

Feb. 19, 1963

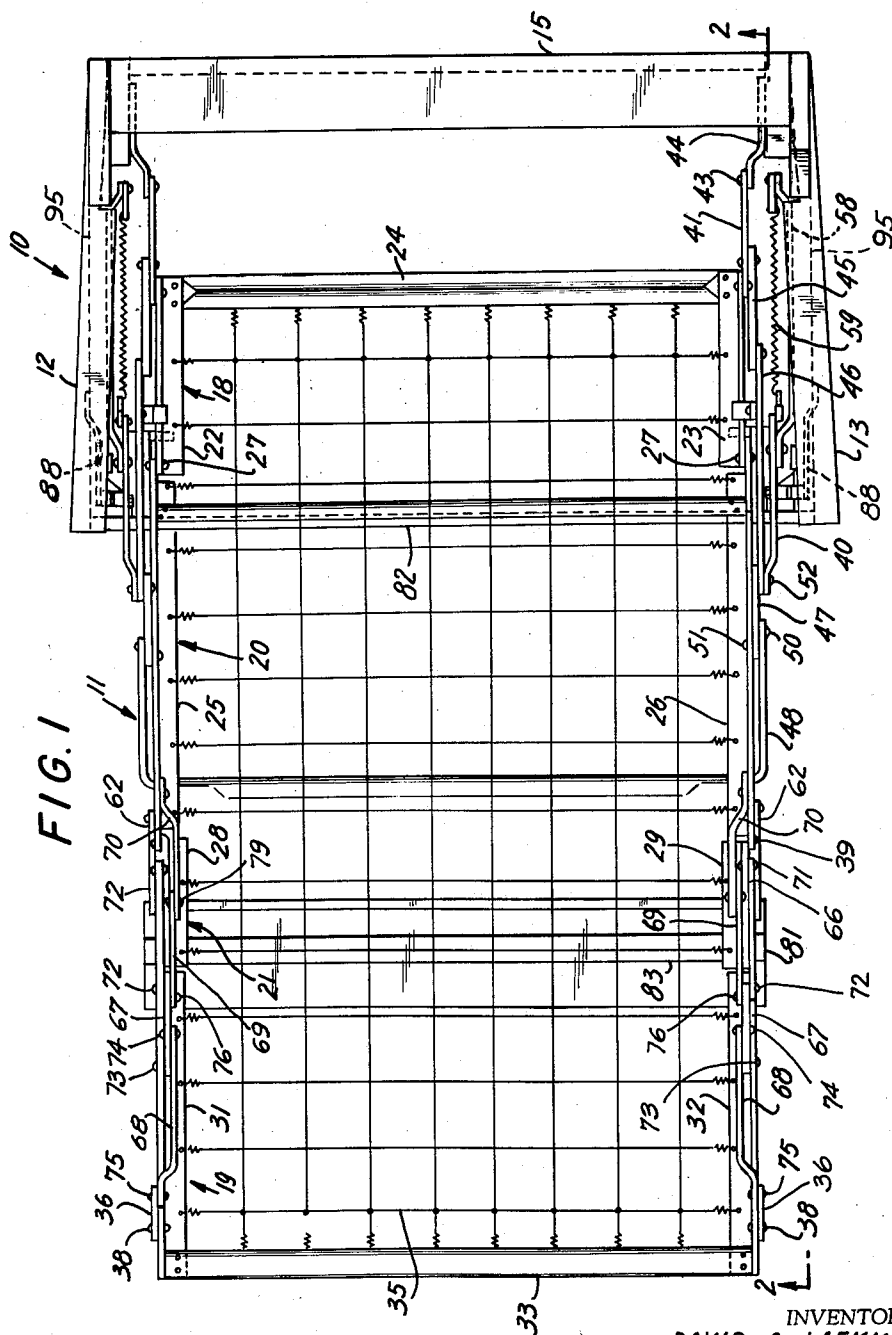
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3,077,611

CHAIR BED WITH EXPANDABLE SIDE FRAMES

Filed Oct. 20, 1961

4 Sheets-Sheet 1



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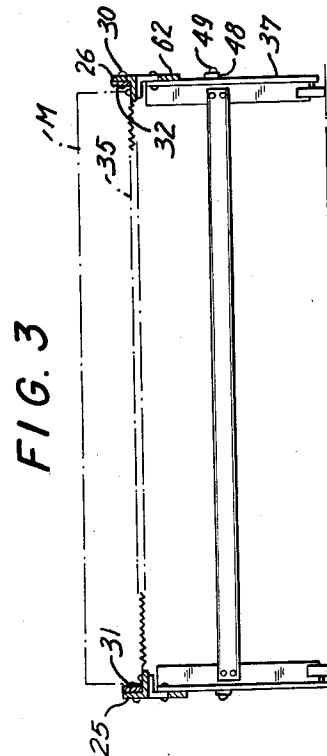
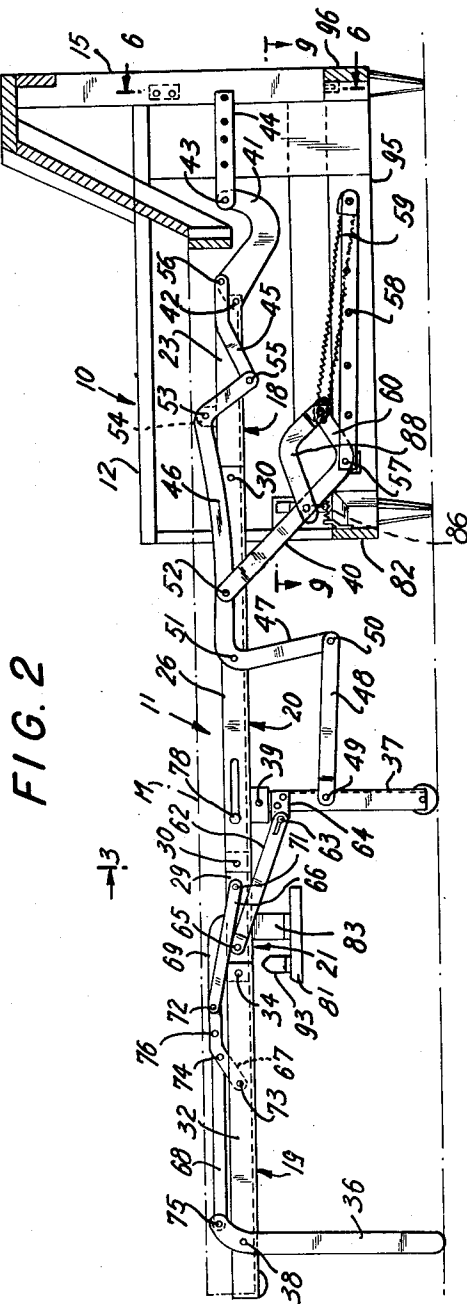
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4 Sheets-Sheet 2



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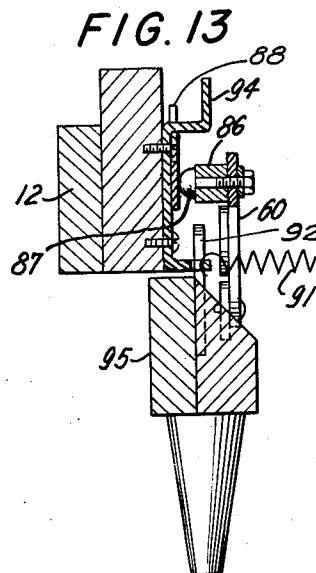
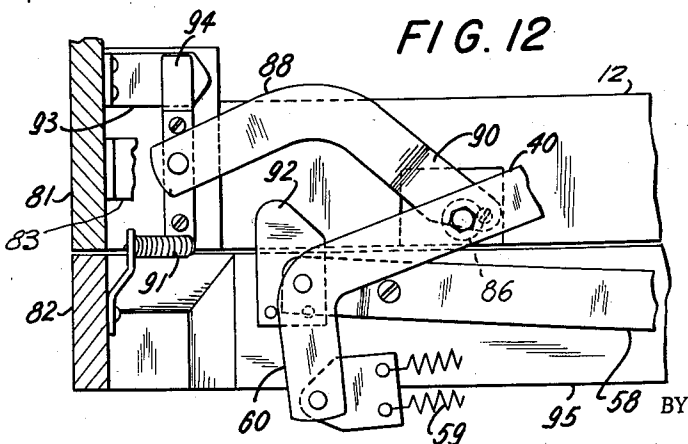
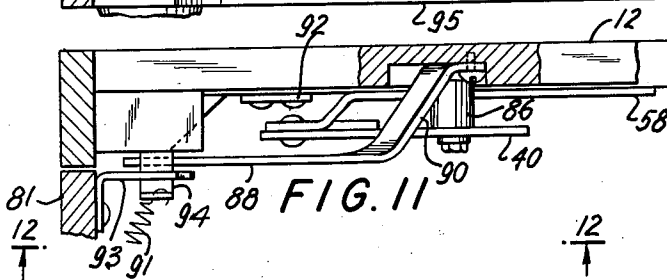
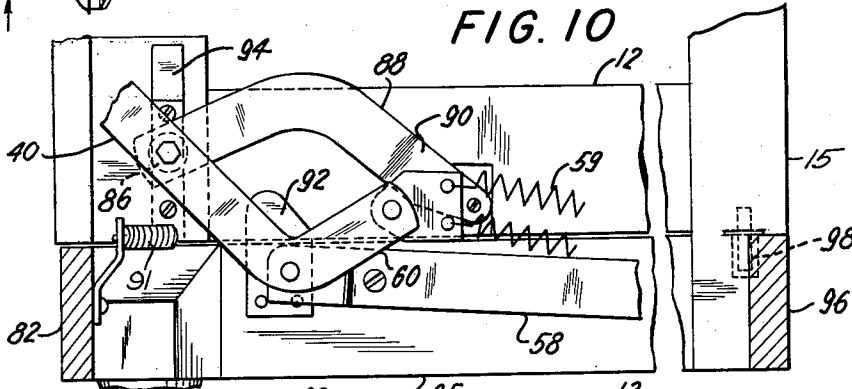
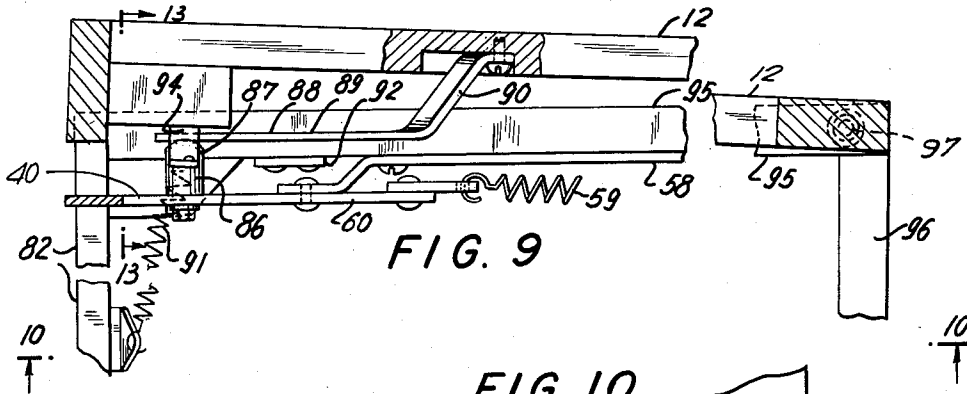
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CHAIR BED WITH EXPANDABLE SIDE FRAMES

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4 Sheets-Sheet 4



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3,077,611

**CHAIR BED WITH EXPANDABLE SIDE FRAMES**  
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Filed Oct. 20, 1961, Ser. No. 146,477  
5 Claims. (Cl. 5-52)

This invention relates to an article of furniture of the type which includes a foldable frame adapted to be disposed in folded relation within a furniture frame to provide a chair or seat and which is adapted to be unfolded to form a bed, and the invention has particular reference to the furniture frame having side frames which are moved from substantially parallel relation to divergent relation with the movement of the foldable frame to bed formation.

In articles of furniture of this character, sufficient clearance must be allowed between the furniture frame and the foldable frame to permit of the folding and unfolding of the foldable frame with reference to the furniture frame. This has resulted in a furniture frame of excessive width in relation to the width of the foldable frame. In order to overcome this objection, the present invention provides means for expanding the opposite side frames of the furniture frame to divergent relation with the movement of the foldable frame to bed formation to thereby eliminate the excessive clearance heretofore required therebetween.

Another object of the invention is to provide interengageable means carried by the foldable frame and the side frame of the furniture frame for expanding the side frame outwardly with the unfolding movement of the foldable frame.

Still another object of the invention is to provide cam means for moving the side frames outwardly against the bias of tension means which tension means functions to move the side frames into substantially parallel relation with the movement of the foldable frame to chair formation.

With the foregoing and other objects in view, reference is now made to the following specification and accompanying drawings in which the preferred embodiment of the invention is illustrated.

In the drawings:

FIG. 1 is a top plan view of an article of furniture constructed in accordance with the invention with the side frames shown in divergent relation.

FIG. 2 is a longitudinal sectional view taken approximately on line 2-2 of FIG. 1.

FIG. 3 is a transverse sectional view taken approximately on line 3-3 of FIG. 2.

FIG. 4 is a view similar to FIG. 2 showing the mattress supporting frame in partially collapsed relation.

FIG. 5 is a similar view showing the mattress supporting frame in fully collapsed relation and the article of furniture in chair or seat formation.

FIG. 6 is an enlarged fragmentary sectional view taken approximately on line 6-6 of FIG. 2.

FIG. 7 is a fragmentary sectional view taken approximately on line 7-7 of FIG. 6.

FIG. 8 is a fragmentary view taken approximately on line 8-8 of FIG. 7.

FIG. 9 is an enlarged fragmentary sectional view taken approximately on line 9-9 of FIG. 2.

FIG. 10 is an enlarged fragmentary sectional view taken approximately on line 10-10 of FIG. 9.

FIG. 11 is a view similar to FIG. 9 with parts of the foldable frame shown in collapsed position.

FIG. 12 is a view similar to FIG. 10 taken approximately on line 12-12 of FIG. 11.

FIG. 13 is a vertical sectional view taken approximately on line 13-13 of FIG. 9.

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Referring to the drawings, the article of furniture includes a furniture frame 10 which is connected to a folded metal frame 11 composed of a plurality of pivotally connected sections adapted to be arranged in folded relation within the furniture frame for receiving one or more seat cushions to provide couch, chair or the like and to be disposed in alignment to form a bed. The foldable frame 11 supports a mattress M which is folded into doubled over relation between the sections of the foldable frame when the said frame is arranged in folded relation within the furniture frame.

The furniture frame consists of side frames 12 and 13 which form the arm rests when the article of furniture forms a couch, chair and the like and which are swingably connected at the rear thereof to vertical frame members 15 of the furniture frame 10 for movement of the side frames from substantially parallel relation to outwardly divergent relation as shown in plan in FIG. 1 of the drawings.

The foldable frame 11 may be of any desired number of pivotally connected sections and the same may be connected with the furniture frame 10 in any desired manner for movement of the sections to dispose the same in folded relation within the furniture frame or in longitudinal alignment. As illustrated, the foldable frame 11 included four pivotally connected sections, namely, an inner section 18, and outer section 19 and two intermediate sections 20 and 21. The sections are preferably of angle iron construction, the inner section 18 consisting of spaced side rails 22 and 23 which are connected together by end rail 24. The intermediate section 20 consists of oppositely disposed side rails 25 and 26 which are pivoted to the side rails 22 and 23 of the inner section 18 on pivot pins 27. The intermediate section 21 consists of opposite side rails 28 and 29 which are pivoted to the side rails 25 and 26 of the intermediate section 20 on pivot pins 30 and the outer section 19 includes opposite side rails 31 and 32 which are connected at their outer ends by an end rail 33 and are pivoted to the side rails 28 and 29 of the intermediate section 21 on pivot pins 34. The side rails of each of said sections have inwardly directed horizontally disposed flanges and upwardly projecting vertically disposed flanges. Secured to the inwardly directed flanges of said sections and to the end rails 24 and 33 is a wire mesh spring 35 which supports the mattress M when the sections are in aligned formation to serve as a bed.

The outer section 19 and the intermediate sections 20 and 21 are supported in bed formation by front and rear legs 36 and 37 which are pivotally connected on pivot pins 38 and 39 with the outer and intermediate sections 19 and 20 respectively. The inner section 18 is supported in bed relation by links 40 and 41, the links 40 also function to partly support the intermediate section 20. The links 41 are pivoted at their outer ends to the side rails of the inner section 18 on the pivot pins 42 and at their inner ends are pivoted on pivot pins 43 to straps 44 affixed to the frame members 15. The links 40 and 41 together with the legs 36 and 37 at each side form part of a linkage construction.

A series of links 45, 46, 47 and 48 at each side connects the legs 37 with the links 41. The outer ends of the links 48 are pivoted to the legs 37 on pivot pins 49 and the inner ends thereof are pivoted to the downturned ends of the links 47 on pivot pins 50. The links 47 are pivoted intermediate their ends to the side rails of the intermediate section 11 on pivot pins 51 and said links are pivoted at their inner ends to the outer ends of the links 46 and to the upper ends of the links 40 on pivot pins 52. The links 46 are pivoted on pivot pins 53 to brackets 54 affixed to the side rails of the inner section 18 and said links have downturned inner ends which are pivoted to the

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outer ends of the links 45 on pivot pins 55. The links 45 are pivoted to the links 41 on pivot pins 56 which are located in rearwardly spaced relation from the pivotal connection 42 of the side rails of the inner section 18 with the links 41. The links 41 are of angulated formation and extend downwardly and rearwardly from their pivotal connections with the inner section 18 when the sections are in bed formation. The inner ends of said links extend upwardly and inwardly to the pivotal connections thereof with the straps 44. When the sections are in collapsed formation, the links 41 are inverted and extend upwardly and rearwardly from the pivotal connections thereof with the straps 44 so as to swing the inner section 18 into upright relation. The links 40 are pivoted at their upper ends to the links 46 and 47 on the pivot pins 52 and at their lower ends the said links are pivoted on pivot pins 57 to flat bars 58 affixed to the inside faces of the side frame members 17 respectively. The said links are biased by coil springs 59 connected to the lower inwardly directed ends 60 thereof and to the inner ends of said flat bars. The springs thus function to cushion the downward and inward swinging of the sections into collapsed relation and to bias the sections upwardly and outwardly toward bed relation.

Each of the legs 37 are connected by a linkage construction with the outer section 19, the intermediate section 21 and the legs 36 which function to swing the outer section 19 downwardly so as to compress the doubled over end of the mattress M with the downward and inward swinging of the sections. The linkage constructions include links 62 having pin and slot connections 63 with lugs 64 affixed to the legs 37 adjacent their upper ends. At their outer ends the links 62 are pivoted to the vertical flanges of the side rails of the intermediate section 21 on pivot pins 65. The linkage constructions also include pivotally connected links 66, 67, 68, 69 and 70. The links 66 are pivoted at their inner ends on pivot pins 71 to the vertical flanges of the side rails of the intermediate section 21 and at their outer ends the said links are pivoted to the inner ends of the links 67 on pivot pins 72. The latter links are pivoted at their outer ends to the vertical flanges of the outer section 19 on pivot pins 73 located intermediate the ends of said section. The links 68 are pivoted at their inner ends on pivot pins 74 to the links 67 substantially medially thereof and at their outer ends the said links 68 are pivoted to the upper ends of the legs 38 on pivot pins 75. The links 69 are pivoted at their outer ends on pivot pins 76 to the links 67 intermediate the pivotal connections of the links 68 and 66 therewith. The links 69 are pivoted at their inner ends on pivot pins 77 to the links 70 adjacent their outer ends, said links 70 having pin and slot connections 78 at their inner ends with the vertical flanges of the side rails of the intermediate section 20 and at their outer ends the said links 70 are pivoted to the side rails of the intermediate section 21 on the pivot pins 79. The links 69 and 70 limit the movement of the intermediate section 21 to substantially right angular relation with the intermediate section 20 with the movement of the outer section 19 into overlying relation with the intermediate section 20.

The foldable frame also carries a front panel 81 which swings therewith from an out-of-the-way position below the frame when the same is in bed relation to a vertical position closing the front of the furniture frame 10 above a fixed panel 82. The panel 81 is affixed to a cross bar 83 having angulated end portions secured to the inwardly directed flanges of the side rails 28 and 29 of the intermediate section 21 so as to dispose the said panel in spaced relation from said intermediate section.

With the downward and inward swinging of the sections from the position shown in FIG. 4 to the folded relation shown in FIG. 5, the legs 37 swing into substantially parallel relation with the side rails of the intermediate section 20. This movement of the legs 37 pulls the links 62 downwardly so as to move the intermediate

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section 21 into substantially right angular relation with the intermediate section 20 whereby the links 70 move inwardly to dispose the inner ends thereof substantially at the inner ends of the slots of the pin and slot connections 78. This movement of the foldable frame compresses the doubled over end of the mattress between the outer and intermediate sections 19 and 20 and retains the outer section 19 in fixed position. With the outward movement of the foldable frame from collapsed relation within the furniture frame, the outer section 19 is freed from fixed position to permit of the swinging thereof to bed relation. With the outward movement of the foldable frame, the side frames 12 and 13 are moved outwardly to divergent relation, and with the inward movement of the foldable frame to the couch or chair position, the side frames are swung inwardly into substantially parallel relation.

The outward movement of the side frames 12 and 13 to divergent relation is effected by means of cam lugs 86 affixed to the links 40 to project laterally therefrom and which have rounded outer ends 87 disposed against cam brackets 88 affixed to the inside faces of the side frames respectively. Each of the cam brackets includes a forward portion 89 having a vertically disposed planar inner face and a downwardly and outwardly divergent rear portion 90 having a downwardly and forwardly canted inner face extending from the top to the bottom edges thereof and which face is also canted rearwardly from the forward portion 89 to the outer end of the divergent portion 90. The side frames are biased against the outer rounded ends of the lugs 86 by means of coil springs 91 affixed to the inside face of the front panel 82 of the furniture frame and to the side frame 12 and 13 adjacent the forward ends thereof. With the swinging of the foldable frame from the fully collapsed relation shown in FIG. 5 of the drawings to the partly unfolded position shown in FIG. 4 of the drawings, the lugs 86 move over the inside faces of the divergent portions 90 of the brackets 88 to thereby swing the side frames outwardly on their pivotal connections to outward divergent relation. Continued movement of the foldable frame outwardly to dispose the inner and intermediate sections 18 and 20 into aligned relation, the lugs 86 move over the inside faces of the forward portions 89 of the brackets to the outer ends thereof respectively. With the inward swinging of the foldable frame into folded relation within the furniture frame, the lugs 86 move over the inside faces of the forward portions 89 of the brackets 88 and over the inside faces of the divergent portions 90 thereof whereby the springs 91 swing the side frames inwardly on their pivotal connections from divergent relation to substantially parallel relation against stop lugs 92 affixed to the inside faces of the side panels 95. With this movement of the foldable frame, angle brackets 93 affixed to the inside face of the front panel 81, move into engagement with vertically disposed angle brackets 94 affixed to the inside faces of the side frames 12 and 13 respectively to secure and lock the side frames in said substantially parallel relation.

The side frames 12 and 13 are supported by and swingably connected with the furniture frame 10 above the side panels 95 thereof which extend between and are secured to the front panel 82 and to a rear panel 96 which panels form the bottom frame of the furniture frame 10. The side frames 12 and 13 are pivoted on vertical pins 97 in sockets 98 formed in the side panels 95 respectively and adjacent the upper edges thereof the side frames are swingably connected with the vertical members 15 of the furniture frame by headed studs 99 slidably engaging key-hole slots 100 formed in metal plates 101 affixed to the inside faces of the side frames 12 and 13 respectively. This construction supports the side frames for swinging movement and permits of convenient assembling of the side frames with the furniture frame.

The side frames 12 and 13 and the panel and frame

parts of the furniture frame 10 may be suitably upholstered in any desired manner.

While the preferred form of the invention has been shown and described herein, it is to be understood that the invention is not so limited but shall cover and include any and all modifications thereof which fall within the purview of the invention.

What is claimed is:

1. In an article of furniture of the character described, a furniture frame, said furniture frame having side frames swingably connected therewith for movement thereof from substantially parallel relation to divergent relation, a foldable frame composed of a plurality of sections pivotally connected together in end to end relation, linkage means at each side connecting said foldable frame with the furniture frame for movement of the sections of the foldable frames from aligned formation to folded relation within the furniture frame between said side frames, a lug carried by said linkage means at each side, a cam track affixed to each of said side frames having a canted cam face, means carried by said furniture frame and said side frames biasing said side frames inwardly to dispose said cam tracks in engagement against said lugs respectively, said lugs moving over said cam faces to cam said side frames outwardly to said divergent relation with the movement of said foldable frame from said folded relation within the furniture frame toward said aligned relation, and said biasing means swinging said side frames inwardly into said parallel relation with the movement of said foldable frame to said folded relation.

2. In an article of furniture of the character described, a furniture frame, said furniture frame having side frames swingably connected therewith for movement thereof from substantially parallel relation to divergent relation, a foldable frame composed of a plurality of sections pivotally connected together in end to end relation, linkage means at each side connecting said foldable frame with the furniture frame for movement of the sections of the foldable frames from aligned formation to folded relation within the furniture frame between said side frames, said linkage means at each side including a link pivotally connected to the furniture frame below the side frames thereof for movement with the linkage means from rearwardly extending relation when the foldable frame is in folded relation to forwardly extending relation when the sections of the foldable frame is moved toward aligned relation, a lug carried by each of said links, a cam track arranged on the inner face of each of said side frames having a canted cam face, means carried by said furniture frame and said side frames biasing said side frames inwardly to dispose said tracks in engagement against said lugs respectively, said lugs moving over said cam faces to cam said side frames outwardly from substantially parallel relation to said divergent relation with the movement of said foldable frame from said folded relation towards said aligned relation, and said biasing means swinging said side frames inwardly into said parallel relation with the movement of said foldable frame to said folded relation.

3. In an article of furniture of the character described, a furniture frame, said furniture frame having side frames swingably connected therewith for movement thereof from substantially parallel relation to divergent relation, a foldable frame composed of a plurality of sections pivotally connected together in end to end relation, linkage means at each side connecting said foldable frame with the furniture frame for movement of the sections of the foldable frames from aligned formation to folded relation within the furniture frame between said side frames, a lug carried by said linkage means at each side, a cam track affixed to each of said side frames having a cam face canted rearwardly and outwardly, means carried by said furniture frame and said side frames biasing said side frames inwardly to dispose said cam

tracks in engagement against said lugs respectively, said lugs moving over said cam faces to cam said side frames outwardly to said divergent relation with the movement of said foldable frame from said folded relation within the furniture frame toward said aligned relation, and said biasing means swinging said side frames inwardly into said parallel relation with the movement of said foldable frame to said folded relation, and interengageable means carried by said foldable frame and said side frames locking said side frames in said parallel relation when said foldable frame is in said folded relation within the furniture frame.

4. In an article of furniture of the character described, a furniture frame, said furniture frame having side frames swingably connected therewith for movement thereof from substantially parallel relation to divergent relation, a foldable frame composed of a plurality of sections pivotally connected together in end to end relation, linkage means at each side connecting said foldable frame with the furniture frame for movement of the sections of the foldable frames from aligned formation to folded relation within the furniture frame between said side frames, said linkage means at each side including a link pivotally connected to the furniture frame below the side frames thereof for movement with the linkage means from rearwardly extending relation when the foldable frame is in folded relation to forwardly extending relation when the sections of the foldable frame is moved toward aligned relation, a lug carried by each of said links, a bracket arranged on the inner face of each of said side frames having a cam face extending rearwardly and outwardly, means carried by said furniture frame and said side frames biasing said side frames inwardly to dispose said bracket in engagement against the outer ends of said lugs respectively, said lugs moving over said cam faces to cam said side frames outwardly from substantially parallel relation to said divergent relation with the movement of said foldable frame from said folded relation towards said aligned relation, and said biasing means swinging said side frames inwardly into said parallel relation with the movement of said foldable frame to said folded relation.

5. In an article of furniture of the character described, a furniture frame, said furniture frame having side frames swingably connected therewith for movement thereof from substantially parallel relation to divergent relation, a foldable frame composed of a plurality of sections pivotally connected together in end to end relation, linkage means at each side connecting said foldable frame with the furniture frame for movement of the sections of the foldable frames from aligned formation to folded relation within the furniture frame between said side frames, said linkage means at each side including a link pivotally connected to the furniture frame below the side frames thereof for movement with the linkage means from rearwardly extending relation when the foldable frame is in folded relation to forwardly extending relation when the sections of the foldable frame is moved toward aligned relation, a lug carried by each of said links, a bracket carried by each of said side frames having a forward portion provided with a vertically disposed inner face and having a rear portion formed with a rearwardly and outwardly canted inner cam face, means carried by said furniture frame and said side frames biasing said side frames inwardly to dispose said bracket in engagement against the outer ends of said lugs respectively, said lugs moving over said cam faces to cam said side frames outwardly from substantially parallel relation to said divergent relation with the upward movement of said foldable frame from said folded relation towards said aligned relation and said lugs moving over said vertically disposed faces of said brackets with the outward movement of said foldable frame toward said aligned relation, and said biasing means swing-

ing said side frames inwardly into said parallel relation with the movement of said foldable frame to said folded relation, and interengageable means carried by said foldable frame and said side frames locking said side frames in said parallel relation when said foldable frame is in said folded relation within the furniture frame. 5

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