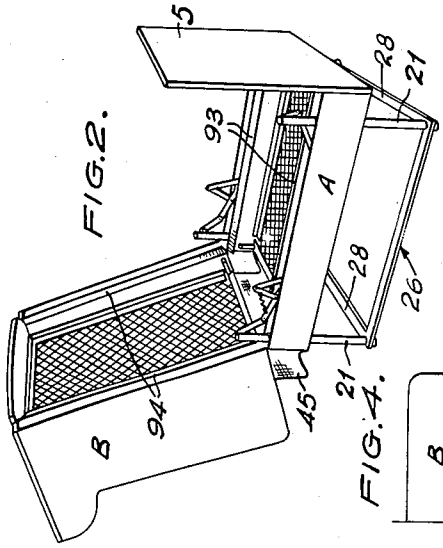
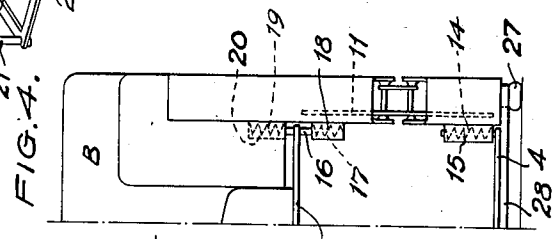
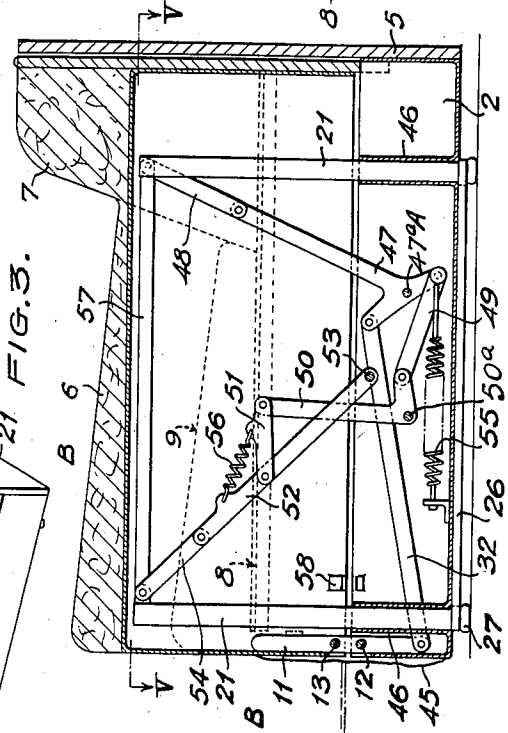
March 12, 1940. C. FRECH ET AL 2,193,402

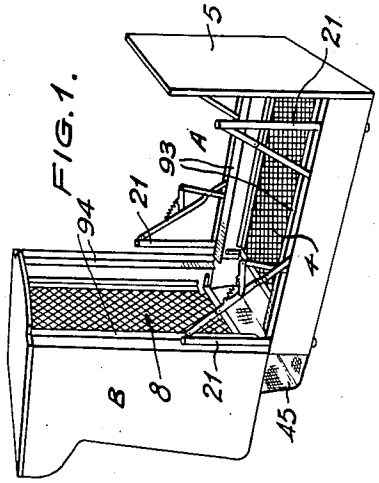
ARTICLES OF FURNITURE, SUCH AS BED CHAIR AND BED SETTEE

Original Filed March 29, 1938 4 Sheets-Sheet 1









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ARTICLES OF FURNITURE, SUCH AS BED CHAIR AND BED SETTEE

Original Filed March 29, 1938 4 Sheets-Sheet 2

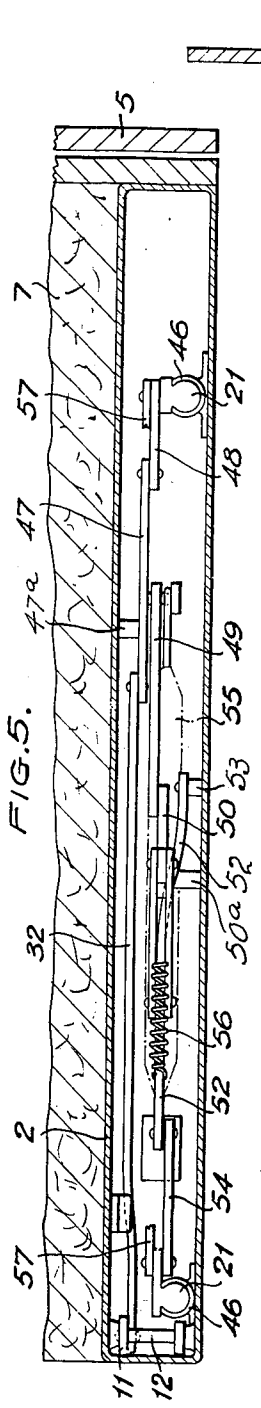


FIG. 5.

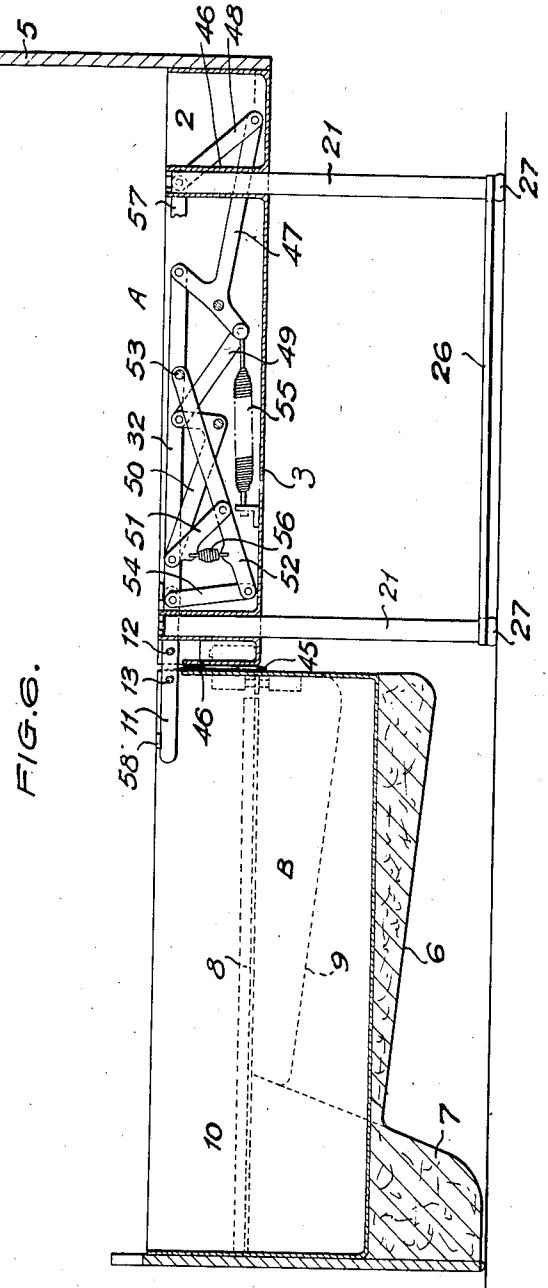


FIG. 6.

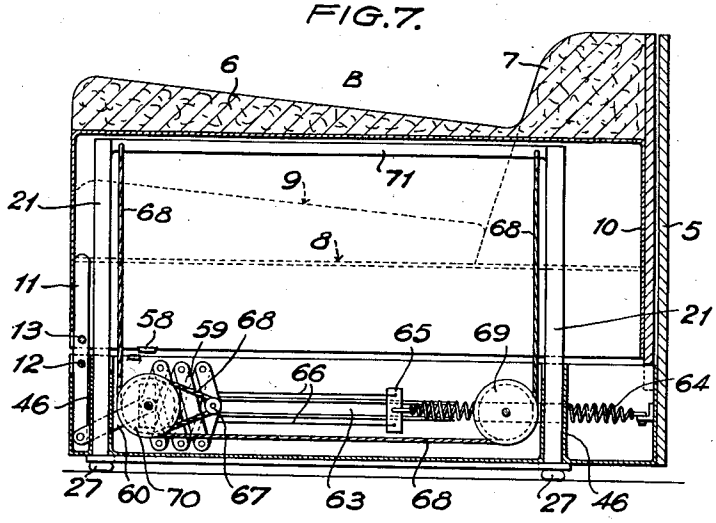
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ARTICLES OF FURNITURE, SUCH AS BED CHAIR AND BED SETTEE

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FIG.7.



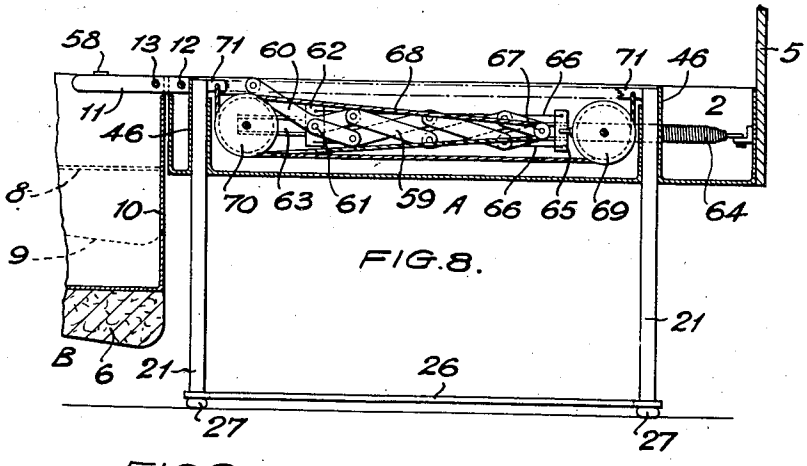


FIG.8.

FIG.9.

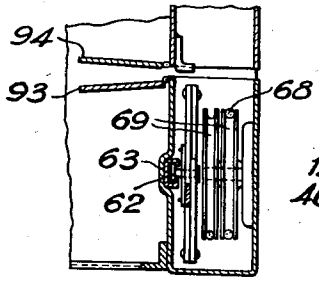
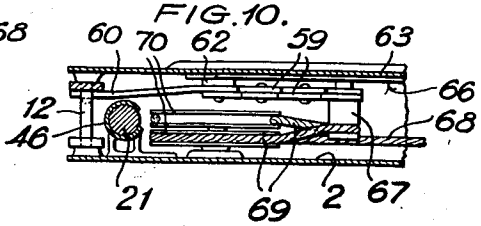


FIG.10.

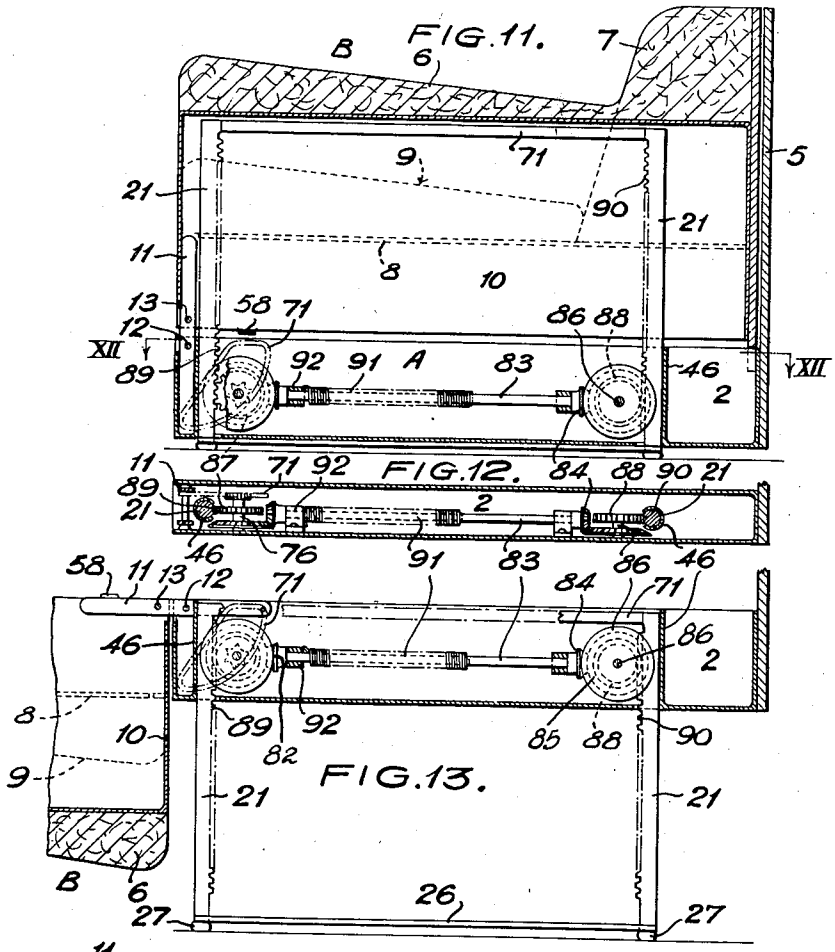


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ARTICLES OF FURNITURE, SUCH AS BED CHAIR AND BED SETTEE

Original Filed March 29, 1938 4 Sheets-Sheet 4



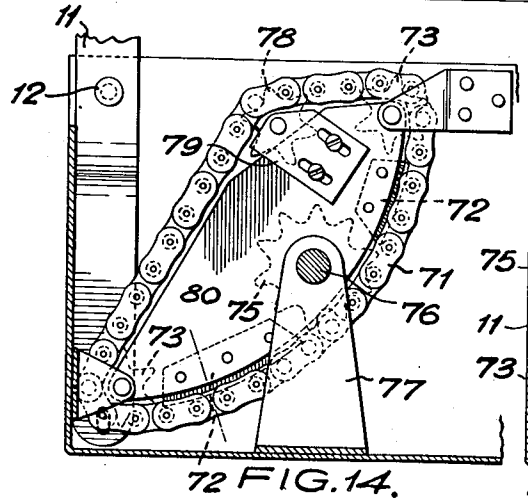


FIG.14.

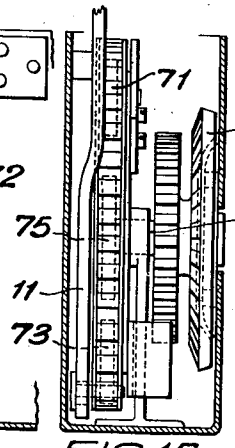


FIG.15.

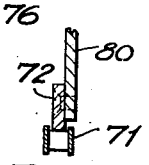


FIG.16.

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Patented Mar. 12, 1940 2,193,402

UNITED STATES PATENT OFFICE

2,193,402

ARTICLES OF FURNITURE, SUCH AS BED CHAIR AND BED SETTEE

Charles Frech and John Eric Nilsson, London, England

Original application March 29, 1938, Serial No. 198,767. Divided and this application January 13, 1939, Serial No. 250,824. In Great Britain November 7, 1938

9 Claims. (Cl. 5—31)

This invention is a division of our co-pending application, Serial No. 198,767, filed March 29, 1938, and relates to improvements in bed chairs and bed settees of the kind in which an extension section is normally supported on a main frame to which said section is hingedly or pivotally connected, the section being swung over to extend the supporting surface of the article to convert the chair or settee into a bed.

Bed chairs and bed settees of this kind have already been proposed in which, after a predetermined initial swing-over movement of an extension section in relation to the main frame of the article, one or more members on the swinging extension automatically effect the projection of legs beneath the main frame in which latter the said legs are normally housed and concealed.

In order to impart rigidity to the extended bed the leg-operating members have been adapted to initiate or effect the projection simultaneously of two transverse pairs of legs, one pair at or near the rear of the main frame forming the rear legs of the extended bed, and the other pair at or near the front of the main frame, forming legs intermediate of the length of the extended bed.

The present invention is concerned with improvements in articles of the kind referred to. One of the main objects of the present invention is to provide a bed chair or bed settee comprising a main frame provided with substantially vertical slidable rigid legs and an extension section pivoted thereto and carrying leg-operating means which remain stationary during a predetermined initial swing-over movement of the extension about one transverse axis of pivoting. The leg-operating members function during the continued swing-over movement of the extension to project the retracted legs and elevate the main frame, thus bringing a horizontal supporting surface provided on said main frame into alignment with a second horizontal supporting surface provided on the underside of the extension.

Preferably the usual back of the chair or settee (and arm, if provided) move with the swing-over extension section and the main frame of the chair or settee is provided with a separate upright member which is normally disposed behind the chair or settee back and which forms a head board when the chair or settee is converted to bed-like form.

Hitherto bed chairs and bed settees have generally been constructed so that the main frame remains resting upon its own legs when converted into a bed. In such constructions, a comfortable seat height above the floor level results in a bed surface which is rather lower than that of the average bedstead. Alternatively, if provision is made for a bed surface of usual bedstead height, the seating surface of the chair or settee is uncomfortably high. The improved construction according to this invention obviates these disadvantages by providing both a bed-surface and a chair or settee seating surface at comfortable height above floor level. This desirable result is achieved by the elevation of the main frame, as stated, into a position in which a horizontal supporting surface provided on said main frame is brought into alignment with a second horizontal supporting surface provided on the underside of the swung-over extension section, thereby providing a full-length supporting surface for mattresses and bed-clothing.

The leg-projecting mechanism is housed in the main frame of the chair or settee and the leg-projecting movements thereof are initiated through the agency of the leg-operating members carried by the extension section after a predetermined initial swinging movement of said section.

It will have been understood from the foregoing description that the term "bed-legs" is applied to movable legs carried by and adapted to project below the main frame so as to elevate same. When the extension section has been fully swung over, with consequent elevation of the main frame and the projection of the "bed-legs", the chair or settee back may form the support for the foot end of the end, or alternatively extensible front or foot-end legs may be housed in the extension section, which are automatically projected to an operative position when the said section is swung over.

The main reason for providing for a delay in the leg-projecting movement while the extension section is swung through a predetermined initial movement, is to make it an easy task for the extension section to be swung up vertically and thereafter to take advantage of the weight of the pivoted section to exert a leg-projecting effort, such effort being aided, if desired, by the pulling power of springs associated with the leg-projecting mechanism, as will be apparent from the description of particular construction which follows. For the same reason, the actuating mechanism is also arranged so that when converting a bed into a chair or sette a predetermined initial swinging movement of the exten-

sion section must be made before the retraction of the bed-legs is initiated or effected.

The accompanying drawings show, by way of example, three constructions employing rigid bed-legs housed when the article is in chair form partly in the arms of the extension section and partly in the main frame. The construction shown in Figures 1 to 6 employs leg-operating mechanism of pivoted link form. Figure 1 shows the extension section after having effected a predetermined initial swing-over movement, the leg-projecting mechanism being about to be put into operation, whilst Figure 2 shows the chair during the leg-projecting movement. Figure 3 is a part-sectional elevation of the article in chair form, Figure 4 is a fragmentary front view of the chair, Figure 5 is a sectional plan on line V, V of Figure 3, to an enlarged scale and Figure 6 is a longitudinal section of the article in bed form.

A further modification is shown in Figures 7 to 10 in which the linkage is of lazy-tongs form. Figure 7 is a part-sectional side view of the article in chair form, Figure 8 is a fragmentary longitudinal section of the article in bed form, and Figures 9 and 10 are detail views of the leg-projecting mechanism.

In Figures 11 to 16 is shown a bed chair with leg-projecting mechanism of toothed-gear and chain-drive form, Figure 11 being a part-sectional side view. Figure 12 is a fragmentary sectional plan on line XII—XII of Figure 11, Figure 13 is a fragmentary longitudinal sectional view, Figure 14 is a fragmentary end elevation, Figure 15 is a transverse section of the mechanism shown in Figure 14 and Figure 16 is a detail hereinafter described.

In the construction of bed chair illustrated in Figures 1 to 6, the main frame A of the chair which normally rests upon the floor on an assembly of four legs suitably braced and hereinafter referred to and described as the bed-legs, comprises a pair of side boxes 2 with closed bottoms 3, a wire mattress 4 extending between said boxes 2 and an upright board 5 which forms the head board of the bed when the article has been converted into bed form. The extension section B comprises a pair of upholstered arms 6, an upholstered back 7, a wire mattress 8 supporting an upholstered seat 9 and extending transversely between a pair of side boxes 10 which latter extend vertically above and below the level of the mattress 8, the upper part of said boxes 10 being enclosed within the upholstered arms 6. These boxes 10 may serve also to house auxiliary front-end legs of the form described in the specification of our concurrent application Serial No. 198,767, already referred to. The use of these auxiliary legs is optional.

The main frame A and extension section B are connected together solely by means of a pair of hinge bars 11, one at each side of the chair, said bars 11 being hinged to the boxes 2 of the main frame A at pivots 12, and to the boxes 10 of the extension section B at pivots 13.

The wire mattress 4 of the main frame A is resiliently mounted for use as bed-supporting surface by being suspended on tension springs 14 anchored to housings 15 and secured to the walls of the boxes 2. Similarly, in order that the wire mattress 8 of the extension section B shall yield when the seat 9 is sat on, rods 16 are provided which rest upon compression springs 17 carried in housings 18 secured to the walls of the boxes 10. When the section B is swung over to form a bed extension the mattress 8 also yields to any weight imposed thereon by reason of the rods 16 then bearing down upon the compression springs 19 carried in housings 20 also secured to the walls of the boxes 10.

The bed-legs 21 are connected at their bottom portions by the side frame members 26 and the front and rear frame members 28, and the lower extremities of the legs are provided with feet 27. Said legs 21 are slidable in a substantially vertical direction in tubular guides 46 of C-section (see Figure 5) are accommodated, together with the leg operating mechanism, partly in the open-top main frame boxes 2 and partly in the open-bottom extension boxes 10. The leg-operating mechanism comprises main motion links 32 connected to the lower ends of the hinge bars 11, which transmit the swing of said hinge bars 11 to three-armed levers 47 pivoted as at 47a to the inner side walls 2 of the boxes and from thence through links 48 direct to one pair of bed-legs 21 and through links 49, and bell-crank levers 50, pivoted as at 50a to the outer side walls of the boxes 2 to links 51 pivoted to the middle portions of bars 52 swinging about pivots 53 and links 54 connected to the upper ends of the other pair of legs 21. Springs 55 and 56 control the swing of the linkage. The upper ends of the two legs 21 of each pair are connected together by steady bars 57. It will be apparent that when the hinge bars 11 swing about pivots 12 the linkage operates to eject the retracted legs, the springs 55 and 56 assisting in the action. It will also be quite clear from the drawings that during the initial swing-over movement of the extension section B, said section swings about the pivots 13, without moving the hinge bars 11. When the section B reaches the position indicated in chain-dotted lines in Figure 3, inwardly projecting lugs 58 on the boxes 10 abut against the hitherto stationary hinge bars 11 so that during the continued swinging movement of the section B, said bars 11 move with the section and thus actuate the leg-projecting mechanism. In other words the axis of swinging of section B is transferred from pivots 13 to pivots 12.

It will be observed that ample space for the storage of flock mattresses (which are preferably laced to the wire mattresses 4, 8) and of all the necessary bed-clothes is afforded in the chair within the space between the wire mattresses 4 and 8. Figure 1 illustrates clearly the extent to which the extension section B can be swung over before the leg-projecting movements are effected, whilst Figure 2 shows how, after the predetermined initial swing-over movement has been effected, the continued swinging of the Section B is accompanied by the projection of the bed-legs. The opening at the front of the chair between the wire mattresses 4 and 8 is normally covered by a flexible curtain 45.

In the construction illustrated in Figures 7 to 10 the leg-projecting mechanism is housed solely within the main frame boxes 2 and consists of a series of links 59, 60 pivoted together in lazy-tong fashion, the end link 60 being of crank form and connected to the lower end of the hinge bar 11. The pivot 61 of the link 60 is mounted on a slider 62 which can move along the slideway 63 under the pulling action of a spring 64 operating through the agency of a second slider 65 connected to the first slider 62 by flexible wire cables 66. The outer end of the lazy-tongs assembly carries a roller 67 around which passes a length of wire cable 68. This cable 68 which is wrapped

around sheaves 69, 70 is anchored at opposite ends to the steadying bar 57 by means of which the upper ends of the legs 21 are interconnected. When the swinging hinge bar 11 extends the lazy-tongs assembly the cable 68 is rolled around the sheaves 69, 70 and the legs 21 are projected through the guides 46.

In the gear type of leg-operating mechanism shown in Figures 11 to 15, the lower end of the hinge bar 11 is connected to a roller chain 71 which moves over a pair of curved guides 72 (see Figure 15 in particular), over upper and lower idler sprocket wheels 73 rotatably mounted in brackets 74, around a driven sprocket wheel 75 mounted on a spindle 76 journalled in the footstep bearing bracket 77, and around a tensioning or jockey sprocket wheel 78 mounted on an adjustable bearing plate 79 carried by the plate 80 which is supported by the spindle 76 and the spindle or pins of the idler sprockets 73. The guides 72 are also supported by the plate 80. On the spindle 76 is mounted a toothed bevel wheel 81 which transmits the motion imparted to sprocket 75 from the swinging hinge bar 11 via the chain 71 to a bevel pinion 82 carried on a longitudinal shaft 83. A second pinion 84 transmits the motion to another bevel wheel 85 mounted on a spindle 86. The spindle 76 and 86 carry spur wheels 87, 88 respectively, which are in constant mesh with toothed racks 89, 90 provided on the bed-legs 21. It will be clear that as the hinge bar 11 swings about its pivot 12 its swinging movement is converted by the chain and toothed gear drive to a rotary motion which either projects or retracts the legs 21 according to the direction of movement of said bar 11. A spring 91 encircling the shaft 83 and anchored to the shaft at one end and to one of the shaft bearings 92 at the other is coiled up as the legs 21 are projected and operates to assist the extension of said legs 21 when the seat section B is swung up.

The open top of the box 2 is covered when the bed is extended by a throw-over hinged cover plate 93 (see Figure 9, for example) and a similar cover plate 94 is provided for covering the open bottom of the box 10 when the extension section B is inverted. When the article is in chair form and the boxes 2 and 10 are aligned in order to accommodate the rigid bed-legs 21, these cover plates are swung inwards as shown in Figures 1 and 2.

We claim:

1. An article of furniture for use as a chair or bed, including; a chair base, comprising, a frame adapted to rest on the floor and having opposite pairs of rigid upright legs, side members slidably mounted on said legs, a transverse mattress support connecting said side members, elevating means for said side members, hinge bars pivotally connected to said side members and operatively connected at their lower ends with said elevating means; a seat unit including a transverse mattress support, means for pivotally connecting the front end of the seat unit with the hinge bars above their points of pivotal connection with the side members, and means carried by the seat unit for engaging the rear side of the hinge bars as the seat is tilted forwardly and downwardly to elevate the mattress support of the chair base as the seat unit is swung over upon the hinge bars.

2. An article of furniture for use as a chair or bed, including; a chair base, comprising, a frame adapted to rest on the floor and having opposite pairs of rigid upright legs connected at their upper ends by a steady bar, side members in the form of housings slidably mounted on said legs, a mattress support connecting the inner sides of said side members; elevating means for said side member, said means including a plurality of levers carried by the side members and pivotally connected by links with the steady bar, and a main actuating lever pivotally connected with one of said first named levers; hinge bars pivotally connected to the ends of said side members and operatively connected at their lower ends with said main actuating lever; a seat unit including a transverse mattress support, means for pivotally connecting the front end of the seat unit with the hinge bars above their points of pivotal connection with the side members, and means carried by the seat unit for engaging the rear side of the hinge bars as the seat is tilted forwardly and downwardly to move said bars and actuate said elevating means to elevate the mattress support of the chair base as the seat unit is swung over upon the hinge bars.

3. An article of furniture for use as a chair or bed, including; a chair base and a seat unit, hinge bars pivotally connecting the front ends of the said base and unit; a frame for said chair base including rigid upright legs and open top boxes forming side members slidable on the legs, a mattress support connecting the inner side of said open top boxes, arm members for the seat unit, open bottom boxes arranged in the arm members of the seat unit; a transverse mattress support carried by said last named boxes, and the open bottoms of said last named boxes adapted to register with the said open top boxes slidable on the legs when the chair base and seat unit are in normal chair constituting relation; elevating means concealed in said registering boxes for lifting the open top side boxes; actuating means connecting said elevating means with the lower ends of said hinge bars, and means carried by the boxes in the arms for engaging the upper ends of the hinge bars as the seat unit is tilted forwardly and outwardly to operate said actuating means to elevate the mattress support of the chair base as the seat unit is swung over upon the hinge bars.

4. An article of furniture for use as a chair or bed, including; a chair base and a seat unit; opposite pairs of casings each including upper and lower casings respectively in the chair base and seat unit and having spaced side walls and disposed in communicating relation; elevating means for said lower casings, said means including, opposite pairs of rigid upright legs for the chair base, means for slidably guiding the lower casing of each pair on said legs, a pair of levers pivotally mounted in each of the lower casings and having portions normally extending upwardly into the upper casing of each pair, springs for tensioning said levers, links for connecting said levers with the upper ends of said legs, link means for connecting said levers, actuating links each connected with one lever of said pair of levers; hinge bars medially pivoted at the front ends of the lower casings, said hinge bars having their lower ends pivotally connected with the said actuating links, means for pivotally connecting the seat unit with the hinge bars above the points of pivotal connection between said bars and said lower casings, and means carried by said seat unit for engaging the rear side of said hinge bars when the seat unit is tilted forwardly and outwardly thereby to move said

hinge bars and cause the same to operate said actuating link whereby the levers carried by the lower casings will cause the same to slide upwardly on the rigid legs, thereby to elevate the mattress support carried by said lower casings as the seat unit is swung over upon the hinge bars.

5. An article of furniture for use as a chair or bed, including; a chair base, comprising, a frame adapted to rest on the floor and having opposite pairs of rigid upright legs, side members, including opposite side walls connected by a bottom wall, said bottom wall having openings for receiving a pair of said legs, a steady bar connecting the upper ends of each pair of legs, a mattress support connecting the inner side walls of the side members; a seat unit also including hollow arms adapted to normally receive and house the upper ends of said legs and the connected steady bar when the article of furniture is in chair constituting position; elevating means for said side members, said elevating means comprising for each side member, a bell crank lever pivoted to one of the walls of the side member and a three-armed lever pivoted to another of the walls of the side members, one arm of said three-armed lever connected with a link pivotally supported near the upper end of one of the leg members, a link member connecting another arm of said three-armed lever with one arm of the bell crank lever, a spring having one end anchored to the bottom wall of each side member and having its other end connected to the junction of said link with one of the arms of the three arm lever, a medially jointed link having its lower extremity pivotally connected with one of the walls of the side member and its upper extremity anchored near the front leg member, a short link pivotally connecting one arm of the bell crank lever with one of the sections of the said last named jointed link, a spring connecting said last two named links, and an actuating link having one end connected to an arm of said three-armed lever; hinge bars pivotally connected with the front ends of the side members and having their lower ends pivotally connecting with said actuating links; means pivotally connecting the front end of the seat unit with the hinge bars above their point of pivotal mounting in the side members, and means in the hollow arms of the seat unit for engaging the rear side of the hinge bars as the seat is tilted forwardly and outwardly thereby to move the hinge bars and operate the said actuating link of the actuating means to cause the said links and levers to elevate the side members and lift the mattress support carried thereby into alinement with the mattress support of the seat unit.

6. An article of furniture for use as a chair or bed, comprising; a chair base, including opposite pairs of rigid upright legs, a steady bar connecting the upper ends of said legs, opposite side members each slidably mounted on a pair of said legs, a mattress support arranged between and connecting the side members; a seat unit normally superimposed on the base, a transverse mattress support carried by the seat; hinge bars pivoted at the front end of each of the side members, means pivotally mounting said seat unit on said bars above their point of pivotal connection with the side members, means on the seat unit for engaging said bars above said last mentioned pivots; and means for raising and lowering the side members of the chair base, said means comprising, elevating means carried by each of the side members and including a main actuating link pivotally connected with the lower end of each hinge bar, whereby when the seat is tilted forwardly and outwardly the hinge bars will be moved to operate said actuating means to lift the side members and raise the mattress support carried thereby as the seat unit is swung over upon the hinge bars.

7. An article of furniture for use as a chair or bed, as set forth in claim 6, wherein the main actuating link of each elevating means for each side member connects with one arm of a three-armed lever pivoted to the inside wall of the side member, a bell-crank lever each rockably supported on a different axis in the outer wall of each side member, a lower link connecting a second arm of the three-armed lever and one arm of the bell-crank lever, a spring for normally imparting tension to said lower link, an upper link pivotally connecting the third arm of said three arm lever with one of the legs, a jointed link having its upper end connected near another of said legs and its lower end pivotally connected with the outer wall of said side member, and a spring tensioned short link connecting said jointed link with the other arm of said bell-crank lever.

8. An article of furniture for use as a chair or bed, comprising; a chair base, including opposite pairs of rigid upright legs, a steady bar connecting the upper ends of said legs, opposite side members slidably mounted on a pair of said legs, a mattress support arranged between and connecting the side members; a seat unit normally superimposed on the base, a transverse mattress support carried by the seat; hinge bars pivoted at the front end of each of the side members, means pivotally mounting said seat unit on said bars above their point of pivotal connection with the side members, means on the seat unit for engaging said bars above said last mentioned pivots; and means for raising and lowering the side members of the chair base, said means comprising, elevating means carried by each of the side members and including a guide track carried by one of the walls of the side member, sheave members journaled in the side member at the opposite ends of said guide track, a lazy-tongs unit including a link of crank formation having its forward end connected to the lower end of its related hinge bar, and its knuckle portion mounted on a slide shiftable in said guideway, a second slide member also movable in said guideway, a spring having one end anchored to the side member and its other end anchored to the said second slide member, a roller carried by the end of the lazy-tongs unit opposite said cranked link, a cable having its ends anchored to the steady bar and having its medial portion passing over said roller and the portions between that passing over the roller and the anchored ends passing around said sheaves, whereby when the cranked link of the lazy-tongs unit is operated by the lower end of the hinge bar the said roller carried by the lazy-tongs unit will pull and thereby tend to shorten the cable to lift the side bars and thereby elevate the mattress support carried thereby.

9. An article of furniture for use as a chair or bed, comprising; a chair base, including opposite pairs of rigid upright legs in the form of rack bars with their teeth facing inwardly, a steady bar connecting the upper ends of said legs, opposite side members each slidably mounted on a pair of said legs, a mattress support arranged between and connecting the side members; a seat

unit normally superimposed on the base, a transverse mattress support carried by the seat; hinge bars pivoted at the front end of each of the side members, means pivotally mounting said seat unit on said bars above their point of pivotal connection with the side members, means on the seat unit for engaging said bars above said last mentioned pivots; and means for raising and lowering the side members of the chair base, said means comprising, elevated means carried by each of the side members and including a spring tensioned shaft journaled in the side members, bevel pinions at opposite ends of said shaft, gears rotatably journaled in the side members adjacent the legs meshing with said pinions and the rack of the legs, a sprocket wheel carried with one of said gears, an endles sprocket chain engaging said sprocket wheel, said chain being mounted on a plurality of idler sprockets carried by the side members to provide a loop, and a pivotal connection between said chain and the lower end of each hinge bar whereby the movement of the hinge bar by the seat will actuate the elevating means.

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