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(54) **ADJUSTABLE SEAT**

(57) The item comprises at least one base framework (1) provided with support elements (4, 5a, 5b) on which is supported at least one movable frame (2) fitted with a plurality of tension elements (3a, 3c, 3b) to support at least one seat cushion (30). Some of said support elements (4, 5a, 5b) are arranged at different heights and are susceptible to be selectively used to support the movable frame (2) in at least two different positions. A multiple place seat furniture item can be formed by supporting a multiple place movable frame (2) or various individual movable frames (2) on one base framework (1), or with various individual base frameworks (1) joined together.

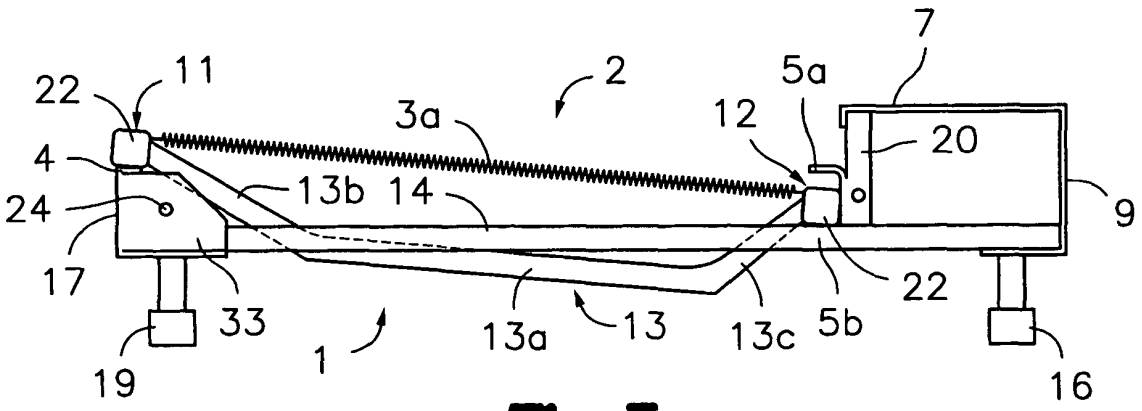

Fig.3

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Description

Field of the invention

[0001] The present invention concerns adjustable seat furniture item that includes a base framework, with support elements at various heights to selectively support a movable frame supporting a seat cushion in at least two positions.

Background of the invention

[0002] The utility model ES-A-1051167 describes an improved sofa comprising a chassis fitted with an interior frame having front and rear sides on which guide profiles are arranged to provide stable support for one or more movable frames fitted with tension elements defining a support surface for seat cushions. The mentioned tension elements comprise elastic bands made of flexible material secured to front and rear profiles on the movable frame by means of U-shaped clips. One drawback of this model is that the existing profiles on the chassis are arranged to provide a single position for the movable frames, so that they only provide a single position for the seat cushions. Moreover, the system of elastic bands secured by clips makes the assembly annoying and the tension adjusting of such bands very difficult, especially by a user.

[0003] Patent EP-0596176 to the present applicant describes a seat furniture item having a modular configuration, which comprises a base framework defining a frame to which a plurality of tension elements are anchored to support at least one seat cushion. A rear section of the base framework includes configurations in the form of vertical guides adapted to receive and secure at least one backrest part. The cited backrest part and the base framework include respective configurations in their side sections, in the form of vertical guides to receive and secure armrest parts. However, the fact that said tension elements are anchored to the base framework has the drawback of providing a single position for the seat cushion.

Disclosure of the invention

[0004] It is an object of the present invention to solve or mitigate the previous and other drawbacks through the provision of an adjustable seat furniture item comprising at least one base framework fitted with support elements on which at least one movable frame fitted with a plurality of tension elements to support at least one seat cushion is supported, wherein some of said support elements are arranged at various heights and are susceptible to be used selectively to support the movable frame in at least two different positions. Preferably, the mentioned support elements comprise at least one front support element one which is supported at least one front support zone of the movable frame and at least one first and at least one second rear support elements on which a rear support zone of the movable frame can be supported. The second rear support element is located at a lower height than the first rear support element and the movable frame is susceptible to be selectively supported on one or the other of the first and second rear support elements to respectively provide a first, substantially horizontally position and a second, inclined position for the moveable frame.

[0005] The movable frame comprises front and rear bars, spaced apart and facing each other, joined by at least two longitudinal beams, each having one intermediate portion and end portions joined to the front and rear bars. These end portions are inclined so that said intermediate portion is at a level that is notably lower than said front and rear bars. The two front and rear bars act as anchoring supports for said plurality of tension elements and as the mentioned front and rear support zones on the front and rear supports element of the base framework, respectively. Elastomer material elements are arranged in contact zones between said support zones on the front and rear bars and the respective front and rear support elements in order to prevent friction and disturbing noises.

[0006] The tension elements anchored on the frame comprise various types of tension elements, which define different support zones for said seat cushion. Moreover, each type of tension element is susceptible to be independently selected for each support zone as a function of the desired hardness.

[0007] The base framework includes configurations adapted to secure a backrest part in a rear section, an armrest part on one or both side sections and front and rear legs in the lower front and rear corners. In accordance with an exemplary embodiment, the base framework is of a width suitable to form a multi-place seat furniture item and can include a single movable frame suitable for said multiple places or several individual movable frames. Alternatively, the base framework is of a width suitable to form a single place seat furniture item, in which case it will be fitted with an individual movable frame and, advantageously, said individual base framework includes configurations for joining to similar adjacent base frameworks to form a multiple place seat furniture item.

A brief description of the drawings

[0008] The previous and other features and advantages will be more easily understood from the following detailed description of an exemplary embodiment with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a base framework and a movable frame forming part of a adjustable seat furniture item in accordance with an exemplary embodiment of the present invention;
Fig. 2 is a side elevation view of the base framework and movable frame of Fig. 1 assembled in a first

position;

Fig. 3 is a side elevation view of the base framework and movable frame of Fig. 1 assembled in a second position;

Fig. 4A is a plan view illustrating one possible layout of several types of tension elements on the movable frame for the purpose of defining different support zones on the same;

Fig. 4B is a partial plan view illustrating another possible layout of several types of tension elements on the movable frame;

Fig. 5 is an exploded perspective view of a base framework and two movable frames forming part of an adjustable seat furniture item in accordance with another exemplary embodiment of the present invention;

Fig. 6 is a partially exploded side elevation view showing different parts installed or about to be installed on the base framework and movable frame to form a seat furniture item; and

Fig. 7 is a side elevation view of an assembled seat furniture item.

Detailed description of an exemplary embodiment of the invention

[0009] First referring to Fig. 1, the adjustable seat furniture item in accordance with an exemplary embodiment of the present invention comprises a base framework 1 fitted to receive a movable frame 2 thereon adapted to support a plurality of tension elements 3a, 3b, 3c not shown in Fig. 1 and described below in detail with reference to Figs. 4A and 4B. These tension elements 3a, 3b, 3c comprise a support surface for a seat cushion 30 shown in Fig. 6. The movable frame 2 rests on a front support element 4 and on one or the other of first and second rear support elements 5a, 5b provided on the base framework 1.

[0010] The movable frame 2 comprises front and rear bars 11, 12, spaced apart and facing each other, which act as anchor supports for the plurality of tension elements 3a, 3b 3c. The mentioned front and rear bars 11, 12 are joined together by at least two longitudinal beams 13, each preferably having an intermediate portion 13a and end portions 13b, 13c connecting the intermediate portion 13a to front and rear bars 11, 12, respectively. These end portions 13b, 13c are inclined so that said intermediate portion 13a is notably lower than said front and rear bars 11, 12 so that they do not interfere with the tension elements 3a, 3b, 3c and/or the lower part of the seat cushion 30 arranged thereon when they are deformed downwards under the weight of an occupant. Front and rear bars 11, 12 of the movable frame 2 include elastomer material elements 22 in zones to support on respective front support elements 4 and first or second rear support elements 5a, 5b to prevent disagreeable noises and make it difficult for the movable frame 2 to slip over the base framework 1. Preferably, the front and rear bars 11, 12 are formed from tubular profiles and the elastomer material elements 22 are rubber plugs coupled to their ends. The seat furniture item includes a pad or cushion 30a, in general flat and thin, interposed between the tension elements 3a, 3b, 3c and the seat cushion 30.

[0011] As shown in Figs. 2 and 3, the front support element 4 of the base framework 1 has a fixed predetermined height and the first and second rear support elements 5a, 5b are arranged on two different levels: the first rear support element 5a is basically located at the same height as said front support element 4 and the second rear support element 5b is located at a lower height than the front support element 4. Thus, the front bar 11 of the movable frame 2 is always supported on the front support element 4 of the base framework 1 at a constant height, while the rear bar 12 of the movable frame 2 is susceptible to being selectively supported on the first rear support element 5a or on the second rear support element 5b in order to obtain two different positions for the movable frame and, consequently, for the seat cushion arranged on same.

[0012] In the situation shown in Fig. 2, the front bar 11 of the movable frame 2 is supported on the front support element 4 of the base framework 1 and the rear bar 12 is supported on the first rear support elements 5a, thereby obtaining a first, substantially horizontal position for the frame 2. In Fig. 3, the front bar 11 of the movable frame 2 is equally supported on the front support element 4 of the base framework 1 and the rear bar 12 is alternatively supported on the second rear support elements 5b, thereby obtaining a second, inclined position for the movable frame 2.

[0013] Now referring to Fig. 4A, the mentioned tension elements 3a, 3b, 3c are designed to define different support zones for said seat cushion 30 on movable frame 2. To this end, each of said different zones comprises tension elements of different types 3a, 3b, 3c having different properties with respect to hardness and elasticity, which are susceptible to be independently selected for each support zone in function of desired hardness. The first type of tension elements 3a are anchored at their ends to facing areas of the front and rear bars 11, 12, preferably at the side ends of the movable frame 2. The second type of tension elements 3b are anchored at one of their ends to the front bar 11 and at the other of their ends to a floating crossbar 6 arranged between the front and rear bars 11, 12. Finally, the tension elements of the third type 3c are anchored at one of their ends to the rear bar 12 and at the other of their ends to said floating crossbar 6. With this layout, the floating crossbar 6 is tensively suspended by the tension elements of the second and third types 3b, 3c and its position can be varied as a function of the complementary lengths of the tension elements of the second and third types 3b, 3c. In the exemplary embodiment shown in Fig. 4B, all the tension elements are tension elements of the second and third types 3b and 3c and there are no tension elements that extend between the front and rear bars 11, 12 of the movable frame

2. Other layout variants are possible.

[0014] In the illustrated exemplary embodiments, the tension elements of the first, second and third types 3a, 3b, 3c are constituted by helical springs under traction, which have different elasticity factors for each type or each zone of the seat furniture item. The springs are terminated at their ends by hooks adapted to be removably anchored in corresponding holes in the front and rear bars 11, 12 and/or in the floating crossbar 6 of the movable frame 2, so that said helical springs are easily replaceable or substitutable by other having a different elasticity factor in order to adapt the hardness of the seat furniture item to the user's taste. Preferably, between the tension elements 3a, 3b, 3c and the seat cushion 30, there is a piece of an intermediate support felt or pad.

[0015] To complete the seat furniture item, the base framework 1 further comprises configurations adapted to secure at least one backrest part 8 on a rear section, at least one armrest part 27 in at least one side section and rear and front legs 16, 19 at lower front and rear corners, respectively. The configurations to secure the backrest part 8 include a substantially horizontal upper support member 7 for supporting a generally horizontal section of a lower step of said backrest part 8 (Fig. 6) and a substantially vertical rear surface 9 adapted to be backed onto a generally vertical section of said lower step of the backrest part 8. The cited rear surface 9 includes holes 10 to permit the insertion of securing members to secure the backrest part 8 to the base framework 1, for example, using screws, rivets or bolts.

[0016] The base framework 1 in accordance with the exemplary embodiment shown in Fig. 1 defines a basically rectangular frame formed by two lower side longitudinal beams 14 connected at their ends to respective rear and front crossbeam parts. The rear crossbeam part defines the mentioned supper support member 7 and rear surface 9 to secure the backrest part 8 and the front crossbeam part defines said front support element 4 for the movable frame 2 and a frontal surface 17 for attaching a frontal finishing part 29. The base framework 1 also includes a pair of struts 20 arranged between each lower side longitudinal beam 14 and the upper support member 7. The mentioned struts 20 comprise projections that act as the first rear support elements 5a while an upper section of said side longitudinal beams 14 act as the second rear support elements 5b. Preferably, the upper support member 7 includes a skirt 7a acting as a stop for the pad or cushion 30a.

[0017] Referring to Fig. 6, holes 24 are provided in front lateral brackets 33, while the backrest part 8 includes side apertures 26 comprising a relatively wide inlet portion inferiorly communicating with a vertical slot portion. The armrest part 27 comprises an anchor configuration 32 formed by a short shaft terminated in an expanded head that cooperates with one of said side apertures 26 and a threaded shank 25 cooperating with one of said holes 24 for securing of the armrest part 27 to the module. The result is shown in Fig. 7.

[0018] The adjustable seat furniture item in accordance with the present invention may be presented under different configurations For example, in the embodiment shown in Fig. 1, said base framework 1 has a width suitable for forming a single place seat furniture item, for which reason it is assembled with an individual movable frame 2. With this base, an individual seat furniture item can be formed incorporating a seat cushion 30, a rear backrest part 8 and, optionally, a pair of side armrests 27. However, from this same base a seat furniture item with several places can be formed incorporating to the individual base framework 1 configurations for joining same to similar other adjacent base frameworks 1, each incorporating a seat cushion 30 and a rear backrest part 8 and optionally mounting a pair of armrest parts 27 only on the free sides of the base frameworks at the ends.

[0019] In Fig. 5 another configuration is shows wherein the base framework 1 has a width suitable to form a seat furniture item having multiple places (two places in the illustrated example) on which a similar number of individual movable frames 2 are supported. Another exemplary embodiment, not shown, comprises a base framework 1, similar to that shown in Fig. 5, i.e. having suitable width to form a multiple place seat furniture item, on which a single movable frame 2 is supported having same number of places. Other combinations are also possible. For example, a base framework for four places with two movable frames each having two places, etc.

[0020] Although the present invention has been described using specific exemplary embodiments, those skilled in the art will be capable to introduce numerous variations, modifications and/or additions without departing from the scope of the present invention as defined in the attached claims.

Claims

1. Adjustable seat furniture item, of the type comprising at least one base framework (1) provided with support elements (4, 5a, 5b) on which is supported at least one movable frame (2) fitted with a plurality of tension elements (3a, 3c, 3b) to support at least one seat cushion (30), **characterised in that** some of said support elements (4, 5a, 5b) are arranged at different heights and are susceptible to be selectively used to support the movable frame (2) in at least two different positions.

2. Seat furniture item in accordance with claim 1, **characterised in that** said support elements (4, 5a, 5b) comprise at least one front support element (4) on which is supported at least one front support zone of the movable frame (2), at least one first rear support element (5a), and at least one second rear support element (5b) located at a lower height that said first rear support element (5a), a rear support zone of the movable frame (2) being susceptible to be se-

lectively supported on one or the other of said first and second rear support elements (5a, 5b) to respectively provide a first, substantially horizontal position and a second inclined position for the movable frame (2).

3. Seat furniture item in accordance with claim 2, **characterised in that** said movable frame (2) comprises front and rear bars (11, 12) spaced apart and facing each other, connected by at least two longitudinal beams (13), said two front and rear bars (11, 12) acting as anchor supports for said plurality of tension elements (3a, 3b, 3c) and as the mentioned front and rear support zones on the front and rear support elements (4, 5a, 5b), respectively.

4. Seat furniture item in accordance with claim 3, **characterised in that** the seat furniture item comprises elastomer material elements (22) in contact zones between said support zones of the front and rear, bar (11, 12) of the frame and the respective front support element (4) and first and second rear support elements (5a, 5b).

5. Seat furniture item in accordance with claim 3, **characterised in that** each of said at least two longitudinal beams (13) has an intermediate portion (13a) and end portions (13b, 13c) connected to the front and rear bars (11, 12), said end portions (13b, 13c) being inclined such that said intermediate portion (13a) is at a notably lower level than that of said front and rear bars (11, 12).

6. Seat furniture item in accordance with claim 5, **characterised in that** the tension elements (3a, 3b, 3c) comprise tension elements of at least first, second and third types (3a, 3b, 3c), which define different support zones on the movable frame (2) for said seat cushion, said tension elements of said first, second and third types (3a, 3b, 3c) being susceptible to be independently selectable for each support zone as a function of desired hardness.

7. Seat furniture item in accordance with claim 6, **characterised in that** it includes a pad or cushion (30a), in general flat and thin, interposed between the tension elements (3a, 3b, 3c) and the seat cushion (30).

8. Seat furniture item in accordance with claim 6, **characterised in that** the tension elements of said first type (3a) are anchored at their ends to facing areas of the front and rear bars (11, 12) of the moveable frame (2), the tension elements of said second type (3b) are anchored at one of their ends to the front bar (11) and at the other of their ends to a floating crossbar (6) arranged between the front and rear bars (11, 12), and the tension elements of the third type (3c) are anchored at one of their ends to the rear bar(12) and at the other of their ends to said floating crossbar (6), the floating crossbar (6) being tensively suspended by the tension elements of the second and third type (3b, 3c) above said intermediate portions (13a) of the longitudinal beams (13) of the movable frame (2).

9. Seat furniture item in accordance with claim 6 or 8, **characterised in that** said tension elements of at least first, second and third types (3a, 3b, 3c) are constituted by helical springs under traction, with their ends terminated in hooks adapted to be removably anchored in corresponding holes in the front and rear bars (11, 12) and/or the floating crossbar (6) of the movable frame (2), thereby said helical springs are easily replaced or substituted.

10. Seat furniture item in accordance with claim 1, **characterised in that** said base framework (1) includes configurations adapted to secure at least one backrest part (8) on one rear section, at least one armrest part (27) in at least one side section, and rear and front legs (16, 19) at lower front and rear corners.

11. Seat furniture item in accordance with claim 10, **characterised in that** said base framework (1) has a suitable width for forming a multiple place seat furniture item with a movable frame (2) having multiple places.

12. Seat furniture item in accordance with claim 10, **characterised in that** said base framework (1) has a suitable width for forming a multiple place seat furniture item with various individual movable frames (2).

13. Seat furniture item in accordance with claim 10, **characterised in that** said base framework (1) has a suitable width for forming a single place seat furniture item with one individual movable frame (2).

14. Seat furniture item in accordance with claim 13, **characterised in that** said individual base framework (1) includes configurations for joining to other similar adjacent base frameworks (1) to form a multiple place seat furniture item.

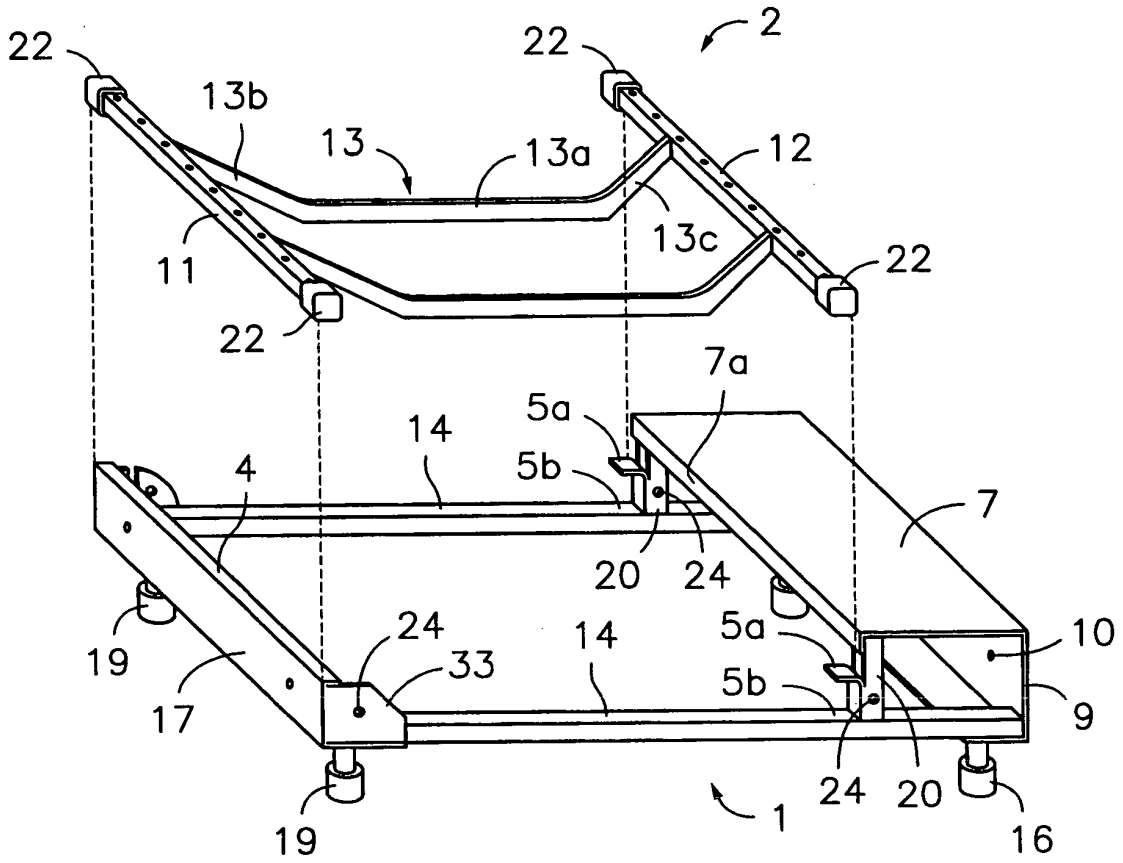
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Fig. 1

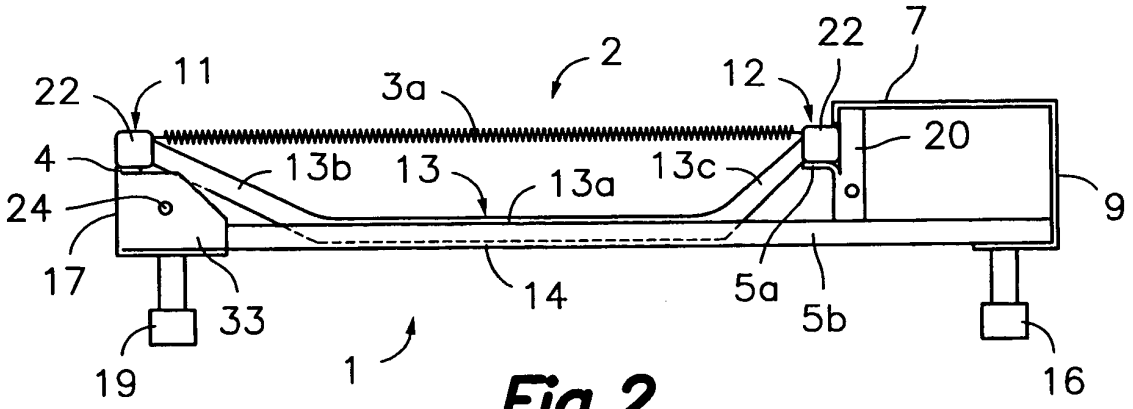
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Fig. 2

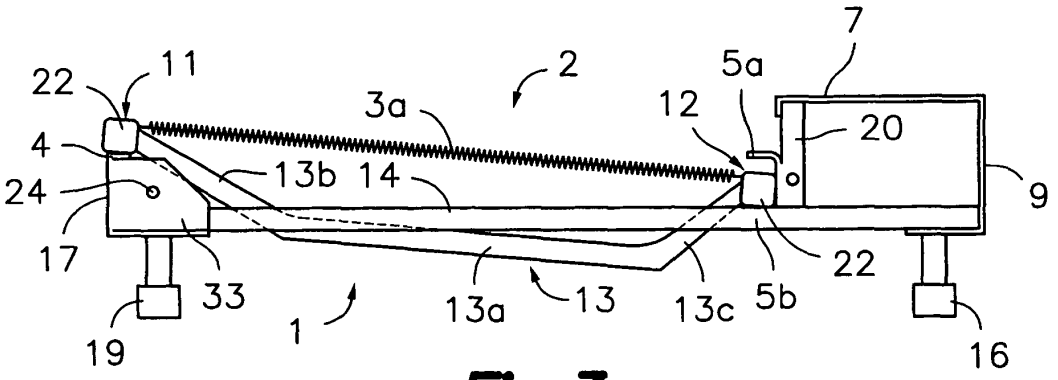

Fig.3

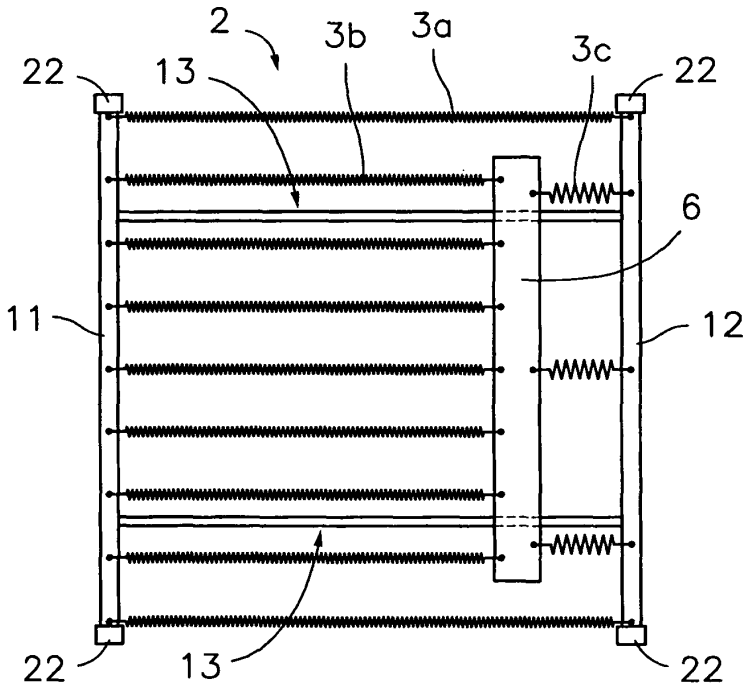

Fig.4A

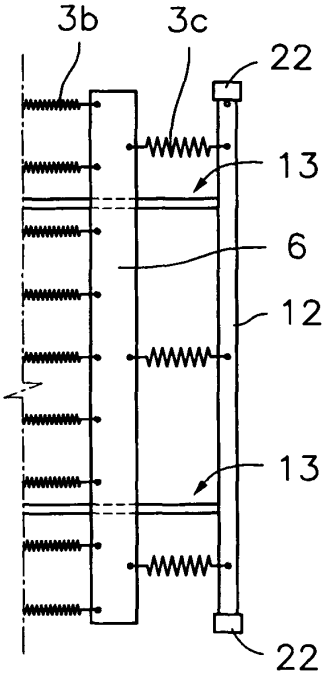

Fig.4B

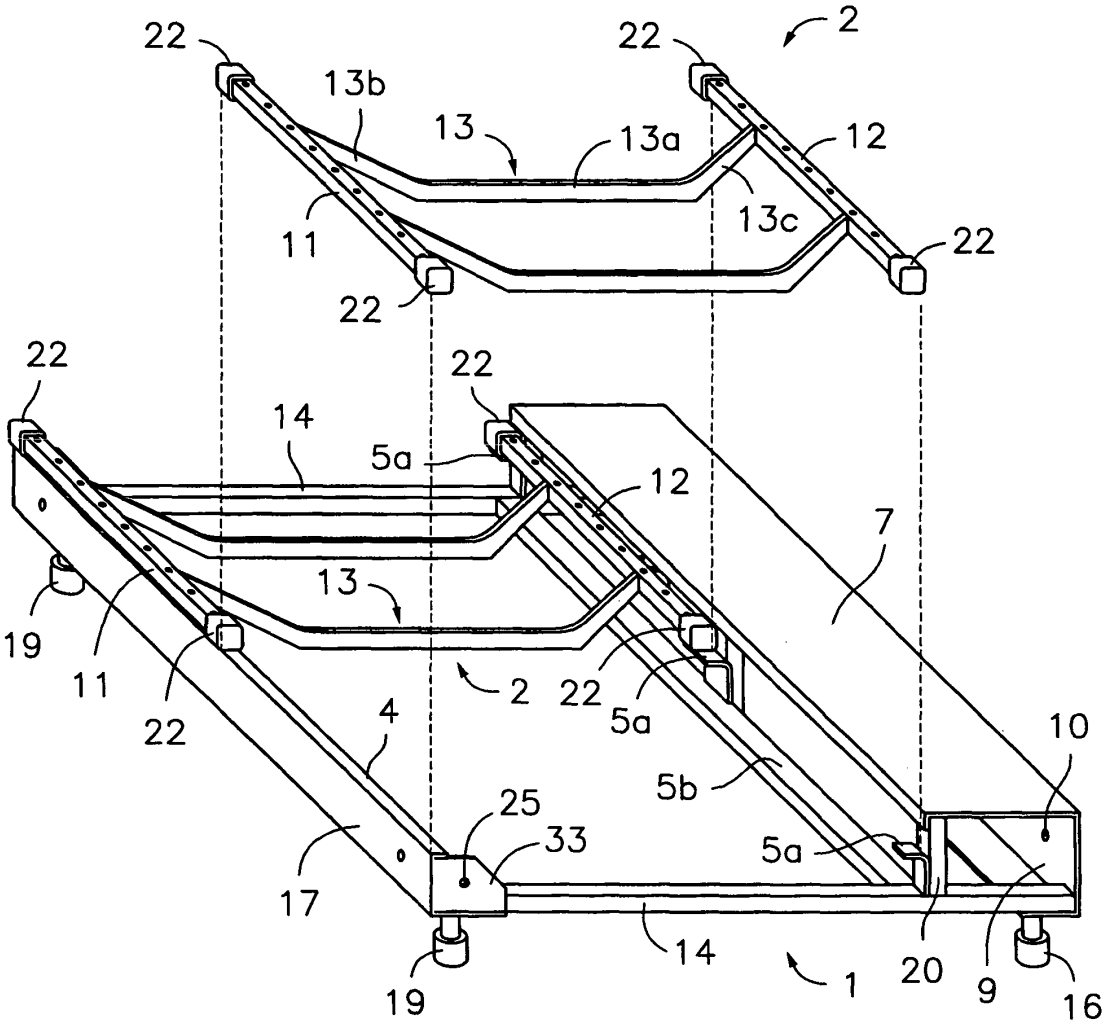
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Fig.5

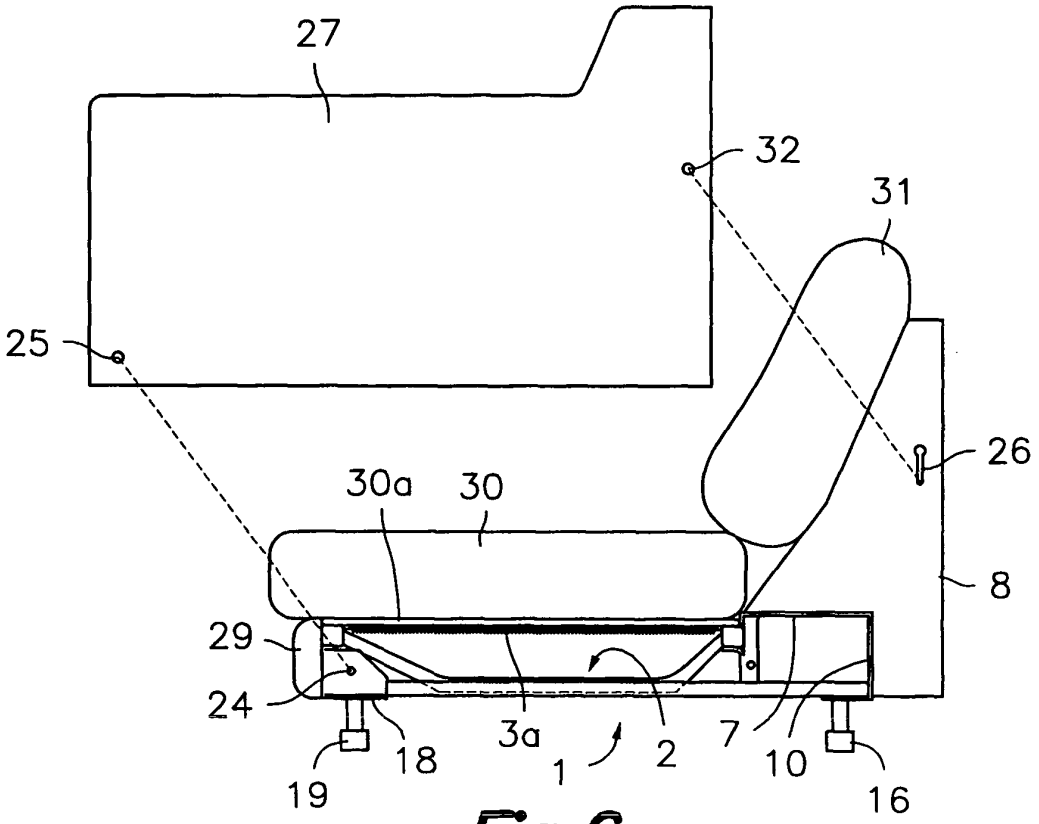

Fig.6

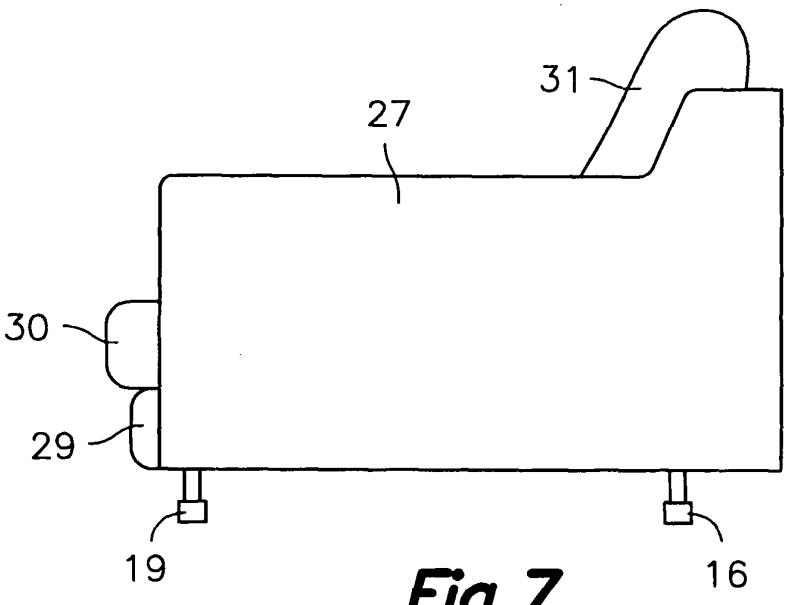

Fig.7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 03/00479

A. CLASSIFICATION OF SUBJECT MATTER

IPC.7 A47C17/04, A47C19/00, A47C23/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC.7 A47C+

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	GB 951324 A (GEORG STRASSER.) 04.03.1964; page 1, line 25- page 2 line 42; **abstract and** figures .	1, 2, 10-14 3-6, 7, 9
Y	US 2611137 A (RALPH RIELL) 23.09.1952;column 2, lines 5 – 52; **abstract and** figures.	3-6, 9
Y	FR 2347909 A (MARTINEZ GEORGES) 10.11.1977, page 3, lines 21-25 **and** figures.	7
A	US 1977370 A (ALLEN STUART R W) 16.10.1934; page 2, line 20 – page 3, line 58 **and** figures.	3, 5, 6, 9
A	ES 1051167 A (GRA PRODUCCIONES DE DISEÑO S.L.) 01.07.2002, column 2, line 33 –column 4, line 4 **and** figures.	3, 4, 5, 12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
24 November 2004 (24.11.2004)	**04 December 2004 (04.12.2004)**
Name and mailing address of the ISA/ Facsimile No. **SPTO**	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/ES 03/00479

Patent document cited in search report	Publication date	Patent familiy member(s)	Publication date
GB 951324 A	04.03.1964	AT 211499 B	10.10.1960
US2611137 A	23.09.1952		
FR 2347909 A	10.11.1977		
US 1977370 A	16.10.1934		
ES 1051167 A	01.07.2002		

Form PCT/ISA/210 (patent family annex) (July 1992)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES 1051167 A **[0002]**
- EP 0596176 A **[0003]**