



(12)

## EUROPEAN PATENT APPLICATION

(21) Application number : **93870190.1**

(51) Int. Cl.<sup>5</sup> : **A47C 4/24, A47C 4/50,  
A47C 17/16**

(22) Date of filing : **17.09.93**

(30) Priority : **17.09.92 NL 9201616**

(43) Date of publication of application :  
**27.04.94 Bulletin 94/17**

(84) Designated Contracting States :  
**AT BE DE DK ES FR GB IT NL**

(71) Applicant : **SEDAC-MECOBEL**  
**Kortrijkstraat 246**  
**B-8560 Wevelgem (BE)**

(72) Inventor : **Djie, Eric Johan**  
**Lauriergracht 108**  
**NL-1016 RP Amsterdam (NL)**

(74) Representative : **Pieraerts, Jacques et al**  
**GEVERS Patents, Rue de Livourne 7, Boîte**  
**Postale 1**  
**B-1050 Bruxelles (BE)**

(54) **Sofa bed, a piece of furniture convertible from a seat into a bed.**

(57) A sofa bed, i.e. a piece of furniture convertible from a seat into a bed is provided with an upper part (1) and a support (2) supporting this part and having four legs (13,14) rigidly connected to one another. The legs of the support (2) are formed of two at least substantially U-shaped profiles, such as tubes, which are disposed cross-wise and which are irrotatably connected to one another through an integrated base plate (8) which is also a part of the operating mechanism of the upper part (1), i.e. this base attachment plate is both a component of the support (2) and of the operating mechanism (5).

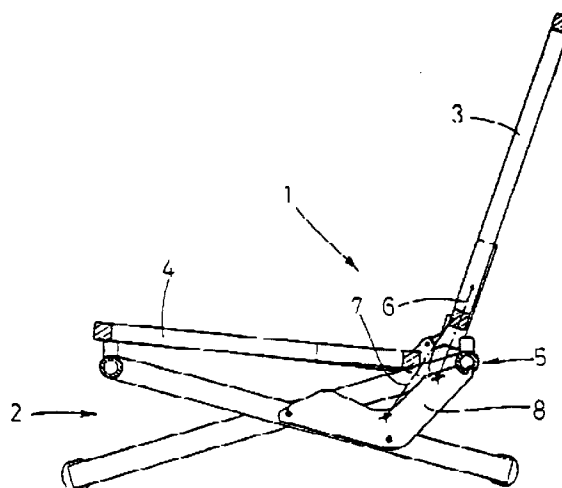


Fig.1

The present invention relates to a sofa bed, i.e. a piece of furniture convertible from a seat into a bed, provided with an upper part and a support supporting this part and having four legs rigidly connected to one another by connecting parts.

In one known embodiment of such a piece of furniture convertible from a seat into a bed, such as a sofa bed, the support is provided with four short small vertical legs which are welded two by two to side plates, which are connected to one another by means of a cross beam through a punch system or through a screw connection. An operating mechanism for adjusting the upper part is screwed or welded to the side plates. A drawback of this known support is that besides the required screws and nuts (or punch) and plastic components, eight frame components are required which have to be fixed to one another through about eight welded connections and four screw or punch connections. By the extensive welding operations and the required assembly time, the cost price is adversely affected. Further, this known support provides a limited stability to the piece of furniture. Indeed, when the piece of furniture is in the bed position, the back portion and seat portion folded out to a sleeping surface project considerably, both on the front and on the back, beyond the legs so that the piece of furniture tend to tip over if somebody is too close to the edge of the sleeping surface. The legs can, however, not be disposed further to the front or to the back because they would otherwise be situated, in the sofa position of the piece of furniture, before and behind the seat portion which is of course not desired.

The invention aims now to provide a piece of furniture convertible from a seat into a bed of the kind mentioned in the preamble, the support of which is relatively easy and cheap to manufacture and which offers nevertheless very good possibilities for a stable support of the piece of furniture, both in the sofa and in the bed position thereof.

The piece of furniture according to the invention convertible from a seat into a bed is characterized thereto in that the legs of the support are formed of two at least substantially U-shaped profiles which are disposed cross-wise and which are irrotatably connected to one another by means of attachment means.

According to the invention, the support can be built up of only two main components which are easy to manufacture, namely the two substantially U-shaped profiles. These profiles can for example consist of simple tubes but other shapes are of course possible. Due to the cross-wise arrangement of the U-shaped profiles, the legs formed thereby can be positioned far to the front and to the back, without being inconvenient in the seat or bed position of the piece of furniture. In particular when the U-shaped profiles are directed with their body on the upper side and with

the legs downwards, there are no hampering cross connections since the legs of the one U-shaped profile may continue beyond the body of the other U-shaped profile. Of course, in principle it is also possible to provide a cross connection between the legs on the ground level, but this connection will have to be curved then further inwards through a curved piece.

It is very advantageous when said attachment means for the U-shaped profiles of the support are formed of parts of the upper part.

In this way, components which are already required for the upper part get a double function whereby even less components are required.

In one possible embodiment of said attachment means, these means are provided with plates disposed on both lateral sides of the support, which plates are each connected at two places to the one U-shaped profile and at one of these places also to the other U-shaped profile, while each of the plates further supports at a third place the other U-shaped profile, the plates being then preferably part of an operating mechanism for adjusting the upper part between a bed position and a seat position.

In this way, both U-shaped profiles are rigidly and irrotatably fixed to one another on each side only through three connections by means of plates which were already required for the operating mechanism of the upper part and only the shape of which has to be adapted for the function of attachment means.

In order to further reduce the number of components, locking members are advantageously formed on the plates which may engage irremovably at said third place in holes in the body of the other U-shaped profile.

In this way, no extra components are required for this connection, while the mounting operation only consists in pushing the locking members into the holes, which locking members may for example be designed as a barb-shaped lip.

The invention further embraces a support for use in the hereabove described piece of furniture.

The invention will be illustrated hereinafter by means of the drawings which schematically represent embodiments of the piece of furniture convertible from a seat into a bed according to the invention and in particular of the support therefor.

Fig. 1 and 2 are very schematical side elevational views of the embodiment of the piece of furniture convertible from a seat into a bed according to the invention in the sofa position and in the bed position respectively, with only two frame components of the upper part being in particular indicated.

Fig. 3 is, on a larger scale, a side elevational view of an operating mechanism for adjusting the upper part between the sofa and bed position of the piece of furniture according to fig. 1 and 2.

Fig. 4 is a perspective view of the U-shaped profiles connected to one another for the support of the

piece of furniture according to fig. 1 and 2.

Fig. 5, 6 and 7 show in different steps the final assembly of the support of the piece of furniture according to fig. 1 and 2, on a larger scale.

The drawings show very schematically an embodiment of the piece of furniture according to the invention, which is designed in this case as a sofa bed, which forms in the seat position a two or three seat sofa and in the bed position a double bed. Of course, the piece of furniture can also be designed as a chair respectively a single bed or may even comprise other combinations.

In the sofa bed, an upper part 1 and a support 2 supporting this upper part can roughly be distinguished. From the upper part 1, frame parts of the back portion 3 and the seat portion 4 are indicated very schematically. In the sofa position of the sofa bed according to fig. 1, the back portion 3 is directed obliquely upwards and the seat portion 4 is inclined backwards, while through a manipulation of an operating mechanism 5 represented very schematically in fig. 1-3, the back portion 3 and the seat portion 4 can be displaced and pivoted towards a horizontal bed position as illustrated in fig. 2.

The operating mechanism 5 comprises on both lateral sides a four bar system, one bar side of which being formed by a support for the back portion 3, which is connected through two bars 6 and 7 with a stationary bar side, which is a part of a side plate 8. The further construction and functioning of the operating mechanism is not relevant for the present invention and is therefore not described in greater detail. Only the side plates 8 of the operating mechanism are an element of the invention and will be discussed further hereinafter.

As mentioned, the upper part 1 of the piece of furniture is supported by the support 2 which is essentially built up of two at least substantially U-shaped tubes 9 and 10, the body 11 of the one U-shaped tube 9 being shorter than the body 12 of the other U-shaped tube 10 in such a manner that the legs 13 of the U-shaped tube 9 serving as legs for the piece of furniture fit accurately between the legs 14 of the other U-shaped tube 10 serving also as legs and both U-shaped tubes 9 and 10 can be connected cross-wise to one another. The upper part 1 is adjustably supported by the bodies 11 and 12 of the U-shaped tubes 9 and 10 in a not further indicated way, for example through support blocks 15. As shown, caps can further be applied onto the lowermost extremities of the legs 13 and 14.

In particular fig. 5-7 illustrate in which way both U-shaped tubes 9 and 10 are rigidly and solidly connected to one another. It can be seen that the side plate 8, which is a part of the operating mechanism 5, also serves for mutually connecting the U-shaped tubes 9 and 10, the other side plate 8 on the opposite side of the piece of furniture also connecting mirror-

wisely both tubes 9 and 10. The side plate 8 is fixed with screws 16 and 17 to the inner side of the leg 13 of the U-shaped tube 9, while the screw 16 serves at the same time for hingedly connecting the legs 13 and 14 of both tubes 9 and 10 to one another at their intersection. On the extremity of the side plate 8 removed from the screw 16 there is formed further a special lip 18, which is designed for irremovably engaging in a hole 19 in the body 12 of the U-shaped tube 10. As shown in fig. 5-7, both U-shaped tubes 9 and 10 can be pivoted in such a manner with respect to each other from a flat storage or transport position according to fig. 5 that, via the position according to fig. 6, the body 12 of the U-shaped tube 10 is going to lay finally in the position according to fig. 7 on to both side plates 8 in a cavity 20 formed thereby, and the lip 18 being penetrated into the hole 19, the shape of the lip 18 and the hole 19 being such that the lip 18 can no longer be withdrawn from the hole 19 so that a rigid connection of both tubes 9 and 10 is achieved and a stable support having a large base is provided.

From the above it will be clear that the invention provides a piece of furniture convertible from a seat into a bed, the support of which can be manufactured from very little components and in a very easy way, while the extremities of the legs 13 and 14 of the U-shaped tubes 9 and 10 provide in the depth direction of the piece of furniture a very large and therefore stable base for the piece of furniture, so that there is no risk for tipping over in the bed position of the piece of furniture. On the other hand, the legs of the support do not trouble persons sitting on the piece of furniture in the sofa position, which support is moreover also a visually attractive entity.

The invention is not limited to the embodiment represented in the drawings and described hereinabove, which can be modified in different ways within the scope of the invention defined in the claims. In this respect, the attachment means may also be mounted at other places or can be shaped in a different way.

## Claims

1. A sofa bed, a piece of furniture convertible from a seat into a bed, provided with an upper part (1) and a support (2) supporting this part and having four legs (13, 14) rigidly connected to one another by connecting parts (11, 12), characterized in that the legs (13, 14) of the support (2) are formed of two at least substantially U-shaped profiles (9, 10) which are disposed cross-wise and which are irrotatably connected to one another by the base plate (8) of the integrated operating mechanism (5).

2. A piece of furniture according to claim 1, wherein the U-shaped profiles (9, 10) have the legs (13, 14) directed downwards.
3. A piece of furniture according to claim 1, wherein the attachment means (8) for the at least substantially U-shaped profiles (9, 10) of the support (2) are formed of parts of the upper part (2). 5
4. A piece of furniture according to claim 1, 2 or 3, wherein the attachment means (8, 16-20) are provided with plates (8) disposed on both lateral sides of the support, which plates are each connected at two places (16, 17) to the one U-shaped profile (9) and at one of these places (16) also to the other U-shaped profile (10), while each of the plates (8) further supports at in third place (18) the other U-shaped profile (10). 10 15
5. A piece of furniture according to claim 3 and 4, wherein the plates (8) are part of an operating mechanism (5) for adjusting the upper part (1) between a bed position and a seat position. 20
6. A piece of furniture according to claim 4 or 5, wherein locking members (18) are formed on the plates (8), which members may engage irremovably at said third place in holes (19) in the body (12) of the other U-shaped profile (10). 25 30
7. A piece of furniture according to any one of the claims, wherein the U-shaped profiles (9, 10) consist of tubes.
8. A support for use in the piece of furniture according to any one of the preceding claims. 35

40

45

50

55

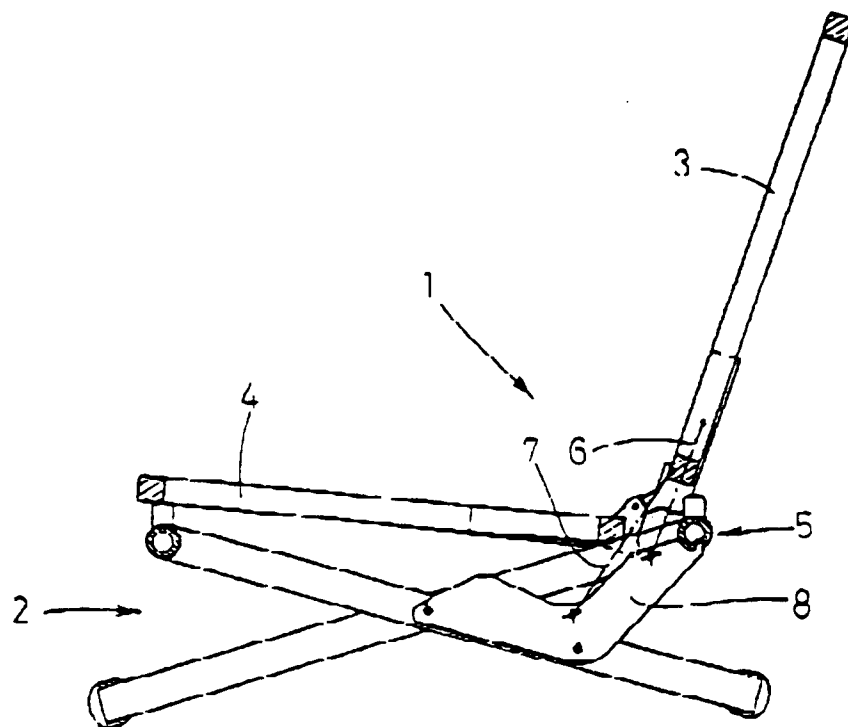


Fig.1

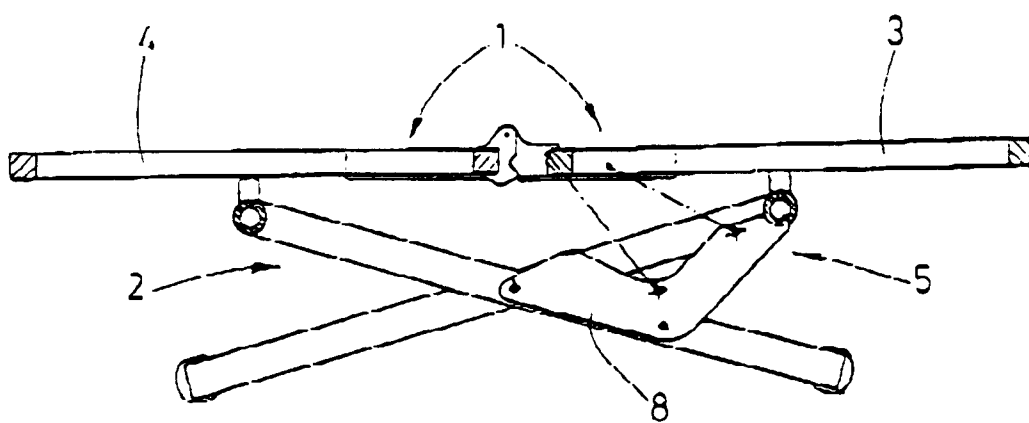


Fig.2

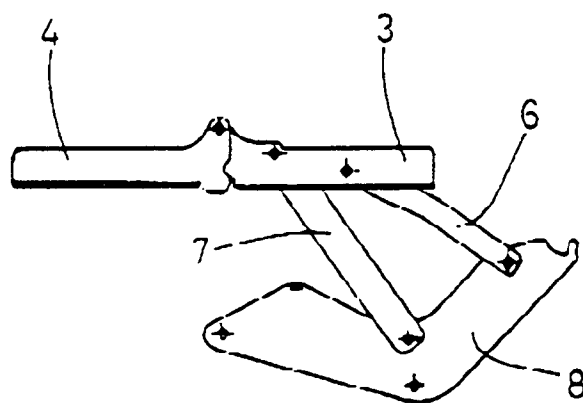


Fig.3

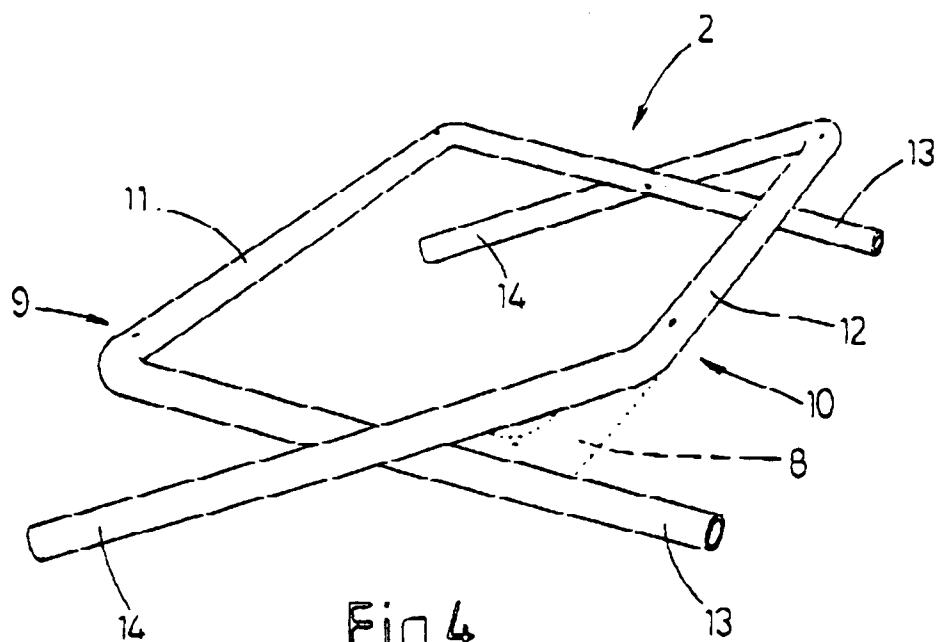
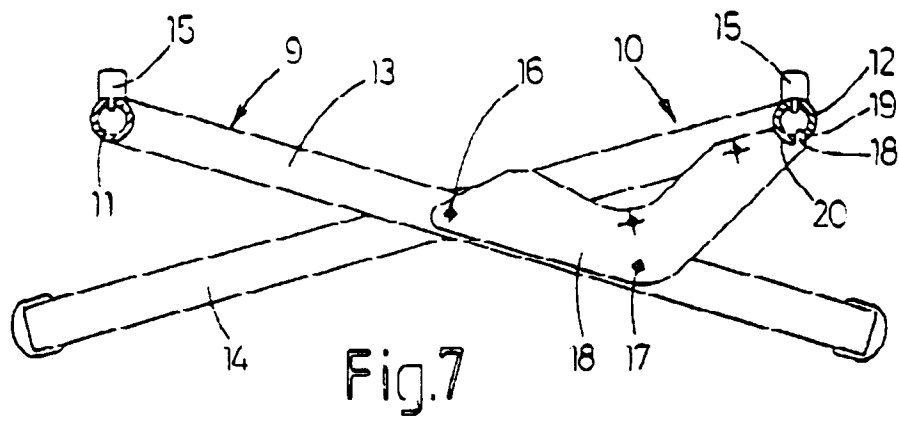
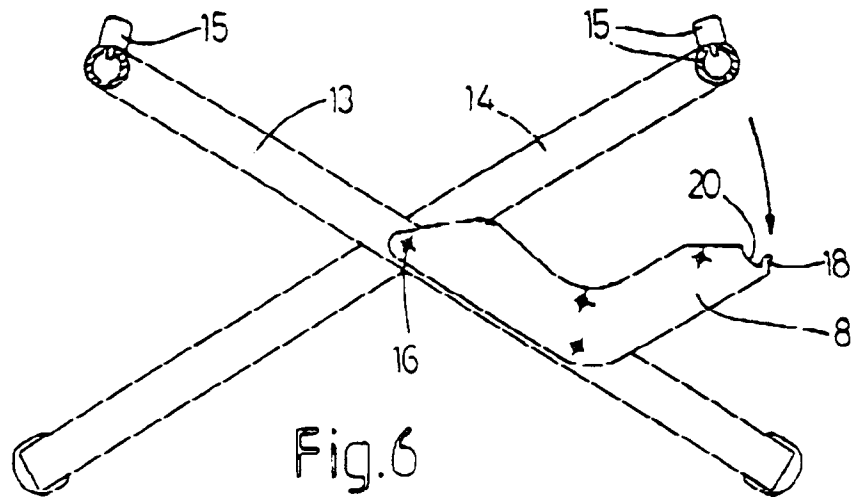
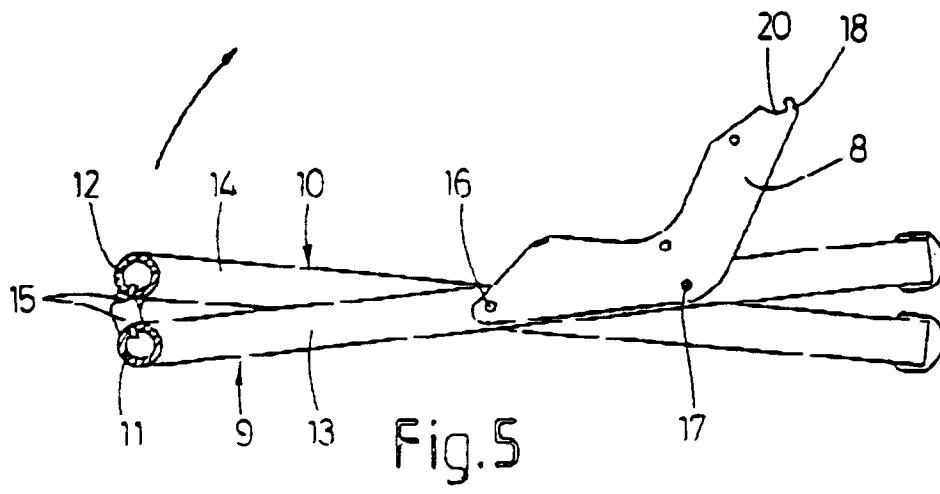


Fig.4





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 93 87 0190

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	US-A-2 658 558 (CARLSON) * column 1, line 44 - column 4, line 15; figures 1-6 *	1,2,7	A47C4/24 A47C4/50 A47C17/16
A	US-A-3 589 661 (HARRIS) * figure 3 *	2	
A	FR-A-1 180 733 (BALLANSARD) * page 2, column 1, line 17 - column 2, line 18; figures 1-3 *	1,7	
A	US-A-2 552 128 (WAXMAN) * figures 1,2 *	4,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			A47C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 February 1994	Examiner Mysliwetz, W
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... A : member of the same patent family, corresponding document</p>			

EPO FORM 1503 01.82 (P0400)