

[54] **BED-SETTEE**

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[51] **Int. Cl.**..... A47c 17/14, A47c 17/36

[58] **Field of Search**..... 5/13, 14, 24, 26, 28, 35,
5/37

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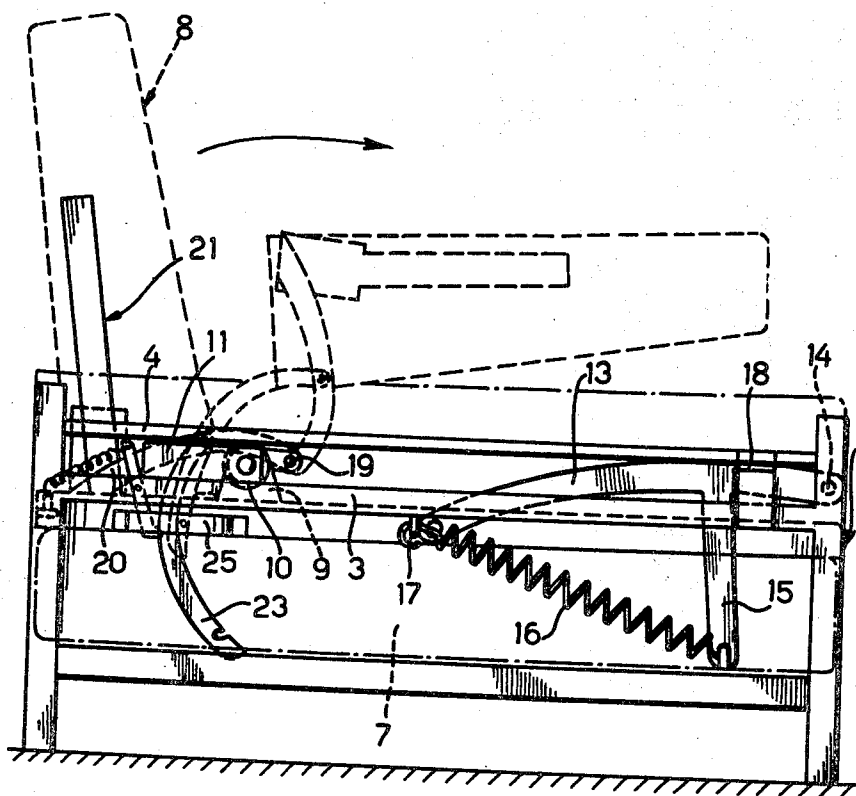
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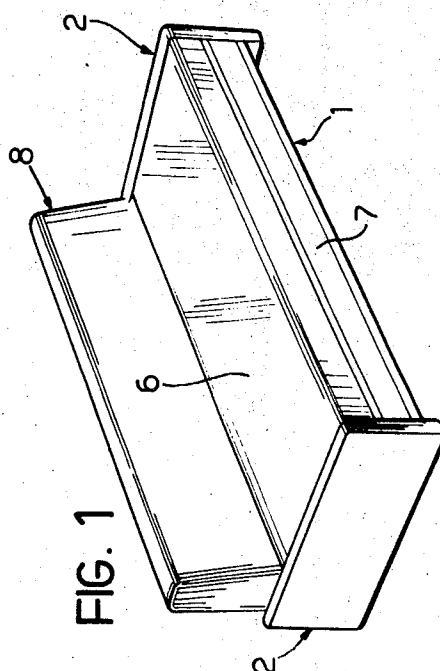
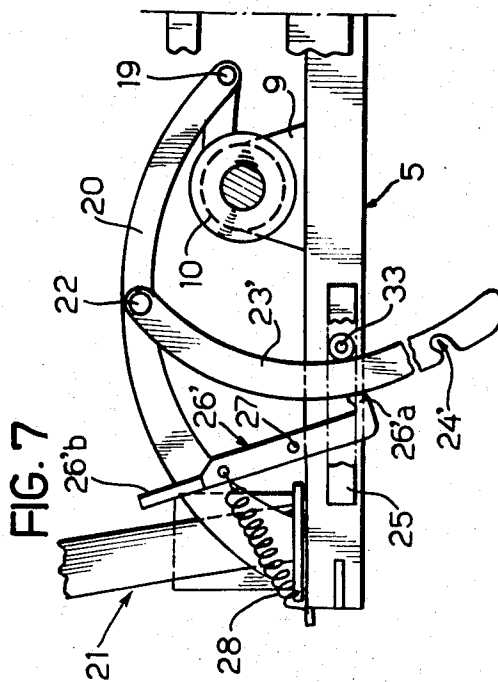
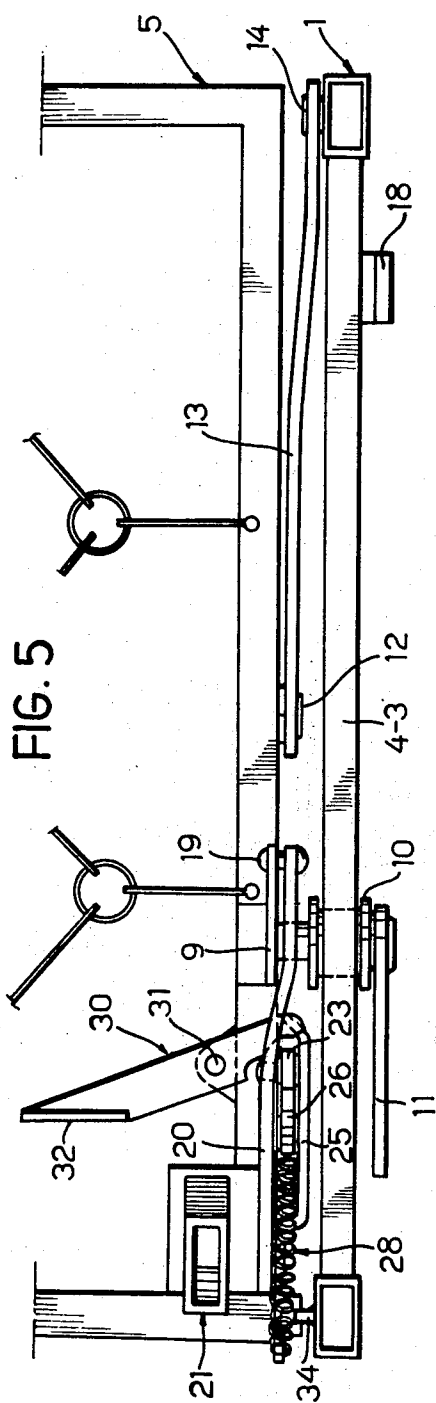
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[57] **ABSTRACT**

This invention provides an improved convertible bed-settee unit of the kind having a movable frame which rotates about a longitudinal axis relative to a fixed frame for transition between bed and settee configurations. Two rollers are carried by the movable frame for rotation about a common longitudinal off-centre axis and are guided in end portions of the fixed frame, and respective three-armed levers are provided at each end of the fixed frame, with pivotal connections to centre of the movable frame, these levers being acted upon by traction springs which assist the transition of the movable frame between the two configurations of use of the unit, which may be constructed for conversion to a single or a double bed.

5 Claims, 15 Drawing Figures





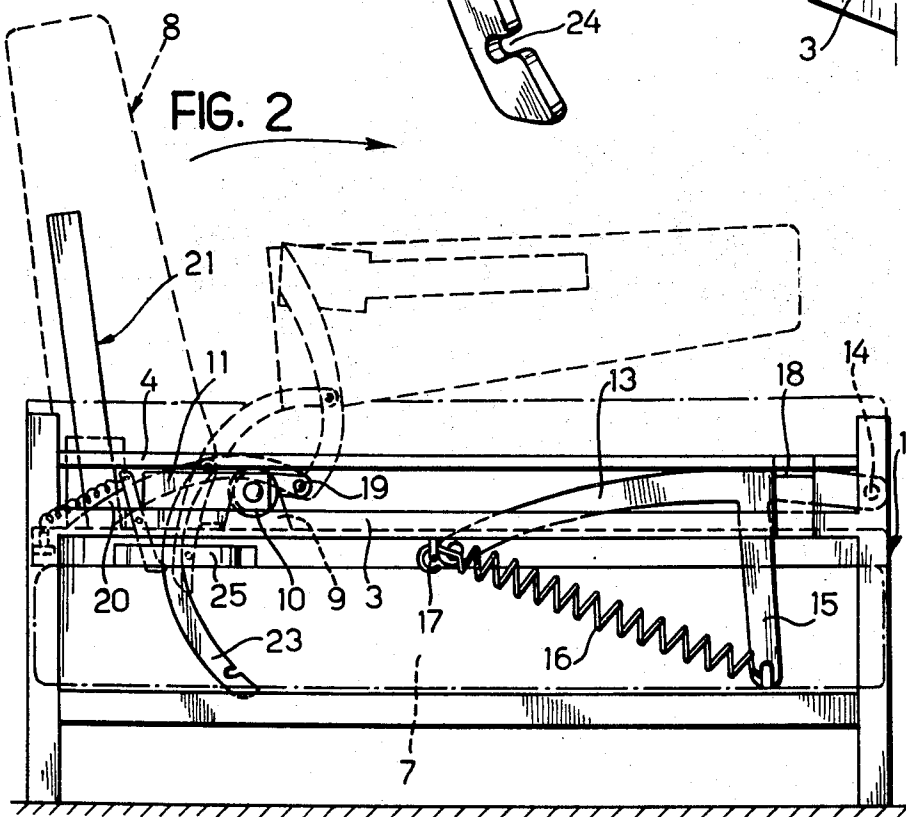
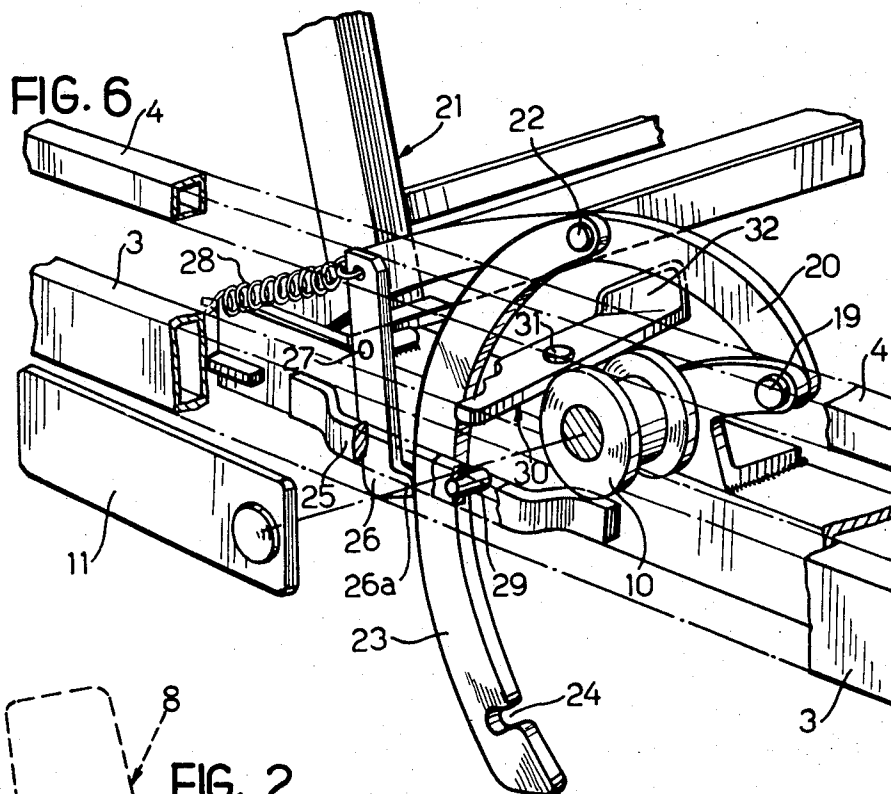


FIG. 8

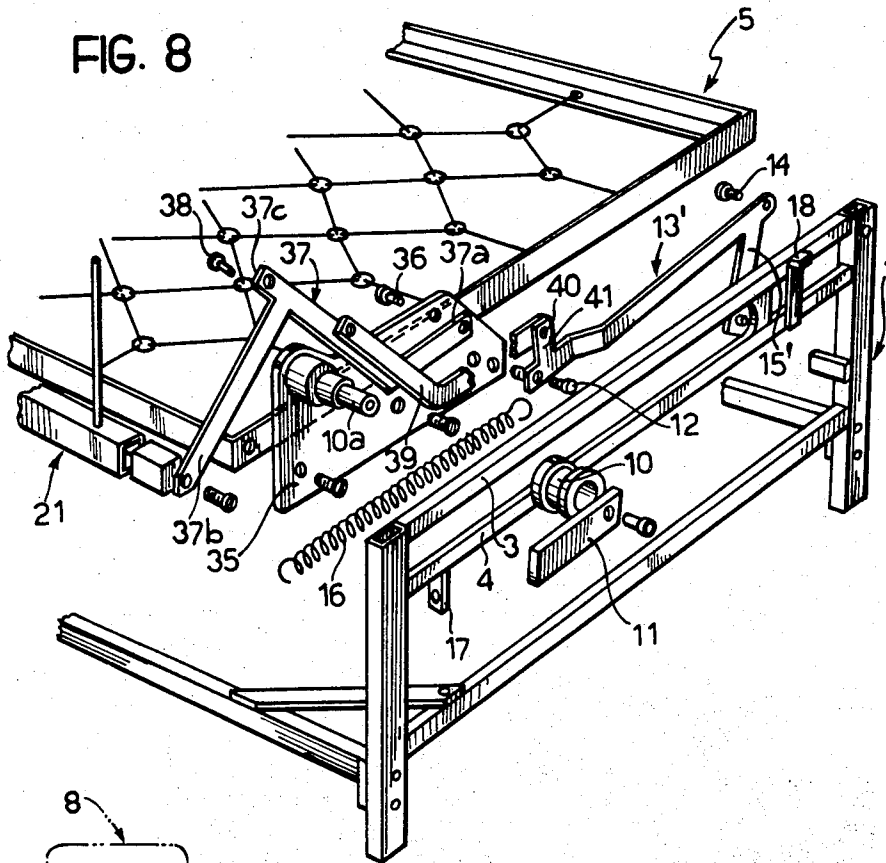
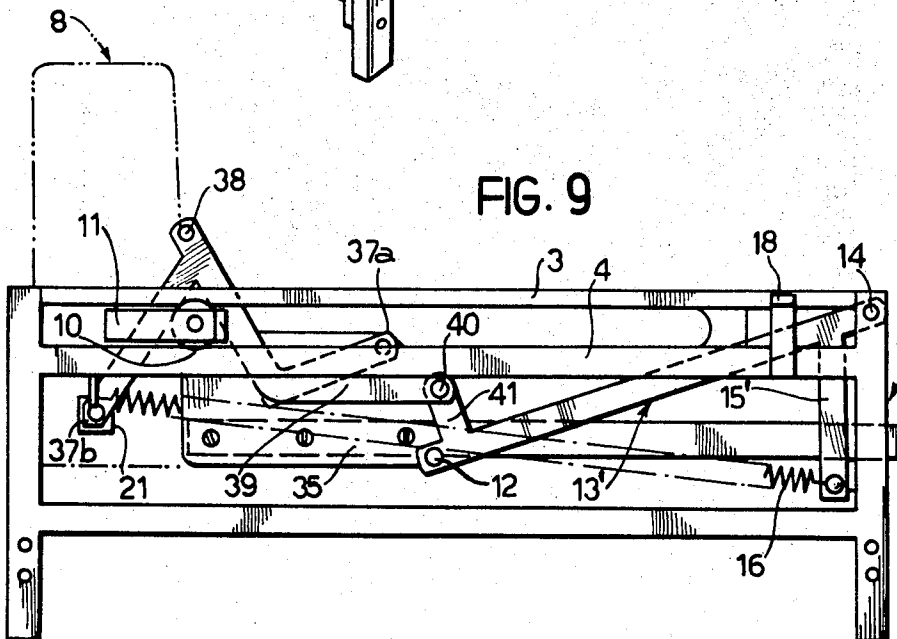


FIG. 9



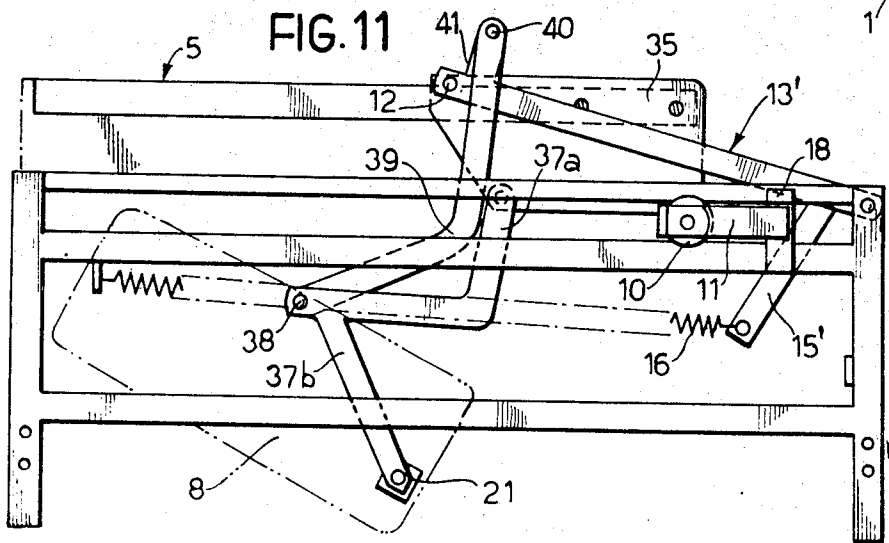
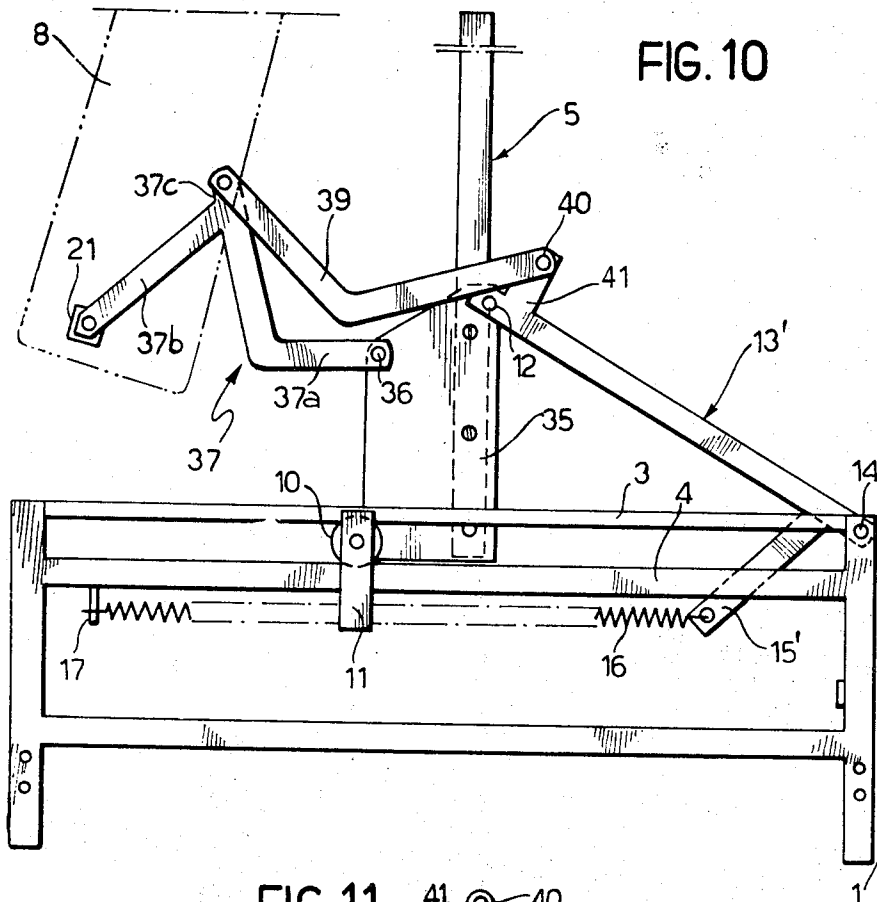


FIG. 12

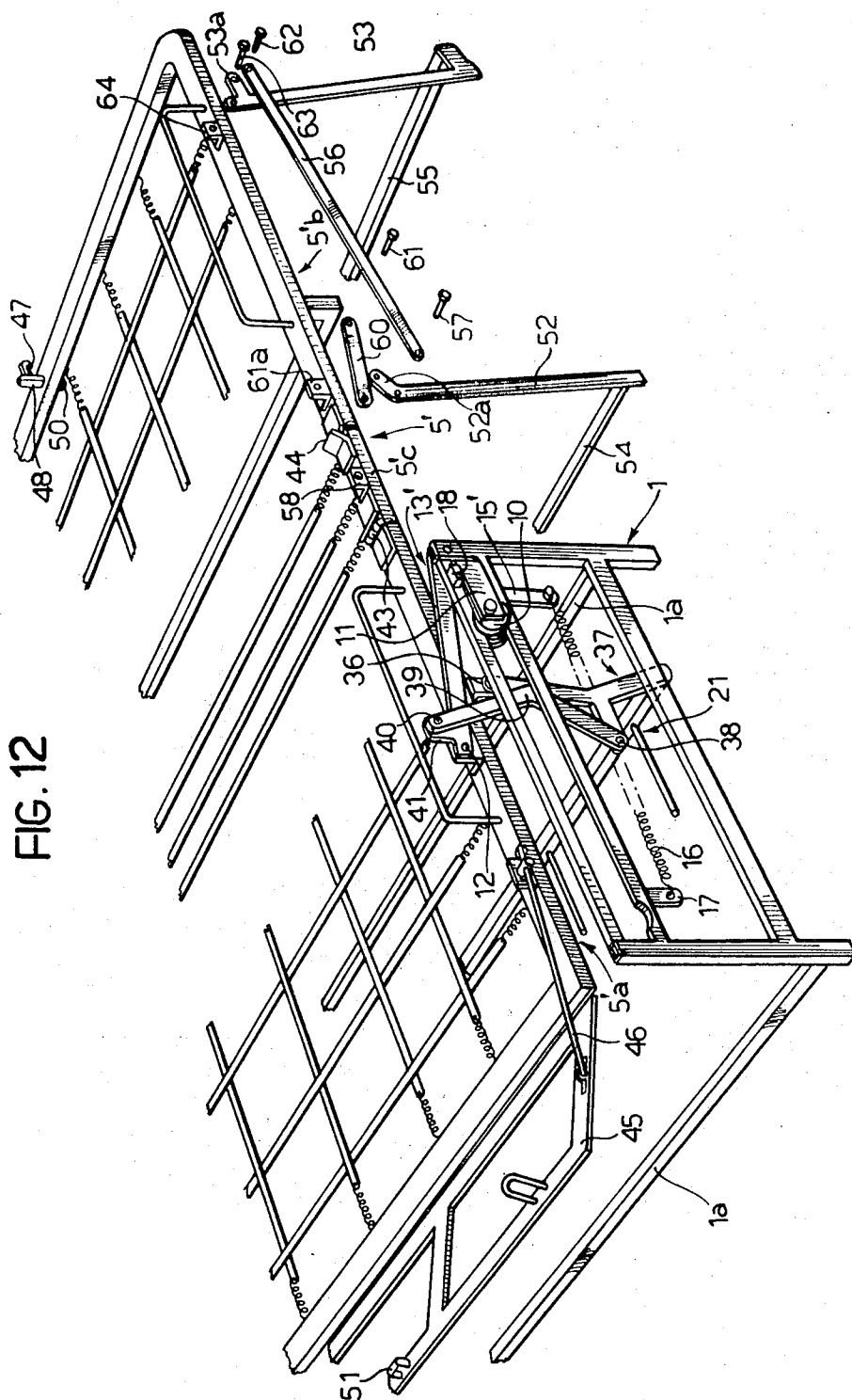


FIG. 13

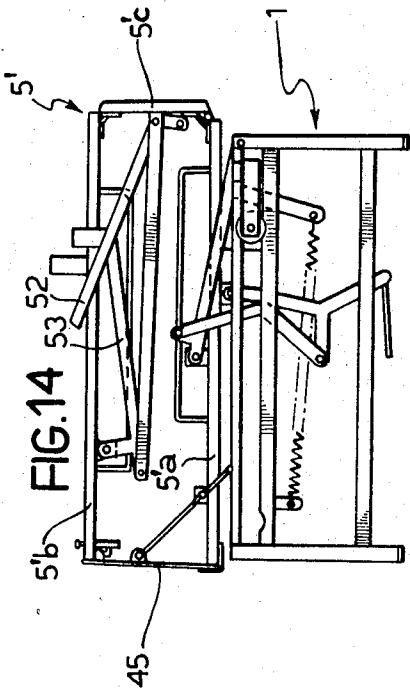
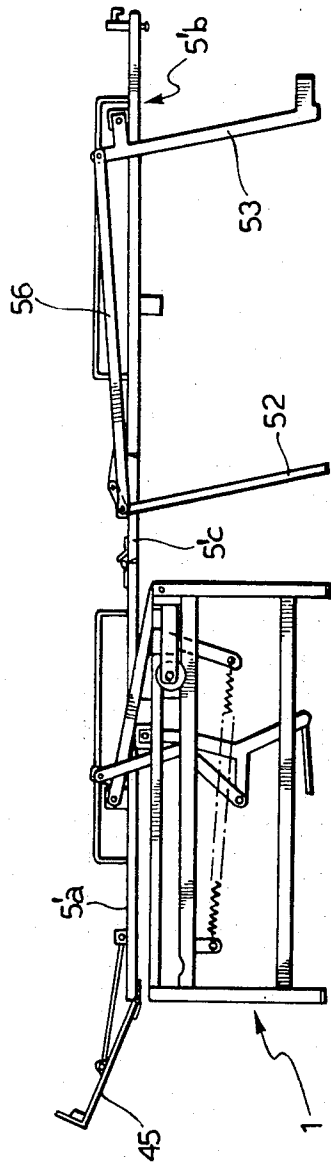
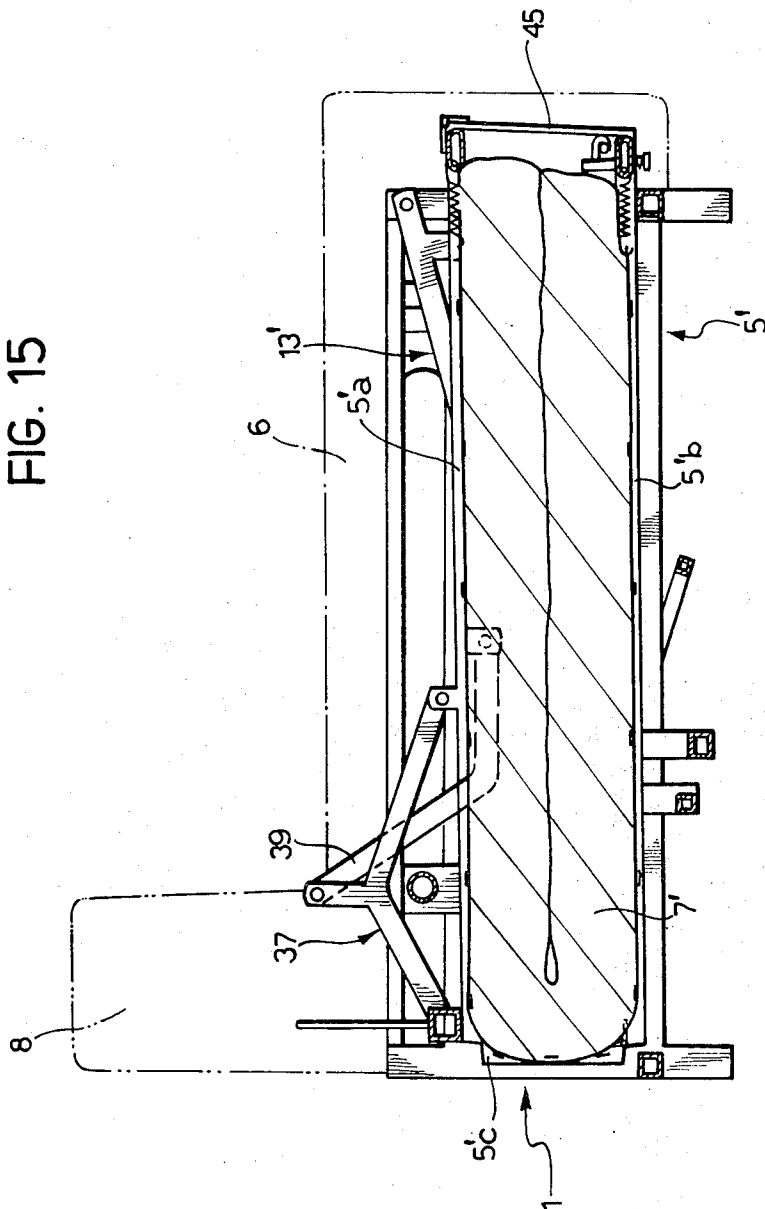


FIG. 15



1 BED-SETTEE

BACKGROUND AND OBJECTS OF THE INVENTION

The present invention relates to settee capable of being converted into beds.

More particularly, the invention relates to convertible settees of the type comprising a fixed frame constituted by two end pieces forming the arms of the settee and interconnected by spars and a movable frame which carries on one face the seat and the back of the settee and on the opposite face a mattress for use as a bed, the movable frame being connected to the fixed frame in correspondence with the two end pieces, so as to permit rotation of the movable frame by 180° in both directions about a longitudinal axis between a position for use as a settee and a position for use as a bed.

In convertible bed-settee units of the known type the inter-connection between the fixed frame and the movable frame is provided by a plurality of levers arranged to balance the force required for rotating the movable frame so as to render the operation as automatic as possible. This interconnection involves substantial complications in construction and structure of the settee and entails increased height and thickness of the end pieces which function as the arms of the settee.

For certain uses entailing strict limits on the overall length and height, it is necessary to restrict the dimensions of the unit as much as possible, and for this purpose it is necessary to reduce the height and the thickness of the arms so as not to reduce shorten beyond the permissible limits the length of the movable frame on which the mattress is carried.

An object of this invention is to provide a convertible bed-settee unit of the abovementioned type, in which the thickness and height of the end pieces acting as arms, and the thickness of the arms, are reduced, keeping within acceptable limits the dimensions of the bed whilst reducing the overall dimensions of the unit.

A further object of this invention is to provide a convertible bed-settee unit of the abovementioned type, constituted of a reduced number of parts and having good stability in its two different positions of use.

Another object of this invention is to produce a convertible bed-settee unit, in which the turning-over operation to change from one position of use to the other is simple and easy to carry out and does not require excessive muscular effort.

SUMMARY OF THE INVENTION

The convertible bed-settee unit according to this invention comprises a fixed frame having two interconnected end portions and a movable frame, adapted to be rotated about a longitudinal axis and carrying on one face a seat and a back for use as a settee and on the other face a mattress support for use as a bed, wherein the improvement consists in that the unit further includes:

- a. two flanged freely rotatable rollers carried by the movable frame at opposite ends of a common longitudinal axis parallel to and displaced with respect to the median longitudinal axis of the movable frame;
- b. respective pairs of parallel guides along which said rollers move, said guides being carried by two ends of the fixed frame;

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- c. respective three-armed levers connecting each end of the movable frame to the corresponding end of the fixed frame, each said three-armed lever having one arm which is articulated to the movable frame at the centre line of the latter, a second arm which is articulated to one end of the fixed frame and a third arm;
- d. a traction spring anchored to the respective end of the fixed frame and acting on said third arm to facilitate movement of said movable frame in both directions between its two positions, and;
- e. stop means arranged respectively inside and outside each end of the fixed frame for arresting the movable frame in said two positions of use.

BRIEF DESCRIPTION OF THE DRAWINGS

Practical embodiments of this invention will be described hereinafter, by way of example, with reference to the accompanying diagrammatic drawings, in which:

FIG. 1 is a view in perspective of a convertible bed-settee unit according to one embodiment of this invention, shown in its position of use as a settee;

FIG. 2 is a diagrammatic front elevational view of an end piece of the unit in the position of use as a settee;

FIG. 3 similar to FIG. 2, shows the end piece in an intermediate transitional position;

FIG. 4, analogous to FIGS. 2 and 3, shows the end piece in the position of use as a bed;

FIG. 5 is a diagrammatic partial view in plan of one end of the unit;

FIG. 6 is a view in perspective, partially broken away and exploded, of a detail on an enlarged scale of the unit;

FIG. 7 is a partial diagrammatic lateral view showing a variant of the embodiment of FIGS. 1 to 6;

FIG. 8 is a partial exploded perspective view of a convertible bed-settee according to another embodiment of the invention;

FIG. 9 is a diagrammatic lateral view in elevation of one end of the unit shown in FIG. 8, shown in the position of use as a settee;

FIG. 10 similar to FIG. 9, shows the unit of FIG. 8 and 9 in an intermediate transition phase of turning-over of the movable frame;

FIG. 11 similar to FIGS. 9 and 10, shows the unit of FIGS. 8 to 10 in the position for use as bed;

FIG. 12 is a view in perspective, partially exploded, of a convertible bed-settee unit according to another embodiment of the invention, capable of forming a double bed;

FIG. 13 is a diagrammatic view in elevation of the bed-settee unit illustrated in FIG. 12;

FIG. 14 similar to FIG. 13, shows the unit of FIGS. 12 and 13 with the mattress support in its closed position, and

FIG. 15 is a transverse cross section of the unit shown in FIGS. 12 and 14, in the position of use as a settee.

The same reference numerals are used throughout the drawings to designate corresponding component parts.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

The convertible bed-settee unit according to this in-

vention comprises a fixed frame constituted by two end sub frames 1 interconnected by longitudinal spars 1a. The end sub-frames 1 are made so as to form two end pieces 2 having a reduced height and thickness and acting as arms.

In the embodiment shown in FIGS. 1 to 5, each end sub-frame 1 of the fixed frame has integral with it two parallel horizontal guides 3, 4 between which a flanged roller 10 is engaged, the roller being carried with spring action by a stirrup 9 integral with a movable frame 5. The movable frame 5 carries on one face a seat 6 and a back 8 for use as a settee and on the opposite face a mattress 7 for use as bed.

In substance the movable frame 5 can be rotated through 180° in both directions about a longitudinal axis, the movable frame being articulated to the fixed frame in correspondence with the said longitudinal axis, which passes through the two flanged rollers 10, the latter being situated in eccentric positions with respect to the longitudinal centre-line of the movable frame itself.

Each roller 10 is mounted on a shaft which is fixed to a lateral appendix 11 which projects towards the exterior and extends parallel to the respective end member of the movable frames 5.

The movable frame 5 is moreover connected to the fixed frame at each end through a three armed lever 13 one arm of which is articulated to a pivot 12 situated on the centre line of the frame 5, a second arm of which is articulated to a pivot 14 situated at one end of the respective end sub-frame 1, a third arm 15 of which is subject to the action of a helical spring 16 anchored to a fixed support 17 on the sub-frame. The spring 16 is tensioned in both the positions of use of the unit, that is, use as a settee and use as a bed, and its tension is relieved during transition between these positions to facilitate the transition and reduce the muscular effort required for effecting the transition.

During the transition from one position to the other as shown in FIGS. 2 to 4, the rollers 10 run along the horizontal guides 3 and 4 in the two fixed end sub-frames 1 whilst the three-armed levers 13 oscillate, first in an upwards sense and then in a downwards sense, enabling the movable frame 5 to rotate through 180°.

In the position of use as a bed (FIG. 4) the seat 6 and the back 8 are horizontal and each of the lateral appendices 11 of the frame 5 abuts against a respective stop 18 placed outside the fixed end subframe 1 to lock the movable frame 5 in the horizontal position.

In the other position of use as a settee (FIG. 2) the movable frame 5 is locked either by engagement of eccentric rollers in the guides 3 and 4, or by stops 34 located inside the fixed end sub-frames 1.

Each stirrup 9 of the movable frame 5 carries a projecting appendix to which is articulated, through a pivot pin 19, a curved arm 20 integral with the frame structure 21 of the back 8. The back frame structure 21 can thus move with respect to the movable frame 5 from an erect position (FIG. 2) to a collapsed horizontal position by rocking about the pivot pins 19.

Each curved arm 20 is connected at an intermediate point, through a pivot 22, to a curved lever 23 which is provided at its free end with a notch 24. The lever 23 is guided in a transversely elongated eyelet formed by a strip 25 attached to the respective end member of the movable frame 5 and cooperates with a double lever 26 pivotally supported intermediate its ends on a fixed

pivot 27. A helical spring 28 acts upon one arm of the lever 26 to urge a nose 26a formed on the other arm of the lever 26 against the convexly curved edge of the curved lever 23, with a force sufficient to hold the curved lever 23 against a fixed peg 29.

When the back 8 is overturned towards the seat 6, as shown in FIGS. 3 and 4, the curved lever 23 moves in such manner that its notch 24 comes to into engagement with the fixed peg 29, locking the back 8 in the overturned position, when the unit is to be used as a bed.

To release the back 8 for return to the erect position for use as settee, a release lever 30 with two arms is used. The release lever 30 is mounted on a vertical pivot 31 carried by the movable frame 5 and is provided at one end with a manually movable handle 32. By moving the handle 32 the other end of the release lever 30 acts upon the internal concavely curved edge of the curved lever 23, disengaging the notch 24 of the lever 23 from the peg 29.

In the variant shown in FIG. 7, the curved lever 23' rests with its concave edge against a reaction device constituted in this example by a roller 33. The lever 23' has at its lower end a notch 24' in its convex edge: the double lever 26' has at one end a nose 26'a which engages in the notch 24' of the curved lever 23' in the overturned position of the back, and the lever 26' has at its other end a handle 26'b which is manually operated to effect disengagement of the nose 26'a from the notch 24'.

The convertible bed-settee unit herein described is of simplified construction since the connection between the movable frame 5 and the fixed frame is effected at each end through a single lever with three arms and through the engagement of the rollers 10 in the guides 3 and 4. The connection of the back 8 to the movable frame 5 is in turn effected through the curved lockable lever 23, 23' and the lever 26, 26'. This makes it possible to reduce the overall height and thickness of the two end pieces 2, as compared with the arms of a conventional bed-settee unit, and the upper surfaces of the end pieces 2 are substantially coplanar with the mattress in the position use as bed. The thickness of each end piece 2 can thus be used to support a pillow or cushion, so that the proper dimensions of the bed are maintained, whilst reducing to minimum the overall length of the unit.

In the embodiment depicted in FIGS. 8 to 11, the bed-settee unit according to this invention is convertible to a single bed, essentially in the manner described with reference to FIGS. 1 to 7. The movable frame 5, which contains the resilient support of the mattress 7, extends longitudinally so that in the two modes of use respectively as a settee and as a bed the overall dimensions of the unit do not vary.

As shown in FIGS. 8 to 12, a shaped plate 35 is fitted to each lateral end of the movable frame 5. An outwardly projecting longitudinally extending stub axle 10a is attached to each plate 35, the axles 10a carrying the respective flanged rollers 10 which are located between the two guides 3 and 4 in the two end sub-frames 1 of the fixed frame. Each plate 35 is connected with the corresponding end sub-frame 1 by means of a respective three-armed lever 13', of which one of the arms, the longest, is connected by means of a pivot 12 to the plate 35, a second, shortest arm is connected by means of a pivot 14 to one corner of the sub-frame 1

and a third arm 15' is subject to the action of a tension spring 16 anchored to a support 17 on the subframe 1.

The longest arm of the three-armed lever 13' has a projection 41 which is articulated by means of a pivot pin 40 to one end of an angle lever 39 the opposite end of which is releasably connected through a further pivot pin 38 to a second three-armed lever 37 which connects the plate 35, and therefore the movable frame 5, to the frame structure 21 of the back 8. One of the arms 37a of the lever 37 is pivotally connected through a pivot pin 36 to the plate 35, a second arm 37b is connected rigidly to the back frame structure 21 of the back and a third arm 37c is pivotally connected through the pivot pin 38 to the angle lever 39.

The arrangement of the levers is such that the back 8 passes automatically from the erect position (FIG. 9) to an inverted position (FIG. 11) in which it is located beneath the seat 6 of the settee through the effect of the rotation imparted to the frame 5 in passing from the position of use as a settee (FIG. 9) to the position for use as a bed (FIG. 11), and vice versa. Moreover, in the inverted position (FIG. 11) the back 8 is locked with respect to the seat 6 and can move only when the movable frame 5 is brought back into the position for use as a settee. Thus the operations to be carried out for transition from one position of use to the other are simplified, and in addition the construction is facilitated.

As shown in FIG. 8, each of the end sub-frames 1 of the fixed frame may be readily dismantled from the remaining parts of the unit, so as to reduce the overall dimensions and thereby facilitate packing and transport.

Without changing the mechanisms for moving the frame 5 and overturning the back, a double-bed unit can be produced as shown in FIGS. 12 to 15. In this embodiment of the invention the movable frame 5' is articulated and is constituted by two portions 5'a, 5'b and by intermediate portions 5'c connected to the said two portions 5'a and 5'b by hinges 43 and 44; each frame portions 5'a, 5'b and 5'c has a width which is substantially equal to that of the fixed frame. To the free end of one of the frame portions 5'a there is hinged an articulated closure element 45 which completes the closure of the other parts of the movable frame 5 in the contracted or folded-up position of use as a settee, forming a cage containing the mattress 7' (FIG. 15). The hinging movement of the closure element 45 is limited by stay rods 46. The closure element 45 carries a fixed retaining eye 51 adapted to cooperate with a hooked bolt 47 which is slidably mounted in a tubular guide 48 carried at the free end of the frame portion 5'b. The bolt 47 is attached to an operating element 50 which is acted upon by a spring 49.

To keep the two frame portions 5'a and 5'b in the closed position, shown in FIGS. 14 and 15, the hooked bolt 47 is engaged in the retaining eye 51: to effect disengagement the element 50 is manually operated so as to remove the hooked bolt 47 from the eye 51 and thereby permit opening of the articulated frame.

The articulated frame 5', in its fully open position, shown in FIGS. 12 and 13, extends in the transverse direction with respect to the fixed frame, so that the overall dimensions of the bed are greater than those of the fixed frame. The overhanging parts of the frame 5' must be supported by legs to ensure that the bed is kept

even. For this purpose there are provided on each side of the frame 5' two oscillating legs 52, 53, connected to their counterparts on the opposite side of the frame 5' through spars 54, 55 and also interconnected at their upper ends by a respective connecting rod 56. Each of the legs 52 nearer the fixed frame is connected through a pivot pin 57 both to one end of the respective connecting rod 56 and to a fixed bracket 58 carried by the intermediate frame portion 5'c of the articulated frame 5'. The upper end part of each leg 52 is bent to form an inclined appendix 52a which is articulated through a pivot 59 to one end of a second connecting link 60 of reduced length, the opposite end of the link 60 being articulated, through a pivot pin 61, to a bracket 61a carried by the second portion 5'b of the articulated frame 5'.

Each of the end legs 53 is connected at its upper end to the second end of the respective connecting rod 56 through a pivot pin 62. At its upper end each leg 53 is provided with a transverse lug 53a which is pivotally connected through a pivot pin 63 to a bracket 64 mounted near the free end of the frame portion 5'b.

In view of the connections between the two pairs of legs 52, 53 and the mutually articulated frame portions 5'b 5'c of the frame 5, the opening and reclosing of the abovementioned frame during transition between the contracted position and the extended position, brings about automatically the opening and lowering of the legs 52, 53 or their folding towards the frame 5'. In the folded position, shown in FIGS. 14 and 15, both the spars 54, 55 which interconnect the two pairs of legs 52, 53 lie against the external surface of the frame portion 5'b, whilst the legs 52, 53 themselves and the connecting rods 56 controlling them are disposed on opposite sides of the frame 5'.

In the embodiment of FIGS. 12 to 15 the articulated frame 5' is not provided with lateral plates of the type shown at 35 in FIGS. 8 to 11, since the pivots of the connecting levers are carried by single brackets attached, for example by welding, to one of the portions 5'a of the frame itself. Similarly the two flanged rollers 10 are mounted on axles which are interconnected by a single tubular spar connected to the said frame portion 5'a by means of suitable brackets or the like (not shown).

The same construction of FIGS. 12 to 15 can be used to obtain beds of the single type; in this case the length of the unit is reduced and in the folded position for daytime use, a lounge, rather than a settee, is formed.

I claim:

1. A convertible bed-settee unit of the type comprising a fixed frame having two interconnected end portions and a movable frame, adapted to be rotated about a longitudinal axis and carrying on one face a seat and a back for use as a settee and on the other face a mattress support for use as a bed, wherein the improvement consists in that the unit further includes; two flanged freely rotatable rollers carried by the movable frame at opposite ends of a common longitudinal axis parallel to and displaced with respect to the median longitudinal axis of the movable frame; respective pairs of parallel guides along which said rollers move, said guides being carried by two ends of the fixed frame; respective three-armed levers connecting each end of the movable frame to the corresponding end of the fixed frame, each said three-armed lever having one arm which is articulated to the movable frame at the centre

line of the latter, a second arm which is articulated to one end of the fixed frame and a third arm; a traction spring anchored to the respective end of the fixed frame and acting on said third arm to facilitate movement of said movable frame in both directions between its two positions; stop means arranged respectively inside and outside each end of the fixed frame for arresting the movable frame in said two positions of use; an elbow shaped lever one end of which is articulated to an appendix of said three-armed lever, and wherein the connection between the back frame structure and the movable frame comprises a second three-armed lever one arm of which is connected rigidly to the back frame structure, a second arm of which is articulated to the movable frame, and a third arm of which is articulated to the other end of said elbow shaped lever, said levers being arranged to effect rotation of the back by virtue of rotation of the movable frame through 180° in both directions upon transition between the position of use as a settee and the position of use as a bed, and vice versa.

2. The convertible bed-settee unit defined in claim 1, wherein said movable frame is rigid and has sufficient

length in the longitudinal direction to support on one of its faces a mattress for use as a single bed.

3. The convertible bed-settee unit defined in claim 1, wherein said movable frame comprises a plurality of articulated portions which when folded are adapted to enclose a mattress, said frame portions extending in the transverse direction when unfolded in the position for use as a bed and including retaining means for maintaining the articulated frame portions in the folded position, and including auxiliary support means for supporting overhanging parts of the frame in the open position of the latter.

4. The convertible bed-settee unit defined in claim 3, wherein said auxiliary support means comprise two pairs of hinged legs and means for moving said legs automatically into supporting and retracted positions upon unfolding and folding respectively of the articulated frame.

5. The convertible bed-settee unit defined in claim 3, wherein the longitudinal dimensions of said articulated frame in its unfolded position conform to those of a double bed.

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