Oct. 5, 1965 D. C. LAEMMLE 3,209,378

CONVERTIBLE ARTICLE OF FURNITURE

Filed Aug. 2, 1963 3 Sheets-Sheet 1

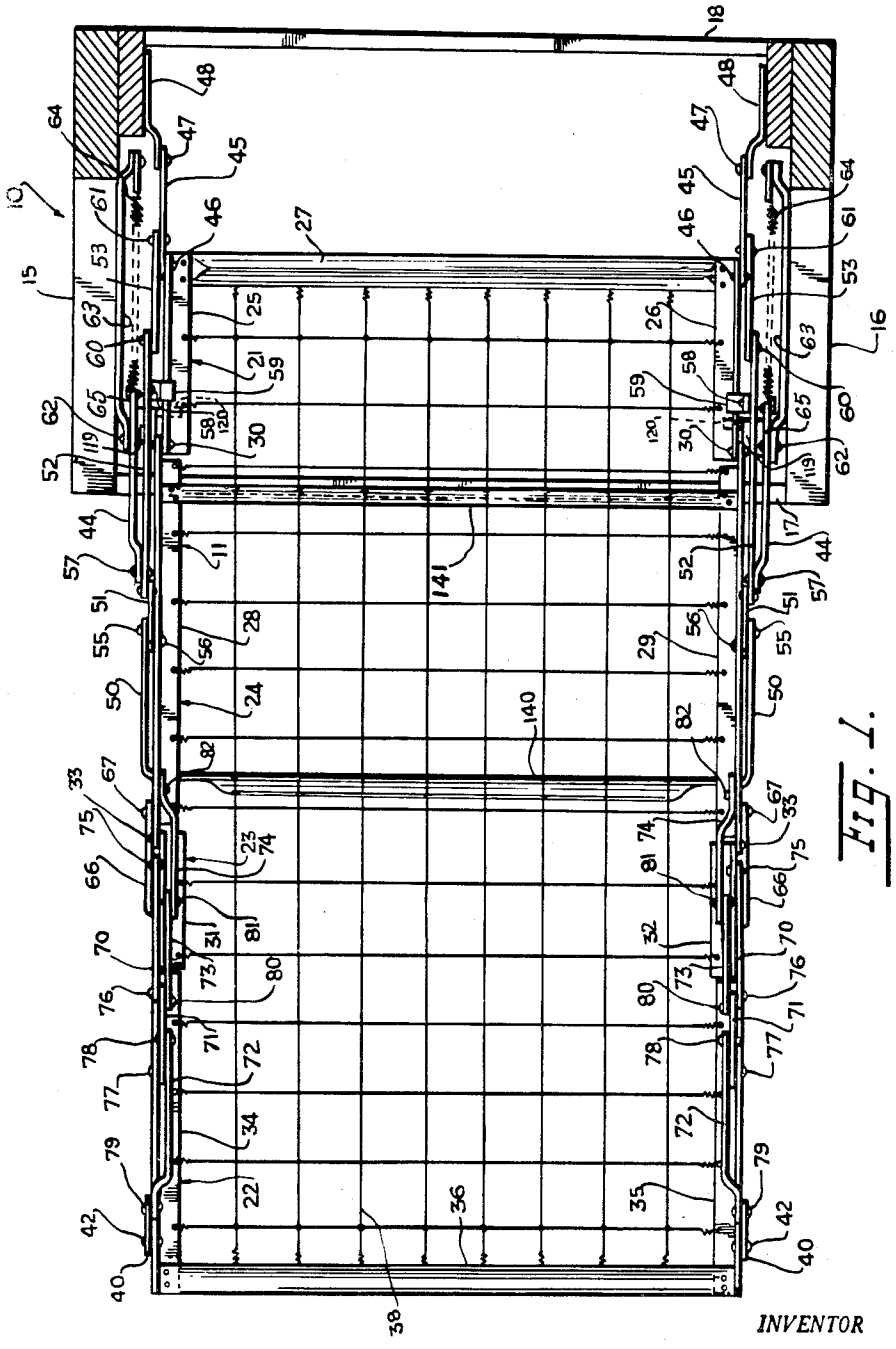


Fig. 1.

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Oct. 5, 1965 D. C. LAEMMLE 3,209,378

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Filed Aug. 2, 1963 3 Sheets-Sheet 2

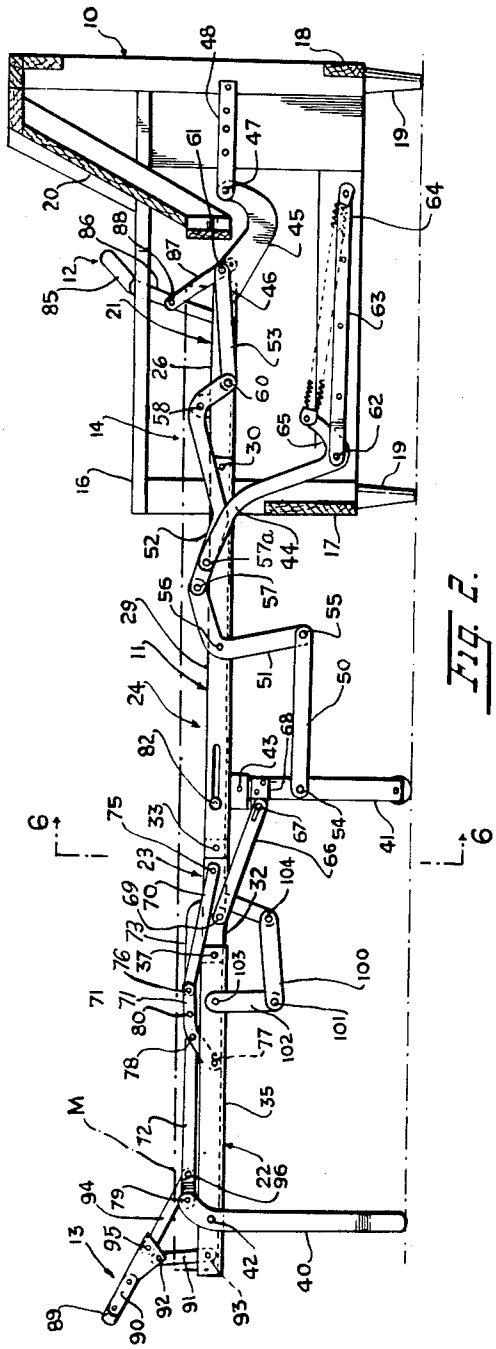


Fig. 2.

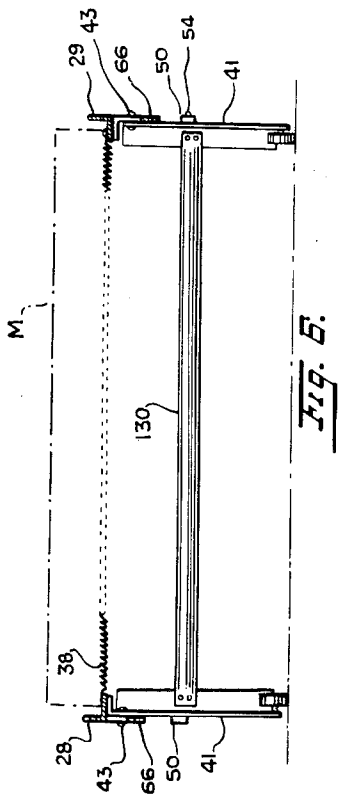


Fig. 6.

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Oct. 5, 1965 D. C. LAEMMLE 3,209,378

CONVERTIBLE ARTICLE OF FURNITURE

Filed Aug. 2, 1963 3 Sheets-Sheet 3

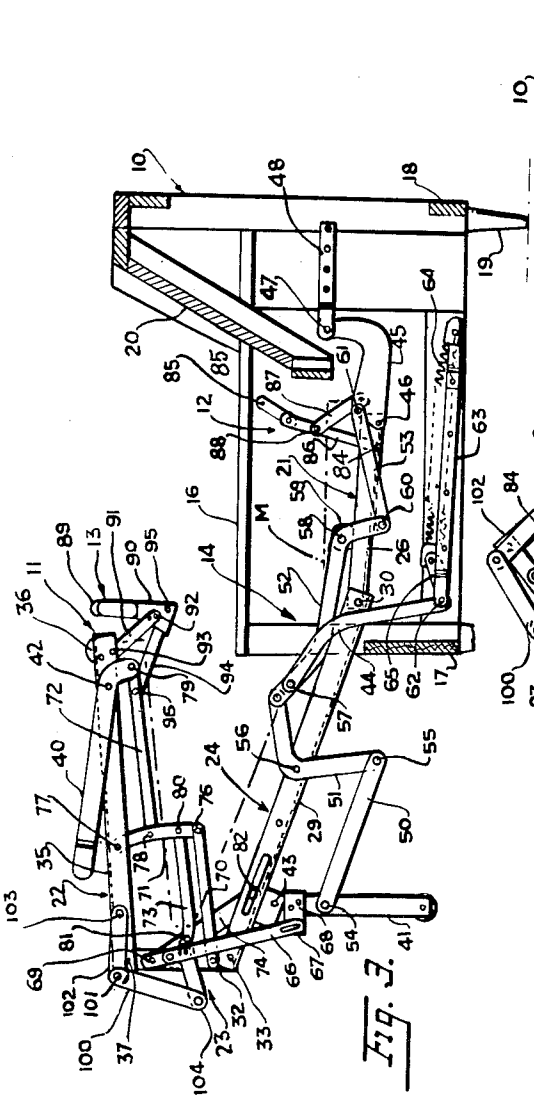


Fig. 3.

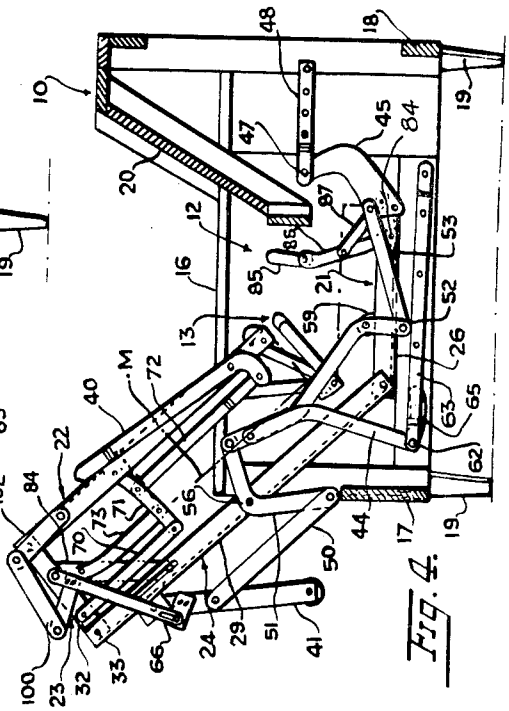


Fig. 4.

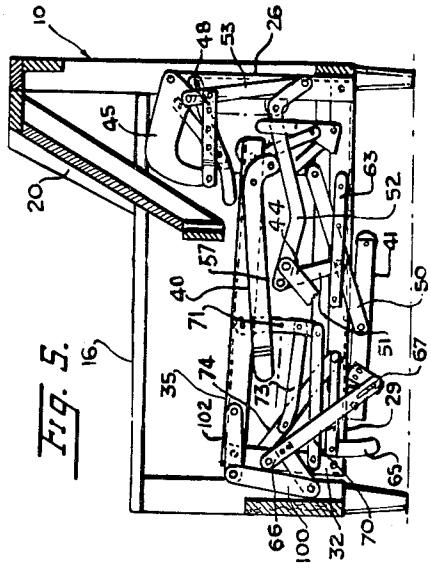


Fig. 5.

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United States Patent Office

3,209,378

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CONVERTIBLE ARTICLE OF FURNITURE

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1 Claim. (Cl. 5—13)

This invention relates to a convertible article of furniture which in one position provides a chair, couch and the like and in another position provides a bed.

The invention has particular reference to a convertible article of furniture in which a foldable frame is swingably connected with a furniture frame for swinging movement of the foldable frame from an unfolded or bed forming position to a folded or seat forming position within the furniture frame.

An object of the invention is to provide an improved construction of furniture frame for taking up the stress and strain incident to the swinging of the foldable frame and which adequately supports the foldable frame and the load thereon particularly in the folded position when serving as a chair, couch and the like. The swinging movement of the foldable frame and the load imposed thereon in the folded position within the furniture frame, tend to expand or cant the side walls of the furniture frame so as to weaken the same. In order to overcome this objection and to provide a stable furniture frame, the present invention provides an improved furniture frame in which the opposite side walls thereof are rigidly connected by front and rear panels so as to prevent outward spreading or canting of the side walls and which panels cover and conceal the foldable frame in the folded poistion within the furniture frame.

Another object of the invention is to provide an improved arrangement of links swingably connecting the foldable frame with the furniture frame by means of which the foldable frame and leg members connected therewith are elevated and swung over the front panel with swinging thereof from the unfolded to the folded position and vice versa.

Still another object of the invention is to provide a convertible article of furniture of said character in which the foldable frame consists of a plurality of pivotally connected sections arranged in side by side relation and with one of the endmost sections providing a head end and the other end section providing a foot end.

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 a convertible article of furniture constructed in accordance with the invention.

FIG. 2 is a side view of the foldable frame with portions of the furniture frame shown in vertical section.

FIG. 3 is a view similar to FIG. 2 showing the sections elevated showing the position of the outer section substantially at the beginning of the movement of the sections into collapsed relation within the furniture frame.

FIG. 4 is a view similar to FIG. 3 showing the sections in more completely folded relation with the movement of the sections from the position shown in FIG. 3 to the position shown in FIG. 4.

FIG. 5 is a view similar to FIGS. 3 and 4 but showing the sections in complete collapsed relation within the furniture frame.

FIG. 6 is a transverse sectional view taken approximately on line 6—6 of FIG. 2.

Referring to the drawings, the convertible article of furniture includes a supporting furniture frame 10 to

which is swingably connected a foldable metal frame 11 having a pillow head rest 12 and a foot rest 13 swingably connected with the head and foot ends thereof respectively. The foldable metal frame 11 is composed of a plurality of pivotally connected sections adapted to be arranged in collapsed relation within the supporting frame for receiving one or more seat cushions to provide a couch, chair or the like and adapted to be disposed in alignment to form a bed. The foldable frame 11 supports a mattress M when in bed formation and which is folded into doubled over relation between the sections of the foldable frame when the said frame is disposed in collapsed relation within the supporting frame.

The pillow head rest 12 constitutes a headboard for preventing a pillow falling from the head end of the foldable frame when in bed formation and the foot rest 13 constitutes a footboard against which the feet may engage. The head rest 12 and the foot rest 13 are connected with the foldable frame 11 for movement from operative positions respectively to collapsed relation with the folding of the foldable frame within the supporting frame. When in collapsed relation the foot rest is disposed at the end of the foldable frame so as to prevent shifting of the mattress toward the outer end thereof during the movement of the foldable frame to collapsed relation within the furniture frame.

The foldable frame is swingably connected with the supporting frame by a linkage construction 14 at each side which automatically moves the outer section downwardly and compresses the folded over end of the mattress with the downward and inward swinging of the foldable frame into collapsed relation within the furniture frame. The pillow head rest and the foot rest are also moved into collapsed relation with the downward and inward swinging of the foldable frame and the sections of the foldable frame are retained in collapsed relation against the expansive action of the mattress.

The supprting frame 10 consists of oppositely disposed side frames 15 and 16 which are connected at the front and rear by panels 17 and 18 respectively. The side frames 15 and 16 have short legs 19 which space the same from the floor. The frame 10 also includes a back rest 20 which extends laterally thereof and is affixed at its ends to the top of the side frames. The back rest 20 is spaced from the back of the supporting frame to accommodate the inner end of the foldable frame and the inner end of the mattress M when the foldable frame is disposed in collapsed relation.

In the embodiment illustrated, the foldable frame 11 includes four pivotally connected sections, namely an inner section 21, an outer section 22 and two intermediate sections 23 and 24. The said sections are pivotally connected together in end to end relation to dispose the same in longitudinal alignment so as to form a bed and for folding thereof into collapsed relation within the supporting frame so as to provide a support for one or more seat cushions. The sections are preferably of angle iron construction, the inner section 21 consisting of spaced side rails 25 and 26 which are connected together by a cross bar 27. The intermediate section 24 consists of oppositely disposed side rails 28 and 29 which are pivoted to the side rails 25 and 26 of the inner section 21 on pivot pins 30. The intermediate section 23 consists of opposite side rails 31 and 32 which are pivoted to the side rails 28 and 29 of the intermediate section 24 on pivot pins 33 and the outer section 22 includes opposite side rails 34 and 35 which are connected at their outer ends by an end rail 36 and are pivoted to the side rails 31 and 32 of the intermediate section 23 on pivot pins 37. The side rails of each of said sections have inwardly directed horizontally disposed flanges and up-

wardly projecting vertically disposed flanges. Secured to the inwardly directed flanges of said sections and to the cross bars 27 and 36 is a wire mesh spring 38 which supports the mattress M when the sections are in aligned formation to serve as a bed.

The outer section 22 and the intermediate sections 23 and 24 are supported in bed formation by front and rear legs 40 and 41 which are pivotally connected on pivot pins 42 and 43 with the outer and intermediate sections 22 and 24 respectively. The inner section 21 is supported in bed relation by links 44 which links also function to partly support the intermediate section 24. Links 45 are pivoted at their outer ends to the side rails of the inner section 21 on pivot pins 46 and at their inner ends are pivoted on pivot pins 47 to straps 48 affixed to the side frames 15 and 16. The links 44 and 45 together with the legs 40 and 41 at each side form part of the linkage constructions 14.

A series of links 50, 51, 52 and 53 at each side connects the legs 41 with the links 45. The outer ends of the links 50 are pivoted to the legs 41 on pivot pins 54 and the inner ends thereof are pivoted to the downturned ends of the links 51 on pivot pins 55. The links 51 are pivoted intermediate their ends to the side rails of the intermediate section 24 on pivot pins 56 and said links are pivoted at their inner ends to the outer ends of the links 52 on pivot pins 57. The links 44 are shaped as bell cranks with their longer legs curved over front panel 17 and are pivoted to the links 52 on pivot pins 57*a* spaced from pivot pins 57. The links 52 are reversely bent with a high point pivoted on pivot pins 58 to brackets 59 affixed to the side rails of the inner section 21 and said links have downturned inner ends which are pivoted to the outer ends of the links 53 on pivot pins 60. The links 53 are pivoted to the links 45 on pivot pins 61 which are located in rearwardly spaced relation from the pivotal connections 46 of the side rails of the inner section 21 with the links 45. The links 45 are of angulated formation and extend downwardly and rearwardly from their pivotal connections with the inner section 21 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 48. When the sections are in collapsed formation, the links 45 are inverted and extend upwardly and rearwardly from the pivotal connections thereof with the straps 48. The links 44 are pivoted at their upper ends to the adjacent outer ends of links 52 at a second high point thereof on the pivot pins 57*a* spaced from the pivotal connection 57 between the links 52 and 51 as hereinbefore described and at their lower ends the said links 44 are pivoted on pivot pins 62 to flat bars 63 affixed to the inside faces of the side rails 15 and 16. The said links are biased by coil springs 64 connected to the lower inwardly directed ends 65 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 41 are connected by a linkage construction with the outer section 22, the intermediate section 23 and the legs 40 which function to swing the outer section 22 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 66 having pin and slot connections 67 with flat bars 68 affixed to the legs 41 adjacent their upper ends. At their outer ends the links 66 are pivoted to the vertical flanges of the side rails of the intermediate section 23 on pivot pins 69. The linkage constructions also include pivotally connected links 70, 71, 72, 73 and 74. The links 70 are pivoted at their inner ends on pivot pins 75 to the vertical flanges of the side rails of the intermediate section 23 and at their outer ends the said links are pivoted to the inner ends of the links 71 on pivot pins 76. The latter links are pivoted at their outer ends to the vertical flanges of the outer section 22 on pivot pins 77 located intermediate the ends of said section. The links 72 are pivoted at their inner ends on pivot pins 78 to the links 71 substantially medially thereof and at their outer ends the said links 72 are pivoted to the upper ends of the legs 40 on pivot pins 79. The links 73 are pivoted at their outer ends on pivot pins 80 to the links 71 intermediate the pivotal connections of the links 70 and 72 therewith. The links 73 are pivoted on their inner ends on pivot pins 81 to the links 74 adjacent their outer ends, said links 74 having pin and slot connections 82 at their inner ends with the vertical flanges of the side rails of the intermediate section 24 and at their outer ends the said links 74 are pivoted to the side rails of the intermediate section 23 on the pivot pins 69. The links 74 limit the movement of the intermediate section 23 to substantially right angular relation with the intermediate section 24 with the movement of the outer section 22 into overlying relation with the intermediate section 24.

With the downward and inward swinging of the sections from the position shown in FIG. 3 to the collapsed relation shown in FIG. 5, the legs 41 swing into substantially parallel relation with the side rails of the intermediate section 24. This movement of the legs 41 pulls the links 66 downwardly so as to move the intermediate section 23 into substantially right angular relation with the intermediate section 24 whereby the links 74 move inwardly to dispose the inner ends thereof substantially at the inner ends of the slots of the pin and slot connections 82. This movement of the links 74 functions through the links 70, 71 and 73 to move the outer section downwardly into overlying relation with the intermediate section 24 so as to compress the doubled over end of the mattress therebetween.

The pillow head rest 12 and the foot rest 13 are moved into fully collapsed out-of-the-way position within the furniture frame with the aforesaid downward and inward swinging of the sections from the position shown in FIG. 3 to the collapsed relation shown in FIG. 5 of the drawings. When in collapsed position the foot rest is disposed at the end of the outer section 22 so as to prevent shifting of the mattress toward the outer end thereof during the movement of the foldable frame to collapsed relation. The pillow head rest 12 includes a cross panel 85 extending laterally of and slightly above the mattress M so as to constitute a rest for a pillow disposed at the head end of the mattress. The cross panel 85 is affixed at its outer ends to the upper ends of links 86 which are pivoted at their lower ends on pivot pins 84 to the side rails of the inner section 21 and links 87 are pivoted at their upper ends on pivot pins 88 to said links 86 and at their lower ends are pivoted to the outer ends of the links 45. With the movement of the foldable frame into collapsed relation within the furniture frame the inner section 21 is disposed in substantially upright relation and the links 45 are inverted. This movement of the links 45 and the inner section 21 swings the cross panel 85 from the operative position for supporting one or more pillows shown in FIG. 3 of the drawings to the collapsed position shown in FIG. 5 in which the said panel is disposed in an out-of-the-way position between the back rest 20 and the outer section 22.

The foot rest 13 projects outwardly beyond and slightly above the outer end of the mattress M in the operative position shown in FIG. 2 of the drawings. The said foot rest includes a cross panel 89 which slopes slightly inwardly and is affixed at its ends to brackets 90. Links 91 are pivoted at their upper ends to said brackets on pivot pins 92 and at their lower ends said links are pivoted on pivot pins 93 to the vertical flanges of the outer section 22 adjacent the outer end thereof. Links 94 are pivoted on pivot pins 95 to said bracket in spaced relation from the pivotal connections of the links 91 therewith and at their inner ends the links 94 are pivoted to the links 72 on pivot pins 96 located adjacent the pivotal connections of the legs 40 with said links 72. With the movement of the outer section 22 into the collapsed relation shown in FIG. 5,

the legs **40** swing about their pivotal connections with the outer section into a position with the lower ends thereof disposed slightly below the outer section. This movement of the legs **40** functions through the links **91** and **94** to swing the foot rest from the operative position shown in FIG. 2 of the drawings to the collapsed out-of-the-way position shown in FIG. 5 in which the cross panel **89** thereof is disposed in upright relation adjacent the outer end of the outer section **22** so as to constitute an abutment for the outer end of the mattress M to retain the same in position with the folding of the foldable frame.

The links **100** are pivoted on pivot pins **101** to angle members **102** which are pivoted on pivot pins **103** to the vertical flanges of the side rails of the outer section **22**. The links **100** are also pivoted on pivot pins **104** to bars affixed to the links **66** respectively. With the swinging of the outer section **22** from bed formation to the overlying relation with the intermediate section **24**, the link **100** is swung from the depending out-of-the-way position as shown in FIG. 2 of the drawings to a position behind the front panel **17** shown in FIG. 5 thereof.

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

I claim:

In a convertible article of furniture including a furniture frame having side walls and front and rear panels connected with the side walls, a foldable frame including inner and outer end sections and two intermediate sections, said sections being pivotally connected together in end to end relation for swinging movement from unfolded relation to folded relation within the furniture frame, a pair of leg members swingably connected with one of said intermediate sections for supporting the intermediate sections when in unfolded relation, a linkage construction at each side of said foldable frame including a first link pivoted to said furniture frame and to said inner end section, a chain of links at each side consisting of an inner end link, an outer end link and two intermediate links, said outer end link being pivoted to one of said leg members, one of said intermediate links being of reversely bent formation having a high point intermediate its length pivoted to said inner end section and a low point at its inner end pivoted to said inner end link, and said one intermediate link being pivoted at its outer end to the other intermediate link, said other intermediate link being of bent formation and pivoted intermediate its length to said intermediate section and at its outer end to said outer end link, and a second link at each side pivoted at its lower end to said furniture frame and bending upwardly and forwardly therefrom with the medial curved portion extending over said front panel and with the upper end of said second link being pivoted to said reversely bent intermediate link in spaced relation from the pivotal connection of said two intermediate links for swinging movement of the inner end section and the intermediate sections from unfolded relation to folded relation within the furniture frame, and said second links and said intermediate links by said bent formation functioning to elevate said foldable frame and the leg members thereof and swing the same over said front panel with the movement of said foldable frame to said folded relation, and said front panel effectively concealing said foldable frame at the front of the furniture frame when in said folded relation.

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FRANK B. SHERRY, *Primary Examiner.*