



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.05.2001 Bulletin 2001/19

(51) Int Cl.7: **A47C 1/027, A47C 1/032**

(21) Application number: **99830689.8**

(22) Date of filing: **02.11.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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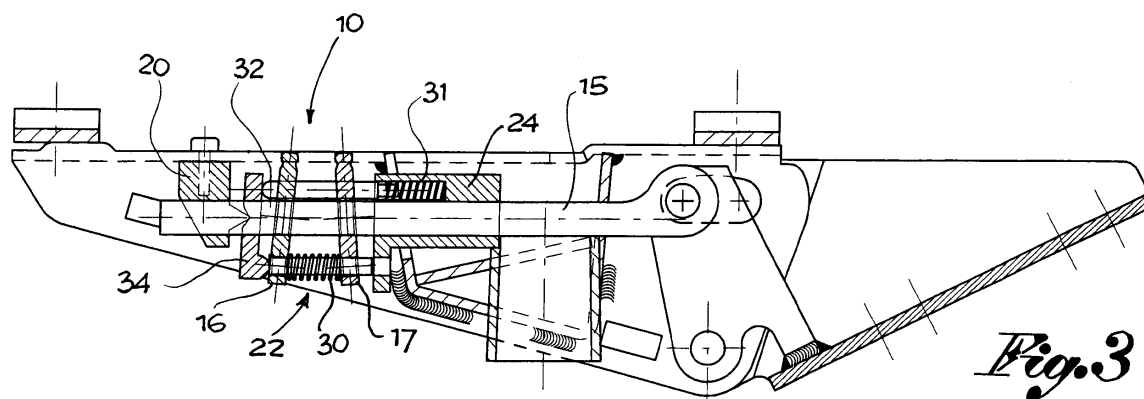
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(54) **A sliding blocking device for varying and regulating the position of chair structures and/or their parts**

(57) This invention concerns a device (10) for blocking the oscillating back support in any of its oscillations with respect to the fixed body bearing the seat of a chair, consisting of a cylindrical rod (15) connected to the oscillating support (12), extending forward under the fixed body (11), two gripping plates (16,17) positioned cross-

wise to the cylindrical rod (15) with its fulcrum at the stationary body and with a through hole for passing the rod. The plates (16,17) can move from an orthogonal non-blocking position in which they allow the rod to pass, to a sloped blocking position in which the edges of their holes act upon the external surface of the rod, blocking it axially in order to stabilise the chair.



Description

[0001] This invention concerns, in general, seating structures like office chairs and armchairs, car seats, or any others requiring regulation and, in particular, concerns a device for choosing and stabilising the user positions of such chairs and/or their parts.

[0002] Existing devices for stabilising the user's position, for example in chairs with adjustable seat and back, generally use toothed blocking elements. These, however, permit blocking only in a limited, pre-determined number of positions, depending on the number of teeth in the blocking element, which, for obvious reasons of space and resistance cannot exceed a certain limit nor be too thick or too thin.

[0003] On the other hand, in order to give a choice of positions between two adjustable elements, a blocking device has already been proposed and was the subject of the patent requests RM/97/A/000099 and RM/97/A/000263 made by the same patentee.

[0004] Such a device allows a gradual regulation, that is, not in steps, of the angle between the two elements connected by a joint, such as the seat and back of a chair, thanks to the use, as a positioning element, of a smooth shaft and, as a blocking element, of a plate that acts upon said shaft.

[0005] The aim, however, of the present invention is to improve such a sliding blocking device and make it suitable and specifically applicable to oscillating and synchronised chairs, with the dual function of being able to vary the inclination of the seat and back freely at will, with no obligatory positions and, at the same time, preventing the back from moving suddenly and violently towards the chair occupant, hitting the person's back, every time it is unblocked to adjust the position.

[0006] This objective is reached, according to the invention, by using a sliding blocking device for chairs with adjustable seat and back, in conformity with claim 1.

[0007] Further details of the invention will become more evident from the description below, made with reference to the enclosed drawings, which are indicative but not binding, in which:

Fig 1 shows a view from below of a support group for an oscillating chair that incorporates the device of the invention, in non-blocking position;

Fig 2 shows a cross-section of the device in the non-blocking position, according to the line II-II in Fig. 1; and

Fig. 3 shows a similar cross-section to that of Fig. 2, but with the device in the blocking position.

[0008] In the illustrated example, the proposed blocking device 10 is applied to an oscillating group for office chairs, which includes: a fixed body 11, to be applied to the top of an extendable upright support - not represented - and intended to carry the seat; an oscillating support 12, hinged to said body 11 with an oscillating cross shaft

13 and intended to carry a back with an adjustable angle to the seat; and an adjustable spring between the fixed body 11 and the oscillating support 12.

[0009] The blocking device 10 includes a cylindrical rod 15 and two gripping plates 16,17. The rod 15 is connected, at the back, to the oscillating support 12 by means of a cross pin 18, parallel to the oscillating shaft 13 and passing through holes 19, located in the fixed body 11. The rod 15 extends from the back to the front under the seat, inside the body 11. Said rod 15 has the front end held in a block 20, fixed to the body 11, and may have a smooth surface or, preferably, a knurled or rough one.

[0010] The two gripping plates 16,17 are positioned at right angles to the rod 15, each with a foot 16',17', forming a fulcrum with the body 11. Both the plates 16,17 have a cross-hole 16'',17'' and the rod 15 passes through said holes. The plates 16,17 can be moved between an orthogonal non-blocking position and a blocking position sloped with respect to the rod 15. In the orthogonal non-blocking position, the axis of the holes in the plates coincides with the rod axis, so that the latter may pass through said holes, relatively to the plates. In the sloped blocking position, the edge of the hole on each plate interacts with the external surface of the rod, with a gripping action that prevents the axial movements of the rod itself.

[0011] It should be noted that the plates 16,17 have a fulcrum for oscillating between the orthogonal and sloped positions, the first in the opposite direction to the second and in such a way that they both act upon, and block, the rod - one against the axial movements of the rod in one direction and the other against the movements in the other direction.

[0012] The plates 16,17 are normally kept in their sloped blocking position by an elastic system 22 and can be moved into their non-blocking position by means of a command lever 23 with the help of a runner 24 that slides relatively to the rod 15.

[0013] Said lever is designed for a dual function: to control the height regulation of the support upright of the chair; to command the blocking/un-blocking device by means of the runner 24. This runner 24 is situated in a position between the pin 18 of the rod 15 and the plates 16,17, and can move from a backward blocking position, near said pin, to a forward non-blocking position, near said plate.

[0014] The command lever 23 passes, from the outside, through a hole 25 made in one side of the fixed body 11, extending through a ring hole 26 set in a dividing wall 27 fixed to said body 11 and with its end using the runner 24.

[0015] In one of its intermediate zones, the lever 23 has an arm 28, designed to control the height regulation of the support upright and forming, with one of its parts, a shoulder 28' designed to interact with a blocking tooth 29 when the lever is in the non-blocking position of the device 10.

[0016] In order to function properly, the command lever 23 can move forward axially, towards the runner 24, according to the arrow A (Fig. 1), and backwards according to arrow B, as well as make angular movements, according to arrow C, with its fulcrum in the hole 25 in the side of the body 11, and rotational movements according to arrow D. The axial and angular movements are intended to control the runner, while the rotation is intended to control the support upright.

[0017] The elastic system 22 which keeps the gripping plates in the blocking position includes a first spring 30, placed between the two plates 16,17, on a small guiding rod 31.

[0018] This small rod 31 is fastened at one end to the first plate 16, the one which is furthest from the runner, and passes freely through corresponding holes made in the other plate 17 and in the runner 24. The spring 30 is mounted with a certain tension in such a way as to keep the plates 16,17 apart and in a position to interact with the rod 15.

[0019] The system 22 includes, furthermore, a second spring 32, positioned in the runner 24 and in line with a pusher 33 which extends forwards across the plates without impediment until it comes to rest against a part of the horizontally pivoted lever 34, which has its fulcrum in 34' at the guiding block 20 of the rod 15, with its other side partly resting against the small rod 31 fixed to the plate 16 and carrying the first spring 30.

[0020] Essentially, when the runner 24 is in the backward position as in Fig. 3, the first spring 30 keeps the plates 16,17 apart, at an angle with respect to the rod 15, and, therefore, in the position to interact with the rod and to block the back support 12, with respect to the seat bearing body.

[0021] To modify such a blocking situation it is necessary to move the command lever 23 deliberately, with an angular movement (arrow C) in such a way as to move the runner 24 from the backward to the forward position (Figs 1 and 2). This means that from one side the horizontally hinged lever 34 is moved by the pusher 33, which is activated by the spring 32, and moves the first plate 16 until it is placed perpendicularly to the rod 15 and, therefore, in the non-blocking position. On the other side, the spring 30 stretches to keep the second plate 17 in the sloped position, blocking the rod 15, until the advancing runner comes to rest against this plate, forcing it too into a perpendicular position with respect to the rod 15 (Fig. 2). At this point, the back may be angled differently from the seat, varying the angle without having to worry about hitting the back of the person sitting on the chair.

[0022] Once the angle of the back has been chosen, moving the command lever and with it the runner back to its original backward position, the plates 16,17, affected by the spring 30, return to their sloped gripping position on the rod, thereby blocking the chair in its new position.

[0023] It should also be noted that, when the runner

is in the forward position, an outward movement of the command lever according to arrow B brings the shoulder 28' into contact with the blocking tooth 29, a condition in which the lever is unable to complete the reverse movement, which means that the non-blocking position of the chair can be stabilised according to necessity.

Claims

1. In a chair or seating structure like office chairs and armchairs, car seats and similar devices, comprising a stationary body (11) fixed to a support upright and bearing the seat, an oscillating support (12) hinged to the stationary body and bearing the back and elastic means for connecting the stationary body and the oscillating support, so as to oppose the oscillations of the latter, a device (10) for blocking the swinging of the oscillating support bearing the back in any position, with respect to the stationary body bearing the seat, characterised by:

- a cylindrical rod (15) connected to the oscillating support (12), extending forwards under the stationary body (11) and sliding through a guiding block (20);
- two gripping plates (16,17) placed obliquely to the cylindrical rod (15), each with a foot rotating on the stationary body and with a hole to permit the rod to pass, and where said plates (16,17) can move from an orthogonal non-blocking position, where they are perpendicular to the cylindrical rod and the axis of their cross-holes coincides with the axis of said rod, for the sliding of the latter, and a sloped blocking position, where the edge of the cross-holes interacts with the external surface of the rod, blocking it axially;
- said plates, when in the sloped blocking position, are angled in opposing directions in such a way that one plate can act upon and block the rod in one direction and the other plate can do the same in the opposite direction;
- between the cylindrical rod (15) and the gripping plates (16,17) there are some means for keeping the plates normally in the sloped blocking position and for moving the plates, on command, to the orthogonal non-blocking position.

2. Device according to claim 1, in which said cylindrical rod (15) is connected to the oscillating support (12) by means of a cross-pin (18), passing through ring holes (19) located in the stationary body.

3. Device according to claims 1 and 2, in which said cylindrical rod (15) has a smooth or rough surface.

4. Device according to claim 1, in which the gripping

plates (16,17) are normally kept in the sloped blocking position by a spring (30) placed between the plates themselves and mounted on a small guiding rod (31) fixed to one plate and sliding with respect to the other.

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5. Device according to claims 1 and 4, in which the means for moving the plates (16,17) into the orthogonal non-blocking position include a runner (24) that can move with respect to the cylindrical rod (15) from a backward position near the hinge of said rod to a forward position near the plates, a spring (32) mounted in the runner in line with a pusher (33) which extends through the plates as far as a horizontally pivoted lever (34) which has its fulcrum at the guiding block of the cylindrical rod and which rests against a plate adjacent to said block, in such a way that the movement of the runner from the backward to the forward position corresponds to, firstly, the movement of one of the plates and, secondly, the movement of the other plate into the non-blocking position.
6. Device according to claim 5, in which the runner (24) is connected to a command lever (23) which is capable of axial movements towards and away from the runner and of angular movements on a fulcrum, said lever, furthermore, being able to rotate so that it can control the means of regulating the height of the support upright of the chair.

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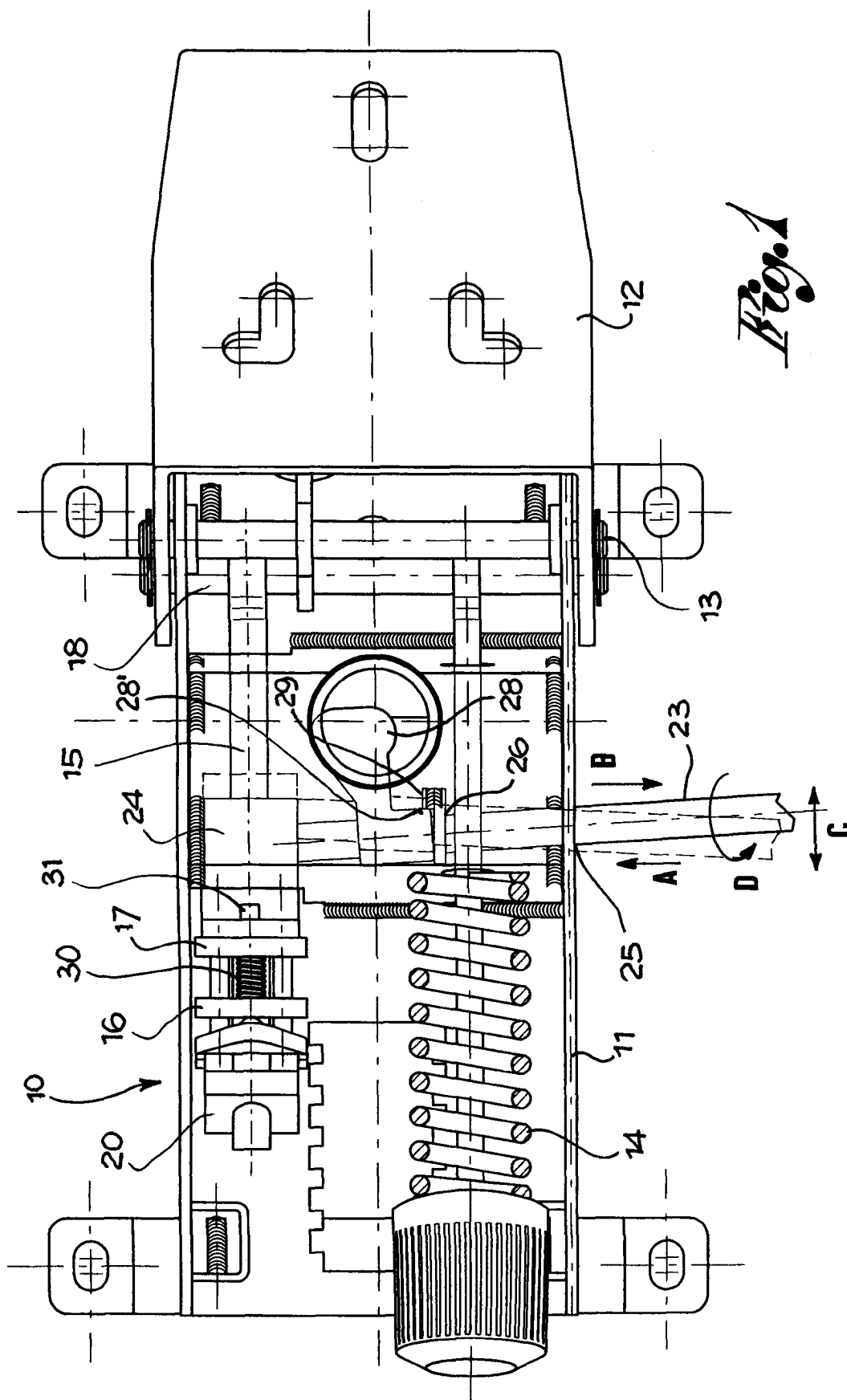
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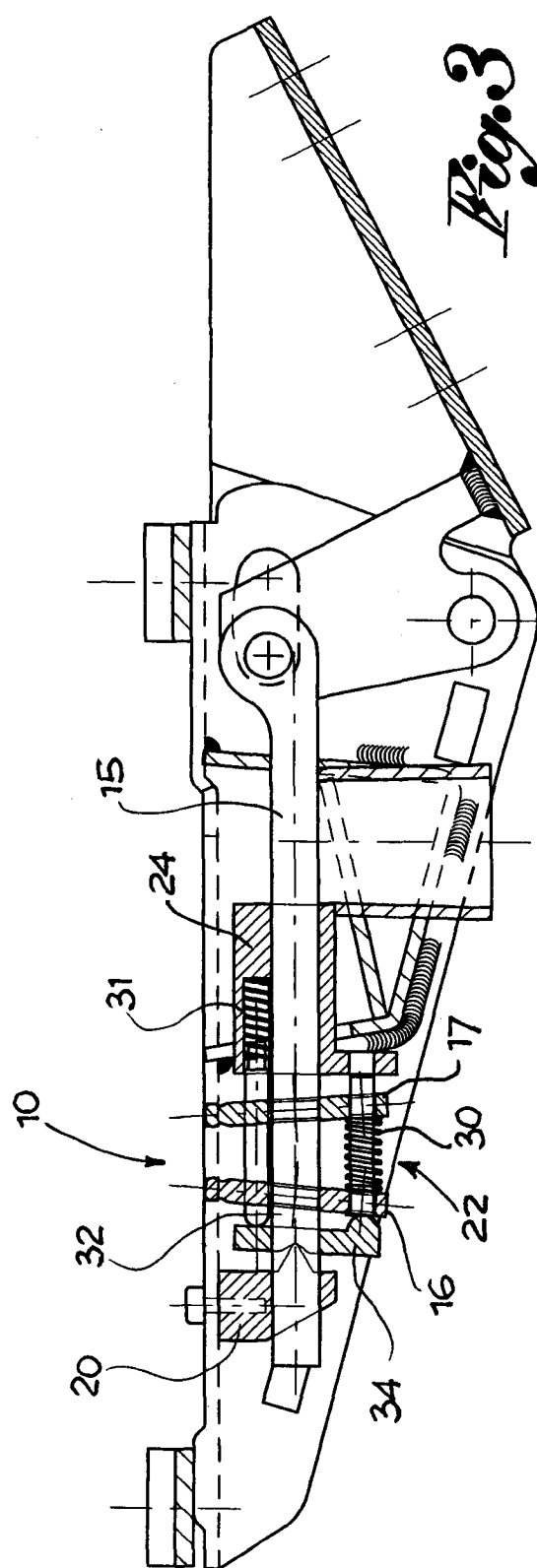
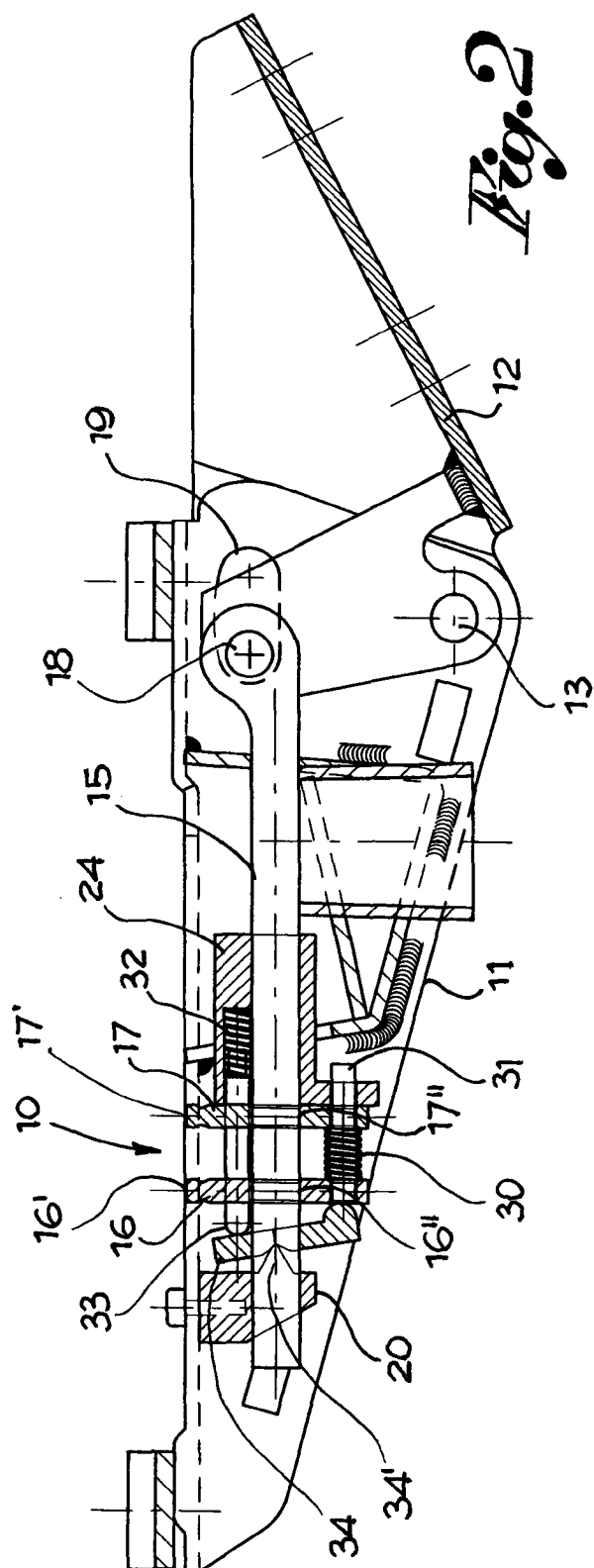
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European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0689

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.7)
X	FR 1 466 417 A (LA PUBLICITE FRANCAISE) 5 April 1967 (1967-04-05) * page 2, paragraph 1 - paragraph 2; figures 1-5 *	1-5	A47C1/027 A47C1/032
X	US 4 452 098 A (WALLACE JOHN B ET AL) 5 June 1984 (1984-06-05) * column 1, line 67 - column 2, line 3; figures 2,4 *	1-5	
X	US 4 441 381 A (HAUGK CHARLES A) 10 April 1984 (1984-04-10) * column 1, line 66 - column 2, line 13; figures 2-5 *	1,3,4	
X	EP 0 069 207 A (ROCKWELL INTERNATIONAL CORP) 12 January 1983 (1983-01-12) * page 6, line 12 - line 18; figure 1 *	1-3 4,6	
X	GB 2 278 772 A (JOHNSON CONTROLS ADWEST) 14 December 1994 (1994-12-14) * page 2, line 18 - line 22; figure 1 *	1,3	
X	US 5 105 486 A (PETERSON WARREN J) 21 April 1992 (1992-04-21) * column 3, line 61 - column 4, line 8; figures 6,6A *	1,3	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47C B60N
Place of search THE HAGUE		Date of completion of the search 21 March 2000	Examiner Joosting, T
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 83 0689

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-03-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 1466417 A	05-04-1967	NONE	
US 4452098 A	05-06-1984	ZA 8304873 A	27-02-1985
US 4441381 A	10-04-1984	NONE	
EP 0069207 A	12-01-1983	US 4387926 A	14-06-1983
		AU 592148 B	04-01-1990
		AU 6822187 A	07-05-1987
		AU 8327082 A	06-01-1983
		BR 8203715 A	21-06-1983
		CA 1184840 A	02-04-1985
		ES 513472 D	16-11-1983
		ES 8400944 A	16-02-1984
		IE 53129 B	06-07-1988
		JP 58008439 A	18-01-1983
		MX 154510 A	24-09-1987
GB 2278772 A	14-12-1994	NONE	
US 5105486 A	21-04-1992	US 5160010 A	03-11-1992
		US 5173975 A	29-12-1992