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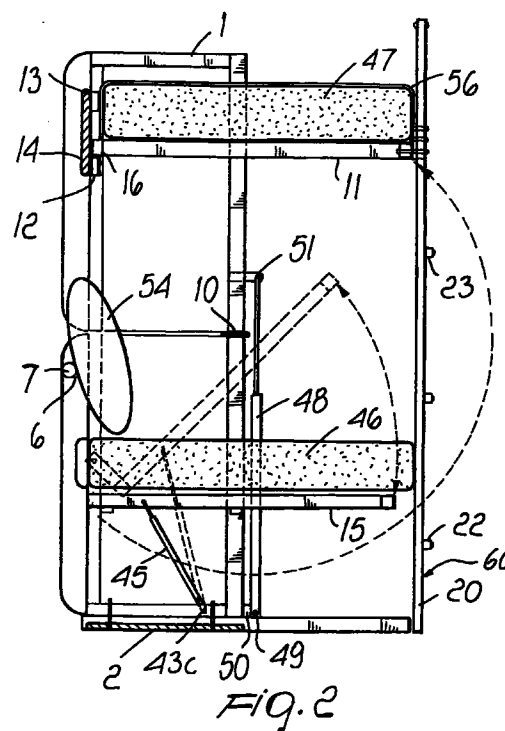
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(54) **Convertible piece of furniture which can be converted from a sofa and/or single bed into a bunk bed**

(57) A furniture unit composed of two bedsprings (11,15) which, in the folded position, acts as sofa or single bed; by rotating the extra bed (11,47), which, in the folded position, is arranged upside down below the sofa (15,46,54), the lower bed is arranged above the sofa in a bunk-bed configuration. The ladder (60) and the associated barrier are folded up and hinged horizontally to the rear long side of the second bed (11,47) when the second bed is not being used; during conversion into a bunk bed, they rotate together with the bed and are arranged on the outer side thereon. The ladder (60), by rotating about two pivots, is arranged vertically, acting as ladder and as support for the open unit, and the safety barrier of the upper bed rises as the ladder, to which it is articulated, rotates. By performing the operations in reverse, the piece of furniture is converted back into a sofa.



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Description

[0001] The present invention relates to a convertible piece of furniture which can be converted from a sofa and/or single bed into a bunk bed.

[0002] There is a constant need to optimize the use of the space available when furnishing a room. Accordingly, pieces of furniture which perform multiple functions are often preferred and sometimes essential. This requirement becomes primary for example in the case of children's rooms, where space is truly essential, or in the case of hostels or hotels, where the need to offer a room with a sofa which is comfortable and aesthetically pleasant is combined with the need to have the highest possible number of beds.

[0003] Many solutions have been proposed in the course of time in order to meet the above requirements, and there are many sofas which convert into beds, bunk beds or single beds with a cot for emergencies.

[0004] The prior art includes several sofas that can be converted into one bed and, and sofas that can be converted into two beds within the space occupied by a bed, but these prior art sofas are scarcely capable to perform all the functions adequately.

[0005] Another drawback of the prior art is that sofas, when they can be converted into beds, are often either comfortable as a sofa or as a bed, but not both.

[0006] Another drawback of the prior art is that a bed arranged under the sofa or under another bed, if pulled out for use, occupies the space of a further bed without meeting the requirement of optimizing space.

[0007] Another drawback of the prior art is that the second bed, even when used under the elevated single bed, cannot be considered a true bunk bed, since the space between the two beds is not sufficient to make it a true bunk bed, and the second bed is in any case at a considerably lower level than a normal bed.

[0008] Another drawback of the prior art is that even when the second bed meets the requirement of optimizing space, being arranged under the single bed, it does not always comply with maximum safety requirements, especially regarding its deployment.

[0009] The aim of the present invention is to obviate the drawbacks of the cited prior art, by providing a piece of furniture which can be easily converted from a sofa and/or single bed into a bunk bed.

[0010] An object of the present invention is to provide a piece of furniture which is equally comfortable as a sofa, as a single bed and as a bunk bed.

[0011] A further object of the present invention is to provide a piece of furniture in which the space below the sofa is used to store a true bed without any particular limitation regarding for example the thickness of the bed or mattress when stored and to its distance from the ground when pulled out, because the bed leaves its storage space by rotation and arranges itself in a bunk bed-like arrangement above the other bed.

[0012] A further object of the present invention is to

provide a piece of furniture which optimizes space by letting the second bed being arranged above the single bed.

[0013] A further object of the present invention is to provide a piece of furniture which, when used as a bunk bed, maintains between the two beds the space that is typical of bunk beds, without forcing the user to sit on the lower bed in uncomfortable crouching positions.

[0014] A further object of the present invention is to provide a piece of furniture which can be used and handled practically and without danger or effort for the users.

[0015] A further object of the present invention is to provide a piece of furniture at an economically advantageous cost.

[0016] This aim, these objects and others are achieved by a convertible piece of furniture which can be converted from a sofa and/or single bed into a bunk bed, as claimed in the appended claims.

[0017] Further characteristics and advantages of the invention will be more apparent by the following description of an embodiment of the invention, illustrated, by way of example in the enclosed drawings in which:

FIG. 1 is a schematic transverse sectional view of the piece of furniture, according to the invention, shown in the closed position;

FIG. 2 is a schematic transverse sectional view of the piece of furniture shown in the open position;

FIG. 3 is a front view of the piece of furniture shown in the bunk-bed position.

[0018] With reference to the above figures, the piece of furniture according to the invention comprises two half-frames 1 each constituted by a C-shaped member, made for example of quadrangular metal tube, which is frontally rigidly coupled to posts 8, constituted for example by a U-shaped metal profile.

[0019] Rods 2, preferably made of metal tube, are rigidly coupled to half-frames 1, for example by means of screws or other fasteners, and act as a support for the unit. Half-frames 1 are mutually connected by longitudinal members 3, 4 and 5, which are made for example of quadrangular metal tube, coupled by welding, and acting as braces.

[0020] Lugs 6, preferably made of metal plate, are provided on half-frames 1 in a rear region. A longitudinal member 7, preferably made of metal tube, is screwed between the lugs and acts as a support for the padding components of the back rest 54.

[0021] A second pair of half-frames 9, symmetrical and identical to half-frames 1, are arranged in a front region and are connected to the half-frames 1 by the two hinges 10 which are rigidly coupled, for example by welding, to half-frames 1 and 9.

[0022] A bedspring 11 and longitudinal members 12

and 13 are rigidly coupled, for example by welding, to half-frames 9; the longitudinal members act as braces and support for the covering panel 14.

[0023] The bedspring 15 is arranged inside half-frames 1 and rests on the longitudinal members 3 and 5 and on the adjustable supports 16 rigidly coupled to the bedspring 11. Brackets 17 are rigidly coupled to the bedspring 15 in a rear region, for example by welding, and are articulated to the pair of pivots 18 rigidly coupled to half-frames 1. Advantageously, on its rear side, bedspring 15 has a mattress retention frame 19 made of shaped metal tube.

[0024] On the opposite side with respect to the covering panel 14, a foldaway ladder 60, constituted by a deformable-parallelogram, is articulated to the bedspring 11 which is rigidly coupled to half-frames 9 and is arranged below the bedspring 15 so that the supporting surface is directed downward.

[0025] As best shown in FIG. 3, the ladder 60 comprises a short post 20, a long post 21, three rungs 22, 23 and 24, a safety barrier 25 and a rod for the barrier 26. Rungs 22, 23 and 24 are articulated to the posts 20 and 21 about the pivots 27, 28, 29, 30, 31 and 32.

[0026] The barrier 25 is articulated to the post 21 about the pivot 33 and to the rod 26 about the pivot 34, while, at its other end, the rod 26 is articulated to the bedspring 11 about the pivot 35.

[0027] The posts 20 and 21 are pivoted about the pivots 36 and 37 which are rigidly coupled to the plates 38 and 39, which are welded to the bedspring 11.

[0028] The spring/damper unit 41 is articulated to the plate 39 about the pivot 40 and is articulated, at its other end, about the pivot 42 which is rigidly coupled to the post 21.

[0029] By slightly pushing the posts 20 and 21 of the ladder 60 as described, the ladder turns counterclockwise about the pivots 36 and 37, so that the system constituted by the ladder and the barrier and composed of deformable parallelograms arranges itself horizontally, supported by the spring/damper unit 41, varying its dimensions until it folds up completely and horizontally.

[0030] The post 21, which is coaxial to the rod 26, can reach the end of its stroke only after it has been forced manually to superimpose itself on the rod 26, through producing a spring effect which helps to keep the system in the horizontal position (in Figure 3 the folded position of the ladder 60 and of the barrier is shown in dashed lines).

[0031] A spring/damper unit 45 is articulated between one of the half-frames 1 and the bedspring 15, at the points 43 and 44, and facilitates the partial overturning of the bedspring 15 and of the corresponding mattress 46, required for subsequently pulling out, by rotation, the second bedspring 11 and the corresponding mattress 47.

[0032] The spring/damper unit 48 is articulated about the pivot 49, which is rigidly coupled to the lug 50 which is welded inside the U-shaped metal profiled member 8

and, at its other end, about the pivot 51, which is rigidly coupled to the lug 52 which is welded inside the U-shaped metal profiled member 53, so that in the closed position, since the pivot 51 is axially offset with respect to the articulation 49 and to the hinge 10, it keeps the pair of mutually hinged frames 1 and 9 in a stably closed position.

[0033] The spring/damper unit 48 is therefore arranged, during maximum compression, inside the pair of U-shaped profiled members 8 and 53, which conceal it from view when the piece of furniture is closed.

[0034] In order to convert the piece of furniture from a sofa position (in which the mattress 46 acts as seat, the mattress 47 is stored upside down under the preceding mattress and the padding of the back rest 54 is supported by the longitudinal member 7) into a single bed position, it is sufficient to remove the back rest padding 54, while the conversion into a bunk bed entails (see FIG. 2) partially turning over the bedspring 15 and the corresponding mattress 46, which are pushed and supported by the spring/damper unit 45, and then, by gripping the covering panel 14, pushing upward, so that the system composed of the pair of frames 9, the corresponding longitudinal members 12 and 13, the mattress 47, the ladder 60 and barrier assembly hinged to the pair of frames 11, by virtue of the pair of hinges 10, rotates through 180°, assisted and supported by the thrust of the spring/damper unit 48, arranging itself in the bunk-bed configuration (FIG. 2).

[0035] The padding components of the back rest 54 can be stored on the supporting surface 55. The bedspring 15 and the corresponding mattress 46 are repositioned horizontally and are supported by the longitudinal members 3 and 5, while the second bed becomes accessible after turning, through 90°, the ladder and the corresponding barrier, which are folded frontally and horizontally, by gripping for example the post 21 and turning it clockwise, with the assistance of the spring/damper unit 41, with a weight balancing function, until the ladder is unfolded vertically and the barrier is simultaneously lifted. This operation opens the chain of parallelograms that constitutes the ladder-barrier assembly.

[0036] In order to return to the original position, it is sufficient to perform the operations in reverse, after anchoring the mattress 47 to the bedspring 11 by virtue of adapted pair of straps 56, while in order to ease access to the upper bed it is sufficient to fold up the ladder to the horizontal position and turn downward the movable part of the furniture unit until the force of the spring/damper unit 48 balances the weight; this occurs approximately after a quarter turn. The mattress is thus inclined forward, facilitating bed-making.

[0037] It has been seen in practice how the above aims and objects have been achieved by a piece of furniture which is converted, by rotation, from a sofa and/or single bed to a bunk bed, according to the present invention, which includes: a pair of vertical metal frames

which are rigidly coupled to a pair of horizontal rods with a supporting function and are mutually connected by four horizontal longitudinal members; a bedspring, which is hinged inside the frames and also acts as support for the seat; a second pair of vertical metal frames, which is symmetrical and arranged in a forward position with respect to the first one and is connected by two horizontal longitudinal members; a metal tube frame, which is rigidly coupled to the frame pair and acts as a bedspring for the second bed; a ladder, constituting a deformable parallelogram, having a related barrier and being articulated to the bedspring of the second bed. The frame pairs are mutually hinged in the front and upper region, so that after partially turning over the bedspring of the first bed, with the aid of the thrust of a spring/damper unit, and by turning through 180° the pair of front frames and the bedspring that is rigidly coupled thereto with the aid of another spring/damper unit, the bedspring and the corresponding mattress that were arranged upside down under the surface of the first bed are now arranged adequately above the surface and in the position for use as bunk bed, stably supported by the pair of underlying twin frames. The ladder and the corresponding barrier, following the rotation of the second bed, are folded horizontally in a front position. By virtue of the simple rotation of a post, the ladder, by turning on two pivots which are rigidly coupled to the bedspring, folds out and opens so as to be arranged in a vertical position to support the bedspring, while at the same time the barrier, which is articulated to the ladder, rises. Conversion to a bunk bed is thus obtained without effort and with a small number of simple and safe movements. By performing these operations in reverse, the piece of furniture can be arranged in the folded, or closed, position again, acting as a single bed which is a comfortable sofa, equipped with adapted cushions supported by one of the longitudinal members of the first bed. The cushions or pillows can be stored under the first bed when the furniture unit is used as a bunk bed.

[0038] The embodiment described above has been proposed merely by way of example and it is understood that it can be susceptible of numerous modifications or variations, within the scope of the appended claims. By performing small or more complex modifications, amendments and refinements, the piece of furniture according to the invention can also be applied to other fields.

[0039] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

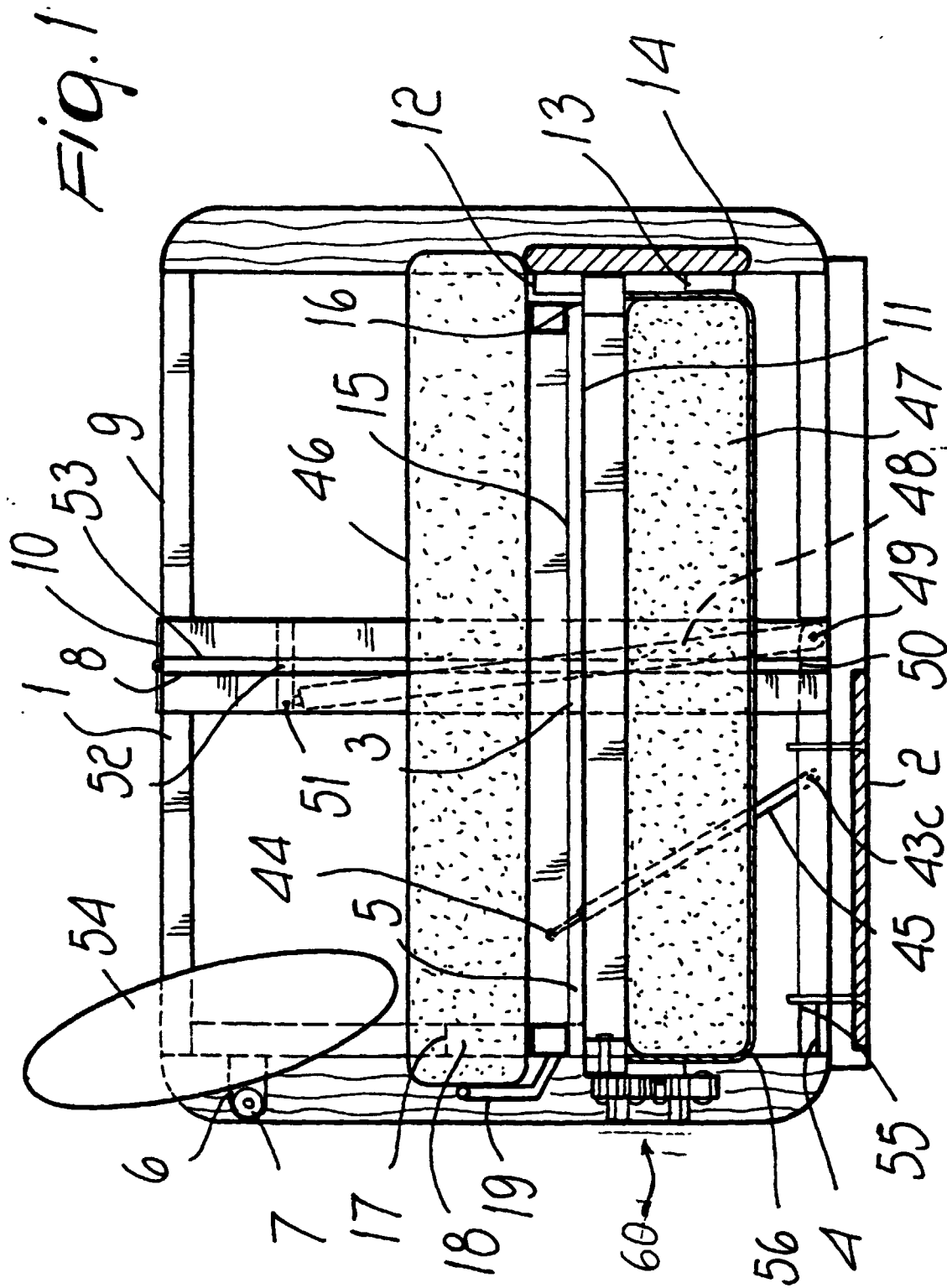
Claims

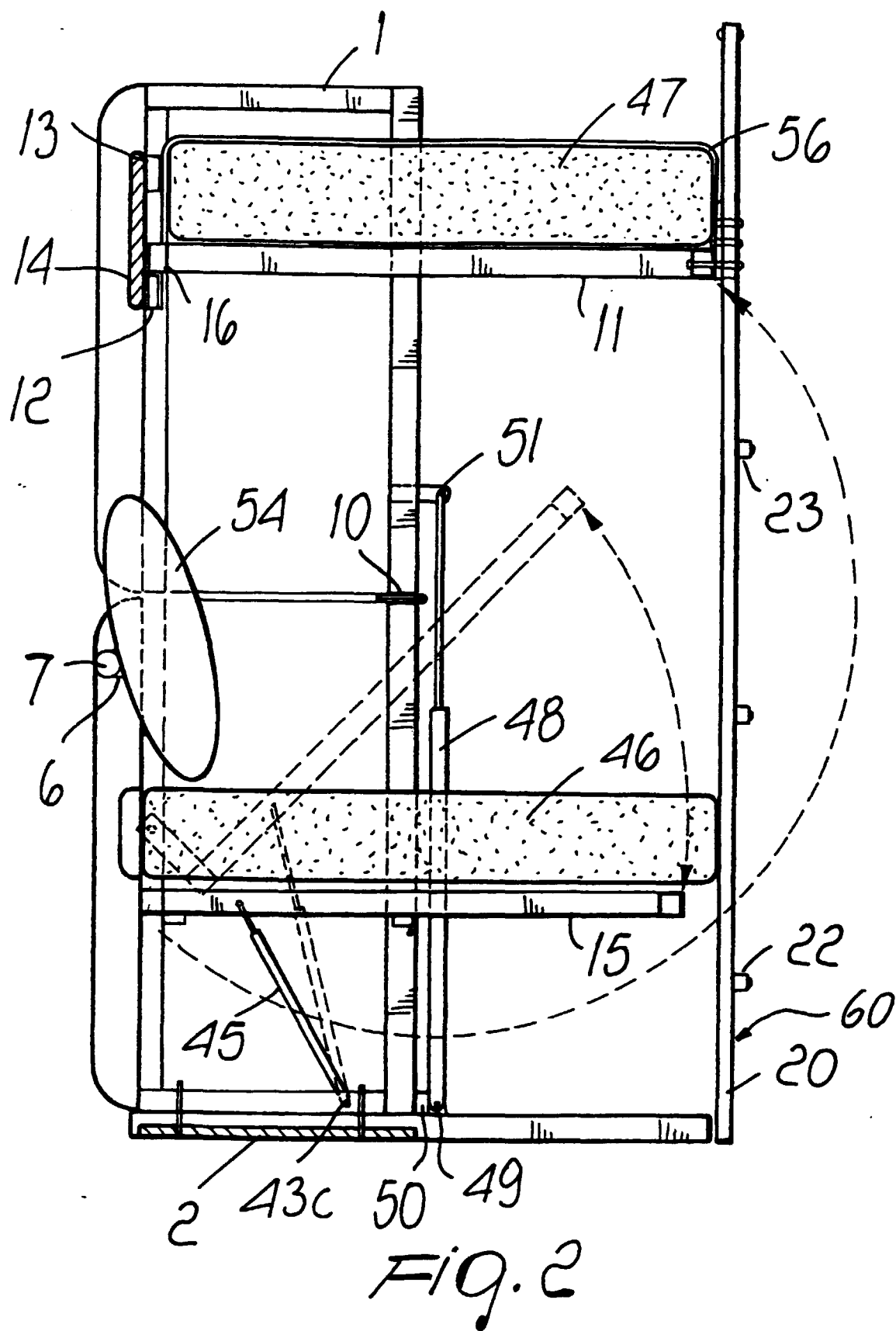
1. A convertible piece of furniture characterized in that

it comprises a first frame (1) articulated to a second frame (9), said first frame (1) supporting a first bed member (15,46) and said second frame (9) supporting a second bed member (11,47), said first and second frames defining at least two positions: a folded position wherein said second bed member (11,47) is arranged under said first bed member (15,46) and said first bed member (15,46) functions as a sofa or a single bed; and an open position wherein said second frame (9) is arranged above said first frame (1) whereby said second bed member (11,47) is arranged over said first bed member (15,46) at a distance sufficient to make said first and second bed members function as a bunk bed.

2. The piece of furniture according to claim 1, further comprising a foldaway ladder (60), in said folded position of said piece of furniture, said ladder (60) being folded at one side of said second bed member (11,47).
3. The piece of furniture according to claim 1 or 2, wherein said first frame is constituted by a pair of half-frames (1) and said second frame is constituted by a pair of half-frames (9), said first bed member comprising a bedspring (15) hinged inside said half-frames (1), said second bed member comprising a second bedspring (11) arranged inside said second frame (9), said first frame (1) being symmetrically identical to said second frame (9), said ladder (60) being articulated to said second bed member (11), said frames (1,9) being mutually hinged in the front and upper region.
4. The piece of furniture according to one or more of the preceding claims, further comprising a covering panel (14) associated with said second bed member (11) and with longitudinal members (12) and (13) of said second frame (9).
5. The piece of furniture according to one or more of the preceding claims, characterized in that said first bedspring (15) is arranged inside said first frame (1) and rests on longitudinal members (3,5) and on adjustable supports (16); brackets (17) being rigidly associated with said first bedspring (15) in a rear region and being articulated to pivots (18) associated with said first frame (1), said first bedspring (15) having a mattress retention frame (19).
6. The piece of furniture according to one or more of the preceding claims, characterized in that said foldaway ladder (60) is articulated to said second bedspring (11), on the opposite side with respect to said covering panel (14), said second bedspring (11) being arranged below said first bedspring (15) with the supporting surface facing down in said folded position of said piece of furniture.

7. The piece of furniture according to one or more of the preceding claims, wherein said ladder (60) comprises a short post (20), a long post (21), three rungs (22,23,24), a safety barrier (25) and a rod (26) for said barrier (25); said three rungs (22,23,24) being articulated to said posts (20,21) about pivots (27,28,29,30,31,32); said barrier (25) being articulated to one of said post (21) about a further pivot (33) and to said rod (26) about a pivot (34), said rod (26) being articulated, at the other end, to said second bedspring (11) about a pivot (35); said posts (20,21) being further articulated about pivots (36,37) which are rigidly coupled to plates (38,39) associated with said second bedspring (11); a spring/damper unit (41) being articulated about a pivot (40) to said plate (39) and being articulated about a pivot (42) associated with said post (21), at its other end; said ladder (60) being adapted to rotate about pivots (36, 37), upon a pushing action on said posts (20, 21), so that the ladder-barrier assembly is arranged horizontally and supported by said spring/damper unit (41) until said ladder folds up completely and horizontally; said post (21), which is coaxial to said rod (26), being adapted to reach its stroke limit only after it has been forced manually to superimpose on said rod (26), thus generating a spring effect which helps to keep the system in the horizontal position.
8. The piece of furniture according to one or more of the preceding claims, wherein said spring/damper unit (45) is articulated between one half-frame of said half-frames of said first frame (1) and said first bedspring (15) and facilitates the partial overturning of said first bedspring (15) and of an associated mattress (46), which is required for the subsequent extraction, by rotation, of said second bedspring (11) and of its associated mattress (47).
9. The piece of furniture according to one or more of the preceding claims, wherein said spring/damper unit (48) is articulated about a pivot (49) which is associated with a lug (50), said lug (50) being arranged inside a U-shaped metal profiled member (8) at one end and, at its other end, about a pivot (51), which is associated with a second lug (52), said second lug (52) being arranged inside a second U-shaped metal profiled member (53), so that in said folded position, since the articulation (51) is axially offset with respect to the articulation (49) and to the hinge (10), it keeps the pair of mutually hinged frames (1,9) in a stably closed position.
10. The piece of furniture according to one or more of the preceding claims, wherein said spring/damper unit (48) is arranged, during maximum compression, inside said U-shaped profiled members (8, 53), which conceal it from view when said piece of furniture is in said folded position.
11. The piece of furniture according to one or more of the preceding claims, wherein in said folded position said mattress (46) of said first bed member acts as seat, and said mattress (47) of said second bed member is stored upside down under said first bed member; a back rest (54) being supported by a longitudinal member (7).
12. The piece of furniture according to one or more of the preceding claims, wherein said ladder (60) can be folded also when said piece of furniture is in said open position in order to facilitate bed-making of said second bed member (11,47); said ladder being folded up into a horizontal position.





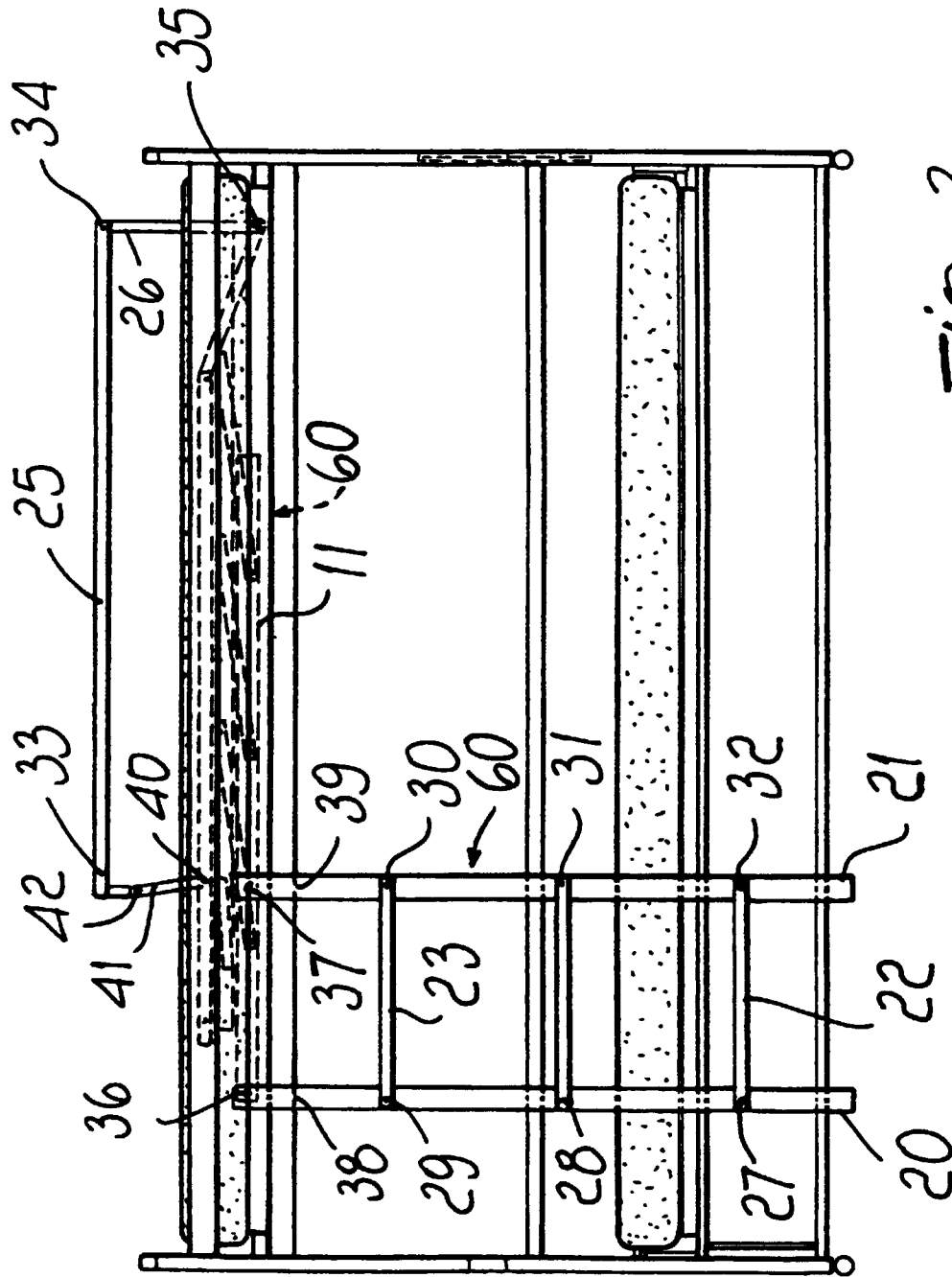


Fig. 3