(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 925 773 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.05.2008 Bulletin 2008/22

(51) Int Cl.:
E06B 9/60 *(2006.01)*

(21) Application number: **07425714.8**

(22) Date of filing: **13.11.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(30) Priority: **14.11.2006 IT RM20060619**

(71) Applicant: **Date System S.r.l.**
84010 San Valentino Torio (SA) (IT)

(72) Inventor: **Nappo, Claudio**
80038 Pomigliano D'Arco (NA) (IT)

(74) Representative: **Lanzoni, Luciano**
c/o Bugnion S.p.A.
Via Vittorio Emanuele Orlando, 83
00185 Roma (IT)

(54) A device for adjusting the tension of the return spring of mosquito nets, roller curtains or the like

(57) A device for adjusting the tension of the return spring of a mosquito net, a roller curtain or the like, comprises a sheet-bearing roller (1) with a sheet (2) mounted rotatably around its own longitudinal axis under the effect of a return spring (25), on a head (4) with return spring (25) and on a head with bushing in a closure roller shutter box (3), said return spring (25), mounted through a sleeve (21) within the sheet-bearing roller (1) and anchored, at one of its ends, to a first support element (17) in proximity to the head (4) with return spring (25) and at the other end to a second support element (170) able to slide without rotating within the sheet-bearing roller (1). The head (4) further comprises a worm screw assembly (13,14) able to be operated from the exterior with the mosquito net mounted, able to vary the tension of the return spring (25).

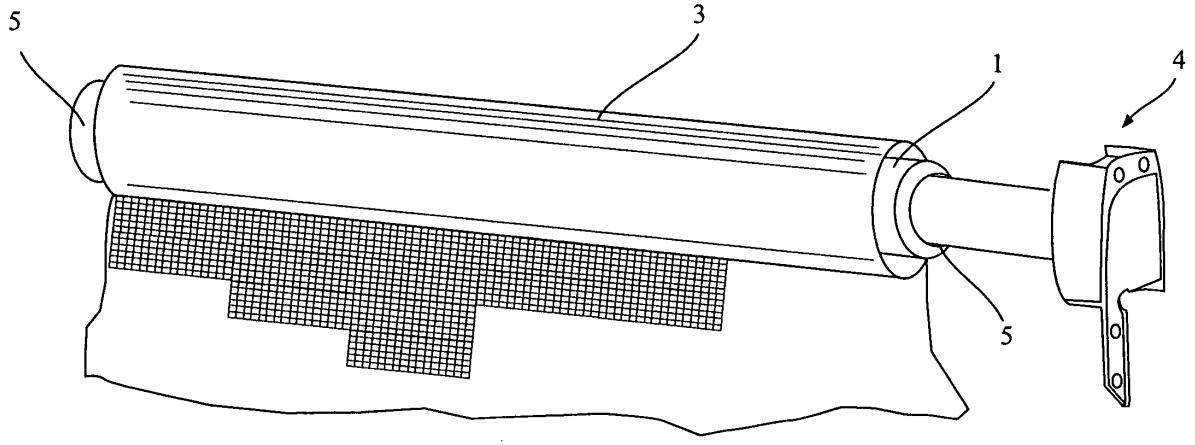

Fig. 1

EP 1 925 773 A1

(Cont. next page)

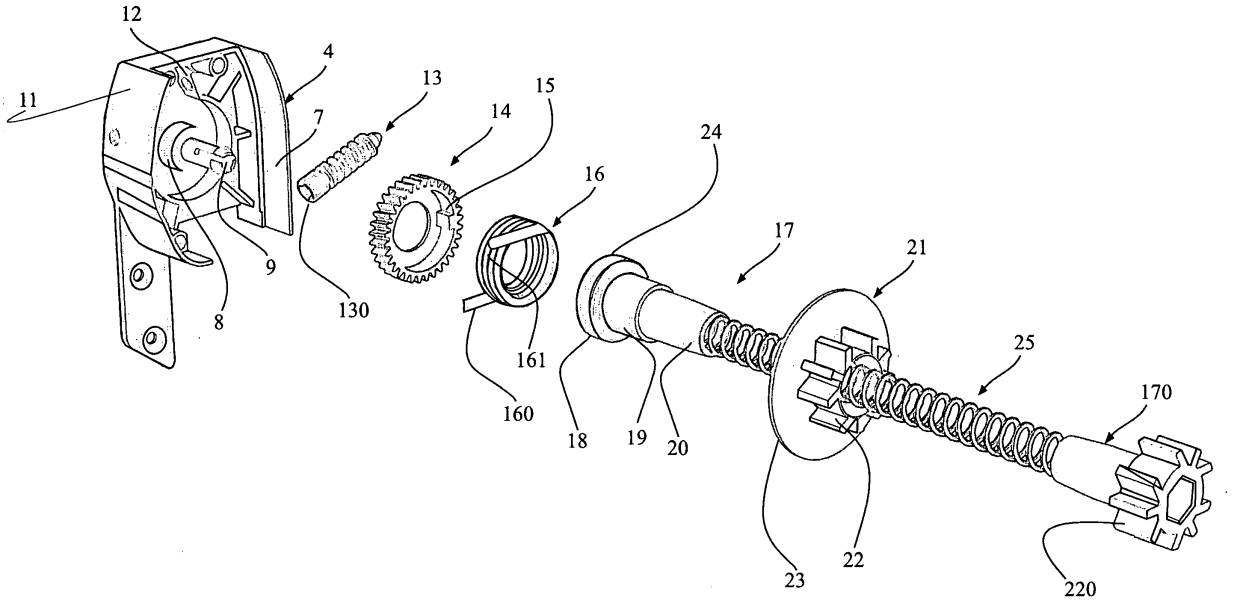

Fig. 2

Description

[0001] The present invention relates to a device for adjusting the tension of the return spring of mosquito nets, roller curtains or the like.

[0002] Generally, in this type of architectural light covers, a fabric, a sheet or a net is wound and unwound on a sheet-bearing roller mounted rotatably at its ends to the heads of a roller shutter box. At its end opposite the one fastened to the sheet-bearing roller, the sheet or the like has a terminal for stiffening and loading it. Normally, a torsion-operated return spring co-operates with the sheet-bearing roller, so that when the sheet or the like is unwound, the spring is further loaded with an action antagonist to the unwinding. In this way, the reverse rotation of the sheet-bearing roller, and hence the winding of the sheet or the like, takes place thanks to the release of the elastic energy of the spring stored by the return spring in the unwinding phase.

[0003] Hence, the return spring that is under tension serves the function of allowing both to rewind the sheet and to maintain the sheet tensioned. If the tension of the spring is insufficient, it may occur that the sheet fails to rewind completely or remains loose.

[0004] It is evident that adjustment of the tension is necessary at the time of the installation of the mosquito net or the like, but it can be required subsequently, when, with time and with wear, the tension of the spring can be modified.

[0005] Mechanisms for loading and unloading the tension of the return spring are already available on the market, but this operation can be performed only when assembling the mosquito net or the like and, in any case, before installation. Therefore, in known mechanisms, to modify the tension of the return spring it is necessary to remove the mosquito net or the like. Moreover, with known mechanisms, the adjustment of the return spring cannot be micrometric or precise, but it can involve large adjustment intervals, such as a complete rotation of the return spring, i.e. the formation of new turn.

[0006] An object of the present invention is to allow an adjustment of the return spring of a mosquito net or the like even after its installation, without requiring its disassembly.

[0007] Another object of the invention is to allow an adjustment of the return spring of a mosquito net or the like with precision and in a wide interval.

[0008] Therefore, according to the present invention a device for adjusting the tension of the return spring of a mosquito net, a roller curtain or the like comprising a sheet-bearing roller whereon is wound and unwound a sheet of a mosquito net, roller curtain or the like in the rotation of the sheet-bearing roller mounted rotatably around its own longitudinal axis under the effect of a return spring, on a header with return spring and on a header with bushing in a closure box able to surround the sheet-bearing roller and the related sheet, said return spring, mounted through a sleeve within the sheet-bearing roller and anchored, at one end thereof, to a first supporting element in proximity to the header with return spring and at the other end to a second supporting element able to slide without rotating within the sheet-bearing roller, device which, from a general viewpoint, is characterised in that said header with return spring comprises a worm screw which can be operated from the exterior with the of a mounted mosquito net, able to vary the tension of the return spring.

[0009] The advantages of the invention are evident. It can be applied to existing mosquito net and the like, simply by a replacing a conventional header thereof.

[0010] The device enables to adjust the tension of the return spring of the mosquito net or the like in micrometric fashion, and additional said operation can be performed even after the mosquito net or the like is mounted.

[0011] Oftentimes, after installation the technician realises the need for a greater and smaller tension of the return spring. Thanks to the device according to the present invention, (s)he can proceed with said adjustment, once the installation is complete, using a simple tool, such as a hexagon ring wrench or Allen wrench.

[0012] Moreover, the device according to the invention allows a reduction in installation times and a more precise adjustment of the tension of the spring, considering that said tension is not always foreseeable before installation because there are multiple factors that determine tension. Said factors are, for example, the variability of the width and height of the mosquito net or the like, the number of turns of the spring, friction on the guides, and other factors besides.

[0013] It will be readily understood that with the device according to the invention, the operation of adjusting the return spring, thanks to its extreme ease, can be performed directly by the user, without having to request a technician's intervention.

[0014] The invention shall be more readily apparent through the detailed description that follows of an embodiment thereof, considered together with the enclosed drawing, in which:

Figure 1 is a partial and partially exploded axonometric view of a mosquito net provided with a device for adjusting the tension of the return spring according to the invention; and

Figure 2 is a partially exploded axonometric view of the device for adjusting the tension of the return spring in the longitudinal direction towards the sheet-bearing roller of the mosquito net of Figure 1.

[0015] With reference initially to the partial and partially exploded axonometric view of a mosquito net of Figure 1, the figure shows a sheet-bearing roller 1, a sheet 2 or the like, having an end integral with the sheet-bearing roller 1, a roller shutter box 3 and only one head 4 thereof, the one with return spring (not shown). For the sake of simplicity, in Figure 1 are not shown, because they are known, the other parts comprising the mosquito net, i.e.

the rest of the sheet 1 with end terminal opposite to the end connected to the sheet-bearing roller, the other head of the roller shutter box, i.e. the one with the bushing, and the sliding frame of the mosquito net.

[0016] As shown in Figure 1, the sheet-bearing roller 1 has a section bar 5 internally grooved for engagement with the head 4 with return spring and with a head with bushing, not shown in the drawings. The head 4 with return spring is provided with a device for adjusting the tension of the return spring of the of the sheet or the like according to the invention, shown exploded in Figure 2 according to a longitudinal direction of the sheet-bearing roller.

[0017] With reference to Figure 2, the device for adjusting the tension of the return spring according to the invention, obtained on the head 4 with return spring, comprises a shaped piece 7 with substantially known conformation, hence not described in detail herein. The shaped piece 7 is such as to constitute a closing element for the roller shutter box 3 shown in Figure 1. The shaped piece 7 of the head 4 centrally presents a cylindrical seat 8 ending in a stop 9.

[0018] According to the present invention, on an outer wall 10 of the shaped piece 7 of the head 4 is obtained a through hole 11, whilst within the header 4 is formed a dead hole 12. The through hole 11 and the dead hole 12 constitute end bearing seats of a screw 13. The screw 13, preferably having a hexagonal socket head 130, is engaged with an internally hollow gear wheel 14, housed rotatably in the cylindrical seat 8 of the shaped piece 7 of the head 4. The screw 13 and the gear wheel 14 constitute a worm screw assembly, which, like other parts of the mosquito net or the like, can conveniently be made of plastic material, preferably charged nylon. The gear wheel 14 internally presents a circumferential abutment 15. Within the gear wheel 14 is positioned a helical spring 16, preferably made of harmonic steel, having ends 160 and 161. When mounting, the ends 160 and 161 of the helical spring are situated at one side and the other of the circumferential abutment 15 of the gear wheel 14. The function of the helical spring 16 will be readily apparent in the remainder of the description. On the helical spring 16 thus mounted is applied a first support element 17, having a cylindrical base portion 18, an intermediate cylindrical portion 19 and a tapered terminal portion 20. The base cylindrical portion 18 of the support element 17 is received within the gear wheel 14 until the stop element 9 of the seat 8 of the head 4 snaps on the tapered terminal portion 20 of the support element 17. Lastly, on the support element 17 is positioned a sleeve or rotor 21. The rotor 21 comprises a tubular portion 22 and a portion 23 with circular crown shape. The tubular portion 22 is grooved externally and substantially cylindrical in its interior. The grooved outer profile of the tubular portion 22 is adapted to be engaged, without possibility of rotating, in the internally grooved section bar 5, whilst the substantially cylindrical inner surface of the tubular portion 22 is adapted to receive rotatably the intermediate cylindrical portion 19 of the support element 17.

[0019] The device for adjusting the return spring according to the invention is positioned, as described above, on the head 4. The head 4 is fastened to the ends of the roller shutter box 3, e.g. by means of screws, so that the tubular portion 22 of the rotor 21 is engaged with the section bar 5 of the sheet-bearing roller 1. On the terminal tapered portion 20 of the support element 17 is fixed a return spring 25 that enables the rotation of the sheet-bearing roller 1. The opposite head, not shown, will be applied to the side of the roller shutter box 3 opposite the side of the head 4, with the related bushing inserted in the section bar 5. The opposite head is simply for the abutment of the sheet-bearing roller 1, i.e. without the device for adjusting the return spring.

[0020] The return spring 25 whereto is anchored at one end the tapered terminal 20 of the support element 17 passes through the tubular portion 22 of the rotor 21 within the section bar 5 of the sheet-bearing roller 1 (not shown in Figure 2). The other end of the spring is fastened to a second support element 170, slidable relative to the section bar 5 of the sheet-bearing roller 1, but without possibility of rotating relative thereto, thanks to the externally grooved conformation of the portion 220.

[0021] In the operation of raising and lowering the sheet 2, the support element 17 is always integral with the gear wheel 14 by means of the stop element 15 situated circumferentially to the interior of the gear wheel 14. The force couples that act on the support element 17 cannot produce rotation because, through a slot 24 of the cylindrical base portion 18 act on the ends 160 and 161 of the helical spring 16, tightening it around the seat 8 of the head 4. The force couples acting on the gear wheel 14 instead tend to widen the torsion spring 16 and hence produce rotation in both directions. However, the gear wheel 14 cannot rotate spontaneously because it engaged with the screw 13.

[0022] Using an Allen wrench (not shown), introduced into the through hole 11 of the shaped piece 7 and acting on the hexagonal socket head 130 of the screw 13, it is possible to actuate rotations of the gear wheel 14 and, consequently, of the support element 17.

[0023] Summarising, in the normal operation of the mosquito net or the like the helical spring 16 serves the purpose of keeping the return spring uncoupled from the gear wheel, whilst the support element 17 is normally always torsion stressed because it is integral with the return spring 25.

[0024] To adjust the tension of the return spring 25, the helical spring 16 serves the purpose of coupling the return spring 25 with the gear wheel 14. If the gear wheel 14 is made to rotate in the direction in which the return spring 25 is loaded, an adjustment is made whereby the sheet 2, supported by the sheet-bearing roller 1, is rewound with greater speed. Inverting the rotation of the screw 13, the reverse adjustment is made and the sheet 2 is rewound at slower speed.

[0025] Variations and changes can be made to the em-

bodiment described above, without thereby departing from the scope of the invention as defined in the claims that follow.

Claims

1. A device for adjusting the tension of the return spring of a of a mosquito net, a roller curtain or the like comprising a sheet-bearing roller (1) whereon is wound or unwound a sheet (2) of a mosquito net, roller curtains or the like in the rotation of the sheet-bearing roller (1) mounted rotatable around its own longitudinal axis under the effect of a return spring (25), on a head (4) with return spring (25) and of a head with bushing in a closing roller shutter box (3) able to surround the sheet-bearing roller (1) and the related sheet (2), said return spring (25), mounted through a sleeve (21) within the sheet-bearing roller (1) and anchored, at one of its ends, to a first support element (17) in proximity to the head (4) with return spring (25) and at the other end to a second support element (170) able to slide without rotating within the sheet-bearing roller (1), **characterised in that** said head (4) with return spring (25) comprises a worm screw assembly able to be actuated from the exterior with mosquito net mounted, able to vary the tension of the return spring (25).

2. Device as claimed in claim 1, **characterised in that** the worm screw assembly comprises an internally hollow gear wheel (14) mounted in a cylindrical seat (8) of the head (4) with return spring (25) and a worm screw (13), engaged with the gear wheel (14) and bearing on the same head (4) with return spring (25) in such a way that the worm screw (13) can be screwed and unscrewed from outside the head (4) with return spring (25), a helical spring (16), bearing within the gear wheel (14) and having its own ends (160, 161) at one side and at the other side of a circumferential abutment element (15) of the gear wheel (14), being able to uncouple said return spring (25) from the gear wheel (14) during the normal winding and unwinding of the sheet (2) and to couple said return spring (15) from the gear wheel (14) during the adjustment of the return spring (25).

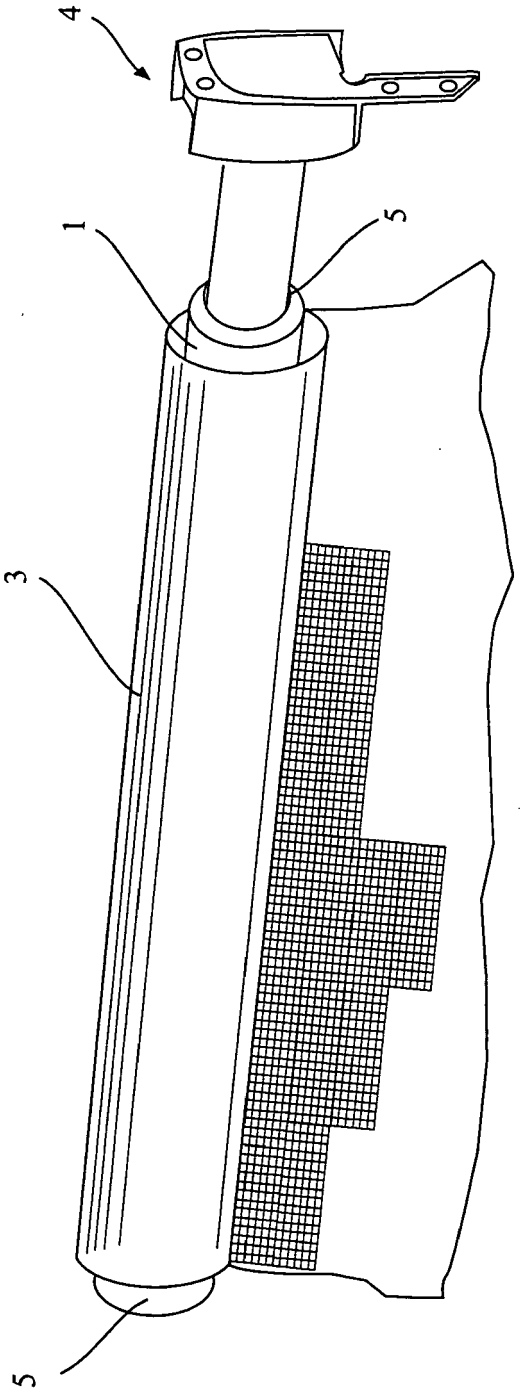

Fig. 1

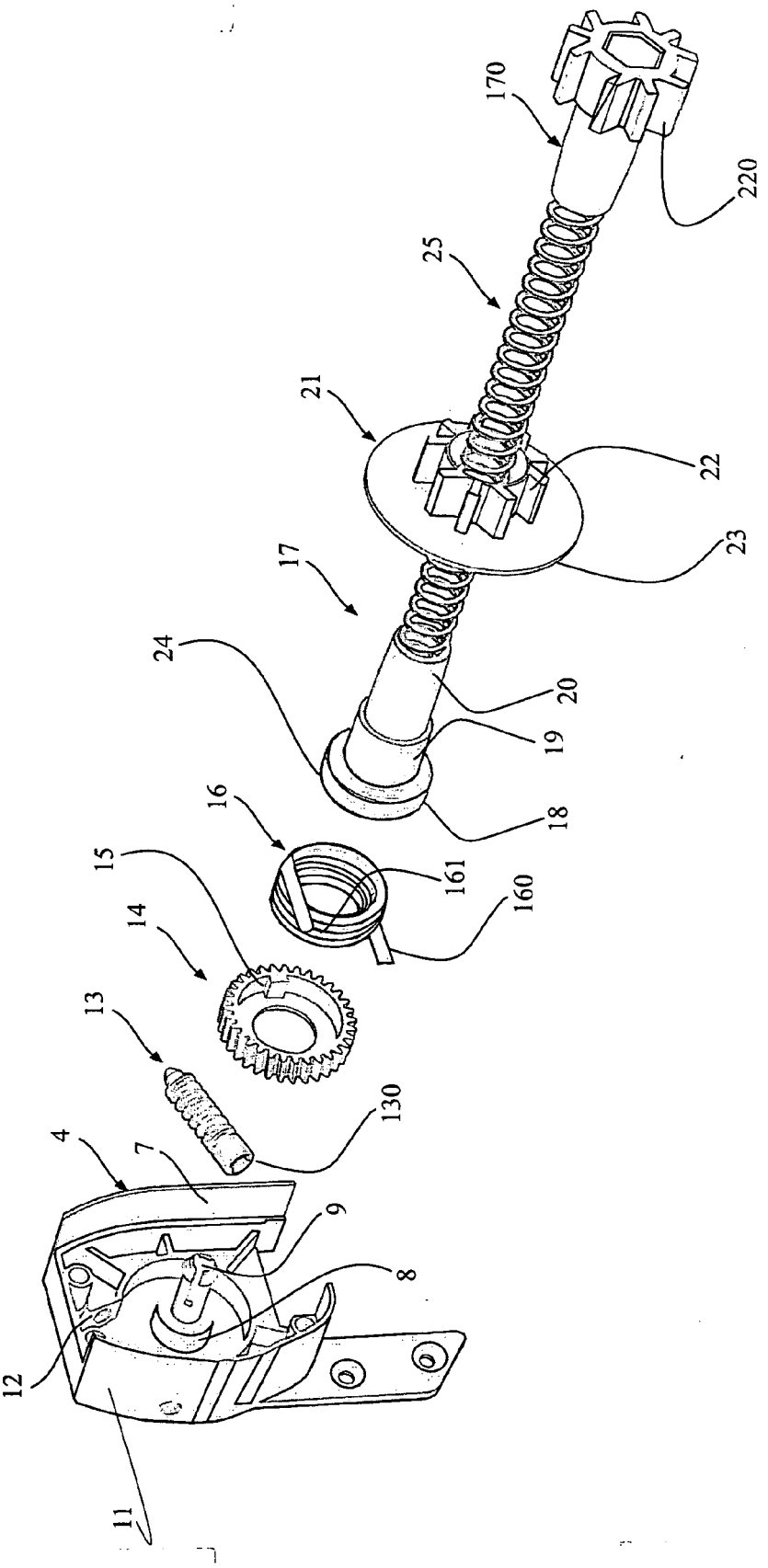

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5714

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 060 676 A (KUYPER PETER H) 10 November 1936 (1936-11-10) * page 1, right-hand column, line 15 - page 2, left-hand column, line 12; claims 5,6; figures 2,6 * * page 2, right-hand column, line 15 - line 25 *	1	INV. E06B9/60
A	US 5 419 010 A (MULLET WILLIS [US]) 30 May 1995 (1995-05-30) * column 6, line 53 - column 7, line 30; figure 3 *	1	
A	US 6 125 582 A (MONDRAGON JOSEPH J [US] ET AL) 3 October 2000 (2000-10-03) * figure 7 *	1	
A	US 5 865 235 A (KRUPKE LEROY G [US] ET AL) 2 February 1999 (1999-02-02) * figure 3 *	1	
A	US 4 487 245 A (SHINOHARA KAZUO [JP] ET AL) 11 December 1984 (1984-12-11) * the whole document *	2	TECHNICAL FIELDS SEARCHED (IPC) E06B E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 February 2008	Knerr, Gerhard

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 07 42 5714

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-02-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2060676 A	10-11-1936	NONE	
US 5419010 A	30-05-1995	AT 169714 T	15-08-1998
		AU 679987 B2	17-07-1997
		AU 6669794 A	21-11-1994
		CA 2136332 A1	10-11-1994
		DE 69412410 D1	17-09-1998
		DE 69412410 T2	24-12-1998
		EP 0648307 A1	19-04-1995
		JP 3510257 B2	22-03-2004
		JP 7508809 T	28-09-1995
		WO 9425713 A1	10-11-1994
US 6125582 A	03-10-2000	NONE	
US 5865235 A	02-02-1999	CA 2226808 A1	23-07-1998
		JP 2911865 B2	23-06-1999
		JP 10266740 A	06-10-1998
US 4487245 A	11-12-1984	EP 0046949 A2	10-03-1982
		ES 8205928 A1	01-11-1982
		JP 57045597 U	13-03-1982
		JP 61032076 Y2	18-09-1986

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82