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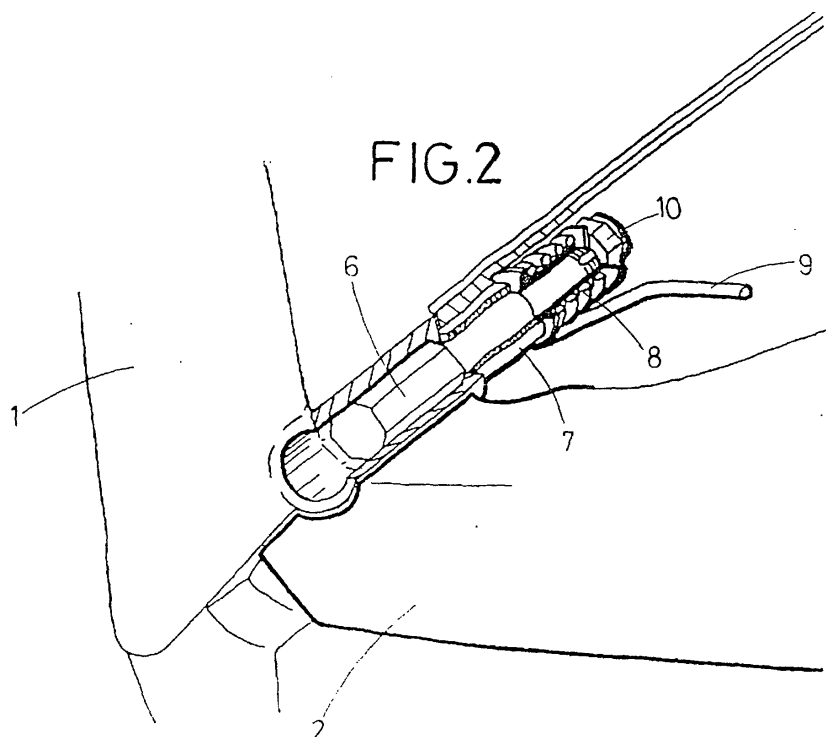
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(54) **CHAIR WITH COLLAPSIBLE SEAT**

(57) It comprises a back (1) and a seat (2), which hinged to the back about a hinge axis (6), said seat (2) being moveable between a substantially vertical position and a substantially horizontal position, and also comprising automatic returning means (8) of the seat (2) from its substantially horizontal position to its substantially vertical position when the user stands up from the seat.

It is characterized in that these automatic returning means (8) of the seat (2) to its substantially vertical position are arranged on the hinge axis (6), this hinge axis (6) being located in the contact area between the back (1) and the seat (2).

There is not any separation practically between the back and the seat when the seat is in its substantially vertical position, being this area preserved from dust and dirt.



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Description

[0001] The present invention refers to a chair with folding seat, so that when the user stands up from the chair, the seat returns automatically to its substantially vertical original position.

BACKGROUND ACCORDING TO THE INVENTION

[0002] The chairs with folding seat known up to now comprise automatic returning means of the seat to its substantially vertical position. These means habitually are formed by a counterweight, so that when the user stands up from the chair, and thanks to the counterweight action, the seat returns to its substantially vertical position.

[0003] The presence of this counterweight causes the hinge axis of the seat to be displaced forwardly, so that there is a clearance between the back and the seat when the seat is in its substantially vertical position.

[0004] This drawback is specially important in chairs that are placed outdoors, for example in sport places, as for example in stadiums. When being outdoors, the chair gets covered in dust and dirt, so that when the user sits down should clean the chair previously.

[0005] There are also chairs that comprise damping means of the turning movement of the seat from its substantially horizontal position to its substantially vertical position, avoiding the hit of the seat against the back.

[0006] Habitually, these damping means are formed by a spring whose compression is adjusted by means of a screw. According to the compression degree, the damping of this movement is carried out in greater or smaller extent.

[0007] However, this type of mechanical damping means presents the drawback that, with the time, they do not damp correctly and, accordingly, the seat may hit against the back.

[0008] Another type of damping devices of the seat returning movement comprises a cylinder of pressurised gas. However, these devices present the drawback that they are expensive and they require maintenance.

[0009] With the chair according to the invention, it is possible to solve the mentioned drawbacks, presenting other advantages that will be described hereinafter.

DESCRIPTION OF THE INVENTION

[0010] The chair with folding seat according to the invention comprises a back and an seat hinged to the back about a hinge axis, said seat being moveable between a substantially vertical position and a substantially horizontal position, and it also comprises automatic returning means of the seat from its substantially horizontal position to its substantially vertical position when the user stands up from the seat; and it is characterized in that these automatic returning means of the seat to its sub-

stantially vertical position are arranged on the hinge axis, the hinge axis being located in the contact area between the back and the seat.

[0011] Thanks to this feature, there is practically no clearance between the back and the seat when the seat is in its substantially vertical position, being this area preserved from dust and dirt. Therefore, when the user sits down on the chair according to the invention, it will be clean, not being necessary to clean it previously.

[0012] According to a preferred embodiment according to the invention, these automatic returning means of the seat to its substantially vertical position comprise elastic means integral with the seat that cause the turn of the seat from its substantially horizontal position to its substantially vertical position about the hinge axis, which is integral with the back.

[0013] According to this embodiment, these automatic returning means of the seat to its substantially vertical position also comprise, preferably, a sleeve, arranged around the hinge axis, integral with the seat and that rotates about the hinge axis.

[0014] Preferably, these elastic means are formed by an helical spring, whose compression can be regulated by means of a screw.

[0015] The chair of the present invention also comprises damping means of the turning movement of the seat between its substantially horizontal position and its substantially vertical position, avoiding, therefore, that the seat hits the back.

[0016] Preferably, this damping means are formed by a carcass, which houses inside it a piston provided with a hole communicated with an air chamber defined between the carcass and the piston; and by a fin integral with the seat, which contacts the upper part of the piston when the seat turns from its substantially horizontal position to its substantially vertical position, moving the piston down as the air comes out through the hole.

[0017] Thanks to this feature, it is obtained an chair with a folding seat, whose turning movement to its substantially vertical position is carried out in a slight way, without hitting against the back, and the damping features are not deteriorated with the time, as happens when mechanical damping means are used.

[0018] Furthermore, the damping means used in the chair of the present invention have a reduced cost and they need no maintenance practically.

[0019] Advantageously, this carcass comprises an helical spring disposed around the carcass, being linked the helical spring with the piston housed inside the carcass, so that the down movement of the piston is carried out against the action of the elastic means and pressing the air inside the air chamber.

[0020] To assure a perfect sealing and a correct operation of the damping means, the chair according to the invention comprises a sealing gasket disposed between the carcass and the piston.

[0021] According to a preferred embodiment, this fin extends across the whole seat, two carcasses being

provided with their corresponding pistons at each end of this fin.

BRIEF DESCRIPTION OF THE FIGURES

[0022] For a better understanding of what is described in this specification, some drawings are enclosed in which, only as an example, a practical embodiment of the chair according to the invention is shown.

[0023] In these drawings, fig. 1 is a perspective view of three chairs according to the invention placed one beside the other one, two of them with the seat in its substantially vertical position, and the third chair with the seat in its substantially horizontal position;

fig. 2 is a perspective view partially sectioned of the contact area between the back and the seat of an chair according to the invention, in which the returning means of the seat to its substantially vertical position are shown;

fig. 3 is a perspective view from behind of the chair structure according to the invention, without its covers;

fig. 4 is an elevation view of the chair structure according to the invention seen from ahead; and

fig. 5 is an elevation view sectioned along line V-V of fig. 4, representing the position in which the seat is in its substantially vertical position.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0024] As may be seen from fig. 1, the chair according to the invention comprises a back 1 and a folding seat 2, which can be in a substantially vertical position, in the case of the first two chairs, or in a substantially horizontal position, like in the third chair shown.

[0025] In this figure the chairs have been represented attached to a bar 3 provided with feet 4. The attachment of the chairs to the bar 3 is carried out, according to the embodiment shown, by means of some clamps 5.

[0026] The chair according to the invention comprises automatic returning means of the seat to its substantially vertical position when the chair user stands up from the seat. These means are seen in detail in fig. 2.

[0027] The hinge axis 6 is integral with the back 1 of the chair, it presents in its central part a sleeve 7 integral with the seat 2, and the sleeve 7 rotates about the hinge axis 6. For returning the seat automatically to its substantially vertical position, the hinge axis 6 comprises a helical spring 8 disposed around it, an end 9 of this helical spring 8 being integral with the seat 2.

[0028] The helical spring 8 comprise a screw 10 that allows to regulate the tension of the spring 8, pressing in greater or smaller extent this screw 10. The tension of the spring 8 will be regulated so that the seat 2 returns to its substantially vertical position in a slight way without hitting the back.

[0029] This way, the hinge axis 6 is disposed in the

contact area between the back 1 and the seat 2, since it is not necessary a counterweight, the helical spring 8 carrying out the function of the counterweight in the chairs known up to now. Therefore, thanks to the arrangement of the hinge axis 6, when the seat 2 is in its substantially vertical position, it does not exist practically any separation between the back 1 and the seat 2, avoiding the accumulation of dirt and dust in the area that will be in contact with the user's body.

[0030] It should be indicated that in fig. 2 is shown only one of the ends of contact area between the back 1 and the seat 2, the other end of the contact area between the back 1 and the seat 2 being provided with identical automatic returning means to those shown, so that each chair is provided with two helical springs 8 for the automatic return of the seat 2 to its substantially vertical position.

[0031] As may be seen in fig. 3, the damping means of the movement of the seat from its substantially horizontal position to its substantially vertical position comprise a couple of air cylinders 11 and a fin 12 integral with the seat 2. The function of the air cylinders 11 and of the fin 12 may be seen more clearly in fig. 5.

[0032] In fig. 5 the chair according to the invention is represented sectioned along line V-V indicated in the fig. 4.

[0033] As may be seen in this figure, the cylinder 11 is formed by a cylindrical carcass 13 in whose interior moves a piston 14, defining between the carcass 13 and the piston 14 an air chamber 15. Between the piston 14 and the carcass 13 it is arranged a sealing gasket 16 to avoid an air loss between the piston 14 and the internal wall of the carcass 13.

[0034] Around the carcass 13 it is disposed a helical spring 18, whose function is to maintain the piston 14 in its upper position.

[0035] The piston 14 comprises a hole 17 in its lower part in communication with the air chamber 15. The dimensions of this hole 17 will be the appropriate to allow the exit of an appropriate volume of air to carry out the damping action, as it will be explained hereinafter in detail.

[0036] From the substantially vertical position of the seat 2 shown in fig. 5, if the user wants to sit down on the chair of the present invention, it should rotate the seat 2 manually in the suitable direction, indicated by the arrow A. This turning of the seat 2 will make the fin 12, integral with the seat, to leave the contact with the upper part of the piston 14, allowing the piston to move to its upper position (movement indicated by arrow B) by means of the helical spring 18 action.

[0037] When the user stands up from the chair of the present invention, the spring 8 rotates the seat 2 from its substantially horizontal position to its substantially vertical position. When this turning movement occurs, in a specific moment the fin 12 will contact with the upper part of the piston 14, which will be in its upper position. At this moment, the piston 14 will damp the turning

movement of the seat 2, avoiding the seat 2 to hit the back 1.

[0038] This damping action is carried out because the piston 14 in its down displacement finds the resistance of the pressure of the air inside the chamber 15, therefore the seat can only move down as the air leaves the chamber 15 through the hole 17. Furthermore, the piston 14 will also find a certain resistance in the helical spring 18, but this spring 18 will have the appropriate features, so that the pressure of the air inside the chamber 15 carries out the damping action in its greater part.

[0039] Although reference has been made to a specific embodiment according to the invention, it is evident for a person skilled in the art that the described chair is susceptible of numerous variations and modifications, and all the mentioned details can be substituted by other technically equivalent ones, without departing from the protection scope defined in the appended claims.

Claims

1. Chair with folding seat, that comprises a back (1) and a seat (2), which is hinged to the back about a hinge axis (6), said seat (2) being moveable between a substantially vertical position and a substantially horizontal position, and it also comprises automatic returning means (8) of the seat (2) from its substantially horizontal position to its substantially vertical position when the user stands up from the seat (2), **characterized in that** these automatic returning means (8) of the seat (2) to its substantially vertical position are arranged on the hinge axis (6), this hinge axis (6) being located in the contact area between the back (1) and the seat (2).
2. Chair according to claim 1, **characterized in that** these automatic returning means of the seat to its substantially vertical position comprise elastic means (8) integral with the seat (2) that cause the turn of the seat (2) from its substantially horizontal position to its substantially vertical position, about the hinge axis (6), which is integral with the back (1).
3. Chair according to claim 2, **characterized in that** these automatic returning means of the seat to its substantially vertical position also comprise a sleeve (7), arranged around the hinge axis, integral with the seat (2) (6) and that rotates around the hinge axis.
4. Chair according to claim 2, **characterized in that** the elastic means are formed by a helical spring (8).
5. Chair according to claim 4, **characterized in that** it comprises regulation means (10) of the compression of the helical spring (8).
6. Chair according to claim 5, **characterized in that** the regulation means of the compression of the helical spring (8) are formed by a screw (10).
7. Chair according to anyone of the previous claims, **characterized in that** it comprises damping means (11) of the turning movement of the seat (2) between its substantially horizontal position and its substantially vertical position.
8. Chair according to claim 7, **characterized in that** this damping means (11) are formed by a carcass (13) in whose interior houses a piston (14) provided with a hole (17) communicated with an air chamber (15) defined between the carcass (13) and the piston (14); and by an fin (12) integral with the seat (2), which contacts with the upper part of the piston (14) when the seat (2) turns from its substantially horizontal position to its substantially vertical position, moving the piston (14) down as the air comes out through the hole (17).
9. Chair according to claim 8, **characterized in that** the carcass (13) comprises a helical spring (18) disposed around the carcass, this helical spring (18) being linked in turn with the piston (14) housed inside the carcass (13), so that down movement of the piston (14) is carried out against the action of the helical spring (13) and pressing the air contained in the air chamber (15).
10. Chair according to claim 8 or 9, **characterized in that** it comprises a sealing gasket (16) arranged between the carcass (13) and the piston (14).
11. Chair according to claim 8, **characterized in that** the fin (12) extends across the whole seat (2), two carcasses (13) being provided, with their corresponding pistons (14), arranged one at each end of the fin (12).

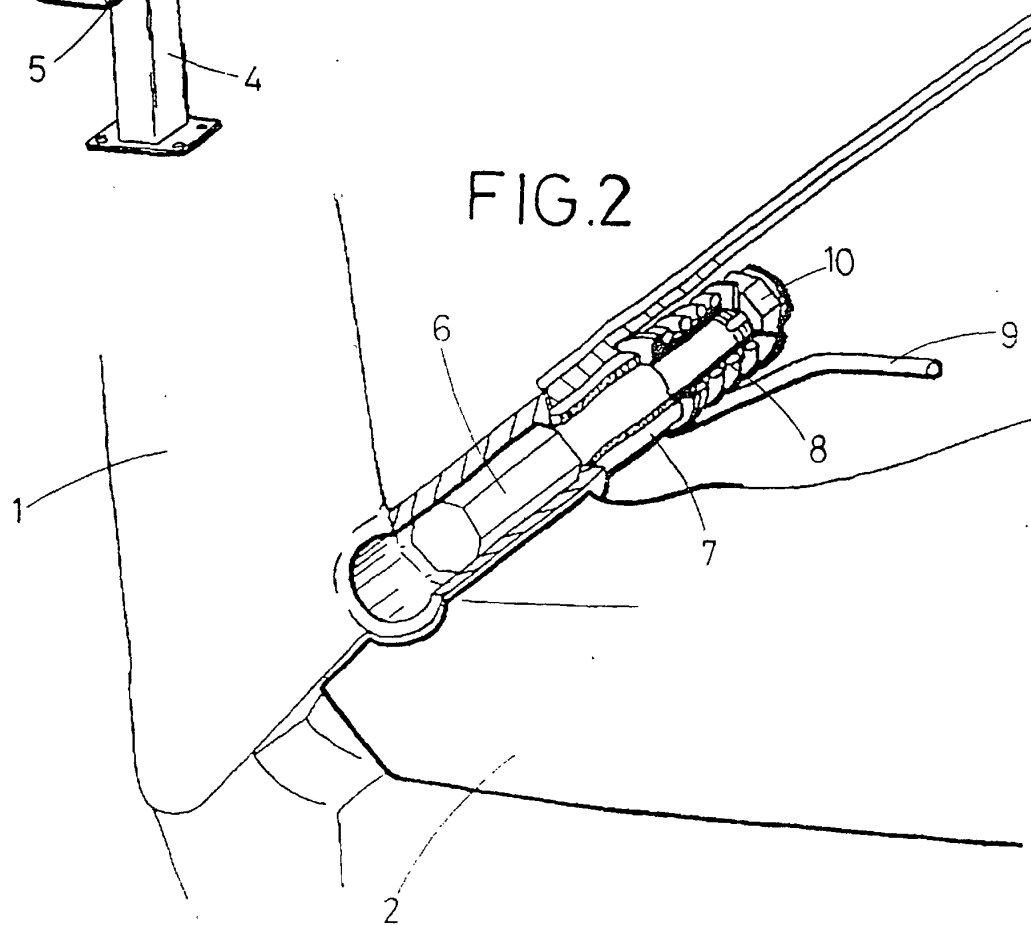
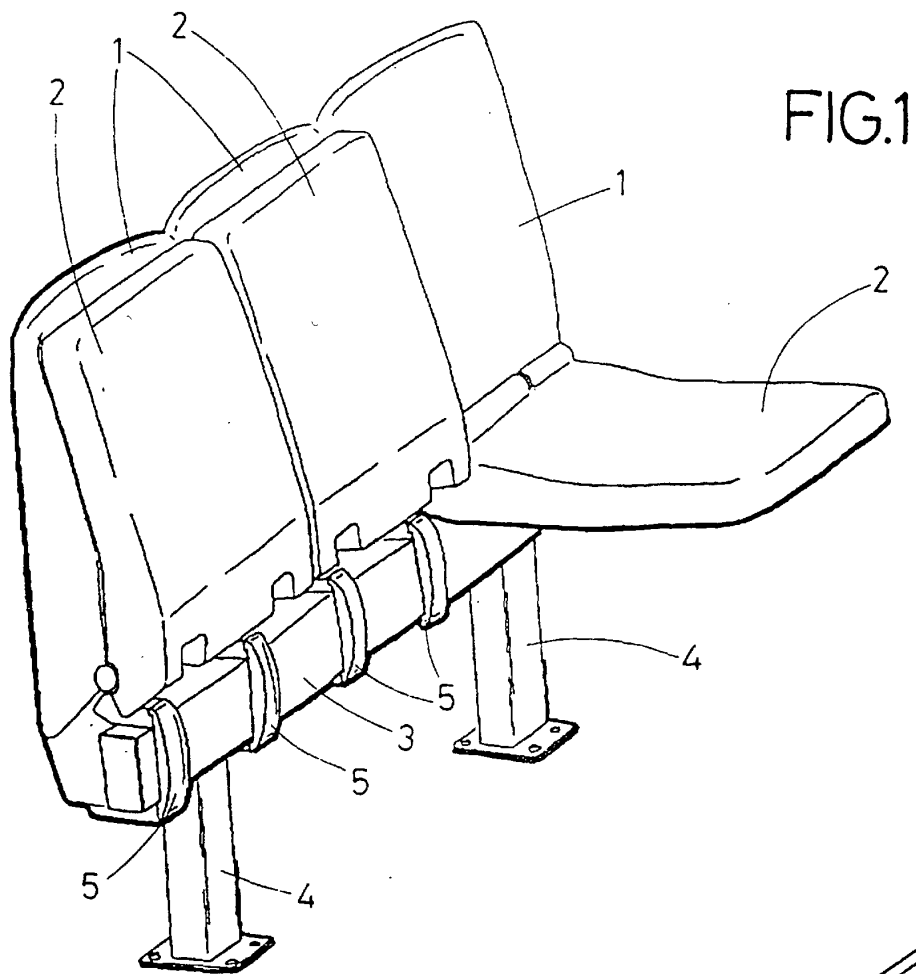


FIG.3

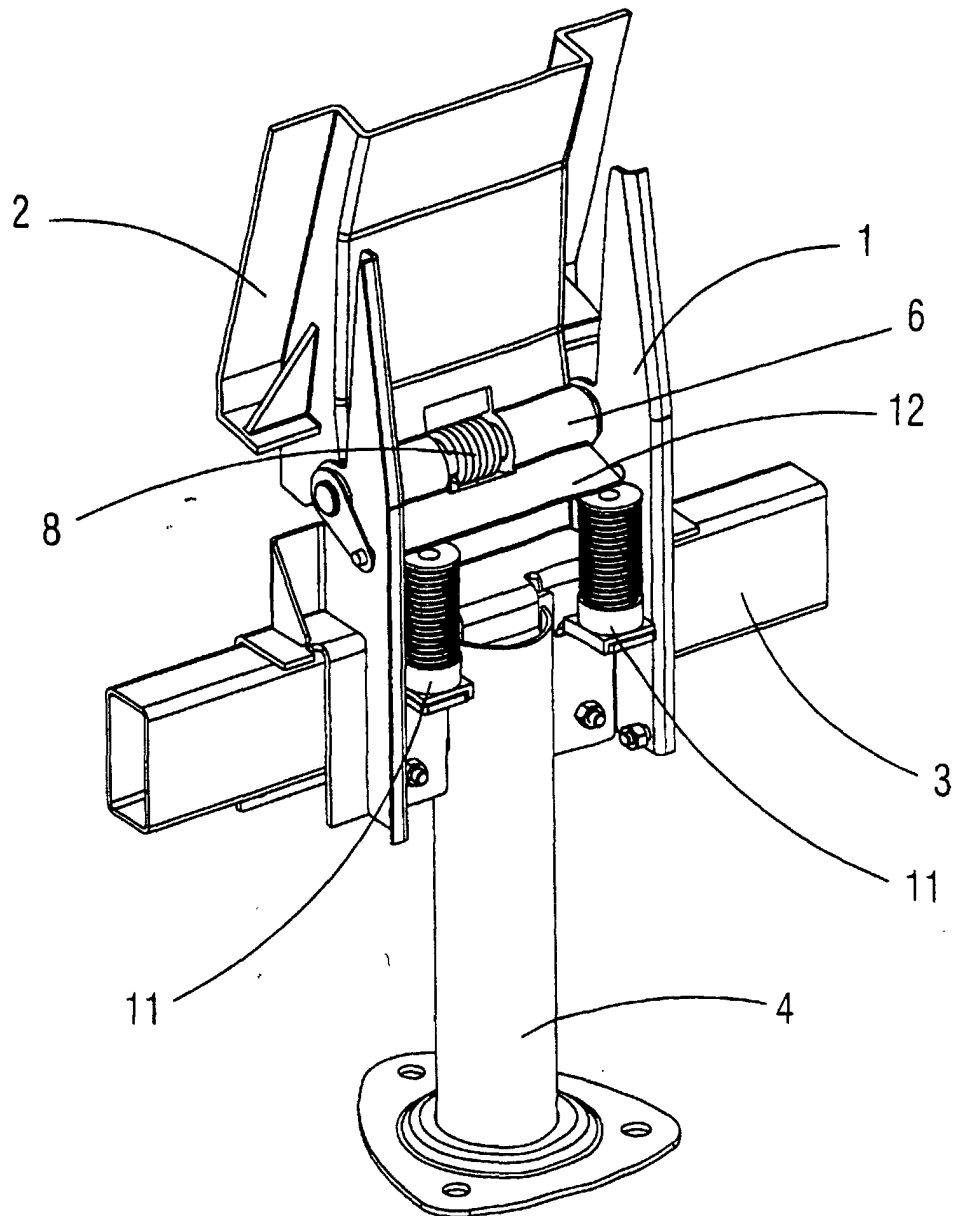


FIG. 4

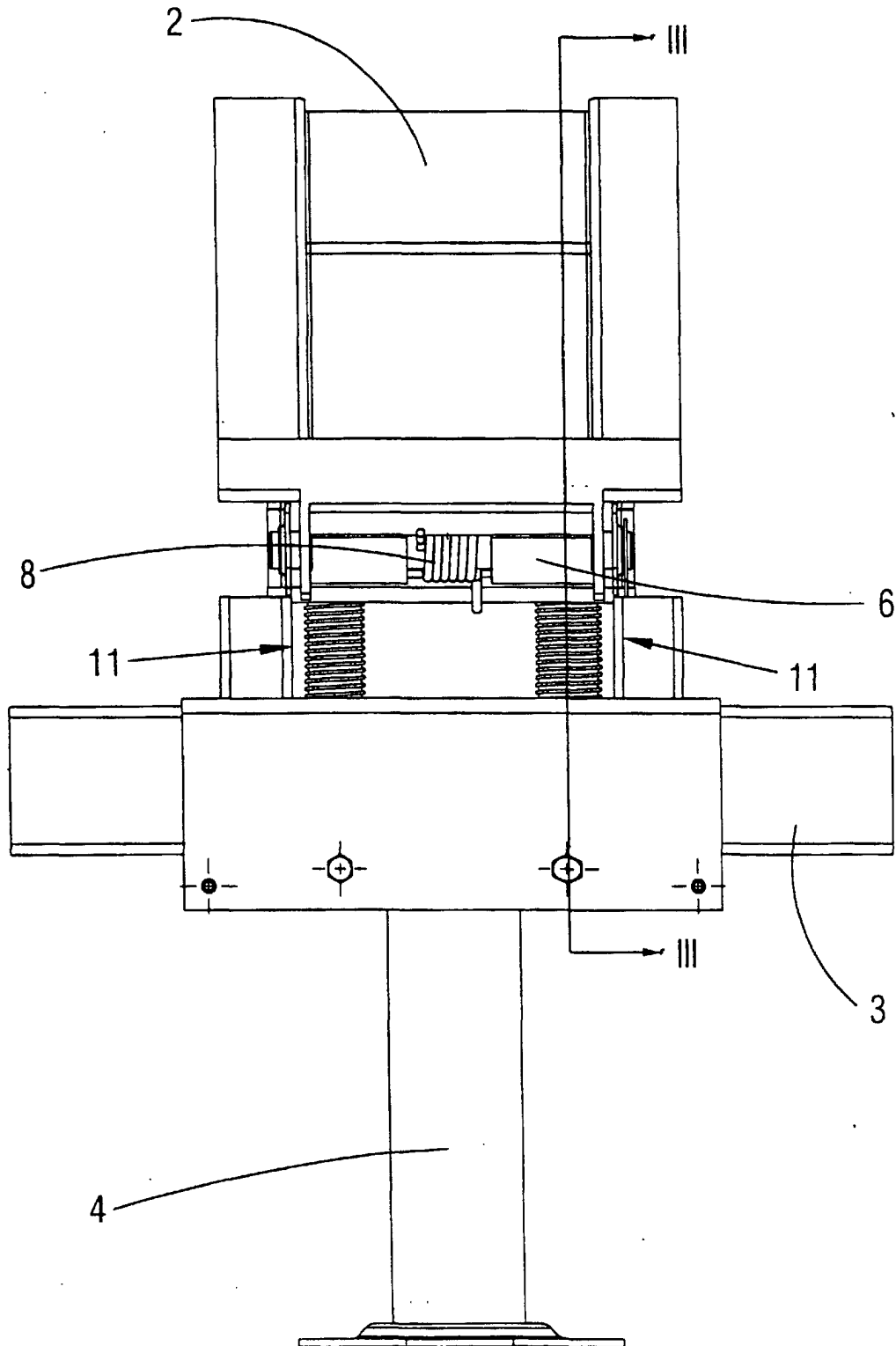
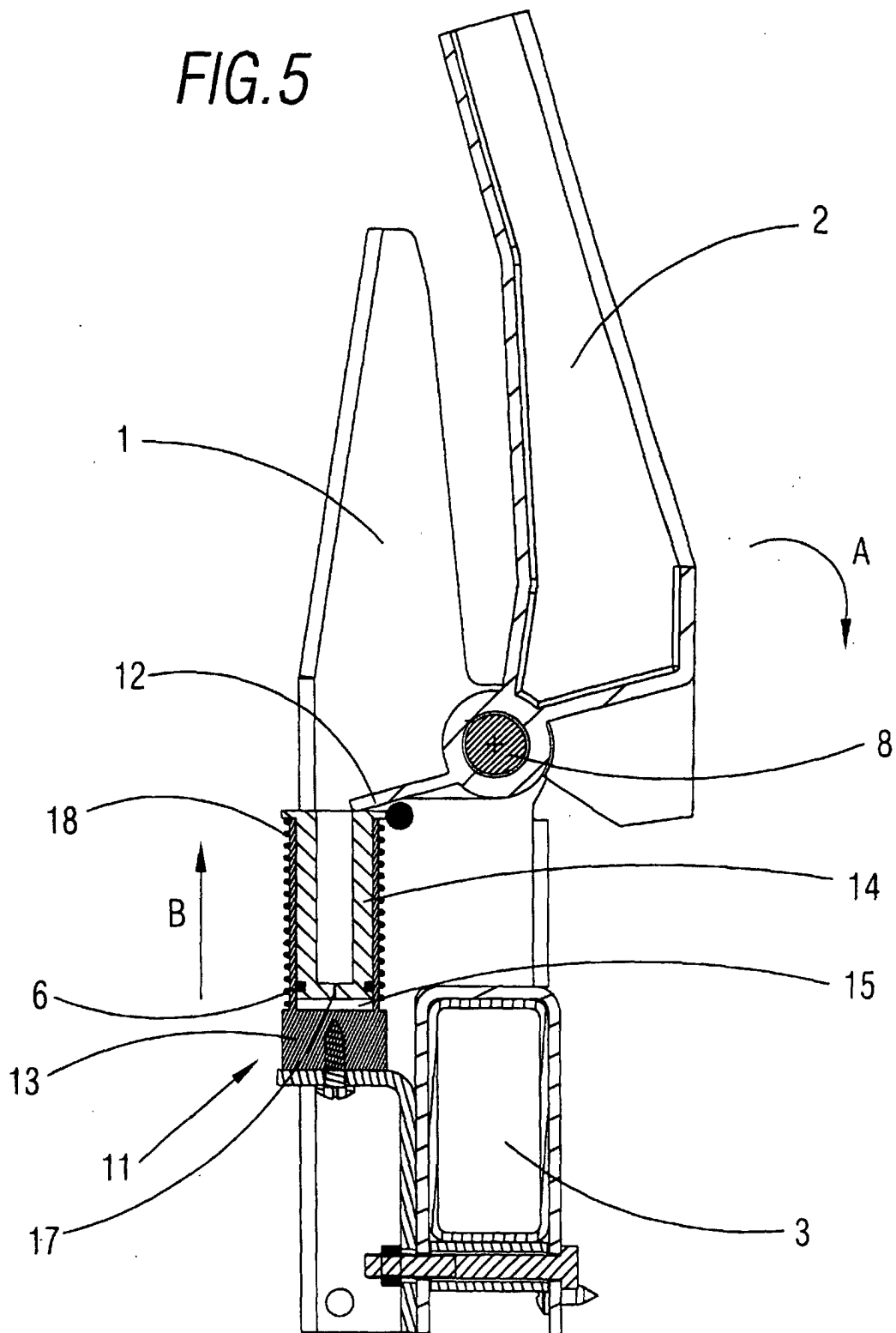


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 00/00097

A. CLASSIFICATION OF SUBJECT MATTER		
IPC 7 A47C1/121 A47C7/56		
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)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 576 746 A (SUGATSUNE CO LTD) 5 January 1994 (05.01.94) column 6, line 56 - column 12, line 13; figures 1-5 ---	1-11
A	US 5 803 546 A (YAMAZAKI RYOKICHI) 8 September 1998 (08.09.98) column 2, line 30 - column 4, line 17; figures ---	1-5
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 297 (C-1068), 8 June 1993 (08.06.93) & JP 05 023230 A (KOTOBUKI:K), 2 February 1993 (02.02.93) abstract ---	7-9
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 12 June 2000 (12.06.00)		Date of mailing of the international search report 27 July 2000 (27.07.00)
Name and mailing address of the ISA/ S.P.T.O. Facsimile No.		Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 00/00097

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 957 138 A (TEDERS JR J) 16 February 1950 (16.02.50) the whole document.	

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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