March 31, 1953 J. R. THOMAS 2,632,897

CONVERTIBLE SEAT

Filed April 1, 1946 3 Sheets-Sheet 1

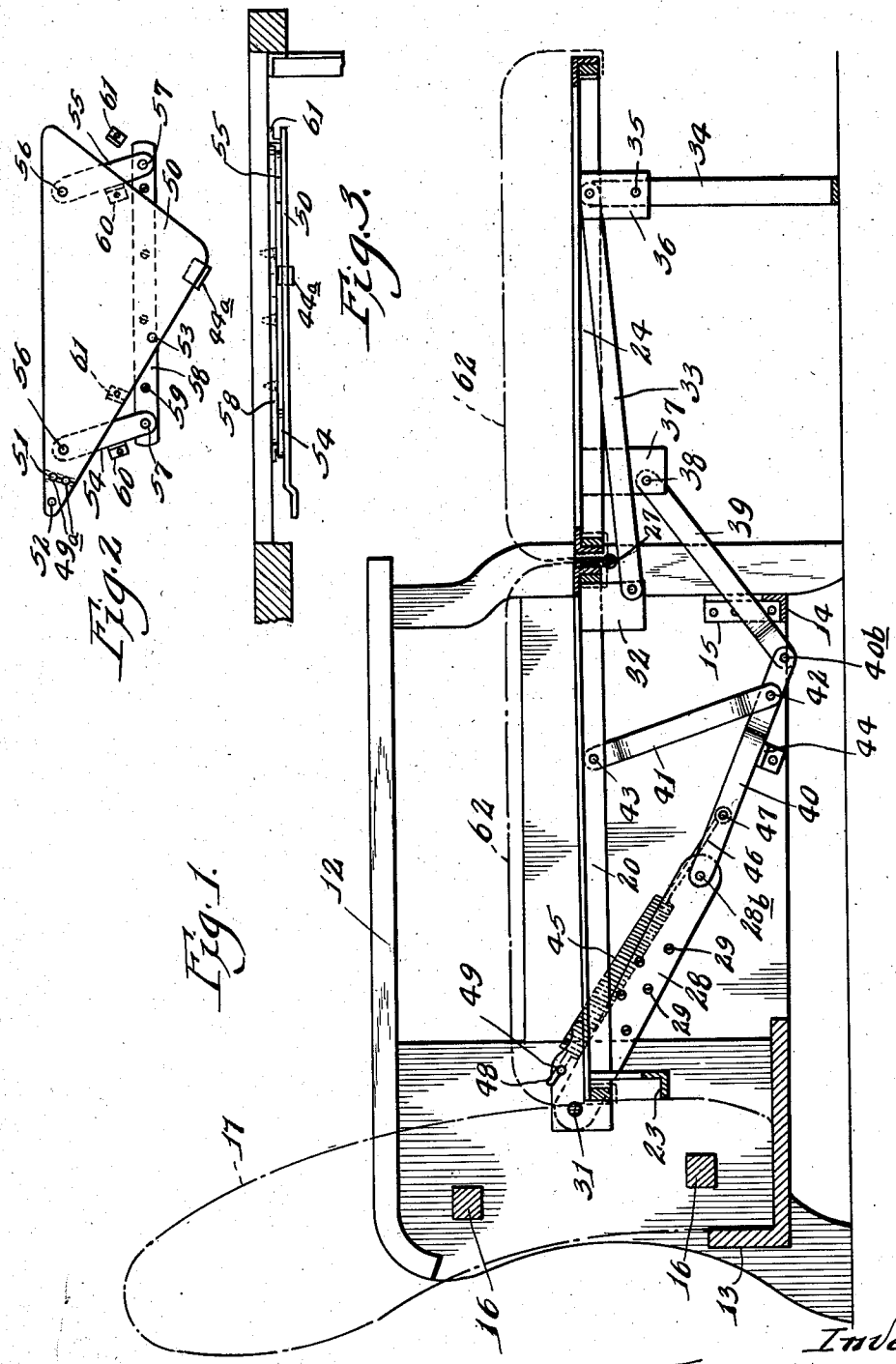

Fig. 1.

Fig. 2.

Fig. 3.

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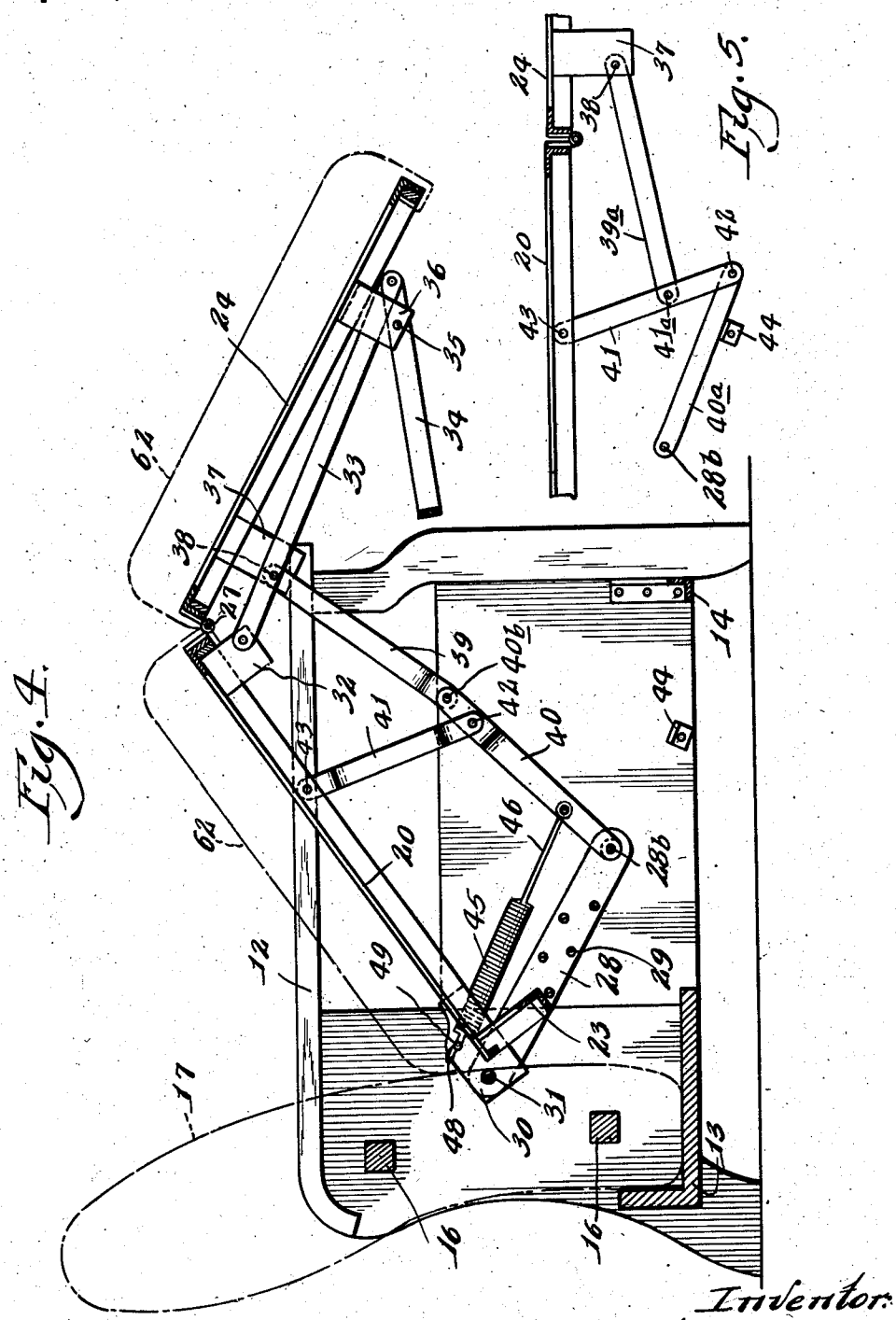

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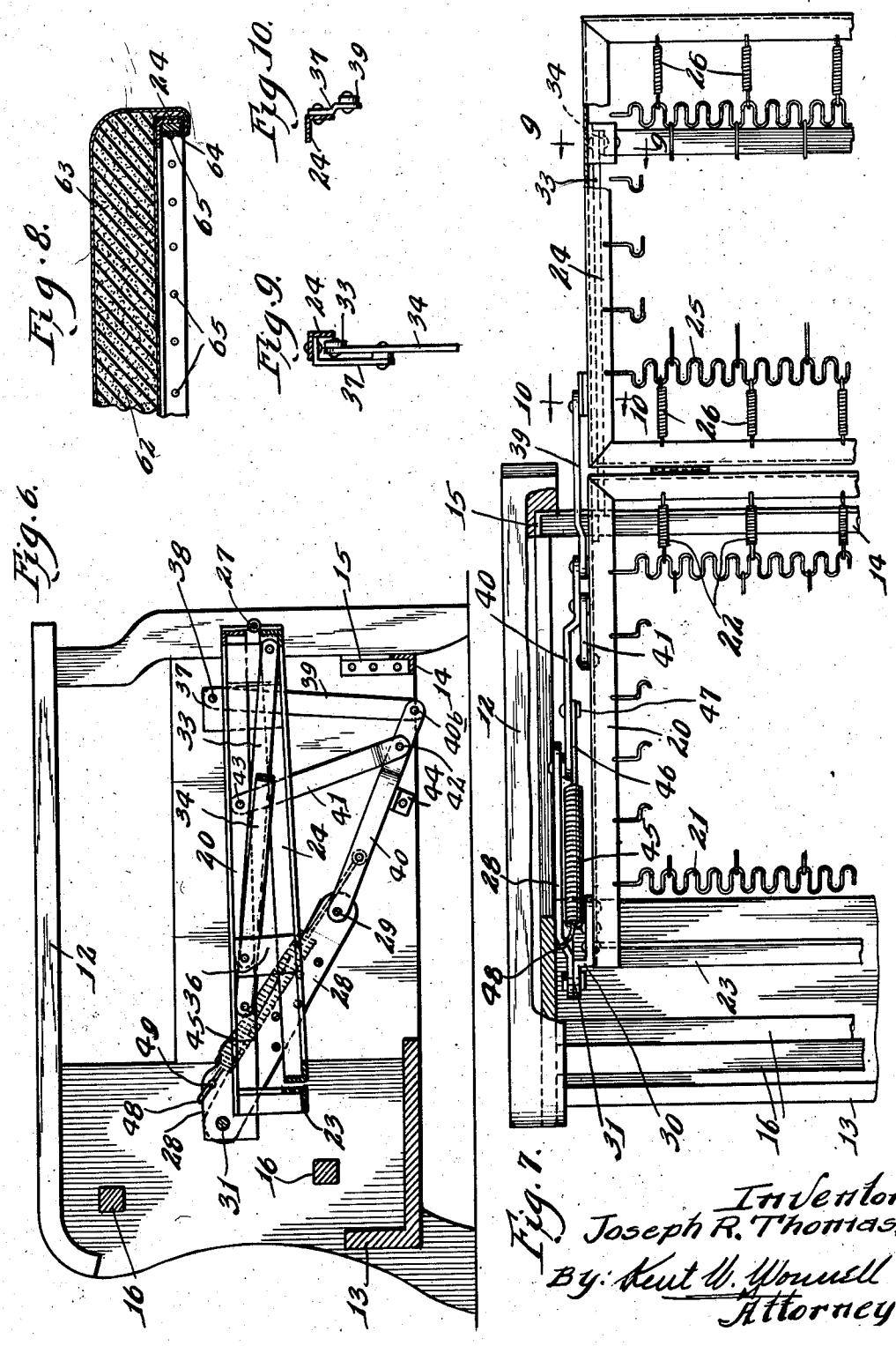
Filed April 1, 1946 3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,632,897

CONVERTIBLE SEAT

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10 Claims. (Cl. 5—29)

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This invention relates in general to a folding seat structure in which a chair may have a foot rest or support extended in front of the seat to provide a comfortable chair or chaise-longue type, and if applied to a settee or davenport, may form a full length bed of narrow or full width disposed between the end frames or arm rests of the davenport.

An important object of the invention is to provide a folding metal construction mounted only in the end frames, extensible and foldable in a predetermined manner without the necessity of guides, rollers, or other contacts with the frame or floor in changing the construction from a seat to a reclining type of furniture, or in returning from the latter condition to a collapsed or folded form within the end frames and below the seat.

A further object of the invention is to provide convertible furniture of the class described in which the mounting of the foldable sections is entirely in the end frames of the structure.

Still a further object of the invention is to provide a folding seat structure in which a seat section has another section hinged directly to the front thereof, foldable closely under the seat section, the sections being automatically folded and unfolded in a predetermined manner in extending and collapsing the sections.

Still a further object of the invention is to provide improved mounting means for connected sections of an extensible seat structure by which the entire folding structure has a limited forward movement relative to the frame for swinging the folding structure forwardly with respect to an upholstered back mounted in the frame.

Other objects of the invention will appear in the specification and will be more apparent from the accompanying drawings in which

Fig. 1 is a sectional view of a convertible seat structure in accordance with this invention in forward or extended position;

Fig. 2 illustrates an improved mounting attachment for a folding structure as shown in Fig. 1;

Fig. 3 is a top plan view of the mounting attachment shown in Fig. 2 as applied to one of the end frames;

Fig. 4 is a sectional view of the structure shown in Fig. 1 in an intermediate position;

Fig. 5 illustrates a modification of the coordinating means connecting the folding sections;

Fig. 6 is a sectional view of the structure shown in Figs. 1 and 4 in a closed or seat position;

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Fig. 7 is a plan view of one end of the structure in open or extended position as shown in Fig. 1;

Fig. 8 is a detail sectional view illustrating the attachment of the cushions to the metal supporting frames;

Fig. 9 is a sectional detail taken on the line 9—9 of Fig. 7; and

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 7.

The present invention relates to a folding structure for chairs and davenports in which metal frames are hinged directly together at the front of a seat section, the extension frame folding directly below the seat section and carrying with it a resilient support similar to that on top of the seat frame so that when the two are extended into alignment, they will form a level substantially continuous and resilient sleeping or lounging surface. This may be possible by providing the metal frames with a resilient metal fabric upon which is mounted an upholstered cushion of any suitable construction, but preferably of the multiple spring filled type or the continuous air rubber type. To this structure is applied a simple linkage which folds and unfolds the extensible section as the seat section is raised and lowered. To free the folding structure from an upholstered back as in making up a bed in the davenport type, an improved mounting is provided in which the entire folding structure is swung forwardly within the end frames upon a limited arc providing sufficient space at the rear into which bed clothes may be inserted or tucked for more easily making the bed and for preventing damage by contact with the back upholstery.

Referring now more particularly to the drawings, the present structure is shown to be mounted in a pair of opposite end frames 12 which are commonly the arm rests of a chair or a davenport, to which the invention is applied. These end frames are connected in any suitable way to hold them rigidly upright, as for example, by means of a rear cross connection 13 at the bottom, an angle bar 14 at the front with the ends 15 of the angle bar turned upwardly and secured to the inner sides of the end frames just within the front legs of the frame, and by upper and lower cross pieces 16 which may also serve to support an upholstered back 17. The structure of this invention comprises two main sections, a seat section and a section hinged to fold under the seat, these seat sections being collapsed to form a chair or davenport seat, and the sections

being extended or placed in alignment to form a chaise-longue type in a chair and a bed if mounted in the davenport.

The chair section comprises a frame 20 preferably of metal angle bars suitably joined and connected to provide a marginal frame in which a flat metal spring fabric 21 is tightly and resiliently supported by means of helical springs 22, in any well known manner. At the rear of this frame, an angular yoke 23 extends downwardly to connect and strengthen the ends of the side frames.

The under the seat section comprises a marginal angle bar frame 24 in which a similar flat metal spring fabric 25 is suitably mounted and is resiliently held by helical springs 26.

The two frame sections are pivoted together by hinges 27 at the front edge of the seat frame connected so that the frame 24 will swing closely below the seat section as shown in Fig. 6 or may be extended in alignment therewith as shown in Fig. 7.

To mount the folding sections in the end frames, a single mounting plate 28 is suitably secured to the end frame by bolts 29, or other fastening devices, to support the plate in a fixed inclined position, inclined downwardly toward the front. The upper rear end of the plate 28 is offset inwardly to afford a support for the rear end of the seat frame 20 which has an offset bracket 30 at each end with a pivot 31 connecting it with the upper end of the mounting plate 28.

Extending downwardly at each side of the seat frame 20 near the front thereof, is a projection 32 preferably a metal plate in which is pivoted one end of a link 33 for operating a supporting leg 34. This supporting leg 34 is located near the front of the connected frame 24 by means of a pivot 35 carried by a downward projection 36 in the form of a thin metal plate, the construction and arrangement being such that when the frames 20 and 24 are folded together, the legs (one at each side) will be automatically folded between them, and as the frames are extended, the legs will be swung to open or supporting position as shown in Fig. 1.

Extending downwardly near the rear or hinged end of frame 24 at each side thereof, is another projecting plate 37 carrying a pivot 38 for supporting one end of a link 39. The other end of this link is connected to the extremity of a lever 40 by a pivot 40*b*, and the opposite end of the lever is connected by a pivot 28*b* with the lower end of mounting plate 28. One end of a link 41 is connected by a pivot 42 to the lever 40 adjacent its outer or free end and the other end of the link is connected by a pivot 43 with the upper and adjacent side of the frame 20 intermediate the front and rear thereof but somewhat nearer the front of the frame.

Downward movement of the lever 40 is limited by a stop 44 secured to the adjacent end frame 12. This stop engages the lever for holding the seat frame 20 in horizontal position by means of the link 41 when the frame 24 is in extended position as shown in Fig. 1, and it also holds both of the frames 20 and 24 in their folded or seat position as shown in Fig. 6.

In order to counterbalance and assist the movement of the frame sections in their folding and extending movements, a coil spring 45 is provided for each linkage, the spring being partially extended and one end 46 being connected to a fixed projection 47 on the corresponding lever 40, the other end 48 of the spring having a hook inserted through an opening 49 at the upper end of the attachment plate 28. The attachment plate 28, the lever 40, and the links 39 and 41 are commonly formed with offsets as shown more clearly in Fig. 7 which facilitate their mounting and movement in the narrow space between the sides of the folding sections and the adjacent inner sides of the supporting end frames. Instead of connecting the link 39 to the extremity of the lever 40, a lever 40*a* may be provided as shown in Fig. 5 which is cut off just beyond the pivot 42, and a corresponding link 39*a* is connected to the frame projection 37 by the pivot 38, but the link is connected at its other end by means of a pivot 41*a* to the link 41 intermediate the ends of this link.

Instead of mounting the folding and extending sections upon a fixed plate 28 at each end of the frames, an additional mounting structure may be provided as shown in Figs. 2 and 3 which comprises an intermediate mounting plate 50 having an offset 51 at its upper rear end with an opening 52 for receiving the pivot 31 by which the seat section is supported and pivoted at the rear and having an opening 53 at its lower inclined edge to receive the pivot 28*b* of the lever 40. The lower edge of this plate 50 extends downwardly and carries the fixed stop 44*a* attached to its lower edge and projecting inwardly from the end frame 12 so that the action of the folding sections mounted upon and with respect to the plates 50 is the same as if the folding structure were mounted directly upon the end frame 12. Two holes 49*a* may be provided in the offset 51 of the plate for engaging the upper end 48 of the spring 45 when thus installed.

A further advantage and difference is provided, however, by supporting each of the angular plates 50 upon the end frames by means of a pair of parallel links 54 and 55. The upper ends of these links are connected by pivots 56 with the upper portion of the plate, and the lower ends of the links are connected by pivots 57 with a mounting strip 58 which is connected directly and permanently to the inner side of the adjacent end frame 12 by means of fastening screws 59. Also secured to the inner face of the end frame at opposite sides of each of the links 54 and 55 are stops 60 and 61 which limit the angular movement of the links to swing the plates, and also the folding frames attached thereto in a limited arc from a rear position close to or against the upholstered back 17 to a forward position free from contact with the back. The stops are located at opposite sides of a central or vertical position of the links 54 so that the folding sections and the plates 50 will remain in either position in which they are placed in contact and limited by the stops 60 or 61. An advantage of this structure is that the folding sections may be moved forwardly to free the back and to provide a space between the rear edge of the seat section and the upholstered back, particularly when the sections are extended in alignment to form a bed, and also to provide for some access to the rear of the sections at any time.

Any type of cushions or upholstery may be applied to the folding sections, such as a multi-spring or an air-rubber cushion 62 as shown in Fig. 8 which may be secured to the metal frame by means of a fabric cover 63 extending over it and around the edge of the metal frame to the inside thereof where a nailing strip 64 is attached to the inside of the frame, the upholstery or cover

63 being attached to the strip by upholstering tacks 65 or other suitable means.

With this construction, the folding sections are completely constructed separately from the chair or davenport frames and may be connected to the mounting plates at the factory and applied to the end frames in a variety of different locations. When the folding sections are mounted in the end frames, the sections are rigidly supported at all times by the metal linkage of levers and connecting links, and in order to unfold or extend the sections, it is necessary only to raise the front of the seat manually from the position shown in Fig. 6 to such a height as permitted by the linkage, as shown in Fig. 4 whereupon the outer or extended section may be engaged by hand and moved outwardly into the extended position as shown in Fig. 1. To reverse the movement or to fold the sections, the outermost section is simply engaged and raised manually whereupon the linkage comprising the links 39 and levers 40 as well as the links 41 will cause the outer section to swing downwardly at the free end away from the joint with the seat section, and pressing the outer section manually inward will draw the supporting legs 34 inwardly and will incline the two sections with respect to each other in such a manner that the continued movement inwardly of the extended section will cause it to fold from the intermediate position as shown in Fig. 4 to an inner folded position as shown in Fig. 6.

At no time is it necessary to support any portion of any of the folding sections with the floor or with any portion of the frame itself. There is no movable roller, slide support or other contact with the frame which is likely to bind the sections in their movement, and the entire action and movement of the folding section is effected by the automatic action of the linkage as thus shown and described.

While a particular construction and arrangement has thus been definitely disclosed, it is by way of illustration and not of limitation, as many changes in the construction, combination and arrangement of the parts may be made without departing from the spirit and scope of the invention.

I claim:

1. In convertible furniture of the class described, a pair of end frames, a seat frame therefor, an extension frame hinged to the front of the seat frame to swing closely under the seat frame, a mounting plate connected to each end frame, means connecting the seat and extension frames to the mounting plates, and said means including pivotally connected parts for controlling the swinging of the extension frame outwardly and overturning it in line with the seat frame when the seat frame is swung upwardly at the front and the extension frame is moved outwardly therefrom.

2. In convertible furniture, a pair of end frames connected together at their rear ends, a connecting cross bar between the end frames at the lower front ends, a seat frame and an extension frame hinged thereto to swing below the seat frame, mounting means including an end plate attached to each end frame, and a hinged coordinating linkage supported only by each end frame and connected to the seat frame and to the extension frame for controlling the swinging movement of the extension frame outwardly from below the seat frame and into alignment with the seat frame free from engagement with the floor of the cross bar when the seat frame is swung upwardly and then downwardly.

3. In convertible furniture, a pair of spaced end frames connected together at their rear ends and by a cross bar between the lower front ends, a seat frame and an extension frame hinged to the front edge and to swing below the seat frame, means for pivoting the rear of the seat frame to swing in the end frames, and a coordinating linkage connected to each end frame and separately to the seat and extension frames for controlling the swinging movement of the seat frame upwardly and downwardly and the extension frame into and out of the end frames over and free from engagement with the cross bar or with the end frames or the floor, in moving the frames from folded relation into alignment and from alignment into folded relation.

4. In convertible furniture, a pair of spaced end frames connected together at their rear ends and by a cross bar between the lower front ends, a seat frame and an extension frame hinged to the front edge of the seat frame and to swing below the seat frame, means for pivoting the rear of the seat frame to swing in the end frames, a folding leg structure pivoted on the extension frame and having an operating link pivoted to it and to the seat frame, and a cordinating linkage connected to each end frame and separately to the seat and extension frames for controlling the swinging of the seat frame upwardly and the extension frame into and out of the end frames over and free from engagement with the cross bar, and also swinging the legs into and out of supporting position as the seat and extension frames are moved to and from alignment with each other.

5. In convertible furniture, a pair of end frames connected together in spaced relation, a seat frame and an extension frame hinged at the front edge thereof to swing under the seat and into alignment therewith, a folding leg pivoted to the extension frame and having an operating link pivoted to the leg and to the seat frame, mounting means for pivoting the rear of the seat frame in the end frames, and a linkage at each end of the seat frame comprising a lever pivoted to the end frame, a link connecting the lever and the seat frame, another link extending from the extension frame and pivoted to the lever, the construction and arrangement causing the extension frame to be unfolded from beneath the seat frame and extended into alignment therewith and also unfolding the leg and moving it into supporting position by raising the front of the seat frame and drawing the extension frame forwardly.

6. In convertible furniture, a pair of supporting end frames, a seat frame pivoted at its rear to the end frames and an extension frame hinged at the front edge of the seat frame to swing under the seat and into alignment therewith, mounting means including a plate having a pair of links connecting it to the end frame to swing relatively thereto and stop means to limit the front and rear movement of the mounting plate, a folding leg structure mounted upon the extension frame and having an operating link extending to the seat frame, a linkage at each end of the seat frame comprising a lever member pivoted to the mounting plate, links separately pivoted to the member and to the seat and extension frames, the construction and arrangement being operative to swing the seat and extension frames relatively forwardly and rear-

wardly and to project the extension frame forwardly and extend the legs when the front of the seat and the extension frame is pulled outwardly and from an extended position to fold the legs between the frames and fold the extension frame below the seat when the front of the seat frame and the extension frame are raised and pushed inwardly.

7. In convertible furniture of the class described, a pair of spaced end frames, a seat frame and a foldable frame hinged to the front edge of the seat frame and to swing below the seat frame, means for pivoting the rear of the seat frame to swing in the end frames, a folding leg structure at each side comprising a leg pivoted at the front of the foldable frame and having an operating link pivoted to it and the seat frame, and operating means connected to each end frame and comprising a lever pivoted at one end to the end frame with separate links pivoted one to the lever and to the seat frame, and another link pivoted to the lever and the foldable frame for controlling the swinging of the front of the seat frame upwardly and of the foldable frame into and out of the end frames, and also the legs being swung into and out of supporting positions by their operating link as the seat and foldable frames are moved to and from alignment with each other.

8. In convertible furniture, a pair of spaced end frames connected together, a seat frame and an extension frame hinged to the front edge of the seat frame to swing below and outwardly from below the seat frame, means pivoting the rear of the seat frame to swing in the end frames and a linkage connected to each frame and comprising a lever connected at one end to the end frame and at the other end having separate links pivotally connected thereto and extending therefrom, one pivotally connected to the seat frame and the other connected to the extension frame to control their joint movement from a folded seat position to an aligned position in front of the seat frame and from an aligned position to a folded seat position when they are manually moved.

9. In convertible furniture, a pair of end

frames connected together at their rear ends, a seat frame pivoted at its rear to the end frames, a foldable bed frame hinged to the front end of the seat frame to fold below the seat frame and a coordinating linkage for folding and unfolding the frames when the front of the seat frame is raised comprising a member pivoted at one end to the end frame, a stop on the end frame to limit the downward movement of the other end of the member, a second member pivoted at one end to the free end of the first member and at the other end to the seat frame, and a link pivoted at one end to the foldable frame and at the other end to one of the two members.

10. In convertible furniture, a pair of end frames connected together, a seat frame pivoted at its rear to the end frames, a foldable bed frame hinged to the front end of the seat frame to fold below the seat frame and a coordinating linkage for folding and unfolding the frames when the front of the seat frame is raised comprising a member pivoted at one end to the end frame, a second member pivoted at one end to the free end of the first member and at the other end to the seat frame, and a link pivoted at one end to the foldable frame and at the other end to one of the two members.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
673,313	Bedell	Apr. 30, 1901
950,137	Karpen	Feb. 22, 1919
1,952,376	Knabusch et al.	Mar. 27, 1934
1,997,577	Ernest	Apr. 16, 1935
2,328,254	Bell	Aug. 31, 1943
2,333,087	Bayer	Nov. 2, 1943
2,352,989	Woller	July 4, 1944

FOREIGN PATENTS

Number	Country	Date
580,268	France	Aug. 26, 1924
769,785	France	June 11, 1934