Sept. 1, 1942. W. N. McALLISTER 2,294,475

CONVERTIBLE SOFA BED

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Fig. 1

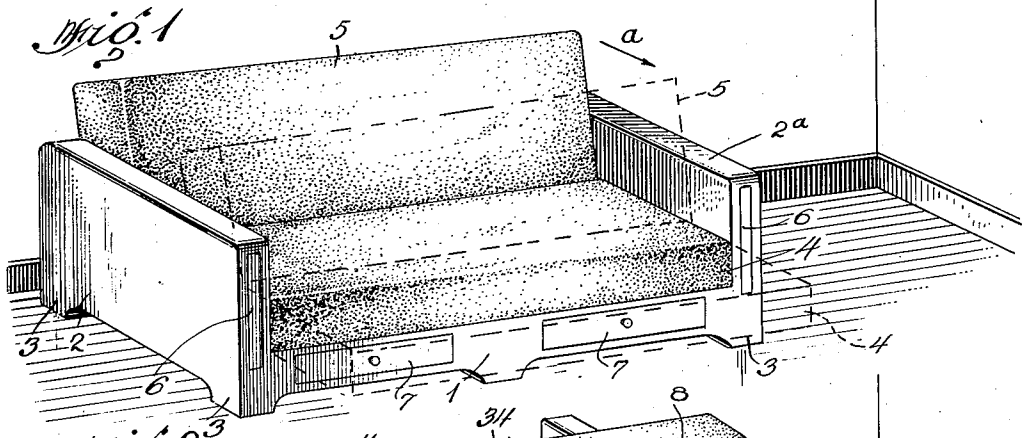


Fig. 2

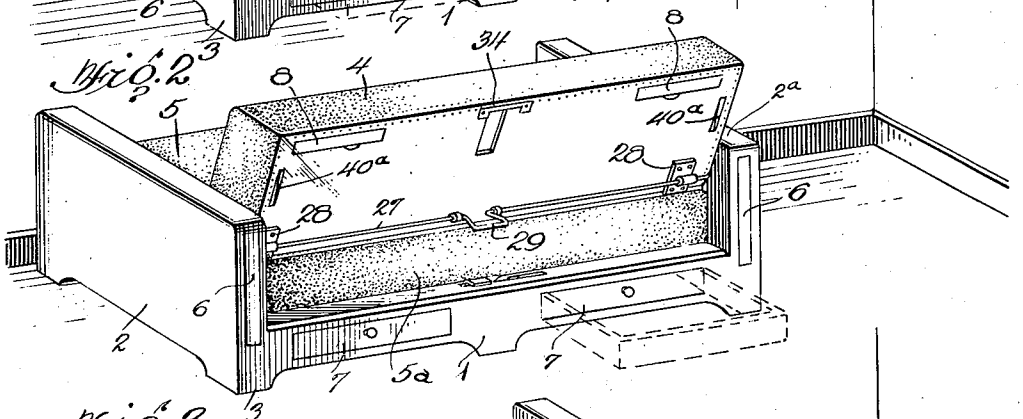
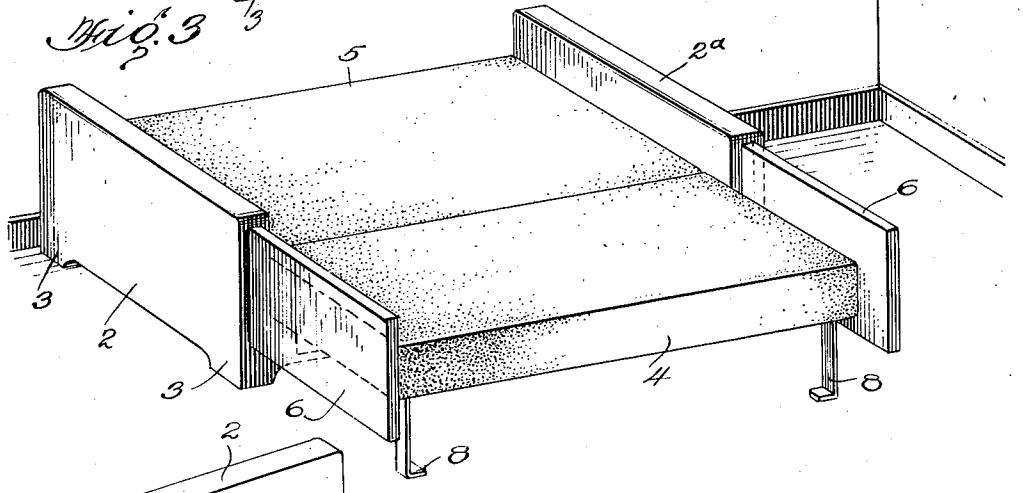


Fig. 3



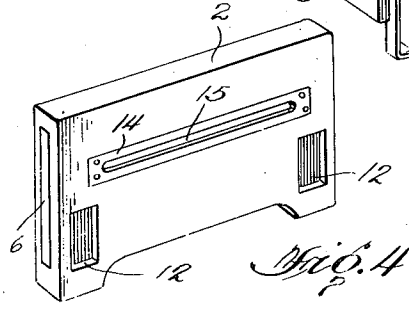


Fig. 4

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CONVERTIBLE SOFA BED

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Fig. 5

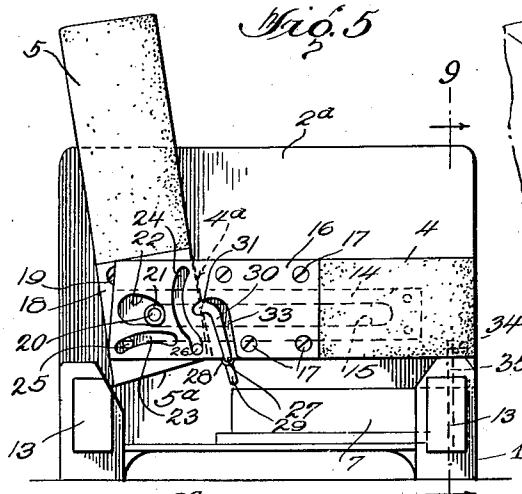


Fig. 7

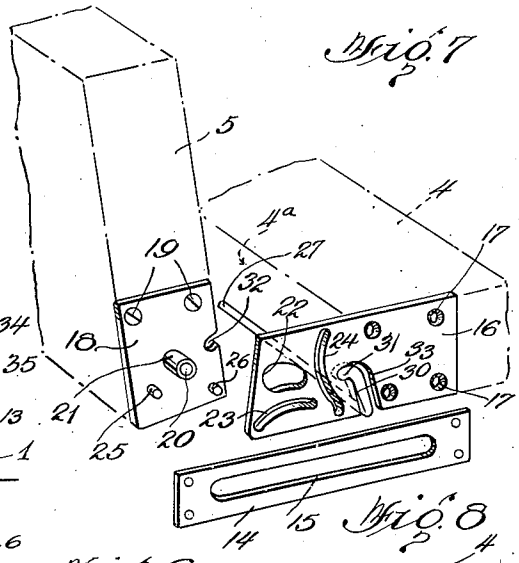


Fig. 6

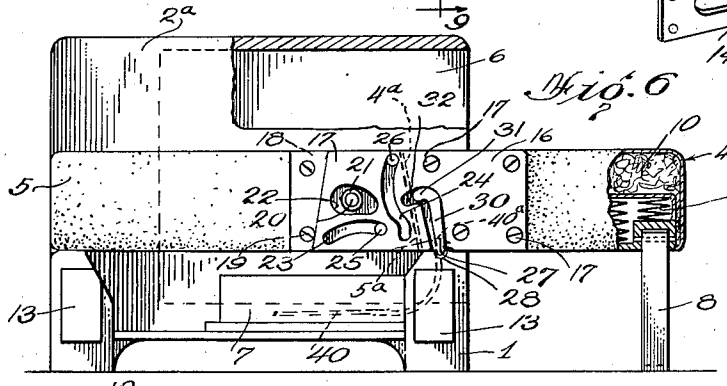


Fig. 8

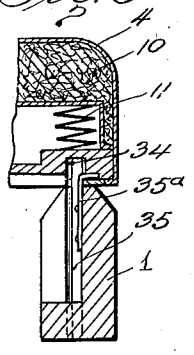


Fig. 9

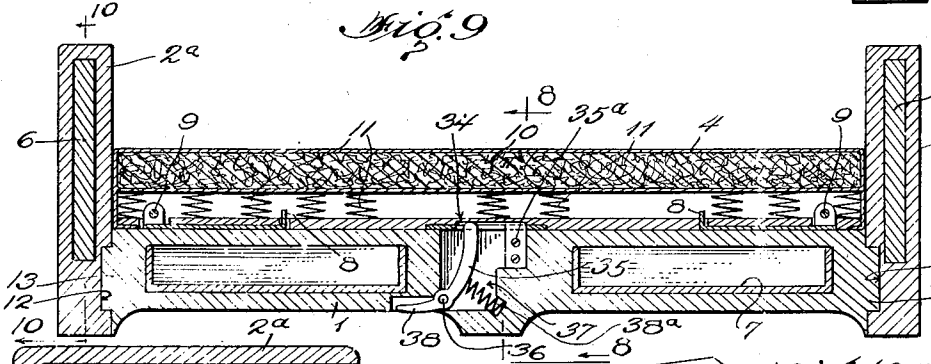


Fig. 10

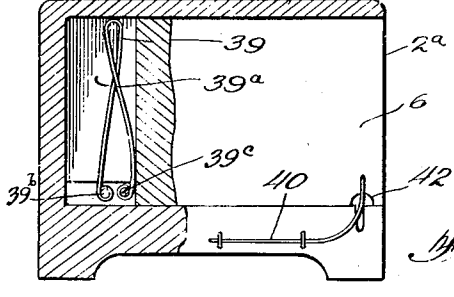
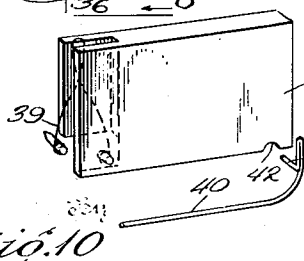


Fig. 10a



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UNITED STATES PATENT OFFICE

2,294,475

CONVERTIBLE SOFA BED

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Application April 14, 1939, Serial No. 267,852

6 Claims. (Cl. 5—47)

The invention relates to sofa beds and has for its objects to provide certain new and useful improvements in articles of furniture of this character.

An important object of the invention is to provide a device of the character described which may be converted from a sofa or divan into a double bed without the necessity for first moving the sofa away from the wall, and without the necessity of drawing any portion of the device forwardly or horizontally over the floor with consequent disadvantages such as scuffing of polished floors and rumpling of rugs.

A further object of the invention is to provide a device or article of furniture which may be converted from a sofa or divan into a bed with a minimum of effort, due to certain structural features of novel character, and which contribute to conversion from a sofa to a bed or vice versa with a minimum of friction.

A still further object of the invention is to provide a convertible sofa bed wherein provision is made for insuring against any tendency of the seat and back portions to come into abutting engagement when being moved from sofa position into bed position, or vice versa.

A still further object is to provide an article of furniture of this character wherein the back rest and seat portion are removably secured together in such manner as to be movable as a unit vertically and horizontally relative to the supporting frame or chassis, which latter is designed to remain in undisturbed position, for example against the wall, during the converting operation.

A further object of the invention is to provide means for removably securing the back portion in angular position relative to the seat portion when the device is employed as a sofa or divan, and also to removably lock or secure the seat portion to the supporting frame so as to prevent any undesired relative movement of the back and seat members as a unit relative to such supporting frame.

A further object of the invention is to provide in a device of this character normally concealed means for providing foot and head rests for a portion of the double bed when the article is designed to be employed for such use. The invention further contemplates provision for convenient storage of bed linen and the like without detracting from its normal attractive appearance as either a sofa or bed.

The invention further contemplates convenient adaptation of its principles of operation to an automobile seat, to the end that the interior of the automobile may be readily converted from its normal arrangement into an interior bed when desired.

With such objects in view as well as other useful advantages which may be incident to the improvements, the invention consists in the parts and combinations thereof hereinafter set forth and claimed with the understanding that the several necessary elements constituting the same may be varied in proportions and arrangements without departing from the nature and scope of the improvements.

In order to make the invention more clearly understood there are shown in the accompanying drawings means for carrying the invention into practical effect, without limiting the improvements in their useful operations to the particular construction which for the purpose of explanation, has been illustrated.

In said drawings:

Fig. 1 is a perspective view of the convertible sofa bed arranged to constitute a sofa or divan, said view illustrating in dotted lines an intermediate position of the back and seat members relative to the supporting frame.

Fig. 2 is a similar view illustrating the back and seat members in a further intermediate position preparatory to converting the sofa into a bed.

Fig. 3 is a similar view illustrating the parts fully converted into and arranged to constitute a bed.

Fig. 4 is a detail perspective view of one of the companion end members of the frame looking toward the inner face or wall thereof.

Fig. 5 is a vertical transverse sectional view through the back and seat members adjacent one end thereof and looking toward one of the end wall members of the divan or sofa.

Fig. 6 is a similar view with the back and seat members arranged to constitute a bed.

Fig. 7 is a detail perspective view illustrating in disassembled or exploded position certain of the parts illustrated in Fig. 5.

Fig. 8 is an enlarged detail vertical section on line 8—8 of Fig. 9, illustrating the manner of removably locking the seat member to the frame when the device is arranged to constitute a sofa.

Fig. 9 is a longitudinal vertical sectional view on line 9—9 of Fig. 5.

Fig. 10 is a transverse sectional view on line 10—10 of Fig. 9.

Fig. 10a is a detail perspective view of one of

the spring pressed and spring locked panel members illustrated in section in Fig. 10.

Referring to the drawings and with particular reference to Figs. 1 to 10*a* inclusive, the sofa bed comprises a frame or chassis including a horizontal base portion 1, companion end wall members 2, 2*a* including supporting legs 3. The assembly further includes a seat member 4 and a back member 5 secured together for angular movement relative to each other by means to be described. Each end wall member 2, 2*a* preferably includes a normally substantially concealed panel member 6 arranged to be projected therefrom forwardly of the frame when the sofa is converted into a bed, as best seen in Fig. 3, said panel members cooperating with the seat portion 4 to constitute a head and foot portion for the forward part of the bed. The base portion 1 of the frame is preferably provided with one or more sliding drawers 7 for the convenient reception and storage therein of bed linen or the like.

The seat portion 4 is suitably recessed at opposite ends of its lower surface and forwardly thereof for the reception of companion leg members indicated at 8 and which are pivotally mounted at opposite ends thereof as at 9 (Fig. 9) to the seat portion and arranged to be swung into vertical position to constitute supporting legs for the seat member when the same is converted into part of a bed, as best seen in Fig. 3. The seat member 4 is provided with the usual upholstery indicated at 10 and supported by a series of coil springs 11 conventionally illustrated in Fig. 9, and it will be understood that the back member 5 is similarly upholstered.

Each end wall member 2, 2*a* is suitably recessed or mortised, as indicated at 12 in Figs. 4 and 9, for the reception of projections or tenons 13 (Fig. 9) of the base portion 1 of the frame to provide for secure assembly of these parts together. Each end wall member 2, 2*a* is further recessed to receive an elongated metal plate 14, cut away as at 15 to provide a substantially horizontal elongated track in said wall members.

As best seen in Figs. 5 to 7, the seat member 4 which includes an inclined rear wall portion or face 4*a* is provided at its opposite ends and has secured thereto metal plate members 16 which project rearwardly of said seat portion and are secured thereto by suitable fastening means having engagement with suitable apertures indicated at 17 to secure the plates to the seat member. Similarly the back member 5 is suitably cut away at its opposite ends and at the lower portion thereof, as best seen in Fig. 7, for the reception of a metal plate 18, one of which is secured to each end of the back member by suitable fastening means generally indicated at 19. Said metal plates 18 at opposite ends of the back member 5 each include a projecting stud or trunnion 20 on which a roller 21 is journaled, said rollers when the parts are assembled being housed within the elongated slots 15 of the inner walls of the plates 14 secured to the end members 2, 2*a*.

When thus assembled the trunnions and rollers project through an enlarged elongated aperture 22 provided in the rearwardly projecting portion of each metal plate 16 rigidly secured to the seat member 4 (Fig. 5). In this manner the back and seat members 4, 5 are secured or connected together with what may be termed a floating hinge connection for relative angular or swinging movement, but said members also may be moved as a unit in respect to the end wall members 2, 2*a* of the sofa bed as the rollers 21 travel on the elongated horizontal tracks 15.

Provision is made to insure clearance between the end wall 4*a* of the seat member 4 and the bottom wall 5*a* of the back member 5 when said members are swung relative to one another to convert the sofa into a bed and vice versa. For this purpose the rearwardly projecting portion of each plate 16 of the seat member 4 is provided with a pair of angularly disposed spaced slots or grooves 23, 24 for the reception respectively of a pair of studs or pins 25, 26 projecting from and rigidly secured to each of the plates 18 secured to opposite ends of the back member 5. As best seen in Figs. 5, 6 and 7 the slots or grooves 23, 24 in the plate 16 are disposed substantially at right angles to one another and each slot is of arcuate or convex configuration with the arch extending toward the included substantial right angle defined by the slots. This insures sufficient clearance and absence of binding or abutting engagement between the seat and back members when the same are relatively moved to be converted from a sofa into a bed and vice versa.

The back member 5 is normally locked against swinging movement relative to the seat 4 when the parts are arranged to constitute a sofa, by means of a horizontally disposed rod or bar 27 (Figs. 2, 5, 6 and 7) journaled adjacent its opposite ends in suitable bearing members 28 secured to the bottom wall of the seat member. Said rod or rock shaft 27 includes an intermediate handle portion 29 and opposite angularly disposed extensions 30 terminating in rearwardly extending projections or lugs 31 normally engaging a notch or recess 32 provided in the forward edge of each plate member 18 secured at opposite ends of the back member 5. The plate 16 of the seat member 4 is suitably cut away as at 33 (Figs. 5 and 7) to provide clearance to permit a certain amount of swinging movement of the angularly disposed portions 30 and 31 of the horizontally disposed rock shaft, bar or rod 27 when the latter is rocked, oscillated or partially rotated in its bearings 28 by manipulation of the handle portion 29. When the projections 31 of the bar are in engagement with the recesses 32 of the back member, said back and members are held against relative swinging or angular movement, Fig. 5. Pressure on handle 29 of the bar, rocks the same in its bearings to remove the projections 31 thereof from engagement with said recesses 32 when it is desired to convert the sofa into a bed (Fig. 6). This locking arrangement prevents the back member 5 from swinging rearwardly relative to the seat member when the device is being occupied as a sofa or divan.

A bracket member 35*a* (Figs. 8 and 9) is secured to the frame and includes a portion adapted to project into the seat member 4 as an additional locking means to prevent rearward movement of the seat and back relative to the frame after the latter have assumed their rearmost position.

Means are provided to normally maintain the back and seat members from movement as a unit in the tracks 15 relative to the supporting frame including the base portion 1 and end members 2, 2*a*. For this purpose the forward portion of the seat member 4 is cut away or recessed on its under surface as indicated at 34 (Fig. 9). Said recess preferably constitutes an integral part of a separate metal plate suitably secured to the described portion of the seat member. The recess 34 is designed to receive one end of a latch

member or lever 35 (Fig. 9) pivotally mounted at 36 within a suitably recessed portion 37 of the base portion 1, said lever having a projecting extension 38 by which the same may be manually engaged and rocked on its pivot. When the parts are in the position illustrated in Fig. 9, the seat portion and the back member 5 pivotally secured thereto, are held as a unit against horizontal movement relative to the supporting frame, the pivoted lever 35 being maintained in engagement within the recess 34 by means of a spring 38a. In this locked position it will be noted that the rollers 21 are at the extreme rear end of elongated track 15 of the metal plate members 14 carried by the opposite end wall members 2, 2a of the device. When it is desired to move the seat and back members as a unit relative to the end wall members and the frame, the lever 35 is swung on its pivot 36 to disengage the lever from the recess 34 of the seat member. The seat member may then be moved forwardly with the back member as a unit with comparatively little effort, due to the non-friction engagement of the rollers 21 with the track 15, for example when the sofa is being converted into a bed. This forward unitary movement of the back and seat members relative to the frame is in the direction of the arrow a in Fig. 1, and such forward position of said members is illustrated in dotted lines in this figure.

Referring to Fig. 10, it will be noted that each panel portion 6 normally housed within the respective companion end wall members 2, 2a is normally urged outwardly relative to said wall members by means of a suitable spring 39 maintained under tension in the recess 39a in which the panel members are housed and at the rear portion thereof so as to exert tension against the inner end walls of said panel members. One end of the spring member 39 is secured at 39b to the wall member 2a while the opposite end of said spring member is secured at 39c to a suitable portion of the panel member 6. Said members are maintained in concealed position in the end walls 2, 2a by means of a spring 40 carried on the inner side of the end wall member, the outer end of said spring being suitably offset as indicated at 41, Fig. 10a, and projecting into a recess 42 in the panel member to hold the same in concealed position. When the seat and back members are moved forwardly as a unit due to the engagement of rollers 21 with the tracks 15, a suitably recessed portion 40a (Fig. 2) of the seat member engages the upstanding forward end of the spring 40 and depresses the same slightly to remove the projecting portion 41 from the recess 42 of the panel. The stored tension of spring 39 acts to project the panels forwardly without manual attention when this clearance is effected at 41, 42 and the panel members are exposed in projecting position as seen in Fig. 3.

In converting the sofa into a bed, it is not necessary to move its supporting frame away from the wall or disturb the position of the supporting frame, as will be noted from a comparison of Figs. 1 to 3 inclusive. The latch member 35 is disengaged from the seat portion and the latter is pulled forwardly with the back member 5 as a unit and with very little effort, due to the non-friction engagement of the rollers 21 traveling on the tracks 15. When the rollers are in the forward ends of the tracks 15 or substantially in the position illustrated in dotted lines in Fig. 1, the seat is lifted and the back lowered as a unit therewith until the latter is in substantially horizontal position as illustrated in Figs. 2 and 3. When in the position illustrated in Fig. 2, the leg members 8 are swung outwardly on their pivots 9 relative to the seat portion and the lever 27 is rocked in its bearings to disengage the projections 31, carried by the seat member from the recesses or notches 32 of the back member. The seat portion is then lowered relative to the back until the leg members engage the floor. At this time the panel portions 6 have been automatically projected by spring pressure from the end wall members 2, 2a and the device has been converted into a double bed ready for use (Fig. 3). It will be noted that the described operations may be carried out with little effort and without disturbing the position of the supporting frame including the base portion 1 and end wall members 2, 2a. Furthermore, it will be noted that the seat portion is moved forwardly relative to the frame and lowered, after being first elevated to lower the back member, without any scuffing of the floor or disturbing or rumpling of any carpet or rug.

After release of the latches 31 of rod 27 and during the movement of the seat member from angular to horizontal position, the described pin and slot connections 23 to 26 insure clearance between the bottom wall 5a of the back member and the rear wall 4a of the seat member without permitting these parts to come into abutting or binding engagement. The pin members 25, 26 of the back member ride in the curved or arcuate slots 23, 24 of the seat member in such manner as to maintain the adjacent walls of the back and seat members out of contact with each other and direct the movement in predetermined lines so as to avoid any contact. This provision for clearance is determined by the position and configuration of the companion slots 23 and 24, as well as to the predetermined location of the projecting pins 25 and 26 of the back member. During this swinging movement from angular to horizontal position the pin 25 of the back member moves from the left hand portion of its slot 23 to the right hand or forward end of such slot, while the companion pin or lug 26 moves from the lowermost postion in its irregularly curved slot 24 into uppermost position in said slot, as will be observed from a comparison of Figs. 5 and 6. This predetermined movement of the pins in the slots to insure proper conversion of the sofa into a bed without undue abutting or binding engagement of said members, constitutes an essential feature of the instant improvements. In the absence of such provision difficulty might be experienced in swinging the seat and back members relative to each other without binding or without providing an increased or excessive space between these elements when the horizontal position has been obtained. During this swinging movement the rollers 21 remain in engagement with the forward end of the tracks 15 and the elongated and substantially oval configuration of the recess 22 in the seat member plate 16 provides clearance for said rollers without binding (compare Figs. 5 and 6), as the plate member 16 swings relative to said rollers while being guided in a predetermined irregular path by the engagement of pins 25, 26 with slots 23, 24.

In re-converting the bed into a sofa, the reverse procedure is followed, seat portion 4 being first elevated relative to the back member which remains in horizontal position, from the position illustrated in Fig. 3 to that shown in Fig. 2.

Latch members 31 are then in position to be engaged with recesses 32 of the back member by rocking movement of rod 27 in the opposite direction to lock the seat and back portions in angular position with respect to one another. Downward pressure on the seat member places it in horizontal position as the back is lifted as a unit therewith into the position shown in dotted lines in Fig. 1. The seat and back may thereafter be moved as a unit with a minimum of effort rearwardly in respect to the frame, due to the anti-friction engagement of rollers 21 with tracks 15 as the former travel from forward position in said tracks into rearmost position. The device is now in readiness to be employed as a sofa or divan as shown in Fig. 1. When in this position, latch 35 is reengaged with recess 34 to lock the seat and back members from further movement forwardly or rearwardly relative to the frame. The engagement of the rollers 21 with the rearmost portion of the elongated tracks 15 in plates 14 also serves as a stop to prevent further rearward movement of the seat and back relative to the frame. The panel members 6 are then pushed into their respective recesses in the end wall members 2, 2a and are automatically maintained therein by the re-engagement of the outer end 41 of spring 40 with recesses 42 in the panel members when the innermost position of the latter has been obtained.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention as claimed or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

What is claimed is:

1. In a convertible sofa bed, the combination of a frame, complementary track sections at opposite ends of said frame, a seat member and a back member pivotally connected together for relative movement, a single trunnion at each end of said back member projecting through adjacent portions of said seat member and engaging said track sections to provide for unitary movement of said seat and back members relative to said frame, one of said members having a pair of pin members at each end thereof cooperating with a pair of arcuate slots in the opposite ends of the other of said members, said slots being disposed at substantially right angles to each other, to insure endwise movement between said members so as to provide clearance therebetween when said seat member is moved from an angular position to a horizontal position relative to said back member, and locking means carried by one of said members cooperating with the other of said members to normally maintain said back member in an angular position relative to said seat member.

2. In a convertible sofa bed, the combination of a supporting frame including opposite end wall members, a back member and a seat member connected together for relative movement and movable as a unit relative to said frame, a sliding panel member normally concealed within one of said end wall members when said back and seat members are positioned to constitute a sofa, means in said end wall member tending to project said panel member therefrom into exposed position, means for holding said panel member in concealed position against the action of said projecting means, said holding means being engageable by one of said seat and back members when the latter are moved into position to serve as a bed to release said panel member and permit the same to be projected outwardly from said end wall member to constitute an end rest for said bed.

3. In a convertible sofa bed, the combination of a supporting frame, a back member and a seat member having a floating hinge connection for a relative angular movement, one of said members having an outwardly projecting roller at each end thereof, the other of said members having enlarged apertures at its opposite ends through which said rollers extend, said frame having elongated recesses at its opposite ends providing horizontal trackways in which said rollers are respectively housed to provide for unitary horizontal movement of said back and seat members relative to said supporting frame, the angular hinge connection between said back and seat members comprising a pair of pins and a pair of slots respectively engaging said pins at opposite ends of said members respectively, said slots each being of curved configuration and convexly arched towards one another to guide said pins in a predetermined path of travel, whereby to prevent abutting engagement of and to insure clearance between said members when one member is moved from angular to horizontal position relative to the other of said members, and locking means for retaining said back and seat members in angularly disposed position to constitute a seat.

4. In a convertible sofa bed, the combination of a supporting frame, a back member and a seat member having a floating hinge connection for a relative angular movement, said back member having an outwardly projecting trunnion and a roller journaled thereon at each end thereof, said seat member having elongated enlarged apertures at its opposite ends through which said trunnions and rollers extend, said frame having elongated recesses at its opposite ends providing horizontal trackways in which said rollers are respectively housed, to provide for unitary horizontal movement of said back and seat members relative to said supporting frame without disturbing their angular position, the angular connection between said back and seat members comprising a pair of pins at each end of said back member respectively engageable within a pair of angularly disposed slots at opposite ends of said seat member, said slots each being of curved configuration and convexly arched towards one another to guide said pins in a predetermined path of travel, whereby to prevent abutting engagement of and to insure clearance between said members when said seat member is moved from angular to horizontal position relative to said back member and vice versa, and releasable locking means for normally holding said back member in angular position relative to said seat member to constitute a sofa or davenport.

5. In a convertible sofa bed the combination of a supporting frame, complementary track sections at opposite ends of said frame, a back member and a seat member connected thereto for relative movement and movable as a unit relative to said frame, a single trunnion at each end of one of said members projecting through the other of said members and engaging a said track section to obtain said unitary movement relative

to the frame, one of said members having a pair of pin members at each end thereof respectively engaging a pair of arcuate slots in the opposite ends of the other of said members, said slots being disposed at substantially right angles to and arched inwardly towards one another to guide their respective pin members in a predetermined path of travel so as to insure clearance and relative bodily movement between said back and seat members when the seat is moved from angular to horizontal position, thereby preventing binding and abutting engagement of said members during the aforesaid movement, and locking means for normally retaining said back and seat members in angular position to constitute a sofa.

6. In a convertible seat and bed, the combination of a frame support having trackways at opposite ends thereof, a seat member and a back member hingedly connected together for relative angular movement by means of cooperating pairs of hinge plates secured to opposite ends of said members, one of said hinge plates at each end of the structure having means engaging a said trackway for unitary movement of said members relative to said frame support, the hinge plate connection between said back and seat members at each end comprising a pair of pin elements on one of said plates and a pair of slots on the other of said plates, said slots being disposed at substantially right angles to one another with at least one of said slots arched inwardly towards the other, said slots serving to guide said pin elements in a predetermined path of travel so as to insure relative transverse bodily movement and clearance between said back and seat members when one of said members is moved from angular to horizontal position relative to the other of said members to constitute a bed, and locking means carried by one of said members for normally retaining both of said members in angular position relative to one another so as to constitute a seat.

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