The nature of still other objects of the invention will be apparent from a consideration of the descriptive portion to follow, taken in conjunction with the figures of the accompanying drawings, wherein:

FIG. 1 is a view in perspective of the sofa of this invention in its closed position;

FIG. 2 is a similar view of the sofa, but showing the same in the open position ready for occupancy as a double bed;

FIG. 3 is a view in perspective similar to that of FIG. 2, but to an enlarged scale and with both mattresses still in position on the forward bed, portions of the mattresses and other elements of the sofa being broken away to show the framework of the sofa and its respective bed members;

FIG. 4 is a sectional view, to an enlarged scale, taken along the line 4—4 of FIG. 1 and showing, in dotted outline, the initial portion of the path taken by the upper bed member as the sofa is opened;

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 3;

FIG. 6 is a fragmentary top plan view of the rear, or underlying bed portion and the manner in which slides and a trackway therefor are affixed on the upper surface of such underlying bed portion to carry the other bed portion as the sofa is opened and closed;

FIG. 7 is a sectional view to an enlarged scale and somewhat broken away, taken along the line 7—7 of FIG. 5, this figure detailing the mounting of one of the aforesaid slides and its trackway and showing a portion of the cam means carried by the upper bed portion, by means of which the sofa is secured in the closed position and the forward portion of the upper bed is held in the raised position making for greater seating comfort;

FIG. 8 is an enlarged sectional view taken along the line 8—8 of FIG. 7 and showing a portion of the rear element of the slide, and the spring-impelled latch acting as a stop against further forward motion by said element;

FIG. 9 is an enlarged sectional view taken along the line 9—9 of FIG. 7 and detailing the mounting of said rear slide element;

FIG. 10 is an enlarged sectional view taken along the line 10—10 of FIG. 7 and showing the rear slide element telescoped within the forward slide element, together with the mounting of the hinge by which the upper bed portion is secured to said forward slide element;

FIG. 11 is a partial sectional view, also enlarged, taken along the line 11—11 of FIG. 7 and showing telescoped forward and rearward slide elements; and

FIG. 12 is a sectional view taken on line 12—12 of FIG. 7 and generally similar to that of FIG. 11, but showing the forward end of the rear slide element in a position acting to stop further outward motion by the enclosing, forward slide element.

Referring more in detail to the drawings, the sofa of this invention comprises a back portion 20, arms 21 and 21', pillows 22, upper and lower mattresses 23 and 24, respectively, rear legs 25 and a pair of forward legs shown generally at 26 in FIG. 1. The sofa has a bottom bed frame-like member indicated generally in FIG. 6 by the reference numeral 27, which bottom, when covered with mattress 23, serves as one of the beds as the sofa is opened. Said back 20 is formed of frame members 28, 29, 30, 31 and 32, while the arms are formed of frame members 33, 34, 35 and 36 secured to the back frame members as particularly shown in FIG. 3. The bottom bed frame-like member 27 is made up of a rear supporting rail 37 secured to back member 29, together with an opposed rail member 38 positioned near the front of the sofa and extending between the side member 34 of the respective arms, said member 38 having an adjoining frame member 39 secured thereto, the upper margin of member 39 being somewhat higher than that of rail 38. Rail members 37 and 38 are braced by members 40 and spanned by attached slats 41 which seat on said rail members and abut against the pieces 29 and 39.

Transversely mounted between the rails 37 and 38 are a pair of runners 42 and 43 each of which carries a trackway and, mounted thereon, an extensible slide of the telescoping type, thus defining a slide unit with said slides and trackway being generally indicated at 44 and 45 in FIG. 6, and serving to carry an upper bed frame-like member 64, to be described and disclosed in more detail hereinafter, as the sofa is opened and closed.

Referring more particularly to FIG. 7, which shows the slide trackway means 44, it will be observed that the same has a trackway comprising a base plate 46 secured to the underlying runner 42 and provided with guides 47 and 48 which receive the rear portion of an interior slide element 49 of the slide unit. Slide portion 49 has a limited forward and rearward motion as controlled by the latch 50 impelled upwardly by spring 51. The latch has a projecting head portion 52 which is received within the slide element 49 as the latter is moved rearwardly, while a projecting shoulder on said portion 52 (FIGS. 7 and 8) moves (as impelled by spring 51) into a slot 53 provided in the upper margin of said element as the latter moves forwardly and thus acts as a stop against further forward motion in the part of said element as the shoulder engages the rear margin of the slot 53. For-

ward motion of slide element 49 is stopped as the leading end of head 52 engages a crosspiece 54 in said element.

Mounted in telescoping engagement with the slide element 49 is an exterior slide element or forward slide portion 55 provided with inset ball bearings 56 which engage the outer surfaces of element 49. Forward motion of the portion 55 is stopped as pin 70 (FIG. 12) terminally carried by the element 49 engages the adjacent bearing mounting, while rearward motion of said portion is stopped as the frame structure carried thereon engages the back of the sofa, as indicated in FIG. 4. It will be appreciated that any similar type of slide can be employed.

Secured to the upper margin of each of the slide elements 55 adjacent its trailing edge is the lower wing of a hinge 57, the upper wing of which is secured to the lower, trailing margin of a rectangular panel 58 which forms the central body portion of the upper, sliding bed frame-like member 64 of the sofa. Such hinge connections are an important feature of the invention since they permit the bed to be tilted (FIG. 4) as the sofa is closed. The panel 58, which is relieved in its central portion to lighten the structure, carries a depending frame member 59 adjacent its lower forward margin, while its upper marginal surfaces are provided with a frame 60 across which are fitted the slats 61 used to resiliently support mattress 24.

Depending from panel 58 in a position behind the member 59 and running transversely of the panel, is a cam device which includes a pair of cam-shaped plates one of which is shown at 62 in FIGS. 5 and 7 and a cam follower, in the form of rollers 63. Plates 62 are mounted in a position of alignment with the rollers 63 which are secured on the upper marginal surface of frame piece 39. As the upper bed is closed, the trailing cam surfaces 65 engage the corresponding rollers and tilt the forward portion of the bed upwardly. The cam exerts its maximum lifting action just before the upper bed is fully closed, and as the closing motion is completed, the rollers engage the leading surfaces 66 of the cams, as indicated in FIG. 4. In this position the bed is not only tilted upwardly towards its front in the interests of greater seating comfort, but also the weight of the bed tends to lock the same against outward movement except as the operator raises the forward bed portion and pulls the bed outwardly. On opening the sofa, the cams pass the rollers, whereupon panel 58 and the bed elements supported thereon resume the flat position desired for sleeping.

This cam action, coupled with the corresponding tilting movement of the bed as permitted by hinges 57, forms a particularly significant feature of this invention. It will be appreciated that the same results could be obtained by reversing the parts, and having the cams on the sofa bottom, the rollers on the upper bed, the trackway and slide secured to either the bottom or upper bed, and the hinge fastened to the opposite bottom or upper bed from the trackway.

In order to provide a particularly pleasing leg structure, frame member 39 of the sofa bottom, in addition to its rear legs 25, is also provided with a pair of front legs 67 having outwardly extending feet or the portions which define recesses in the leg 67, as best shown in FIGS. 4 and 5. Legs 68, having a thickness corresponding to the length of the feet on legs 67, depend from the frame piece 59 of the upper bed, the length of the respective legs 67 and 68 being so proportioned that the legs 68 seat against legs 67 within the confines of the recesses and upon the feet or toe portions thereof as the sofa is fully closed. This feature greatly improves the eye appeal of the sofa since it gives the closed unit the appearance of having but two single front legs as indicated generally at 26 in FIG. 1. At the same time, the lower front margin of the sofa is left relatively unimpeded, thus facilitating the cleaning of underlying floor portions.

While reference has not been made herein to the fabric covering of the sofa, the same is shown in the drawings and is applied to the sofa frame in the conventional fashion, said fabric being backed by suitable panel members or other upholstery units, as required.

I claim:

1. In a sofa bed including a pair of frame-like members each having rear and front portions, apparatus for positioning one of said members in a first position wherein said one member is disposed in a first plane extending generally outwardly from the other member and defining therewith mattress supporting structure and a second position wherein said one member is retracted into overlying relationship relative to the other member and disposed in a second plane inclined from adjacent the rear portion thereof relative to the first plane to define a sofa seat supporting structure, said apparatus including a slide unit interposed between the members to enable the one member to be slidably movable between the first position and the second position, a hinge connection between the slide unit and the rear portion of the one member to enable the one member to be tilted between the first plane and the second plane, and a cam device interposed between the front portion of the one member and the front portion of the other member to tilt said one member from the first plane to the second plane when said one member is moved from the first position to the second position.

2. The sofa bed as set forth in claim 1 wherein said cam device includes a locking portion for maintaining said one member disposed in the inclined plane of the second position, said locking portion being disposed to normally restrain the one member against movement thereof from the second position to the first position.

3. The sofa bed as set forth in claim 1 wherein said cam device includes a cam follower and a camming plate, said camming plate being substantially V-shape in configuration and defined by forwardly and rearwardly extending inclined intersecting surfaces.

4. The sofa bed as set forth in claim 1 wherein said other member is provided with rear and front legs, said legs having recesses therein defined by forwardly projecting toe portions, and said one member is provided with front legs which rest on the toe portions within the recesses of the front legs of the other member when said one member is disposed in the second position.

5. The sofa bed as set forth in claim 1 wherein said slide unit includes an elongated interior slide element and an elongated exterior slide element interconnected for sliding movement relative to each other in directions generally forwardly and rearwardly relative to the frame-like members, one of said elements being mounted on said one member and the other slide element being mounted on the other member with the slide unit being disposed with one end portion adjacent to the rear and the other end portion thereof adjacent to the forward portions of said members.

6. The sofa bed as set forth in claim 5 wherein said other slide element of the slide unit is slidably mounted on said other member.

7. In a sofa bed having a stationary bed frame-like member and a movable bed frame-like member, each of said members including rear and front portions, apparatus for positioning said movable member in a first position in side-by-side relationship to the stationary member with the movable member being disposed in a first plane extending generally forwardly from the stationary member and defining therewith mattress supporting structure and a second position wherein said movable member is retracted into an overlying relationship relative to the stationary member with the movable member being disposed in a second plane inclined from adjacent the rear portion thereof relative to the first plane to define a sofa seat sup-

porting structure, said apparatus including an elongated slide unit having an interior slide element and an exterior slide element, said slide unit being interposed between the stationary member and the movable member with one end portion disposed adjacent the rear and the other end portion thereof disposed adjacent the front of the members, at least one of the slide elements being slidably movable rearwardly and forwardly relative to the stationary member to enable the movable member to be slidably movable between the first position and the second position, a hinge connection between the rear portion of the movable member and the one slide element to enable the movable member to be tilted between the first plane and the second plane, and a cam device including a cam follower and a camming surface interposed between the front portions of the stationary member and the movable member to tilt the movable member from the first plane

to the second plane when said one member is moved from the first position to the second position.

References Cited in the file of this patent

UNITED STATES PATENTS

755,089	Wersel	Mar. 22, 1904
1,381,172	Davis et al.	June 14, 1921
1,684,936	Allemeier	Sept. 18, 1928
2,000,471	Moore	May 7, 1935
2,019,218	Fox et al.	Oct. 29, 1935

FOREIGN PATENTS

127,255	Sweden	Jan. 24, 1950
842,244	Germany	June 26, 1952
1,117,573	France	Feb. 27, 1956