July 7, 1953 S. A. KELLY, JR., ET AL 2,644,170

CONVERTIBLE SEAT BED WITH FORWARD-TURNING BACK

Filed April 19, 1947 3 Sheets-Sheet 1

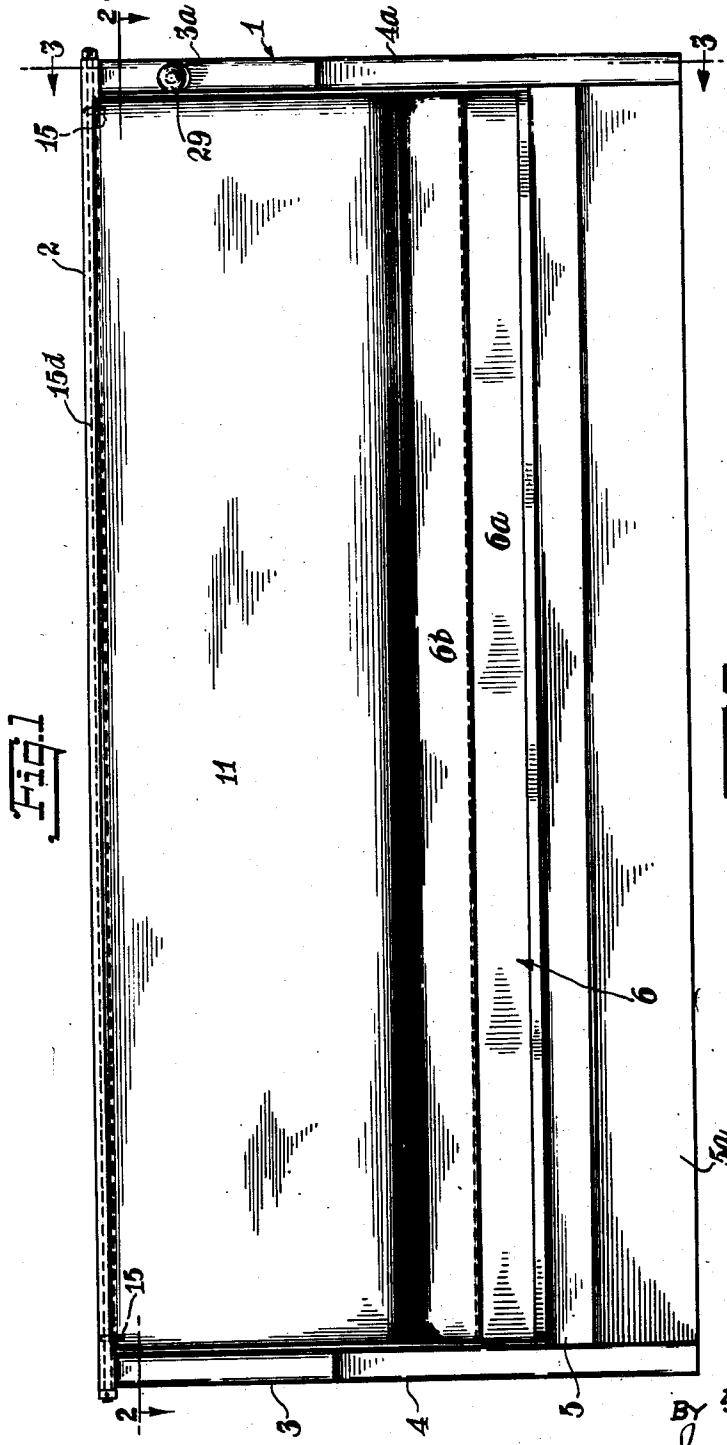


Fig. 1



Fig. 2

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CONVERTIBLE SEAT BED WITH FORWARD-TURNING BACK

Filed April 19, 1947 3 Sheets-Sheet 2

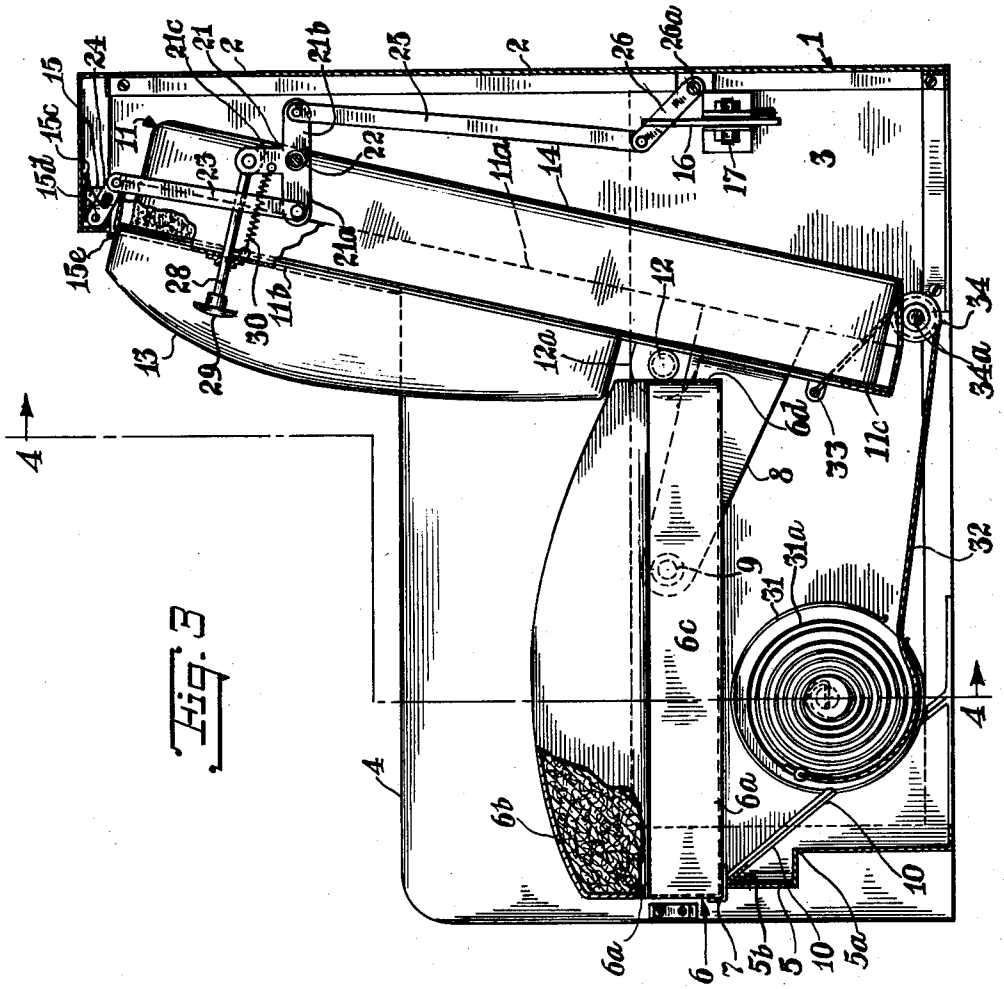


Fig. 3

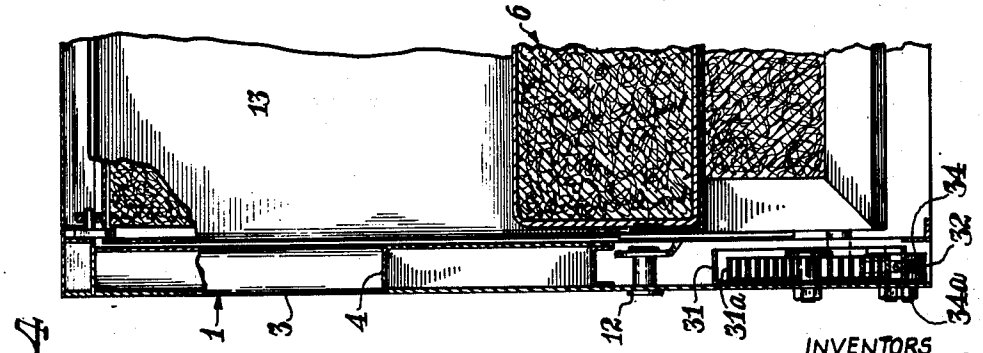


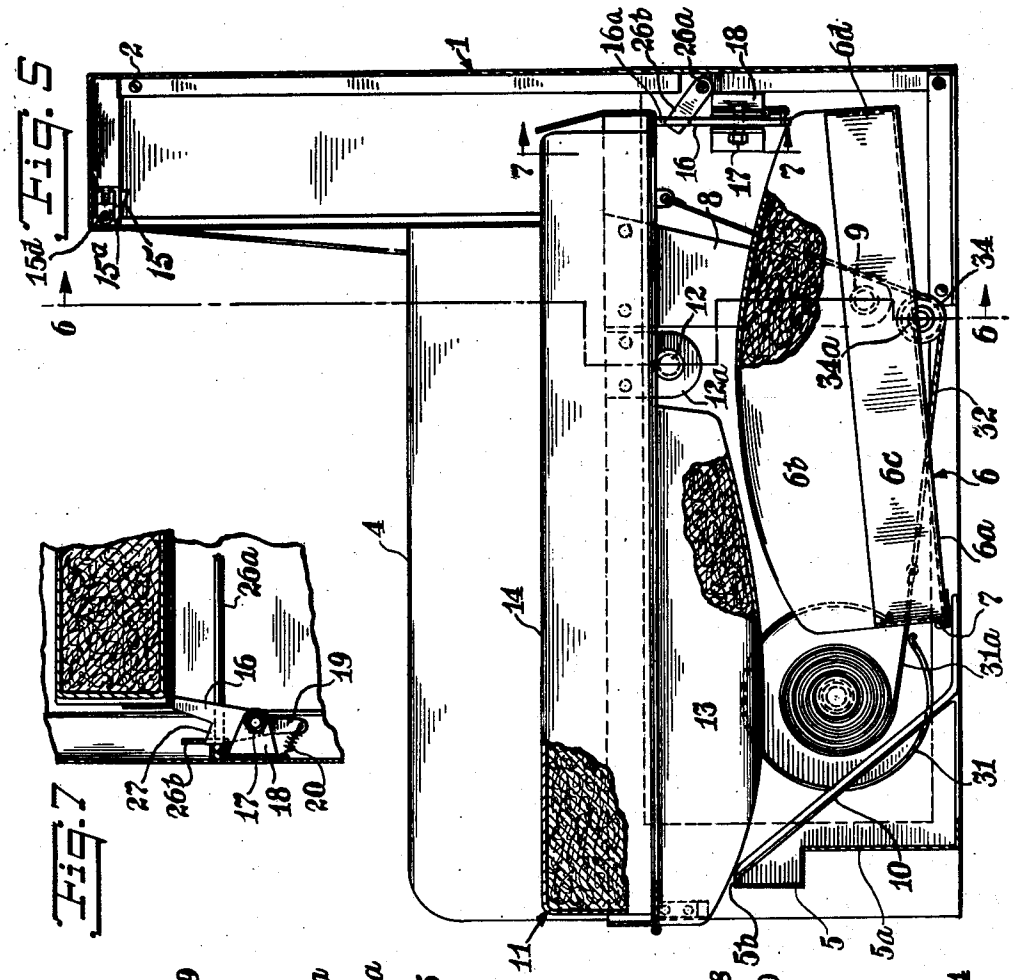
Fig. 4

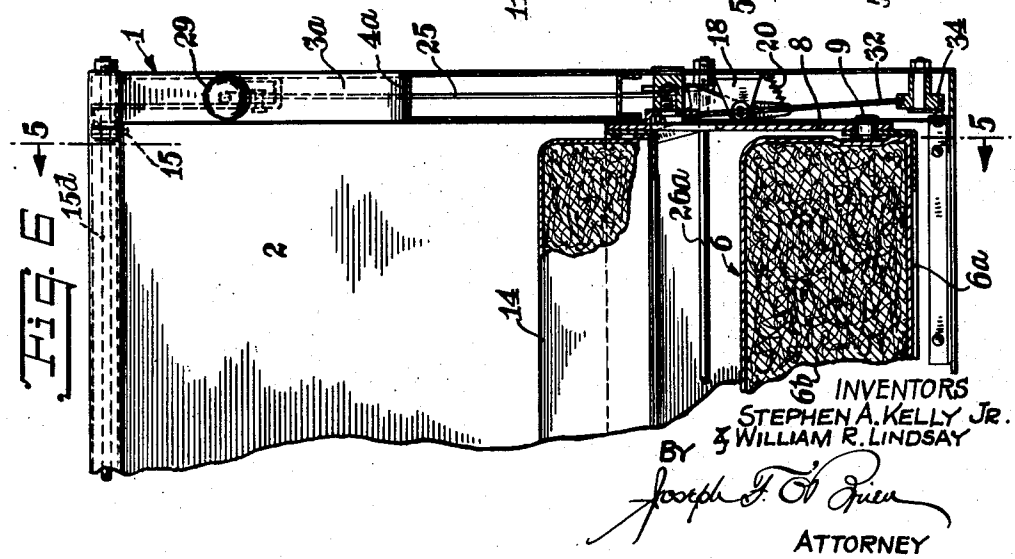
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UNITED STATES PATENT OFFICE

2,644,170

CONVERTIBLE SEAT BED WITH FORWARD-TURNING BACK

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4 Claims. (Cl. 5—43)

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This invention relates to improvements in convertible bed-lounges, seat berths and like devices.

It has been found in practice that a conventional cushion of a lounge or seat is not desirable for conversion into a comfortable bed and conversely a comfortable spring mattress is too wide and otherwise not suitable for providing a comfortable lounge-seat. Consequently, efforts have heretofore been made in which lounge cushions and a mattress have both been employed in the same device, a back-member of a lounge carrying on its front surface a suitable back-rest cushion and on its rear surface carrying a spring mattress; said back-member being adapted to be moved into alternate positions, one of such positions being the erect lounge or seat-forming position in which the back-member cooperates with a lounge-seat member having seat cushions to produce a comfortable lounge or seat, and the other position being a bed-making position in which the back-member having the mattress is moved into and supported in horizontal position. In bed-making position, the comfortable spring mattress is moved to a position over the seat cushions and seat cushions are either removable to permit a lowering of the mattress or said mattress and back-cushion member is positioned above the position of the seat cushion and therefore too high for comfort. The removal of cushions is objectionable because of the loose parts, the labor required, the fact that such removed cushions take up space, and also because such handling and removal of the cushions cause wear and tear on the device under consideration.

In devices of the type specified, the cushioned lounge-seat member, with which the seat-back member cooperates, has in lounge or seat-forming position been fixedly supported in a suitable lounge-seat frame and to avoid loose cushions the seat-back member carrying the spring mattress has been folded over this fixed seat member. This results in a bed that will be unduly high and therefore objectionable. This may, to some extent, be compensated for by reducing the conventional height of the lounge or seat, but if loose cushions are to be avoided, the seat member must either be positioned too low or the bed too high for the comfort of the user.

One of the objects of our invention is to provide a bed-lounge or seat-berth construction in which the lounge-seat member may be positioned in a conventional comfortable positions during use as a seat, all cushions may be retained securely in place, and the movement from lounge-

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making position into bed-making position of the back member carrying the seat-back and mattress will simultaneously cause the seat-member of the lounge to be lowered preferably in a rearward and downward movement out of the path of the cushion of the lounge back member and the mattress carried by said back member will be moved into substantially the place of the seat member at the proper height and position for the comfort of the user, and similarly upon movement of the seat back member in reverse direction, the parts will be replaced to provide a comfortable lounge.

Another object of our invention is, in a device of the character specified, to provide fixed pivots disposed between its ends for pivotally-moving the seat-back member into its alternate positions and to utilize pull-arms connected with a portion of said mattress-carrying seat-back member below such fixed pivots to move or shift said seat member and its cushion downwardly and to the rear side of the frame of the device so as to permit the movement of said seat member and its cushion into a space below the bed-making position of the seat-back member and upon reverse movement of said seat-back member to shift said seat member with its cushion back into its lounge or seat-making position.

Still another object of our invention is to provide, in combination with positively-actuated pull-arms hereinabove specified, a track for guiding one edge, and preferably the front edge, of the seat member to cause the said seat member to be shifted downwardly and rearwardly in said frame, upon one movement and upwardly and forwardly upon a reverse movement.

Another object of our invention is to provide spring balancing means whereby the movement of the mattress-carrying seat-back member and the shiftable seat member will be thoroughly balanced during movements thereof in the fixed frame of the device and will be securely held in the alternate position thereof.

Still another object of our invention is to provide means for automatically locking the mattress-carrying back member in its bed-making position and also means for engaging and locking the parts when the members are in lounge-forming position.

Still another object of our invention is, in a device of the character specified, to provide a rigid frame or pan for said movable seat member combined with a fixed support for the front edge of the seat and a movable support for the rear edge thereof preferably having a supporting engage-

ment with said pan or frame along a longitudinal axis disposed between the middle of the seat and the rear edge thereof, whereby said seat frame may be rigidly supported to provide a comfortable seat and an upward folding or tilting of said seat-frame about the rear axis thereof will enable access to stowing space beneath the seat in its lounge-forming position.

Still another object of our invention is in a shiftable seat of the character specified to provide spring-balancing means coupled with flexible pull members adapted to have an initial assisting pull on the back member and thereafter successively to produce a spring balancing pull in the opposite direction against the downward movement of the seat-back and seat members.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to coact and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:

Fig. 1 is a view in front elevation of a bed-lounge in erect-lounge-forming position;

Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a vertical section on the line 3—3 of Fig. 1 looking in the direction of the arrows and showing our device in lounge-forming position;

Fig. 4 is a fragmentary section on the line 4—4 of Fig. 3 looking in the direction of the arrows;

Fig. 5 is a section on the line 5—5 of Fig. 6 showing the device in bed-making position;

Fig. 6 is a fragmentary section on the line 6—6 of Fig. 5 looking in the direction of the arrows; and

Fig. 7 is a detailed view of the locking mechanism employed for locking the mattress carrying member in bed-making position.

Referring now to these drawings which illustrate a preferred embodiment of my invention, 1 indicates a supporting frame member of our convertible bed and lounge unit. As illustrated, the frame member 1 includes a hollow back portion 2, end members 3—3ª preferably having forward extensions 4—4ª, and at the forward edge of the device a seat-supporting front-rail or plate 5 which preferably extends from the extension 4 to the extension 4ª in a plane below a seat-member 6 which, in the lounge-forming position of the device, is loosely supported at its front edge 6ª by said rail 5 and is pivotally supported at opposite ends of its rear portion and rear edge to cause said seat to be firmly supported in elevated seat-forming position in the plane of the top of said rail 5 and to be movable from said loosely-supported lounge-forming position to a lowered out-of-the-way position as hereinafter specified.

As shown, the rail 5 is provided below the top thereof with a re-entrant bend at 5ª and has at its upper edge an inturned, horizontal fixed flange 5ᵇ on which, in said lounge-forming position, the front portion of said seat member 6 is adapted to rest, and in the form of seat illustrated, the bottom corner of such front edge is reinforced by a corner angle-member 7 which rests on the inturned supporting flange 5ᵇ. The seat member, as illustrated, comprises a rigid cushion-supporting pan or frame 6ª and a cushion 6ᵇ. The said rear portion of the pan 6ª is pivotally supported on a pair of arms 8 projecting forwardly from the foldable seat-back member 11 and is pivotally movable about an intermediate axis positioned between the middle of opposite end rails 6ᶜ of said pan of the seat member 6 and the rear edge 6ᵈ thereof. A pivotal support comprising the pivots 9 in the arms 8 is thus provided for said rear portion 6ᵈ and the seat member 6, and when said arms 8 are moved, a bodily movement of said seat 6 will be caused. At the same time, while the device is in its lounge-forming position, means is provided to permit a manual upward tilting of the front edge about said intermediate axis to enable access to stowing space beneath the seat.

In accordance with our invention, the seat member is siftable bodily off the flanges 5ᵇ and movable downwardly on guide members 10 and such bodily shifting is accomplished upon a folding or converting movement or operation of a seat-back member 11 when said seat back member 11 is moved from the erected lounge-forming position shown in Fig. 3 to the bed-making position shown in Fig. 5 as will now be more particularly specified.

In the embodiment of our invention illustrated, the seat-back member 11 in lounge-forming position extends above and below the seat member 6 and is foldable or pivotally movable about fixed pivots 12 on the supporting frame 1 and positioned intermediate the longitudinal edges of said seat-back member 11 which has forwardly-extending lugs 12ª with which said fixed pivots 12 engage. Said seat-back member 11 comprises a rigid elongated frame or pan member 11ª and the pivots 12 are positioned at substantially seat height above the floor to provide dual sections, one comprising a relatively long section 11ᵇ which, in seat-forming position, extends upwardly a suitable distance above said pivots and is provided on its forward face with a non-removably mounted back-cushion 13, while the other section 11ᶜ is relatively short, extending in said position downwardly below said pivots, and is employed during a folding or converting movement of the said member 11 as a lever for bodily shifting the seat member 6 as hereinabove specified. The arms 8 having the seat-supporting pivots 9 are fixedly connected with and project at a right angle from said short lever section at a point removed from and below said pivots 12 to produce a bell-crank construction in which the arms 8 in the inclined position of the seat-member 11 are inclined upwardly, while the ends thereof with the pivots 9 carried thereby, in said inclined position of the seat-back member, assume a position in substantially the horizontal plane of the pivots 12 and are movable in a downwardly-and-rearwardly-directed arc during movement of said short-lever rearwardly and upwardly.

On the entire rear face of the member 11 opposite to said cushion 13 a suitable comfortable spring mattress 14 is irremovably mounted and is arranged to provide a comfortable bed in substantially the same plane as occupied by the seat when said member 11 is swung on its pivots 12 and thus moved to a horizontal bed-making position.

As the pivotally-mounted seat-back member 11, in lounge-forming position, is normally retained in a plane in which the upper section is slightly inclined rearwardly from a vertical plane, with the cushion 13 normally held in such rearwardly-inclined position, the top portion of said seat-back member 11 will, in a converting move-

ment, be pulled forwardly to move or swing said member 11 about said pivots 12. In this movement, the said two sections will be first moved to a vertical plane. Upon this initial movement, the bell-crank arms 8 will move into horizontal position and the rear end of the seat portion will be tilted downwardly and somewhat depressed without, however, dislodging the seat from its lounge-forming position, so that the seat-back and seat members assume an initial neutral or balanced position. Further manual movement will then cause the long section to move forwardly and downwardly till it assumes a horizontal position and in this movement said short section will be moved, as aforesaid, rearwardly and upwardly in an arc of a circle till said horizontal position is assumed. During such further converting movement the arms 8 will be movable in an arc from a substantially horizontal position to a substantially vertical position in which the pivots approach the floor, and in said converting movement, said outwardly-projecting arms 8 will shift and carry the seat member 6 downwardly and rearwardly into a stowed position adjacent to the floor while a reverse movement thereof will cause said seat member 6 to be shifted and carried back into its initial lounge-forming position.

In order to guide and facilitate the said shifting movement of said seat member 6, we provide inclined tracks 10 for contacting the forward edge 6a of the seat member 6 during movement from its elevated seat-forming position to its lower stowed position and vice versa.

The seat-back member 11 and the cushion 13 is preferably securely held and locked by suitable latches in said rearwardly-inclined lounge-forming position, and when said member 11 is swung into horizontal position will be securely locked by latches in said bed-making position, with the top of the spring mattress occupying a horizontal plane substantially registering with the plane formerly occupied by the top of the cushion of the seat member. As illustrated, the said seat-back member 11 is held in its upright position by a locking-bolt 15 releasable by a slotted tilting member 15a mounted on a horizontal shaft 15d and adapted to engage projections 15c on the locking bolt 15. Obviously an arcuate rotary movement of the shaft 15d will cause a tilting of the member 15a and the withdrawal of the locking-bolt from sockets in the upper edge of the member 11. Said seat-back member 11 is held in its bed-making position by a latching member 16 pivoted intermediate its ends at 17 in bearings 18 on the rear wall 2 of the frame and having at its upper end a pan-engaging part 16a and at the opposite end a tail portion 19 connected by a spring 20 with the said rear wall 2. The member 16 is so positioned that the engaging part projects slightly into the path of the seat-back member 11 and in the converting movement of the seat-back member is moved backwardly against the action of the spring until said seat-back member passes the same, whereupon it will automatically move beneath said member 11 to lock the same securely in position.

It is desirable to release both the locking-bolt 15 and the pan-engaging part 16a by a single operating element and, as illustrated, we provide on the casing or frame 1 a double-acting bell-crank lever 21 pivoted at 22 and having one arm 21a pivotally connected to rod 23 which is pivoted to a link 24 adapted to swing the shaft 15d in an arcuate path, as aforesaid, while said bell-crank is provided at the opposite side of said pivot with an arm 21b pivotally connected to a rod 25 which is pivotally connected with a link 26 pivoted on shaft 26a and engageable with the projection 27 on the latch 15 to release the same. It will be understood that the latching member 16 and latch-releasing member 26 will be duplicated at opposite sides of the seat-back member 11. Thus a duplicate member 26b will be mounted on the shaft 26a which, upon movement, will release both latches simultaneously. Said bell crank is operated by an operating arm 21c to which is connected a plunger rod 28 having a knob or handle 29 adapted, upon inward pushing, to swing the bell crank about its pivot 22 for the purpose of releasing the latches. The bell-crank and said latching members are normally held in latching position by spring 30 stretched between the operating arm 21c and the frame portion 3a of the device.

In heavy constructions of the type specified, it is desirable to balance the weight of the seat-back member 11 during its converting movements, and for this purpose we provide at least one conventional balancing-spring assembly 31 in which the spring 31a is connected by flexible connection 32 with the forward or front face of the short-lever part of the pan 11a at 33 and said flexible connection 32 passes around a pulley 34 journalled on a shaft 34a fixedly mounted in the frame portion 4 of the device in a position below and slightly to the rear of the pivots 12 so that in lounge-forming position the pull of the spring will tend automatically to move the seat-back member 11 from its rearwardly-inclined position into a substantially vertical position when the latch 15 is released, and will thereafter, during a lowering or folding movement, balance the weight of said seat-back member, and in a reconverting movement to lounge-forming position will upon release of the latch 15 tend to move said member 11 into vertical position from which it may be readily moved manually into its normal rearwardly-inclined position in which it will be automatically latched by the latch 15.

Movements of the various parts of the device will be clear from the above description. It will be obvious that manual pressure on the knob 29, when the parts are in lounge-forming position, will release the latch 15 and move the seat-back members to vertical position from which it may be readily depressed to shift the seat member; to replace said seat in the same movement and to be securely latched in bed-making position, and also that upon an inward releasing movement of said knob 29 while the device is in horizontal bed-making position will free the device for a balanced swinging to vertical position and a pushing of the seat upwardly on the track 10 into a supported position inclined in relation to its final seat forming position, and that a subsequent facile movement of the back member from vertical to rearwardly inclined position will cause a latching and secure retention of the parts in lounge-forming position.

Having described our invention, we claim:

1. A convertible bed-lounge, seat-berth or like device embodying, in combination, a stationary couch-frame including a pair of spaced stationary end-frames and a front rail connecting said end-frames, a back-member foldable from couch-forming to bed-making positions and pivoted intermediate its end edges in said end-frame about an axis positioned to provide a relatively-long portion at one side of said axis and a relatively

short portion at the opposite side thereof, a backrest cushion carried on the front face of said relatively long portion of said back member, a spring mattress carried by and extending over the entire rear face of said back member, said relatively long cushion-carrying portion of said back-member being movable forwardly and downwardly from its couch-forming position while the relatively short portion is movable rearwardly and upwardly to cause said back-member to assume a horizontal bed-forming position, a pair of outwardly-extending arms fixed to the front face of said relatively-short portion of said back-member and movable during folding of said back member from couch-forming to bed-making position in a downward and rearward direction, a cushioned seat-member having in couch-forming position its front-edge portion loosely supported on said stationary front rail and having its rear portion pivotally connected to said outwardly-extending arms, said seat member, upon the bed-making pivotal movement of said back member, being pulled downwardly and rearwardly with said forwardly extending arms, a releasable latching device for retaining said seat member in couch-forming position, a releasable latching device for retaining said back member in bed-making position, mechanism connecting said latching devices, and a single operating element arranged in one of the end members for releasing each of the latching devices of the back member in both its couch-forming and bed-making positions.

2. In a convertible bed lounge, seat berth or the like including a stationary couch frame having a vertically-disposed back frame member and a front rail member, a combined back and bed member pivoted in end members of said couch frame on fixed pivots disposed at approximately seat height aand positioned and spaced a substantial distance forwardly of the rear edge of said couch frame, said back and bed member being of sufficient width to provide on its front face at one side of said fixed pivots a seat back portion and on its rear face to provide at both sides of said pivotal axis a full-size bed portion, said back and bed member having on its front face at the side of said fixed pivots opposite to said seat-back portion a seat-engaging bracket, a seat member pivotally mounted on said bracket to extend forwardly from said front face of the combined back and bed member into supporting contact in couch-forming position with said front rail member, said combined bed and back member in both forward and reverse movements about said fixed pivots being adapted to move from a rearwardly inclined couch-forming position to a horizontal bed-making position and to stop at an intermediate mechanically-balanced dwell position disposed within vertical planes spaced forwardly from said stationary back frame member with said seat member partially supported in said couch frame and disposed in balanced relationship to said pivoted back and bed member, and manually-releasable fastening means on said stationary couch frame engageable in said rearwardly-inclined couch-forming position of said back and bed member with an edge thereof to normally retain the same in said rearwardly-inclined couch-forming position.

3. A convertible bed lounge, seat berth or the like as claimed in claim 2 in which the fixedly pivoted back and bed member together with the seat-carrying bracket and the seat carried thereby are arranged to form a bell-crank structure adapted in the intermediate mechanically balanced dwell position to support said seat in said couch frame in a downwardly tilted position while said back and bed member is in vertically disposed position.

4. A convertible bed lounge, seat berth or the like as claimed in claim 2 in which a pulley is mounted beneath the lower end of said back and bed member at the rear of the supporting pivots thereof in substantial alignment with the vertical position of said back and bed member in its intermediate dwell position, a balancing spring is mounted at the front of said couch frame and a flexible connection is connected at one end with said balancing spring, passed around said pulley and connected to said back and bed member at a point positioned forwardly of the pivotal axis of said pulley whereby said balancing spring will, upon release of said fastening means, produce a positive movement of said back and bed member into its initial vertically-disposed intermediate dwell position and thereafter will resist further movement into bed-making position.

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