

The present patent application concerns a mechanism enabling the adjusting in three positions termed "bed", "sofa" and "relax" of a sofa-bed in which the padding elements are supported by two reciprocally moving frames consisting of angle-bars, the first supporting the frame forming the seat, and the second supporting the frame forming the back, the angle-bar supporting the frame forming the back being furthermore connected by a hinged coupling consisting of two sets of reciprocally moving arms to a chassis element of the sofa-bed, a ratchet mechanism which acts with a pawl to control two or three of the said positions.

With sofa-beds of this type, a problem exists resulting from the relatively large height of the coupling mechanism between the two frames. The presence of this mechanism prevents the disposition of padding in this locality. This means that two different pieces need to be used, one situated on the frame forming the bed and the other on the frame forming the back.

It has also previously been proposed to provide a mechanism designed such that the coupling mechanism is either eliminated or reduced in height, but in the solutions known to date the distance, furthermore variable, between the frame forming the back and the frame forming the seat is too large to equip the frame forming the seat and the frame forming the back with a single piece of padding or mattress or with two pieces connected together. This problem is clearly encountered in the mechanism according to the French certificate of utility 2.547.1831, which serves as a basis for the preamble to claim 1, where the space between two linked elements remains relatively large.

The aim of the present invention is therefore to propose a mechanism in which the sections forming part of the frame (supporting the seat) and those forming part of the frame (supporting the back) have a coupling point situated sufficiently low for the two frames to be fitted with a single piece forming the mattress or with two pieces connected together.

To achieve this aim in accordance with the invention and to minimize the parts projecting towards the top part of the said hinged coupling and to enable the use of a piece of padding which is unitary or consists of two

pieces connected together, the said pawl which is fixed in relation to an angle-bar which supports the frame forming the seat and which is shaped so that it contacts at two different locations with a single stop provided on one of the said movably connected arms, in the present case the arm which is situated closest to the said pawl.

Still according to the invention, the said pawl has on one side a curve which is shaped so that this curve encounters the said single stop during the movement which brings the frame forming the back into an intermediate position termed "relax" between the bed position and sofa position of the latter frame.

In one advantageous embodiment, the said arm has at its free end a hollow which rests against the said single stop when the frame forming the back is brought into its most raised position, that is, into the "sofa" position.

Other details and advantages of the invention will emerge from the description which will now be provided of a mechanism enabling the adjusting in three positions of a sofa-bed according to the invention. This description is provided only by way of example and in no way limits the invention. The reference notations refer to the appended figures.

Figure 1 shows the mechanism according to the invention in the position in which the sofa-bed is used as a bed.

Figure 2 shows the mechanism according to the invention in the position in which the sofa-bed is used in the position termed intermediate or "relax".

Figure 3 shows the mechanism according to the invention in the position in which the sofa-bed is used as a sofa.

The mechanism illustrated in these figures is assumed to be incorporated into or fixed onto a chassis or a box represented in the drawings by reference 1. A first part 2, which is attached to the chassis 1,

is a fixed part causing movably connected arms 5 and 5' to pivot at 3 and 4. The arm 5 is subject to the action of a return spring 6 which acts to move it in the direction of the arrow 7.

The coupling arms 5 and 5' are furthermore linked at 8 and 9 to the angle-bar 10 which supports the frame forming the back.

The angle-bar 11 supports the frame forming part of the seat. The mattresses 12 and 13, which are shown in chain-dotted representation, are fitted to the frames forming the seat and the back, respectively.

The angle-bars 10 and 11, which form back and seat elements, are hinged together at 14, each angle-bar 10 and 11 having an excess thickness for this purpose designated by the respective references 15 and 16.

A ring 14' forming an intermediate part maintaining a distance slides on this spindle 14 and determines the distance between the planes in which the excess-thickness parts 15 and 16 are located.

The height of the excess thicknesses 15 and 16 appertaining to the angle-bars 10 and 11 is perfectly visible in figure 1, where the mechanism is in the "bed" position. This height does not constitute an obstacle for a single-piece mattress or for two mattresses represented by 12 and 13, which are interconnected by glueing, for example, over a distance designated by reference 17 (figures 2 and 3).

The very great utility of the mechanism according to the invention can be immediately appreciated, since it allows the disposition of a unitary piece of padding or possibly of two pieces connected together, and this is essentially due not only to the fact that the link between the frames forming the back and the seat does not involve an opening whose dimension varies during the opening or closing movements of the sofa-bed, but especially to the presence of the fixed pawl 18, which is fixed in relation to the angle-bar 11 and whose curved profile offers a support point for a single stop 19 fixed on the arm 5.

In figure 1, neither the pawl 18 nor the stop 19 plays any role.

Referring to figure 2, it can be seen that the single stop 19 houses itself in the hollow 20 disposed in the free end of the pawl 18, whereas in figure 3, the same stop 19 is still held by the pawl 18, but at a point determined by the curved profile of the said pawl.

Due to this arrangement, the mechanism according to the invention is particularly compact and the afore-mentioned inconveniences can be completely eliminated.

The compactness of the mechanism is reinforced still further by the assembly of the pawl 18, and particularly of the part which forms the said pawl, plus the afore-mentioned ratchet mechanism.

The pawl 18 consists of a part which is solidly connected to the angle-bar 11 by means of the said spindle 14 and by means of a second spindle 21 which connects the piece of which the pawl 18 forms part to the angle-bar 10 which supports the frame forming the back. The second spindle 21 acts as a stop for each of the slots 22 and 23 in the piece 24 which forms the principal element of the ratchet mechanism. This piece 24 is mounted so that it can pivot in relation to the angle-bar 10 at 25, and it is subject to the action of a return spring in the form of a leaf spring 26.

Figure 2 illustrates the position in which the slot 23 in the piece 24 comes to rest against the second spindle 21, whereas in figure 3, it can be seen that it is the second slot, notably slot 22, which is in contact with the second spindle forming the stop.

The ratchet mechanism is therefore designed very compactly and inserts entirely within the coupling between the angle-bars 10 and 11 of the mechanism.

The essential role played by the pawl 18 and its curved profile can also be noted. In one position, the single stop 19 penetrates entirely inside the hollow 18' in the pawl 18 (figure 3, representing the seat position).



In the "relax" position, the stop 19 penetrates into the hollow 20 in the pawl 18. This represents the "relax" position.

From the above description, it can be immediately appreciated that the mechanism according to the invention allows a particularly easy assembly of the mattresses 12 and 13, which can either from a unitary piece or be be connected as shown, by way of example, in the figures.

Claims

1. Mechanism enabling the adjusting in three positions termed "bed", "sofa" and "relax" of a sofa-bed in which the padding elements are supported by two reciprocally moving frames consisting of angle-bars (10, 11), the first angle-bar (10) supporting the frame forming the back, and the second (11) supporting the frame forming the seat, the angle-bar supporting the frame forming the back being furthermore connected by a hinged coupling consisting of two sets of reciprocally moving arms (5 - 5') to a chassis element of the sofa-bed, a ratchet mechanism which acts with a pawl (18) to control two or three of the said positions, characterized in that, in order to minimize the parts projecting towards the top part of the said hinged coupling and to allow the use of a piece of padding which is unitary or formed of two pieces connected together (12, 13), the said ratchet mechanism acts with a pawl (18) which is fixed in relation to an angle-bar (11) which supports the frame forming the seat and is shaped so that it connects at two different points with a single stop (19) situated on one of the said reciprocally moving arms, in the present case arm (5), which is situated closest to the said pawl (18).

2. Mechanism according to the preceding claim, characterized in that the said fixed pawl (18) has a hollow (18') on one side which is shaped to accomodate the stop (19) during the action which moves the frame forming the back into a position termed "sofa", which is situated between the "relax" position and "bed" position of the said frame.

3. Mechanism according to either claim 1 or 2, characterized in that the said pawl (18) has a hollow (20) at its free end which rests



against the said single stop (19) when the frame forming the back is moved into its "relax" position.

4. Mechanism according to any of claims 1 - 3, characterized in that the angle-bars (10) of the frame forming the back and the angle-bars (11) of the frame forming the seat and the part forming the said pawl (18) are connected by a pin (14) on which a ring (14') slides and forms an intermediate part which maintains a distance to allow the ratchet mechanism to move between the two angle-bars (10) and (11), while a second pin (21) connects the same angle-bars (10) and (11) at a distance and acts as a stop for the ratchet mechanism element which controls the two positions termed "relax" and "sofa" of the frame forming the back.

5. Mechanism according to claim 4, characterized in that the ratchet mechanism, which is mounted so as to tilt between the said angle-bars (10) and (11), is subject to the action of a return spring (26) and has two slots (22) and (23) which are situated in the part forming the ratchet and are disposed opposite the pivoting pin (25) of the ratchet in relation to the angle-bar (11) which supports the frame forming the seat, and the said slots (22) and (23) come alternately into contact with the second pin (14), which acts as a stop when the frame forming the back is moved respectively into the positions termed "sofa" and "relax".