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

(11) EP 1 627 981 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
22.02.2006 Bulletin 2006/08

(21) Application number: **04710047.4**

(22) Date of filing: **11.02.2004**

(51) Int Cl.:
E05F 11/38 *(1968.09)* ***B60J 1/17*** *(1974.07)*

(86) International application number:
PCT/ES2004/000057

(87) International publication number:
WO 2004/106684 (09.12.2004 Gazette 2004/50)

(30) Priority: **27.05.2003 ES 200301302 U**

(71) Applicant: **Daumal Castellon, Melchor**
08013 Barcelona (ES)

(72) Inventor: **Daumal Castellon, Melchor**
08013 Barcelona (ES)

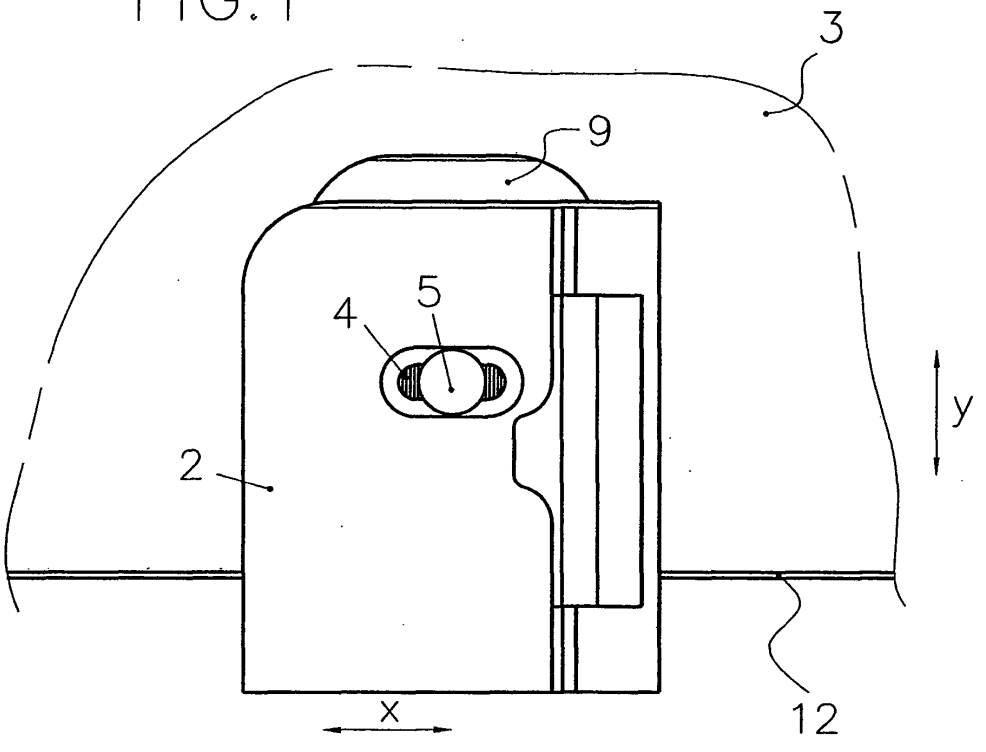
(74) Representative: **Morgades y Manonelles, Juan Antonio**
Morgades & Del Rio, S.L.
C/Rector Ubach, 37-39 bj. 2.o
08021 Barcelona (ES)

(54) **SLIDE FOR MOTOR VEHICLE WINDOW REGULATORS**

(57) It comprises a first base body slidingly driven through a rail and having an enlarged hole for receiving a fastening screw, and a second body coupled to the first one including retaining means of the lower end of the window pane of the vehicle, as well as a hole for threadingly receiving said screw for attaching both bodies to each other. Said bodies can be coupled through friction surfaces allowing a relative previous positioning thereof before fastening of said screw.

Assembling of the power window device in the vehicle door is carried out quickly and comfortably on the part of the operator allowing an extremely accurate adjustment.

FIG.1



EP 1 627 981 A1

Description

[0001] The present invention relates to a power window device for motor vehicles, and more particularly to the slider of a power window device for motor vehicles with which it is possible to carry out a very accurate adjustment of the window pane in the vehicle door taking up possible manufacturing and assembling irregularities and flaws with a very simple and consequently cost effective configuration.

[0002] High precision currently required in manufacturing power window devices for motor vehicles is leading to an increasingly improved production of such devices. Particularly, the need for accurately adapting the design in power window devices to the vehicle door in such a way that the window pane is tightly coupled thereto and with minimum tolerances have resulting in increased expenses of production and assembly due to the accuracy required in the final design and the operator's skill who is assembling the assembly.

[0003] Although rubber strips in the vehicle door frame traditionally allowed taking up tolerances in the power window device and the window of the vehicle, the current aesthetic requirements have imposed provision of rubber strips having a progressively reduced thickness. Accordingly, difficulty in achieving an accurate, quick and simple coupling of the window in the door becomes yet worse as the rubber strips can no longer play the role of taking up manufacturing and assembling tolerances in the window pane as until recently, as stated before.

[0004] The invention seeks to provide an effective solution which is, at the same time, simple in order to overcome the problem in prior art power window devices, so that assembling of the power window device in the vehicle door may be carried out quickly and comfortably on the part of the operator thus allowing an extremely accurate adjustment.

[0005] The solution provided by the invention consists in providing a slider having a structure such that a displacement thereof and consequently of the window pane is allowed.

[0006] It is known that the slider of a power window device is a piece, typically made of plastic, that is moved through a rail by being driven by a driving cable running through pulleys by means of an electric motor or a crank handle. The slider typically includes retaining means of the window pane lower end to force it to be moved as the slider is moved.

[0007] The invention provides a slider having a new design comprising two bodies having a configuration such that they can undergo a slight relative displacement. The first body of the slider of the present invention is a base body adapted to be slidingly driven through the rail of the power window device by means of the driving cable. Said first body is provided with an elongated hole adapted for receiving a fastening screw. Said first body is a substantially L-shaped body having an end extension forming an inner housing intended for allowing the second body to be slid retained within said housing.

[0008] Said second body of the slider is a U-shaped body adapted to house the lower end of the window pane. The end of said second body has an outwardly extending lip so that it is housed within a complementary inner cavity of the first body. Said second body includes retaining means of said lower end of the window pane of the motor vehicle and it also includes a hole for threadingly receiving the fastening screw for attaching both bodies to each other.

[0009] According to the invention, the mating surfaces of both bodies are friction surfaces allowing for a previous relative positioning of both bodies before they are fastened by said screw. In one embodiment, the friction surfaces of both bodies are either saw tooth stripy surfaces defining peaks and valleys having an essentially parallel configuration or made of rubber as friction members, although it will be understood that any suitable relief surface may be used according to the principles of the present invention.

[0010] Retaining means of the lower end of the window pane arranged in the second body of the slider, as stated before, comprise a protrusion projecting from an inner surface of said second body which is adapted to be housed within a hole of said lower end of the window pane so that the window pane is prevented from being moved relative to the slider.

[0011] Preferably, the elongated hole of said first body allows a displacement relative to the second body of the order of $\pm$ 5 mm or $\pm$ 10 mm and provision is made for the arrangement of an inner reinforcing ring fitted therein and complementary thereto for providing a higher mechanical strength. There is also provided that said elongated hole has an upper counterboring as an alternative to the inner metal ring.

[0012] The adjustable slider herein described allows assembling of the power window device to be adjusted properly. In the assembling operation, the window pane is fitted into clips in each slider, the window pane is raised to the end upper position so that the window pane is automatically adapted to the frame structure of the vehicle door and finally the respective screws are tightened. The operation is very quick, simple and especially effective, taking up tolerances.

[0013] The features and the advantages of the adjustable slider of the present invention will be clearer from the detailed description of a preferred embodiment thereof which will be given hereinafter by way of a non limitative example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of one embodiment of an adjustable slider according to the invention, showing the window pane attached to the slider;

Fig. 2 is a cutaway elevational view of the adjustable slider of the invention;

Fig. 3 is a perspective view of the base body of the adjustable slider shown in the above figures; and

Fig. 4 is a perspective view of the second body of the slider shown in the above figures.

[0014] There follows a list of the different references used for describing the preferred embodiment of the slider of the present invention:

(1) slider;
(2) first body of the slider;
(3) window pane;
(4) enlarged hole of the first body of the slider;
(5) fastening screw;
(6) end extension of the first body of the slider;
(7) inner housing of the end extension of the first body of the slider;
(8) end of the second body of the slider;
(9) second body of the slider;
(10) lip of the end of the second body of the slider;
(11) retaining means of the lower end of the window pane of the vehicle;
(12) lower end of the window pane;
(13) protrusion or clip;
(14) walls of the second body of the slider;
(15) hole of the window pane;
(16) threaded hole of the second body of the slider;
(17, 19) mating surfaces of the two bodies of the slider;
(18) support rubber strip of the window pane;
(x) direction of adjustment of the slider; and
(y) direction of operation of the slider.

[0015] Referring first to Fig. 2 of the drawings, the slider (1) is adapted to be moved through a rail (not shown) with the purpose of causing the upward and downward movement of the window pane (3).

[0016] The slider (1) shown by way of an example essentially comprises a first body or base body (2) made of POM or any other suitable material. Said base body (2) is slidingly driven through the rail of the power window device, as stated above, and it is desirably provided with an enlarged hole (4) -see fig. 3 in the drawings- adapted for receiving a fastening screw (5), as it can be seen from fig. 2 wherein the pre-assembly position is shown. The enlarged hole (4) has an upper counterboring and there is also provided with an inner reinforcing ring appropriately fitted inside of it and complementary thereto for providing a greater mechanical strength.

[0017] Particularly referring now to Figs. 2 and 3 of the drawings, the base body (2) of the slider (1) is substantially L-shaped (see the perspective view in fig. 3) with an end extension (6) having a C-shaped cross-section defining an inner housing (7), as best seen from the cutaway perspective view in fig. 3. Said housing or cavity (7) allows the end (8) of a second body (9) to be received therein as shown in the perspective view of fig. 4. The second body (9) has a clip shaped configuration and it may be similarly made of POM, polyamide or any other suitable material. The body or clip (9) of the slider (1) has two elongated walls (14) forming a substantially U-shaped configuration with the ends of said walls (14) slightly open outward to facilitate assembling of the window pane (3) of the vehicle that is housed through its lower edge (12) within said body (9) resting on a rubber strip (18).

[0018] The end (8) of the body (9) has an outwardly extending lip (10) defining a complementary T-shaped cross-section. Said end (8) is inserted within the housing (7) of the first body (2) and held in place therein.

[0019] The enlarged hole (4) has a length such that it allows the relative displacement of the bodies (2, 9) of the slider (1). In a practical embodiment, the relative displacement of the bodies (2, 9) of the slider (1) is of the order of $\pm$ 5 mm or $\pm$ 10 mm for the correct previous positioning of the power window device in the vehicle door before final assembly. The hole in the second body (9) is of smaller diameter for retaining the screw (5) before screwing, tightening and closing the window pane (3).

[0020] Referring to fig. 2, the second body (9) of the slider (1) is provided with retaining means (11) of the lower end (12) of the window pane (3) of the vehicle. Said retaining means (11) of the lower end (12) of the window pane (3) of the vehicle comprise a protrusion (13) extending inwardly from a wall (14) of the body (9) passing through a hole (15) formed in the lower end of the window pane (3) so that it is not allowed to be moved relative to the slider (1) in the assembled position.

[0021] The second body (9) of the slider (1) also includes a hole (16) for receiving the fastening screw (5). The hole (16) may be a threaded hole as shown in fig. 2 or it may also be self-threading. The fastening screw (5) allows attachment of both bodies (2, 9) to each other in the assembled position.

[0022] As it can be seen, first and second bodies (2, 9) of the slider (1) have respective mating surfaces (17, 19) which are friction surfaces so that the relative previous positioning of both bodies (2, 9) is allowed before they are fastened through the screw (5). Said friction surfaces (17, 19) may be either saw tooth stripy surfaces (toothed surfaces) or any other suitable equivalent configuration.

[0023] In the assembling operation, the operator fits the slider (1) of the power window device into the rail (not shown) for the proper displacement thereof in the (y) direction shown in fig. 1 of the drawings. Movement in said (y) direction shown corresponds to the movement of the slider (1) as the window pane (3) is moved upward and downward during power window device operation.

[0024] Assembly of the slider (1) is carried out with the bodies (2, 9) thereof coupled to each other through the end (8) of the body (9) housed in the extension (6) of the first body (2) of the slider (1), as stated before. The operator adjusts the relative position of the bodies (2, 9) of the slider (1), that is, the position of the body (2) - associated with the rail- relative to the body (9) - associated with the window pane (3) of the vehicle ((x) direction)-. This adjustment is carried out easily thus overcoming the

resistance put up by the friction surfaces (17, 19) opposing the relative displacement of both bodies (2, 9), respectively, in the interface area thereof.

[0025] The appropriate positioning of the window pane (3) in the door is comfortably carried out by raising the window pane (3) to the upper end position of the door so that it is automatically adapted to the frame structure of the vehicle door. It therefore determines the relative position of the bodies (2, 9) of the slider (1), so that the operator has only to screw up the fastening screw (5) passing through the enlarged hole (4) of the body (2) as well as the threaded hole (16) of the body (9) passing through the hole (15) of the window pane (3) until the bodies are tightened against one another.

[0026] Once having been sufficiently described what the adjustable slider for power window devices of the present invention consists in accordance to the enclosed drawings, it is understood that any detail modification can be introduced as appropriate, provided that variations may alter the essence of the invention as summarised in the appended claims.

Claims

1. Slider (1) for power window devices for motor vehicles adapted to be slidingly driven along a rail and including retaining means (11) of the lower end (12) of the window pane (3) of the vehicle, **characterized in that** said slider (1) comprises a first base body (2) sliding through said rail and having an enlarged hole (4) adapted for receiving a fastening screw (5), and said slider (1) further comprising a second body (9) coupled to the first body (2) which is provided with said retaining means (11) and which is further provided with a hole (16) for threadingly receiving said fastening screw (5) for attachment of both bodies (2, 9) to each other.

2. Slider (1) for power window devices for motor vehicles as claimed in claim 1, **characterized in that** the bodies (2, 9) of the slider are coupled through interfaces (17, 19), respectively, which are friction surfaces allowing a relative previous positioning of both bodies (2, 9) before fastening of said screw (5).

3. Slider (1) for power window devices for motor vehicles as claimed in claim 2, **characterized in that** said friction surfaces (17, 19) of both bodies (2, 9) are toothed surfaces.

4. Slider (1) for power window devices for motor vehicles as claimed in claim 1, **characterized in that** said retaining means (11) of the lower end (12) of the window pane (3) comprise a protrusion (13) extending inwardly from a wall (14) of said second body (9) which is adapted to be housed within a hole (15) of said lower end (12) of the window pane (3).

5. Slider (1) for power window devices for motor vehicles as claimed in claim 1, **characterized in that** one end (8) of the second body (9) has an outwardly extending lip (10) and that is housed within a complementary inner housing (7) of the first body (2).

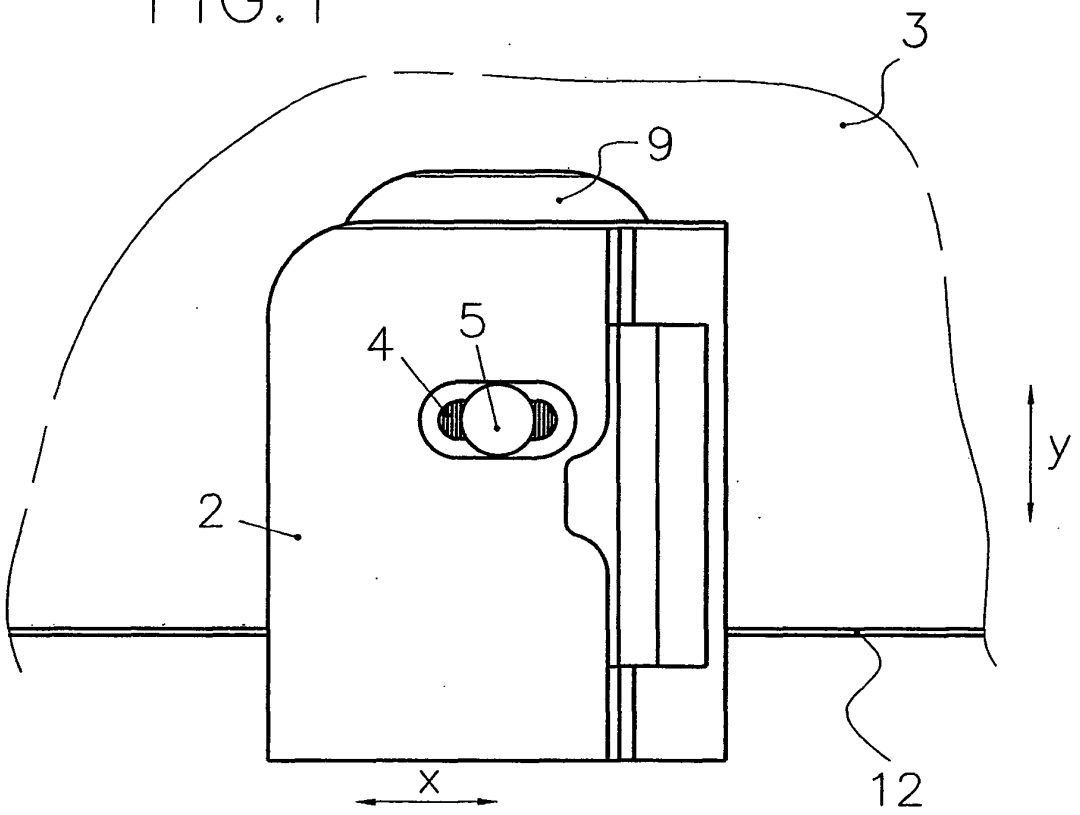
6. Slider (1) for power window devices for motor vehicles as claimed in claim 1, **characterized in that** said enlarged hole (4) of said first body (2) allows a displacement relative to the second body (9) of $\pm$ 5 mm.

7. Slider (1) for power window devices for motor vehicles as claimed in claim 1, **characterized in that** said enlarged hole (4) of said first body (2) allows a displacement relative to the second body (9) of $\pm$ 10 mm.

8. Slider (1) for power window devices for motor vehicles as claimed in any of the preceding claims, **characterized in that** said enlarged hole (4) of said first body (2) is provided with an inner reinforcing ring fitted inside of it and complementary thereto.

9. Slider (1) for power window devices for motor vehicles as claimed in any of the preceding claims, **characterized in that** said enlarged hole (4) is provided with an upper counterboring.

FIG.1



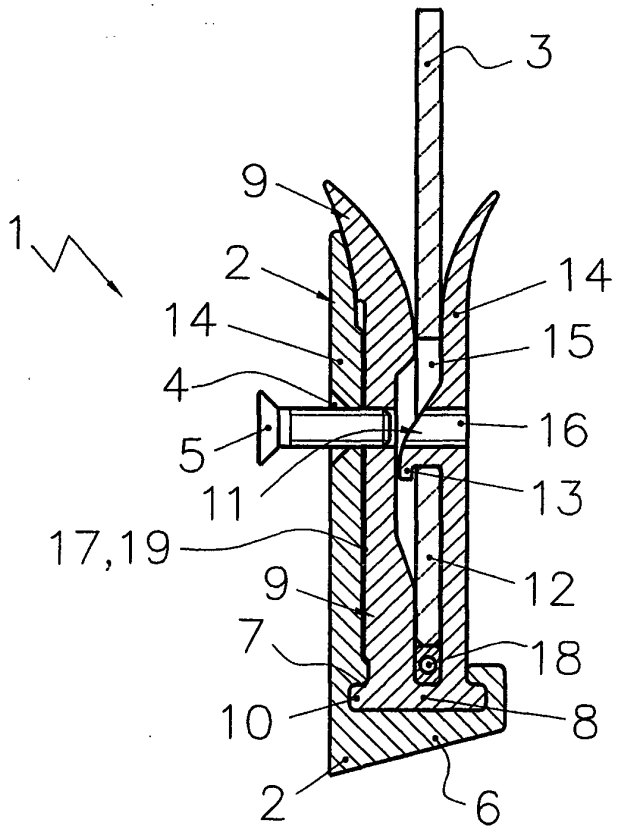


FIG.2

FIG. 4

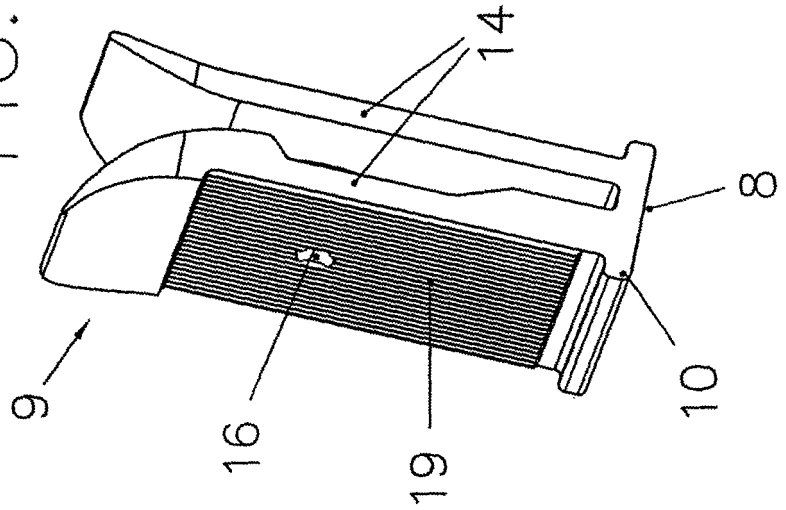
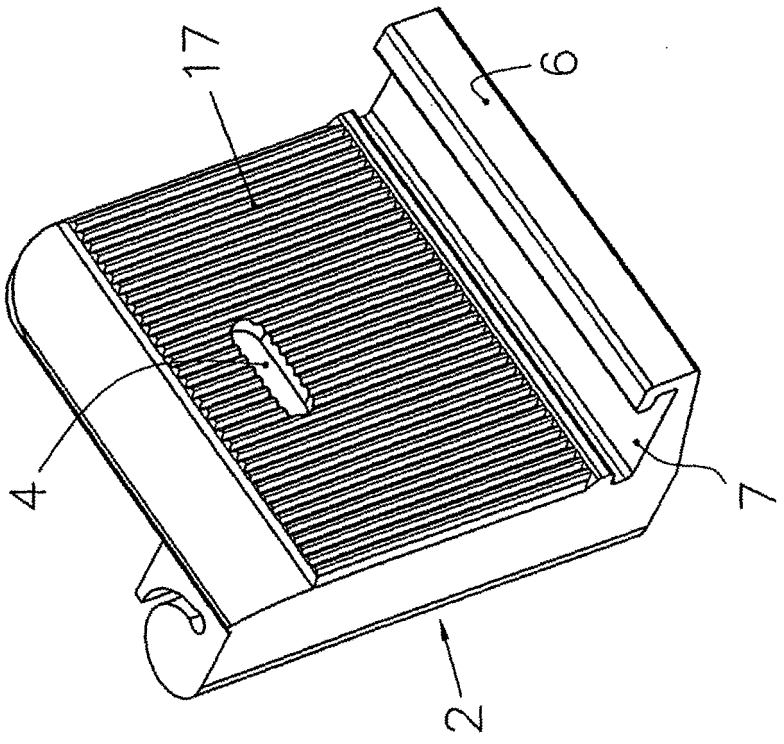


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2004/000057

A. CLASSIFICATION OF SUBJECT MATTER

IPC [7] E05F 11/38, B60J 1/17

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] E05F 11/38, B60J 1/17

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, PAJ, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5778599 A (SAITO) 14.07.1998 **column 6, line 19-column 7, line 3; figures 5-8**	1-5
Y	US 5622005 A (OCHENSKI et al.) 22.04.1997 **column 2, line 9-23; figure 2**	1
Y	EP 1178175 A1 (MERITOR LIGHT VEHICLE SYS Ltd.) 06.02.2002 **abstract, figures**	2,3
Y	WO 02057580 A1 (BAEUMCHEN KARSTEN et al.) 25.07.2002 **abstract, figures**	4
Y	JP 58026625 A (HORI GLASS CO Ltd.) 17.02.1983 **figures**	5
A	ES 2174623 T3 (BROSE FAHRZEUGTEILE) 01.11.2002 **the whole document**	1-3,5

☐ Further documents are listed in the continuation of Box C. ☒ 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	Date of mailing of the international search report
02 June 2004 (06.06.2004)	**08 June 2004 (08.06.2004)**
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
Information on patent family members

International Application No
PCT/ES2004/000057

Patent document cited in search report	Publication date	Patent familiy member(s)	Publication date
US 5778599 A	14.07.1998	JP 8290717 A	05.11.1996
US 5622005 A	22.04.1997	NONE	
EP 1178175 A1	06.02.2002	FR 2812680 AB US 2002020117 A	08.02.2002 21.02.2002
WO 02057580 A1	25.07.2002	DE 20101057 U EP 1352143 A	03.05.2001 15.10.2003
JP 58026625 A	17.02.1983	NONE	
ES 2174623 T3	01.11.2002	WO 9957400 A DE 19819953 A EP 1076750 AB US 6453617 B	11.11.1999 18.11.1999 21.02.2001 24.09.2002

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