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(54) **Mechanism for a sofa-bed enabling the adjustment in three positions**

Sofabettmechanismus, welche die Verstellung in drei Stellungen gestattet

Mécanisme pour canapé-lit permettant le réglage en trois positions

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(56) References cited:
EP-A- 0 380 156 **BE-A- 900 723**
DE-U- 8 605 100 **FR-A- 2 535 182**

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DescriptionTechnical field

[0001] The present invention regards a mechanism for sofa-beds enabling the adjustment in three positions, said "bed", "divan" and "relax", of a sofa-bed.

[0002] In the prior art, concerning the above mentioned application, there are already some realisations of mechanisms enabling the adjustment of a sofa-bed in three positions. Such mechanisms, as the one described in the European patent 0 380 156 B1, are generally release mechanisms comprising two reciprocally moving angle-bars, a kinematism, similar to an articulated quadrilateral, many intermediate elements forming a seat and a ratchet to lock the sofa-bed in the positions termed "divan" and "relax", and, at least, two toothed profiles that, engaging each other, determine the reciprocal position of the angle-bars and, also, the position of the frames supporting the sofa-bed.

[0003] The known applications, anyhow, present many constructive disadvantages. The described kinematism is very complicated, there are a lot of components and, above all, numerous hinges, the toothed profiles do not work in a proper manner because said profiles are not axially stressed but tangentially stressed.

Disclosure of the invention

[0004] The invention is different from the standards on the market thanks to the fact that the angle-bars constitute a release mechanism without the interposition of additional elements; wherein the first angle-bar has a shaped profile and is adapted to engage a pawl at two different points said pawl is positioned upon a back lever of an articulated quadrilateral arrangement and has variable relative motion with respect to said shaped profile; the second angle-bar has a toothed profile enabling a cam, fixed to said first angle-bar, to engage said toothed profile; in this way, the relative position between the two angle-bars is well determined to enable said three adjustment positions to be achieved.

[0005] The other aim of the invention is a remarkable reduction of the number of the hinges, number that, as it will be seen in the detailed description, is not higher than five.

[0006] According to a subsequent aim, the cam and the toothed profile of the second angle-bar are mutually stressed by means of compression, avoiding therefore any tangential stress for the teeth of the profiles.

[0007] These and other advantages will be pointed out in the detailed description of the invention, that will refer to the figures, in which the preferential schemes of the three positions, have been shown. All of them are exemplifying and not restrictive.

Way of carrying out the invention

[0008] With reference to the above mentioned figures:

- fig. 1 shows the kinematism in the "bed" position;
- fig. 2 represents the "relax" position;
- fig. 3 presents the mechanism in the "divan" position.

[0009] According to the figures, the present sofa-bed is made of padding elements supported by two frames; said frames are connected so that they can reciprocally move by means of two angle-bars, concurrent in a point; one of said angle-bars 1 supports the frame which makes up the seat of the sofa-bed and the second one 2 supports the frame forming the back of the sofa-bed. The angle-bar 2 is part of an articulated quadrilateral comprising a fixed lever 11 (which has two fixed hinges 11' and 11" at its ends), two movable levers, a front one 5 and a back one 6. An elastic return element 8 connects the fixed lever 11 to the movable back lever 6. The two levers 5 and 6 are connected to the second angle-bar by means of the hinges 12 and 6' respectively. In particular, three elements, the angle-bars 1 and 2 and the front lever 5, meet at said hinge 12. The angle-bars, without interposition of additional elements, form a release mechanism enabling the desired positions; in fact, the first angle-bar 1 has a shaped profile 4, such to engage, at two different points 4' and 4", a pawl 7; said pawl is positioned on the back lever 6 of the articulated quadrilateral, and has variable relative motion with the respect to said shaped profile when in the positions "divan" and "relax"; moreover, the other angle-bar 2 has a toothed profile 3 enabling a cam 9 (fixed to said first angle-bar by means of the hinge 9" and submitted to the action of a return spring 10) to engage said toothed profile; in this way, the relative position among the two angle-bars is well determined to enable said three adjustment positions to be achieved.

[0010] Of course, since there are not further intermediate elements, it is possible that the cam 9 is on the same plane of the angle-bar 2 and, in particular, of its toothed profile 3. According to a preferential realisation, it is also possible to further ensure the complanarity between the cam and the angle-bar by means of a fixing plate 13.

Example

[0011] The principle of functioning of the mechanism is very simple. The shaped profile 4 of the first angle-bar 1 presents a hollow 4" receiving the pawl 7 in the said position "divan" and a projecting portion 4' able to stop the pawl 7 in the said position "relax". In particular, the projecting portion 4' presents a flat surface, without hollow, and, therefore, the said position "relax" is determined by the contact at just one point between said projecting portion 4' and the pawl 7. The positions "divan"

and "relax" are obtained when the surface 9' of the cam 9 engages the toothed profile 3 of the second angle-bar 2; this fact, in a univocal way, determines the reciprocal position of the two angle-bars. The way of working of the surface 9' of the cam and of the teeth of the toothed profile 3 is proper because they are both stressed by compression and not tangentially.

[0012] As it is evident, the mechanism in object is extremely simple, capable of performing, in an effective way, functions which, up to now, were performed only by very complex mechanisms with a large number of components. In particular, the invention is remarkably different from the others, known as prior art, because it needs only five hinges, that is: the two fixed hinges 11' and 11'' of the articulated quadrilateral, the hinge 6' which connects the back lever 5 of the quadrilateral 6 with the second angle-bar 2, the hinge 12 at which the two angle-bars 1 and 2 and the front lever 5 of the articulated quadrilateral meet and the hinge 9'' which connects the first angle-bar 1 with the cam 9.

Claims

1. Mechanism for a sofa-bed enabling the adjustment in three positions, comprising padding elements supported by two frames; said frames can reciprocally move by means of two angle-bars, concurrent at a point;

a first angle-bar (1) supports the frame forming the seat of the sofa-bed and
a second angle-bar (2) supports the frame forming the back of the sofa-bed; moreover comprising a kinematism which supports said second angle-bar and being,

characterised in that,

the angle-bars constitute a release mechanism without the interposition of additional elements wherein, the first angle-bar (1) has a shaped profile (4) and is adapted to engage a pawl (7) at two different points (4', 4'');
said pawl is positioned upon a back lever (6) of an articulated quadrilateral arrangement and has variable relative motion with respect to said shaped profile (4)
the second angle-bar (2) has a toothed profile (3) enabling a cam (9) fixed to said first angle-bar (1) to engage said toothed profile (3);
in this way, the relative position between the two angle-bars is well determined to enable said three adjustment positions to be achieved.

2. Mechanism according to the claim 1 characterised by the fact that shaped profile (4) of the first angle-bar (1) presents a hollow (4'') receiving the pawl (7)

in the said position "divan" and a projecting portion (4') able to stop the pawl (7) in the said position "relax".

3. Mechanism according to the claim 2 characterised by the fact that the projecting portion (4') presents a flat surface, without hollow, and, therefore, the said position "relax" is determined by the contact at just one point between said projecting portion (4') and the pawl (7).
4. Mechanism according to the claim 1 characterised by the fact that the surface (9') of the cam (9) engages the toothed profile (3) of the second angle-bar (2); this fact, in a univocal way, determines the reciprocal position of the two angle-bars.
5. Mechanism according to the claims 1 and 4 characterised by the fact that the portions (9') of the cam (9) and of the toothed profile (3) of the second angle-bar (2) are both stressed by compression.
6. Mechanism according to the claim 1 characterised by the fact that said cam (9) is on the same plane of said second angle-bar (2) with toothed profile (3).
7. Mechanism according to the claim 6 characterised by the fact that the complanarity between the cam (9) and the angle-bar (2) is further ensured by means of a fixing plate (13).
8. Mechanism according to the claims 1, 4, 5, 6 and 7 characterised by the fact that said cam (9) is submitted to the action of an elastic return element (10).
9. Mechanism according to the claim 1 characterised by the fact that in the junction (12) among the two angle-bars (1) and (2) also the front lever (5) converges.
10. Mechanism according to the claim 1 characterised by the fact that it needs only five hinges, that is: the two fixed hinges (11') and (11'') of the articulated quadrilateral, the hinge (6') which connects the back lever of the quadrilateral (6) with the second angle-bar (2), the hinge (12) at which the two angle-bars (1) and (2) and the front lever (5) of the articulated quadrilateral meet and the hinge (9'') which connects the first angle-bar (1) with the cam (9).

Patentansprüche

1. Es handelt sich um einen Mechanismus für Bettsofas, der eine Einstellung in drei unterschiedliche Positionen ermöglicht. Die Sofapolsterung wird teilweise von zwei miteinander verbundenen Rahmen gehalten, so dass diese sich wechselseitig auf zwei

Winkleisen, die an einem Punkt zusammentreffen, verschieben lassen. Ein Scharnier (1) hält den Rahmen, der die Sitzfläche bildet und ein zweites Scharnier (2) hält den Rahmen der Rückenlehne und enthält auch ein vierseitiges Getriebe, das das og. zweite Winkleisen bewegt. Hierbei ist wichtig, dass die beiden Winkleisen, ohne Zwischenstellung zusätzlicher Elemente, einen Schnappmechanismus bilden, der von den og. drei Positionen mindestens zwei zu erreichen ermöglicht. Dies erfolgt mittels des Profils (4) des ersten Winkleisens (1), das so geformt ist, dass es an zwei verschiedenen Punkten (4', 4'') mit einem Sperrzapfen (7) in Kontakt kommt. Dieser Zapfen befindet sich auf dem Hebel (6) einer vierseitigen Gelenkvorrichtung und hat einen relativ variablen Bewegungsspielraum hinsichtlich des og. Profils (4), während das zweite Winkleisen (2) mit seinem Zahnprofil (3) einem am ersten Winkleisen (1) befestigten Nocken (9) eine Verbindung zu demselben Zahnprofil (3) ermöglicht, so dass die Position zwischen den beiden Winkleisen so festgestellt wird, dass die Regelung in 3 Positionen möglich ist.

2. Mechanismus wie unter 1), dadurch charakterisiert, dass das dem ersten Winkleisen (1) angepasste Profil (4) sowohl eine Einkerbung aufweist (4''), so dass der Sperrzapfen (7) in der "Divano" genannten Position einrastet, als auch einen kleinen Vorsprung (4'), so dass der Sperrzapfen (7) in der "Relax" genannten Position blockiert wird. 25 30
3. Mechanismus wie unter 2), dadurch charakterisiert, dass der kleine Vorsprung (4') eine ebene Oberfläche hat, ohne Einkerbungen, so dass die "Relax" genannte Position durch einen einzigen Kontakt zwischen demselben Vorsprung (4') und dem Sperrzapfen (7) bestimmt wird. 35
4. Mechanismus wie unter 1), dadurch charakterisiert, dass der Nocken (9) eine Oberfläche aufweist (9'), die abwechselnd in Kontakt tritt mit dem Zahnradprofil (3) und dem zweiten Winkleisen (2), so dass die wechselseitige Position der beiden Winkleisen einseitig festgelegt wird. 40 45
5. Mechanismus wie unter 1)- 4), dadurch charakterisiert, dass die Vorsprünge (9') des Nockens (9) und des Zahnprofils (3) des zweiten Winkleisens (2) untereinander gegenseitig durch Kompressionsdruck belastet werden. 50
6. Mechanismus wie unter 1), dadurch charakterisiert, dass der Nocken (9) komplanar zum zweiten Winkleisen (2) mit Zahnprofil (3) ist. 55
7. Mechanismus wie unter 6), dadurch charakterisiert, dass die Komplanation zwischen dem Nocken (9)

und dem Winkleisen (2) noch durch eine zusätzliche Abstützplatte (13) abgesichert wird.

8. Mechanismus wie unter 1), 4), 5), 6) und 7), dadurch charakterisiert, dass der Nocken (9) einem elastischen Kontrollelement (10) untersteht. 5
9. Mechanismus wie unter 1), dadurch charakterisiert, dass in dem Vereinigungspunkt (12) zwischen den beiden Winkleisen (1) (2) auch der Vorderhebel (5) der vierseitigen Gelenkvorrichtung konvergiert. 10
10. Mechanismus wie unter 1), dadurch charakterisiert, dass er nur 5 Gelenke benötigt, und zwar im Einzelnen die beiden festen Scharniere (11' und 11'') der vierseitigen Gelenkvorrichtung, das Scharnier (6'), das den hinteren Arm der vierseitigen Gelenkvorrichtung (6) mit dem zweiten Winkleisen (2) bewegt, das Scharnier (12), in dem die beiden Winkleisen (1) (2) und der Vorderhebel (5) der vierseitigen Gelenkvorrichtung konvergieren und das Scharnier (9''), das das erste Winkleisen (1) mit dem Nocken (9) verbindet. 15 20

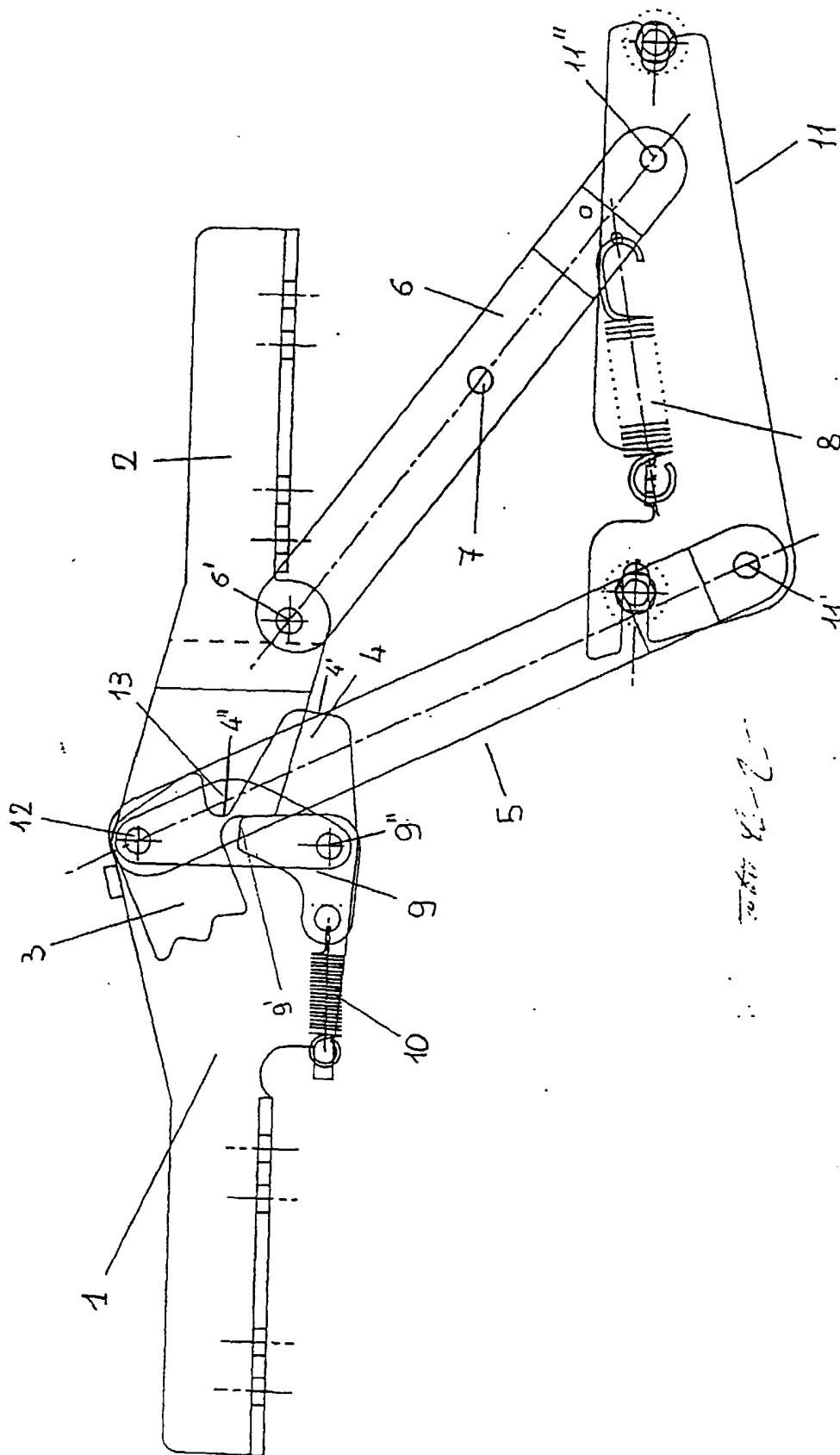
Revendications

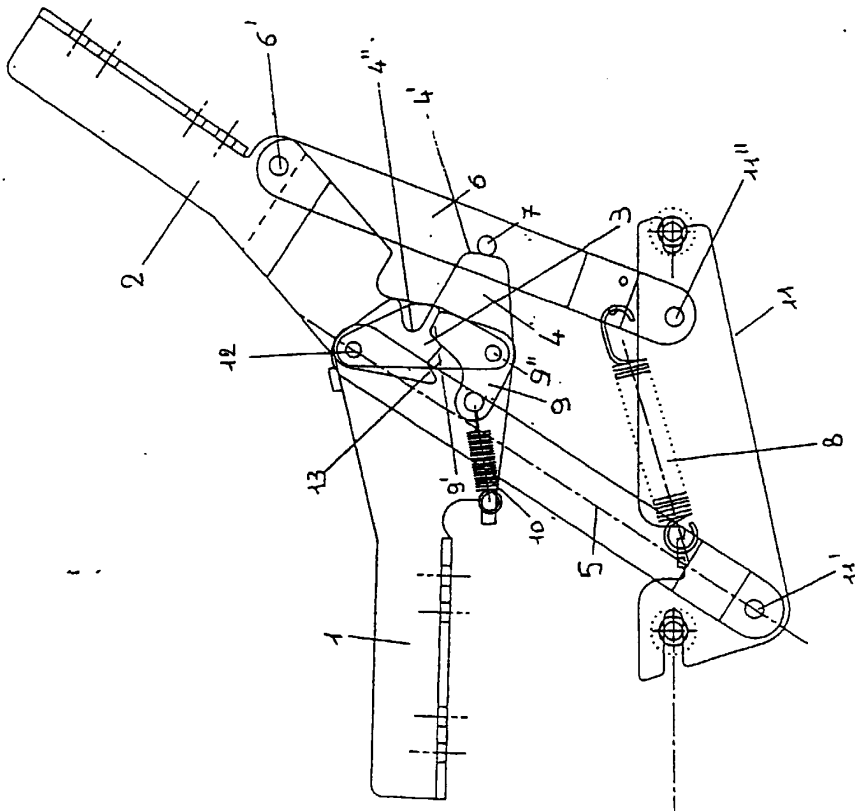
1. Mécanisme pour divans-lit permettant le réglage en trois positions, d'un divan comprenant des éléments de rembourrage soutenus par deux châssis unis, de façon qu'on puisse se déplacer mutuellement, par deux charnières, convergentes en un point; une charnière (1) soutient le châssis formant le siège et une deuxième charnière (2) soutient le châssis formant le dossier, comprenant en outre un cinématisme à quadrilatère articulé qui soutient la susdite deuxième charnière, caractérisé par le fait que, les susdites charnières, sans interposition d'éléments additionnels, constituent un mécanisme de déclenchement qui permet d'obtenir au moins deux des trois positions susdites, en ayant la première charnière (1) un profil façonné (4) tel à entrer en contact en deux points différents (4', 4'') avec un goujon d'arrêt (7); le susdit goujon est positionné sur le levier (6) d'un quadrilatère articulé, et ayant un mouvement relatif variable au regard de tel profil façonné (4) et la deuxième charnière (2) conformée selon un profil denté (3) qui permet à une came (9) solidaire à telle première charnière (1) de s'engager en tel profil denté (3) en résultant la position relative ainsi fixée entre les deux charnières elle permet le réglage en trois positions. 1
2. Selon la revendication 1, mécanisme caractérisé par le fait que le susdit profil façonné (4) de la première charnière (1) présente un creux (4) tel qu'il accueille le susdit goujon d'arrêt (7) dans la position appelée "divan" et une portion saillante (4) qui peut

bloquer le goujon d'arrêt (7) dans la position appelée "relax".

3. Selon la revendication 2, mécanisme caractérisé par le fait que telle portion saillante (4) présente une surface plate, sans creux, et, par conséquent, la position appelée "relax" est déterminée par le contact en un seul point entre la susdite saillie (4) et le goujon d'arrêt (7). 5
4. Selon la revendication 1, mécanisme caractérisé par le fait que la susdite came (9) présente une surface (9') qui entre alternativement en contact avec le profil denté (3) de la deuxième charnière (2) en déterminant de façon univoque la position réciproque des deux charnières. 10
5. Selon les revendications 1 et 4, mécanisme caractérisé par le fait que les portions (9') de la came (9) et du profil denté (3) de la deuxième charnière (2) sont mutuellement poussées à compression entre elles. 15
6. Selon la revendication 1, mécanisme caractérisé par le fait que telle came (9) est complanaire à la deuxième charnière (2) avec le profil denté (3). 20
7. Selon la revendication 6, mécanisme caractérisé par le fait que la complanarité entre la came (9) et la charnière (2) est ultérieurement assurée par une plaque d'étanchéité (13). 25
8. Selon les revendications 1, 4, 5, 6 et 7, mécanisme caractérisé par le fait que la came susdite (9) est soumise à l'action d'un élément élastique de rappel (10). 30
9. Selon la revendication 1, mécanisme caractérisé par le fait que dans le point d'union (12) entre les deux charnières (1) (2) il converge aussi le levier antérieur (5) du susdit quadrilatère articulé. 35
10. Selon la revendication 1, mécanisme caractérisé par le fait de nécessiter de seules 5 rotules et, en particulier, les deux charnières fixes (11 et 11') du quadrilatère articulé, la charnière (6') qui articule le bras postérieur du quadrilatère (6) avec la deuxième charnière (2), la charnière (12) où les deux charnières (1) (2) et le levier antérieur (5) du quadrilatère articulé et la charnière (9'') qui articule la première charnière (1) avec la came (9) convergent. 40

55

FIG. 1



RELAX

FIG. 2

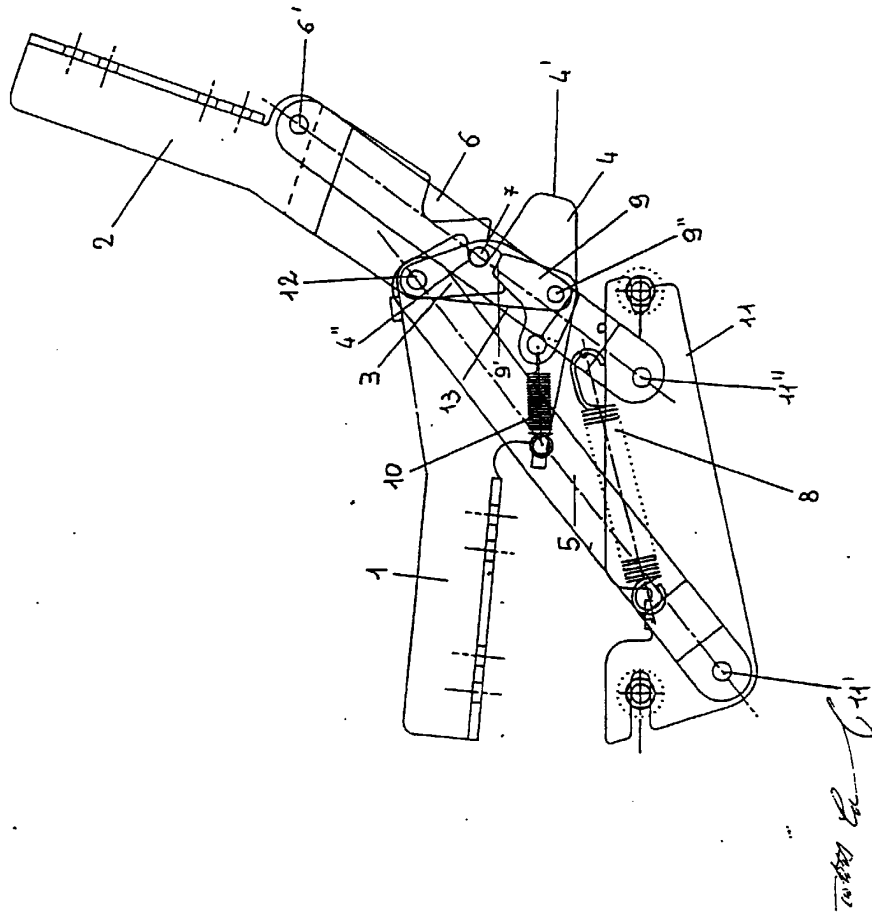


FIG. 3

DIVAN.