

June 29, 1965

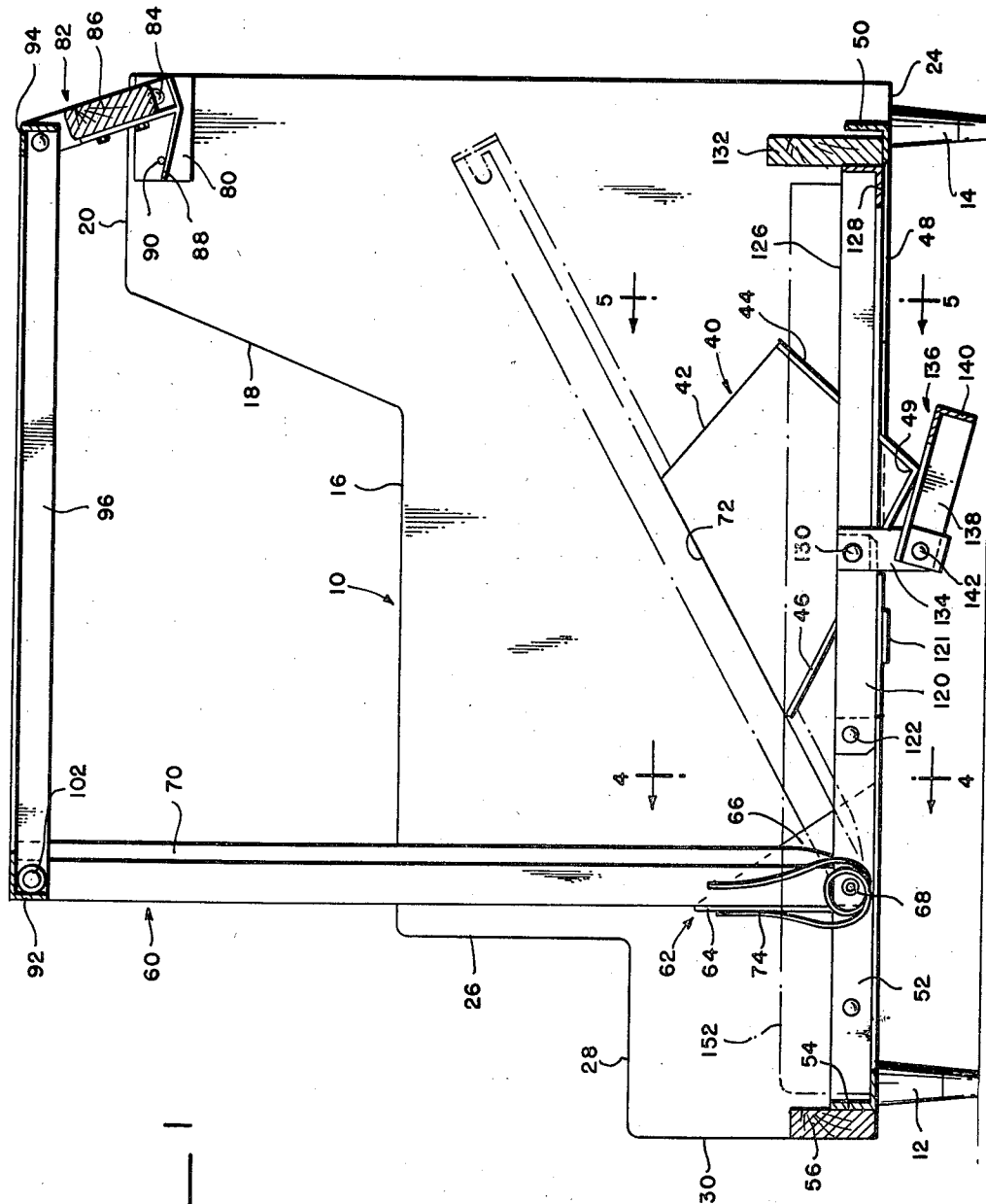
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3,191,194

SOFA-BUNK BED

Filed Aug. 27, 1962

4 Sheets-Sheet 1



FIG—1

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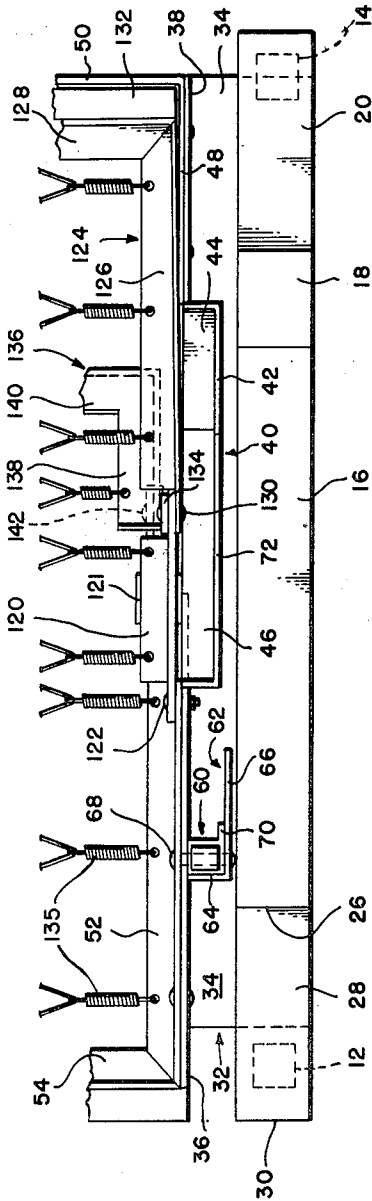


FIG. 2

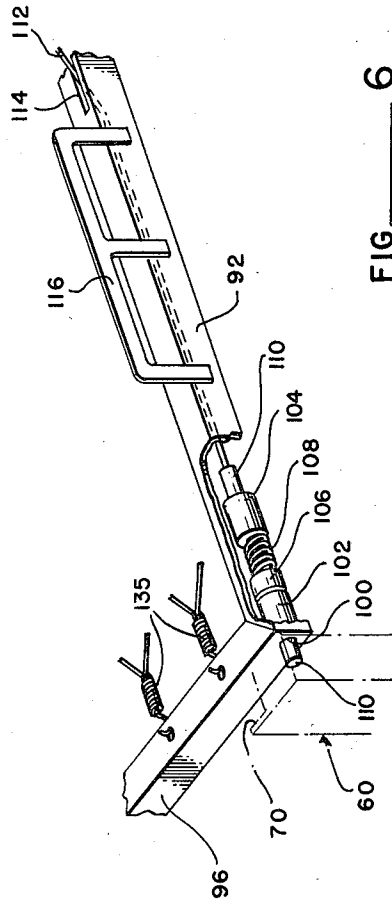


FIG. 6

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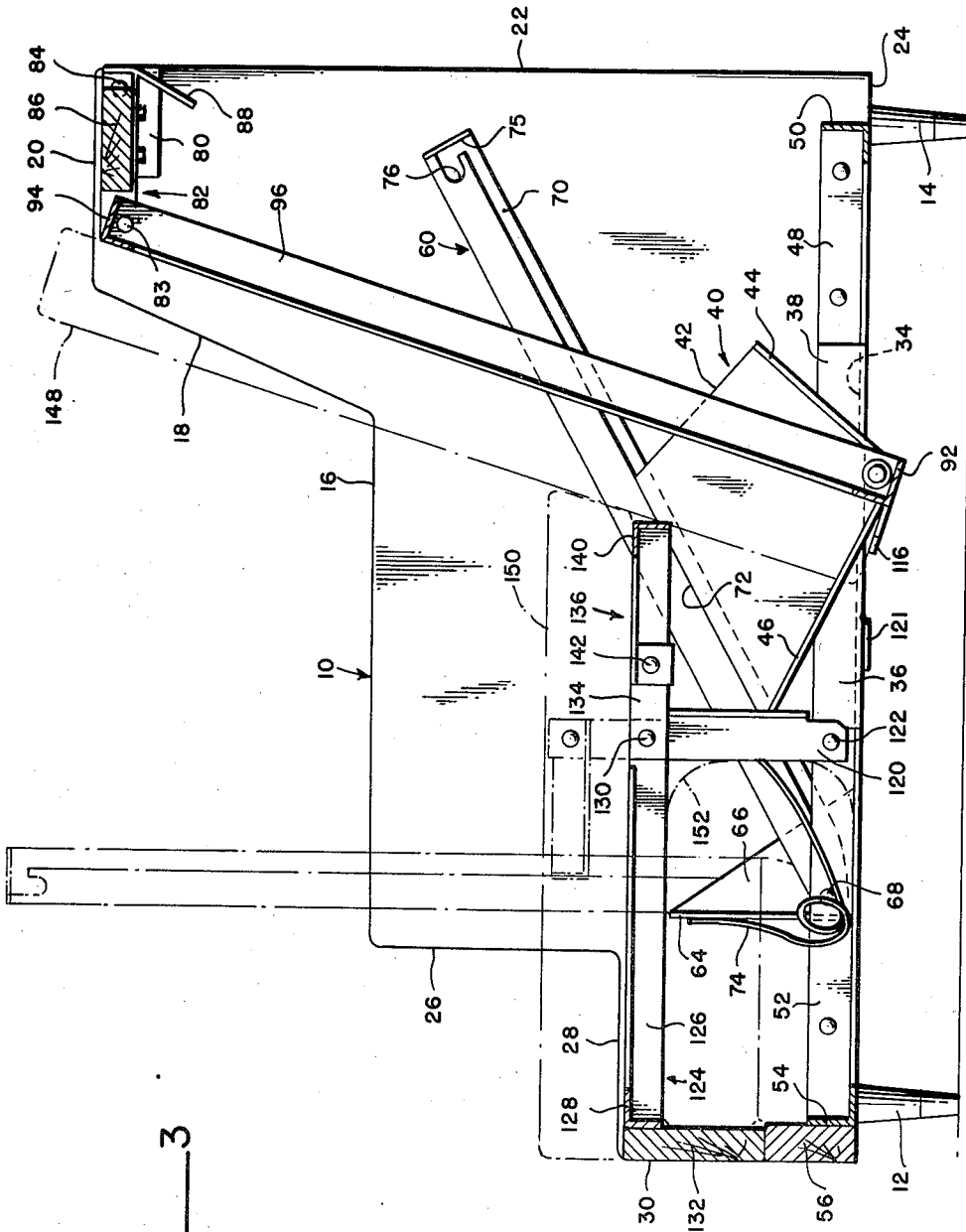


FIG. 3

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FIG. 4

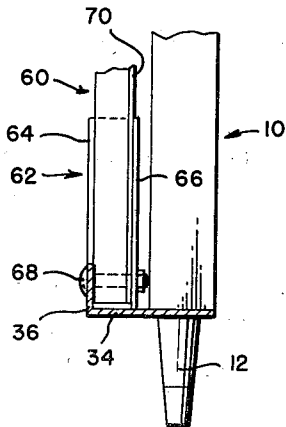


FIG. 5

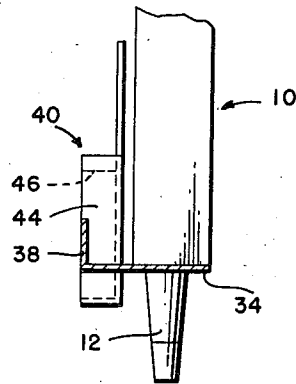


FIG. 7

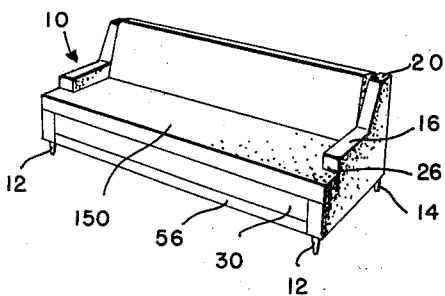
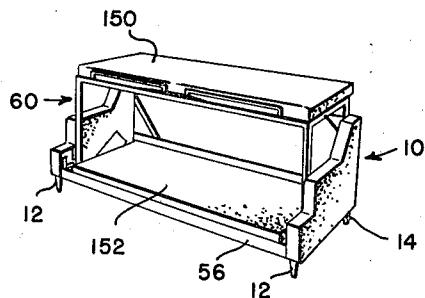


FIG. 8



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Filed Aug. 27, 1962, Ser. No. 219,523

19 Claims. (Cl. 5—9)

This invention relates to a new and useful concept in a convertible sofa and bunk bed and more particularly to a combination sofa, which answers to the dimensional standards of the well-known type hide-a-beds, sofas, and bunk beds which permit sleeping capacity for two persons without any increase in floor space occupied by the invention as a sofa.

The furniture industry in recent years has found a marked popularity in and demand for convertible sofas and beds, best typified in the well-known hide-a-beds and roll-away beds. Those convertible structures which are known today require that when the sofa is expanded into a bed it roughly doubles the floor space required. Attempts have been made to design sofas which would expand into bunks and yet at the same time occupy no more space than they do as sofas. The attempts to solve this problem have been unsuccessful, largely because the complexity of hither-to-known convertible sofa-bunk beds has simply made them impractical from a production and cost standpoint. The problem has been further aggravated by the necessity for designing the sofa within certain acceptable dimensional limitations regarded by the industry as mandatory. To observe the required dimensions for a sofa and yet to engineer it so that the bunk into which it converts is also of acceptable design has been a major obstacle.

Overcoming of the above problems in this invention is accomplished, briefly, by the combination of an angled upper arm joint for the top bunk, together with supporting arms for the top bunk which are swung into position automatically. A dual purpose base unit includes a folding type frame which wraps around the bottom mattress when the invention is in its sofa position. The base unit frame and spring mechanism also folds out of the way so that the back of the sofa can be lifted into the top bunk position. At the same time that the base unit is wrapped around the bottom mattress it provides a supporting assembly for the sofa cushions. In its bunk position, of course, the base unit becomes a flat frame and spring support for the bottom mattress.

Accordingly, it is an object of this invention to provide a convertible sofa and bunk bed which eliminates the necessity of expanding the sofa to occupy additional floor space.

Another object of this invention is to provide a sofa and bunk bed which is extremely simple in design and economical to produce.

Still another object of this invention is to supply a convertible sofa and bunk bed which permits the mattress of the lower bunk to be folded up under the seat when in the sofa position.

Still another object of this invention is to furnish a convertible sofa and bunk bed which as a sofa is within the dimensions, specifications and limitations required for successful merchandising.

Yet another object of this invention is to provide a convertible sofa and bunk bed strong enough to permit a heavy adult to sleep comfortably on the upper bunk.

A further object of this invention is to supply a convertible sofa and bunk bed having a minimum number of moving parts and which because of its unique design eliminates side sway of the upper bunk.

An even further object of this invention is to furnish a convertible sofa and bunk bed giving adequate distance between the lower and upper bunks so as to insure comfortable sleeping in the lower bunk.

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These, together with other objects and advantages which will become subsequently apparent, reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings, forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational and cross section view of the inside of the sofa bunk arms showing the arrangement of parts with the sofa converted into its bunk bed position;

FIGURE 2 is a partial top plan view of the structure shown in FIGURE 1;

FIGURE 3 is a side elevational view in section of the inside of the sofa arms showing the arrangement of parts when the sofa is in its sofa position;

FIGURE 4 is a diagrammatic partial section view taken along the line 4—4 of FIGURE 1 indicating the relationship of the swing arm to its brace and the sofa arm structure;

FIGURE 5 is a diagrammatic view in section taken along the line 5—5 of FIGURE 1 to show the arrangement of the striker plate with respect to the sofa arm structure;

FIGURE 6 is a partial perspective view, some of which is in cutaway to show the spring-actuated pin mechanism which engages the swing arms to hold the top bunk in position; and

FIGURES 7 and 8 are perspective views showing the invention in its sofa and bunk bed positions, respectively.

The sofa in conventional fashion is provided with two similar arms 10, only one of which is shown in the drawings for sake of simplicity of illustration. The arm structures 10 stand approximately 29¾ inches high and measure from front to back in the extreme dimension at approximately 32¾ inches. Each arm structure 10 has front leg 12 and rear leg 14 and a standard profile. An arm rest surface 16 joins to an upwardly and backwardly sloping back surface 18 and top surface 20. The arm structure 10 has a back surface 22, which is generally vertical, and a bottom surface 24, which is generally parallel to the floor. A notch in the forward top corner of the arm structure 10 is formed by vertical surface 26 and horizontal surface 28. The extreme front edge or surface 30 completes the configuration of the arm structure.

The bottom surface 24 of arm structure 10 has securely attached thereto a frame plate generally designated by the number 32. Frame plate 32 extends under the full width of arm 10 and substantially the full length and also extends inwardly away from the inside surface of arm 10 for perhaps two-thirds as much as arm structure 10 is wide. The horizontal flat section 34 of plate 32 has at the inner edge thereof the upstanding forward flange portion 36 and rear upstanding flange portion 38. The flat horizontal portion 34 of plate 32 is approximately 4 inches wide, while the flange portions 36 and 38 are about an inch and a half high. The overall length of frame plate 32 is about 31½ inches.

An irregularly shaped flat striker plate is permanently attached to frame plate 32 as by welding, in a position slightly closer to the rear end of the frame plate than to the front end. Striker plate 40, having four sides, has its two lower sides provided with flanges. Hence, viewing the plate as seen in FIGURES 1 and 3, upper rear side 42 is at approximately a 45° angle, either to the vertical or to the horizontal, and is joined by a 90° angle to lower rear flange side 44. Upper rear side 42 is approximately 5½ inches long.

Lower rear flange side 44 joins the lower front flange side 46 of the striker plate at an angle slightly greater than 90°. It will be seen, particularly with reference to

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FIGURES 1, 3 and 5, that lower front and rear flange sides 44 and 46 join each other at a point approximately $1\frac{1}{8}$ inches below the horizontal surface 34 of frame plate 32 to form a wide V-shaped guide and support channel. Striker plate 40 is joined, as by welding to frame plate 32 in such a manner that the lower flange sides 44 and 46 extend away from arm 10. Upstanding flange 36 of frame plate 32 is joined along the edge of lower flange side 46 and upstanding flange 38 of frame plate 32 is joined along the edge of rear lower flange side 44. Side 44 is slightly in excess of 6 inches long and side 46 is approximately 9 inches long. The V-shaped connection formed by sides 44 and 46 of striker plate 40 is approximately $21\frac{7}{16}$ inches from the front end of said frame plate 32 and the channel formed by flange sides 44 and 46 is about $1\frac{1}{8}$ inches wide.

The two arms are interconnected between the frame plates by connecting frame structure which will now be described. A wide U-shaped angle frame member connects the rear of the arms 10 by virtue of side pieces 48 which are securely attached to the rear upright flange member 38 of frame plate 32 by bolts, rivets, or welding or the like. Extending between the side pieces 48 is the rear connecting frame piece 50. The frame connection between the arms is made rigid at the front thereof by a similar U-shaped angle frame member attached to the forward upright flange 36 in the same manner in which the rear frame connection is made. Front side pieces 52 are attached to flange 36 and interconnected by front frame piece 54. It will be noted by reference particularly to FIGURE 3 that the free ends of the side pieces 48 and 52 of the two U-shaped connecting frame members are spaced from each other by the length of the area generally occupied by striker plate 40. The rigid structure just described, i.e., side members 48 and 52 and longitudinal members 50 and 54 describe a generally horizontally disposed rectangular frame between the two arm structures 10. The forward longitudinal frame member 54 is covered by a wooden frame member 56 which is properly upholstered and which extends above said frame member 54. The wooden frame piece 56 is about twice as high as the metal frame member 54.

Each arm structure 10 of the sofa is provided with a swing arm generally designated by the number 60. Each frame plate 32 has an angled support brace 62 rigidly secured thereto $6\frac{7}{16}$ inches from the front end of the arm structure or approximately half way between the free end of the front side frame piece 52 and its junction with longitudinal frame member 54. The support brace 62 has the generally vertical or upstanding forward portion 64 connected as by welding to upstanding flange 36 and surface 34 and the triangular side support portion 66 in turn welded securely to the horizontal surface 34 of frame plate 32. It will be noted that the upstanding forward portion 64 is just inside or rearward of the notch surface 26 on the arm structure 10. The support brace 62 is the means by which a pivot structure is provided for swing arm 60 and which at the same time acts as a stop against side and forward motion. The support brace 62 is approximately 6 inches high, approximately $1\frac{1}{16}$ inches across the front portion 64 and about 4 inches wide across side portion 66 along its bottom edge where it is connected to plate 34.

The front surface of support brace 62 as presented by front portion 64 is approximately $6\frac{7}{16}$ inches from the front end of the forward upstanding flange 36. As can be seen by reference to FIGURE 2, enough space is provided between the inside surface of arm structure 10 and the upstanding flanges 36 and 38 to accommodate the support brace 62 and swing arm 60 so that said swing arm can pivot unobstructively within its designated area.

Swing arm 60 is basically a $1\frac{1}{4}$ by $1\frac{1}{4}$ inch aluminum square tube. Swing arm 60 is pivotally mounted within the mounting structure defined by upstanding flange 36 and support brace 62 by reason of a pivot shaft assembly

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68 which as can be seen in FIGURE 2 extends entirely through swing arm 60, side portion 66, upstanding flange 36 and front side frame member 52. The pivot shaft 68 is located so that when swing arm 60 is in its up position its front side is braced against the front portion 64 of the support brace 62. As shown by FIGURE 4 only enough distance is provided between upstanding flange 36 and side portion 66 of the support brace to permit arm 60 to swing without binding. Each of the arms 60 on the outside edge of the rear surface are provided with a $\frac{1}{2}$ inch ledge 70 which extends over substantially the entire length of the swing arm. FIGURE 2 indicates that with ledge 70 situated as just described it will not be intercepted by striker plate 40 since said plate 40 and swing arm 60 are aligned to contact each other and so as to permit ledge 70 to clear contact with said plate 40. The upper forward edge of striker plate 40 is cut so that when the swing arm 60 is in its down position it rests flush on the edge 72 of said striker plate. Each swing arm 60 is provided with a spring means 74, in this instance shown to be a large type hairpin spring, with one end connected to the front portion 64 of the support brace 62 and the other end of said spring 74 attached to the inside surface of said swing arm. In this manner at any time that the swing arm is not being held positively in its up position the spring 74 will tend to force it to its down position.

The upper end of the inside surface of swing arm 60 is notched as at 76 in order, as will be described later in detail, to receive a pin projecting from the frame structure of the upper bunk. Ledge 70 of swing arm 60 has as its function to lend rigidity to the swing arm and at the same time to act as a restraining means for the pin whenever it is bearing on the swing arm. The dimension described by the swing arm from the center point of its pivot shaft 68 to the center point of notch 76 is 26 inches. Overall length of the swing arm is $27\frac{3}{8}$ inches. The swing arm from its down position against striker plate 40 to its extreme upright position against support brace 62 pivots through approximately a 60° arc. It will be noted that when in its down position the free end thereof is still within the confines of arm structure 10 so that it does not at any point protrude.

At the extreme upper back corner on the inside surface of arm structure 10 is located a pivot plate 80. Pivot plate 80 is a flat, rectangular piece of metal securely connected to the arm structure. Plate 80 has connected thereto a pivot bracket generally designated by the number 82. Pivot bracket 82 is essentially a length of angle stock pivotally mounted on plate 80 by virtue of a pivot pin 84. Pivot bracket 82 is slightly in excess of 5 inches long and is positioned so that one side of the angle is parallel to plate 80 while the other angle extends away from arm 10. A wooden frame member 86 is bolted to each of and extends between the two pivot brackets 82 as best shown in FIGURES 1 and 3. A stop arm 88 extends from the extreme lower end of pivot bracket 82 generally forwardly and at approximately a 60° angle to the main body of said pivot bracket 82 and to the wood frame member 86. Said stop arm 88 is designed to encounter stud 90 on plate 80 when the upper bunk is in its up position. Stop arm 88 and stud 90 cooperate to restrict side-to-side movement of the upper bunk frame. In its bunk position pivot bracket 82 extends inwardly and upwardly at about a 30° angle, thus giving what is in effect an over-center locking device.

The free end of each of the pivot brackets 82 is rigidly connected to a rear corner of the rectangular upper bunk frame as by bolt or rivet 83. Said upper bunk frame consists of front upper frame member 92, rear upper frame member 94, and end frame members 96 connecting the ends of said front and rear members 92 and 94 to form a generally rectangular bunk frame. It will be noted that the angle members out of which the upper bunk frame are made generally face downward. The

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pivot bracket 82 is securely connected to form a non-pivotal connection 83 at the extreme back end of each of the end members 96. Thus pivot bracket 82, wooden frame member 86 and the entire rectangular upper bunk frame form a single unit. On the under surface of the front frame member 92 of the upper bunk are two spring actuated retractable bolts 110 which are responsible for holding the upper bunk in the bunk bed position. Said bolts or pins are provided at each end of the frame in a manner now to be described. A hole 100 is cut in the extreme front end of each side member 96 as shown in FIGURE 6. On the under surface of front frame member 92 at each end are a pair of spaced-apart heavy tubular guide members 102 and 104. Guide member 102 is placed next to hole 100 so that its inside diameter is coincident with said hole 100 and then permanently connected to frame member 92 by welding or otherwise. In like manner a similar tubular guide member 104 is spaced several inches from said guide member 102, and also connected as by welding to frame member 92 so that its inside diameter is aligned with guide 102 and hole 100. A collar or ring 106 of considerably less length than either of guides 102 or 104, but of the same general inside and outside diameter as the two guides, is placed in the space between the guides 102 and 104.

A compression spring 108 occupies the remainder of the space between guides 102 and 104 not taken by the shorter length collar 106. A shaft, or bolt or pin 110 is then inserted through the hole, guides, collar and spring so that approximately an inch of said pin 110 is extending out of the hole 100 beyond the outside surface of end members 96. Collar 106 by the use of a lock screw can be fixed in position on the pin 110 so that the proper amount of projection from the frame is achieved. In this manner the compression spring 108 serves to keep the pin 110 protruding from hole 100 except when said pin is forcibly retracted. A length of airplane cable 112 is connected to the inner end of pin 110 and extends under along the frame member 92 and is brought out from under the frame member 92 by virtue of a slot 114 provided in the top surface of said member 92. As a practical matter, cable 112 extends from one pin 110 to the pin 110 on the other end of the frame with slots 114 on either side of the middle area of said frame member 92 allowing for the exposed middle section of said cable 112 to be grasped by a person standing in front of the sofa bunk. Thus, cable 112 is the means by which both pins can be simultaneously retracted when the upper bunk is to be dropped from its up position. Pin 110, of course, rests in the notch 76 in the upper end of swing arm 60.

It will be understood from the foregoing description that the upper bunk frame is held by swing arm 60 at the front thereof and by pivot brackets 82 at the rear thereof. The support brace 62 restrains swing arm 60 against any outward movement and the angular displacement of pivot bracket 82 acts in the nature of an over-center locking device so that no side-to-side motion of the upper bunk frame is permissible. It will be understood that if pivot bracket 82 were to extend straight upwardly a considerable amount of lateral or swaying motion would result. However, by designing the pivot bracket 82 so that it extends upwardly and forwardly at about a 30° angle to the vertical, and incorporating stop arm 88 and pin 90, an upper joint is formed which eliminates the side sway problem. When it is necessary to fold the bunk bed into the sofa position it is only required that the user grasp cable 112 to retract the pins 110 which are lodged in notches 76 to release the upper frame so that it may pivot about pivot means 84 at the lower end of pivot bracket 82. The pins are held retracted until the front frame member 92 extends generally below the rear surfaces of swing arms 60 and between the starter plates 40. The cable may then be released, the pins 110 will shoot out of holes 100 and strike the plate.

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The upper bunk frame is then permitted to swing farther down and back until the pins 110 rest in the angle 49 of striker plate 40. Thus, in the down position the upper bunk frame forms a back frame for the sofa.

When it is desired to unfold the sofa into the bunk position it is only necessary to grasp the front frame member 92 of the upper bunk frame and pull generally upwardly and forwardly raising said frame about the pivot 84. As the frame clears the area between the striker plates 40 the pins strike the rear surface of swing arms 60. The swing arms, because of the pressure on the forward frame member 92 and pins 110, are swung up and forwardly about pivot 68 against the force of springs 108. Ledge 70, of course, restrains the pins 110 from extending outwardly beyond the arm side surface of said swing arm 60. In this manner the swing arms 60 are gradually raised to their upright position, the upper bunk frame is gradually brought up around pivot 84 until the pins 110 clear the space 75 at the upper end of the swing arms to lodge in notches 76. Again the hairpin springs 74 by exerting constant pressure against swing arms 60 restrain the swing arms from flopping loosely about their pivot 68. The front frame member 92 of the upper bunk is provided with two mattress retaining fences 116 which can take nearly any design desired. They are spaced, however, apart from each other so that the exposed portion of cable 112 is readily available when it is desired to pull or retract the pins 110. Fences 116, of course, have their most obvious use when the upper bunk frame is in its sofa position and the mattress thereby forms the back of the sofa and is held on the inclined surface formed by the frame by the fences being at the lower end thereof.

The lower bunk frame presented particular problems because it must serve as a mattress frame for the lower bunk and as a seat frame support for the cushions when this invention is in its sofa position. In order to accomplish this dual purpose in the lower bunk frame, it was necessary to construct the lower bunk frame in the manner of linkages so that it would fold around the mattress. The linkage mechanism, which forms the greater portion of the bottom bunk and also the frame means for the seat of the sofa, begins with a 7 inch section of angle stock 120 which is pivotally attached to the free end of bottom front side piece 52, as can best be seen in FIGURE 2. The pivot connection as at 122, whether it be by bolt or rivet or other well known means, extends through the upright part of frame member 52 and through the upstanding frame plate flange 36. As can be seen, the upstanding section of member 120 laps onto the front frame member 52. The generally horizontal section of said member 120 is cut to a length of about 4½ inches and centered. Thus the horizontal section of member 120 and the generally horizontal part of frame member 52 complement each other to form an extended horizontal frame shelf rather than overlapping as do the upstanding parts. The other end of the generally upstanding part of member 120 also extends beyond the horizontal part to permit linking of said member 120 with other parts of the frame structure. Thus, the pivot 122 is permanently located because of the permanent nature of the frame member 52 and the upstanding flange 36.

Attached to the other end of member 120 as by pivot shaft 130 is a U-shaped movable bunk section generally designated by the number 124. Movable frame section 124 has side members 126 connected by base member 128. Side member 126 has its horizontal section cut short of the end of the upstanding section in manner similar to the member 120, so that a gap of about 1½ inches is left between the rear end of the horizontal section of member 120 and the forward end of the horizontal section of side member 126. A wooden frame piece 132 is securely fastened to the outside surface of the upstanding part of base member 128, so that when linkage members 120 and side members 126 are in the bunk position the combined

dimensions of said side members 126, base member 128 and the wooden frame piece 132 fall within the confines of the permanent rear frame structure defined by the up-standing flanges 38, side pieces 48, and rear frame member 50. Wooden frame member 132, of course, spans the distance between the arm structures in the same manner that base member 128 does. The horizontal parts of the angle frame members 50 and 48 form a cradle in which the movable frame member 124 rests when it is in the bunk position. A rectangular piece of flat material is secured to the underside of frame plate 32 and extends inwardly to underlie member 120. Said shelf 121 provides a firm support for said member 120.

Also attached to the inside surface of member 120 and connected to the pivot means 130 is a short section of flat rectangular stock referenced by the number 134. Link 134 extends generally downwardly between member 120 and side member 126 in the gap therebetween. Said link 134 will be a maximum of $4\frac{1}{2}$ inches long. A U-shaped seat frame generally shown by the number 136 spans the distance between the links 134. Rear seat frame 136 has side link members 138 and the web member 140. This U-shaped rear seat frame 136 is approximately $5\frac{1}{2}$ inches long as measured by side link member 138. The web member 140, of course, extends from one arm structure to the other. It will be noted that the rear seat frame 136 is also made of angle stock but the horizontal side is up and the vertical side extends down. The free ends of side links 138 are pivotally attached as by pin 142 to the other end of link 134. It will be observed, with reference to FIGURE 1, that when the folding frame parts are in the lower bunk position that link 134 and rear seat frame 136 are below the level of the main frame so as to be out of the way and not interfere with the mattress supported on the various sections of the lower bunk frame. As can be seen, however, with reference to FIGURE 3, when the invention is in its sofa position link 134 and rear seat frame 136 form part of the shelf or frame means by which the sofa cushions are supported.

When the moving frame parts are in the sofa position, link 134 is restrained from turning downwardly and rearwardly at an angle by the horizontal or short part of member 120. Rear seat frame 136 in like manner is prevented from pivoting downwardly, or stated in another way, is held in the generally horizontal position by virtue of an L-shaped folding bracket 146 which is also mounted with link 134 and side links 138 on the pivot pin 142. The L-shaped bracket 146 is secured to the inside surface of side link 138 and extends under the vertical part of side link 138 and under link 134. Thus, when the invention is in its sofa position the L-shaped bracket 146 bears the weight of the side links 138 to prevent them from swinging down.

It is necessary, of course, when converting the invention to its bunk form that the links 134 and the rear seat frame 136 be swung upwardly and out of the way so that the upper bunk frame pieces may be swung upwardly and unobstructedly to engage swing arms 60. Thus the links 134 and the rear seat frame 136 are capable of being folded upwardly as shown in dash-dot lines in FIGURE 3 to be moved out of the way. It will be seen that the upper mattress or cushion 148 in dash-dot lines also forms the back for the sofa. When the invention is converted to the sofa position the lower mattress shown in dash-dot lines and numbered 152 is doubled or folded up under the rear lower bunk frame means 124 to give added support to those parts which form the frame means for the sofa cushions shown in dash-dot lines by number 150. The wooden frame member 132 which is attached to the lower bunk rear frame means 124 in the sofa position is seen to be superimposed upon the wooden frame member 56. Thus, an attractive upholstered front is presented by the sofa. Of course, with the swing arms down and the linkage mechanism in place as shown in FIGURE 3 and with the back mattress 148 and the cushions 150 in place all of

the moving parts and frame pieces are concealed. At the same time a flap of identical upholstering covering can be attached to the upper rear corner of the sofa arm structure 10 and passed over the wooden frame piece 86 and the top bunk rear frame piece 94 and laid under the mattress 148. It should be mentioned that with the lower bunk mattress folded up between the frame pieces as is shown in FIGURE 3 in dash-dot lines that there is now a forward and backward movement of the movable linkage pieces around pivot 122. For instance, the seat rear frame means 136 and particularly the web piece 140 contacts the back mattress or cushion 148 to prevent movement of the assembly in that direction. By the same token, the lower bunk mattress 152 prevents forward motion. Thus, the entire assembly, while there is no lock to hold it as shown, remains firmly in place and it is only necessary to put the sofa cushions on to render the invention readily usable as a sofa. Conventional spring means 135 are attached to the various frame pieces to complete the assembly.

The foregoing is considered as illustrative only of the principle of this invention. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed is:

1. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, each arm structure including a frame plate at the bottom thereof; permanent front and rear frame means connecting the frame plates of each arm structure; each arm structure having a striker plate rigidly secured to said frame plate between the ends thereof in parallel spaced relationship to the inside surface of its related arm structure and also presenting an upwardly facing generally wide V-shaped guide and support channel; a swing arm means pivotally connected by one end to and supported on said frame plate between said striker plate and the front end of said arm structure and having a notch means at the free end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channels when said top frame means is in the sofa position and for engaging said notch means in said swing arms when said top frame means is in its bunk position; a folding frame means including a first linkage pivotally connected by one end to said permanent front frame means near the front-most end of said striker plate, a first frame means pivotally connected to the other end of said first linkage and adapted when in bunk position to be supported on said permanent rear frame means, said folding frame means also including a second linkage pivotally mounted at the connection of said first linkage and said first frame means and also including a second frame means pivotally mounted on the other end of said second linkage, so that when said folding frame means is in bunk position said second linkage and said second frame means are beneath said first linkage and said first frame means and so that when said folding frame means is in seat position said second linkage and said second frame means are in common plane with said first frame to form a supporting structure for sofa cushions.

2. A sofa back and top bunk structure and supporting means therefor in a convertible sofa and bunk bed, comprising: a pair of arm structures having legs, each arm structure including a generally horizontal frame plate extending along the bottom thereof; permanent front and rear frame means connecting the frame plates of each arm structure; each arm structure having a striker plate rigidly secured to said frame plate between the ends thereof in parallel spaced relationship to the inside surface of its related arm structure and also presenting an upwardly fac-

ing generally wide V-shaped guide and support channel; a swing arm means pivotally connected by one end to and supported on said frame plate between said striker plate and the front end of said arm structure and having a notch means at the free end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position.

3. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means including a first linkage pivotally connected by one end to said permanent front frame means at a point slightly forward of the front to back midline of said sofa and bunk; a first frame means pivotally connected to the other end of said first linkage and adapted when in bunk position to be supported on said permanent rear frame means, said folding frame means also including a second linkage pivotally mounted at the connection of said first linkage and said first frame means and also including a second frame means pivotally mounted on the other end of said second linkage, so that when said folding frame means is in bunk position said second linkage and said second frame means are beneath said first linkage and said first frame means and so that when said folding frame means is in seat position said second linkage and said second frame means are in a common plane with said first frame means to form a supporting structure for sofa cushion.

4. A sofa back and top bunk structure and supporting means therefor in a convertible sofa and bunk bed, comprising: a pair of arm structures having legs, said arm structures being connected by permanent front and rear frame means near the bottoms thereof; each arm structure having an upwardly facing generally wide V-shaped guide and support channel between the ends thereof, said channel being in generally parallel spaced relationship to the inside surface and between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means between said V-shaped channel and the front end of said arm structure and having notch means at the upper end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position.

5. A sofa back and top bunk structure and supporting means therefor in a convertible sofa and bunk bed, comprising: a pair of arm structures having legs, each arm structure including a generally horizontal and rectangular frame plate attached to the bottom thereof, said frame plate also extending inwardly away from the inside surface of the arm structure and having upstanding flange means along the edge thereof in generally parallel spaced relationship to said arm structure; permanent front and rear frame means connecting the upstanding flange means of said frame plate; each arm structure having a striker plate rigidly secured to said frame plate between the ends thereof and presenting an upwardly facing generally wide V-shaped guide and support channel the edge of which is aligned with said upstanding flange means; a swing arm means pivotally connected by one end to and supported on

said frame plate forward of said striker plate and between said upstanding flange means and the inside surface of said arm structure and also having a notch means at the free end thereof; a generally rectangular top frame means including a pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to the rear of each end of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position.

6. A sofa back and top bunk structure and supporting means therefor in a convertible sofa and bunk bed, comprising: a pair of arm structures having front and back legs, said arm structures being connected by permanent front and rear frame means near the bottom thereof; each arm structure having a striker plate rigidly secured to said permanent frame means, said striker plate being placed between the ends of said arm structures in generally parallel closely spaced relationship to the inside surface of its related arm structure, said striker plate having bottom edges thereon with flanges extending toward the opposed arm structure, said flanges defining a generally upwardly facing V-shaped channel, the point of which is below the level of the permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means forwardly of said V-shaped channel and having notch means at the upper end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to the rear of each end of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arm when said top frame means is in its bunk position.

7. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, said arm structures being connected by permanent front and rear frame means near the bottoms thereof; each arm structure having an upwardly facing generally wide V-shaped guide and support channel between the ends thereof, said channel being in generally parallel closely spaced relationship to the inside surface and between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means between said V-shaped channel and the front end of said arm structure and having notch means at the upper free end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position; and a folding frame assembly pivoted on said permanent frame means for forming a seat support means for the sofa seat and sofa seat cushions and for forming a lower bunk frame in the bunk position.

8. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, each arm structure including a generally horizontal and rectangular frame plate attached to the bottom thereof, said frame plate also extending inwardly away from the inside surface of the arm structure and having upstanding flange means on the edge thereof in generally parallel spaced relationship to said arm structure; permanent front and rear frame means connecting the upstanding flange means of

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said frame plates; each arm structure having a striker plate rigidly secured to said frame plate between the ends thereof and presenting an upwardly facing generally wide V-shaped guide and support channel, the edge of which is aligned with said upstanding flange means; a swing arm means pivotally connected by one end to and supported on said frame plate forward of said striker plate and between said upstanding flange means and the inside surface of said arm structure and also having a notch means at the free ends thereof; a generally rectangular top frame means including a pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to the rear of each end of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position; and a folding frame assembly pivoted on said permanent frame means for forming a seat support means for the sofa seat and sofa cushions and for forming a lower bunk frame in the bunk position.

9. A convertible sofa and bunk bed, comprising: a pair of arm structures having front and back legs, said arm structures being connected by permanent front and rear frame means near the bottom thereof; each arm structure having a striker plate rigidly secured to said permanent frame means, said striker plate being placed between the ends of said arm structures in generally parallel closely spaced relationship to the inside surface of its related arm structure, said striker plate having bottom edges thereon with flanges extending toward the opposed arm structure, said flanges defining a generally upwardly facing V-shaped channel, the point of which is below the level of the permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means forwardly of said V-shaped channel and having notch means at the upper free end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to the rear of each end of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position; and a folding frame assembly pivoted on said permanent frame means for forming a seat support means for the sofa seat and sofa seat cushions for forming a lower bunk frame in the bunk position.

10. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means pivotally connected by a first linkage means near the rear of said permanent front frame means, said folding frame means having a first frame means pivotally secured to said first linkage means, said permanent front frame means and said first linkage means and said first frame means forming a lower bunk support; and said folding frame means also including a second linkage means and a second frame means pivotally connected to said first linkage means, said first and second frame means being capable of folding around the mattress used in the lower bunk to form a sofa seat support.

11. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means pivotally connected by one end of a first linkage means at a point slightly forward of the front to rear midline of said arm structures, said folding frame means including a first mov-

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able frame means pivotally secured to the other end of said first linkage means, said permanent front frame means and said first linkage means and said first movable frame means forming a lower bunk when the assembly is in the bunk position; and said folding frame means also including a second linkage pivotally connected to the pivot connection between said first linkage means and said first movable frame means, and also having a second movable frame means pivotally connected to said second linkage means, said first movable frame means and said second linkage means and said second movable frame means forming a sofa seat support when said assembly is in the sofa position.

12. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, said arm structures being connected by permanent front and rear frame means near the bottoms thereof; each arm structure having an upwardly facing generally wide V-shaped guide and support channel between the ends thereof, said channel being in generally parallel spaced relationship to the inside surface and between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means, pivotally connected at its lower end to said permanent frame means between said V-shaped channel and the front end of said arm structure and having notch means at the upper end thereof; a generally rectangular top frame means, including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging the V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means and said swing arms when said top frame means is in its bunk position; a folding frame means pivotally connected near the rear of said permanent frame means, said folding frame means including a first linkage means and a first frame means for forming a lower bunk with said permanent front frame means, and said folding means including a second linkage means and a second frame means for forming a sofa seat support with said first frame means.

13. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, said arm structures being connected by permanent front and rear frame means near the bottoms thereof; each arm structure having an upwardly facing, generally wide V-shaped guide and support channel between the ends thereof, said channel being in generally parallel spaced relationship to the inside surface and between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means between said V-shaped panel and the front end of said arm structure and having notch means at the upper end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means in said swing arms when said top frame means is in its bunk position; a folding frame means, pivotally connected by a first linkage means near the rear of said permanent front frame means, said folding frame means having a first frame means pivotally secured to said first linkage means, said permanent front frame means and said first linkage means and said first frame means forming a lower bunk support; and said folding frame means also including a second linkage means and a second frame means pivotally connected to said first linkage means for folding around

the mattress used in the lower bunk to form a sofa seat support with said first frame means.

14. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, said arm structures being connected by permanent front and rear frame means near the bottom thereof; each arm structure having an upwardly facing generally wide V-shaped guide post channel between the ends thereof, said channel being in generally parallel spaced relationship to the inside surface between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means between said V-shaped channel and the front end of said arm structure and having notch means at the upper end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means and said swing arms when said top frame means is in its bunk position; a folding frame means, pivotally connected by one end of a first linkage means at a point slightly forward of the front to rear midline of said arm structure, said folding frame means including a first movable frame means pivotally secured to the other end of said first linkage means, said permanent front frame means and said first linkage means and said first movable frame means forming a lower bunk when the assembly is in the bunk position; and said folding frame means also including a second linkage means, pivotally connected to the pivot connection between said first linkage means and said first movable frame means, and also having a second movable frame means pivotally connected to said second linkage means, said first movable frame means and said second linkage means and said second movable frame means forming a sofa seat support when said assembly is in the sofa position.

15. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means including a linkage pivotally connected by one end to said permanent front frame means at a point slightly forward of the front to back midline of said sofa and bunk; a first frame means pivotally connected to the other end of said linkage and adapted when in bunk position to be supported on said permanent rear frame means, said folding frame means also including a second frame means pivotally mounted at the pivot point of said linkage and said front frame means, so that when said folding frame means is in bunk position said second frame means is beneath said linkage and said first frame means and so that when said folding frame means is in seat position said second frame means is in a common plane with said first frame means to form a supporting structure for sofa cushion.

16. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means pivotally connected by one end of a linkage means at a point slightly forward of the front to rear midline of said arm structures, said folding frame means including a first movable frame means pivotally secured to the other end of said linkage means, said permanent front frame means and said linkage means and said first movable frame means forming a lower bunk when the assembly is in the bunk position; and said folding frame means also including a second movable frame means pivotally connected to the pivot point of said linkage and said front frame means, said first movable frame means and said second movable

frame means being in a common plane and forming a sofa seat support when said assembly is in the sofa position.

17. A lower bunk and seat assembly for a convertible sofa and bunk bed, comprising: a pair of arm structures having legs and interconnected by permanent front and rear frame means; a folding frame means pivotally connected by a first linkage means near the rear of said permanent front frame means, said folding frame means having a first frame means pivotally secured to said linkage means, said permanent front frame means and said linkage means and said first frame means forming a lower bunk support; and said folding frame means also including a second frame means pivotally connected to the pivot point of said linkage means and said front frame means for folding around the mattress used in the lower bunk to form a sofa seat support with said first frame means, said second frame means extending below said lower bunk support in the bunk position and extending rearwardly in a generally common plane with said first frame means in the sofa position.

18. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, and said arm structures being connected by permanent front and rear frame means near the bottom thereof; each arm structure having an upwardly facing generally wide V-shaped guide post channel between the ends thereof, said channel being in generally parallel spaced relationship to the inside surface between the ends of said arm structure and being rigidly supported on said permanent frame means; an elongated swing arm means pivotally connected at its lower end to said permanent frame means between said V-shaped channel and the front end of said arm structure and having notch means at the upper end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected at an angle to each end of the rear of said top frame means; retractable pin means connected to the front of each end of said top frame means for engaging said V-shaped channel when said top frame means is in the sofa back position and for engaging said notch means and said swing arms when said top frame means is in its bunk position; a folding frame means, pivotally connected by one end of a first linkage means at a point slightly forward of the front to rear midline of said arm structure, said folding frame means including a first movable frame means pivotally secured to the other end of said first linkage means, said permanent front frame means and said first linkage means and said first movable frame means forming a lower bunk when the assembly is in the bunk position; and said folding frame means also including a second movable frame means pivotally connected to the pivot connection between said first linkage means and said first movable frame means, said first and second movable frame means forming a generally common plane sofa seat support when said assembly is in its sofa position.

19. A convertible sofa and bunk bed, comprising: a pair of arm structures having legs, each arm structure including a frame plate at the bottom thereof; permanent front and rear frame means connecting the frame plates of each arm structure; a swing arm means pivotally connected by one end to and supported on said frame plate near the front end of said arm structure and having a notch means at the free end thereof; a generally rectangular top frame means including pivot bracket means pivotally attached to the upper inside rear portion of each of said arm structures and rigidly connected to each end of the rear of said top frame means; pin means connected to the front of each end of said top frame means for engaging said notch means in said swing arms when said top frame means is in its bunk position; a folding frame means including a linkage pivotally connected by one end to said permanent front frame means slightly forward of the front to rear midline of said arm

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structures, a first movable frame means pivotally connected to the other end of said linkage and adapted when in bunk position to be supported on said permanent rear frame means, said folding frame means also including a second movable frame means pivotally mounted at the pivot connection of said permanent front frame means and said linkage, so that when said folding frame is in its bunk position said second movable frame means is beneath said linkage and said first frame means, and so that when said folding frame means is in seat position said second movable frame means is in a common plane with said first movable frame means to form a supporting structure for sofa cushions.

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References Cited by the Examiner

UNITED STATES PATENTS

991,069	5/11	Justh	5-28	X
1,011,201	12/11	Irelan	5-28	
1,058,934	4/13	Andren	5-32	
2,652,573	9/53	Clerc	5-9	
2,891,255	6/59	Simmons	5-9	
3,027,571	4/62	Bendixen et al.	5-9	X

FOREIGN PATENTS

800,854	9/58	Great Britain.
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