



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 612 352 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.01.2006 Bulletin 2006/01

(51) Int Cl.:
E05D 7/086 (2006.01) E05D 1/04 (2006.01)

(21) Application number: **04388045.9**

(22) Date of filing: **02.07.2004**

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

(72) Inventors:
• **Jensen, Jan Fahlen**
2860 Søborg (DK)
• **Sorensen, Peter**
2800 Lyngby (DK)

(71) Applicant: **VKR Holding A/S**
2860 Søborg (DK)

(74) Representative: **Carlsson, Eva et al**
Internationalt Patent-Bureau A/S
Rigensgade 11
1316 Copenhagen K (DK)

(54) Hinge fitting for a pivotal window

(57) The hinge fitting comprises a first hinge part (1) to be secured on the frame of the window and a second hinge part (3) to be secured on the sash. The first hinge part (1) has on a base plate (2) a circular arc-shaped guide (7) which cooperates with an engagement set comprising a slide bar (8) essentially similar to the guide and rotationally mounted on a base plate (4) for the second

hinge part (3) and a guide pin (10) to provide a pivoting movement for the window. In connection with the guide (7), the first hinge part (1) is provided with a braking device comprising a leaf spring (15) which, during at least a part of the pivoting movement, is in frictional engagement with at least one element of the engagement set on the second hinge part (3).

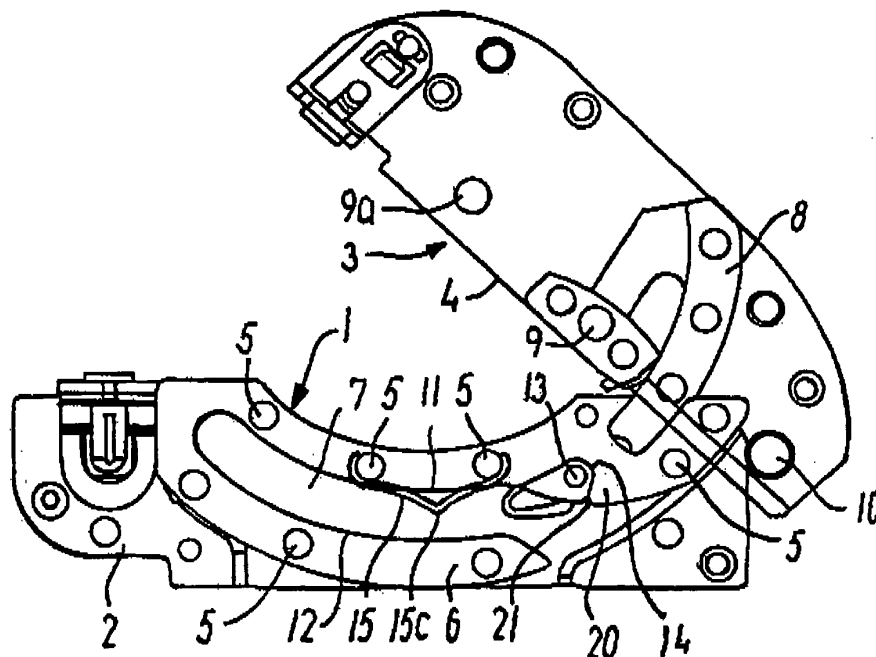


FIG. 1

EP 1 612 352 A1

Description

[0001] The present invention relates to a hinge fitting for a pivotal window with a frame and a sash connected to the frame at a hinge axis, comprising a first hinge part to be secured on the frame and a second hinge part to be secured on the sash, in which the first hinge part on a base plate is provided with a control means in the form of a circular arc-shaped guide cooperating with an engagement set comprising a slide bar essentially similar to the guide and rotationally mounted on a base plate for the second hinge part and a guide pin to provide a pivoting movement for the window, and in which in connection with the guide on the first hinge part, a braking device is provided with a leaf spring which, during at least a part of the pivoting movement, is in frictional engagement with at least one element of the engagement set on the second hinge part.

[0002] Said hinge fitting is used for a pivotal window, e.g. a roof window, to provide a pivoting movement, i.e. the sash turning about a hinge axis at a distance from the top and bottom member, alternatively the side members, of the sash and of the frame. The hinge fitting comprises two extreme positions, between which one or more intermediate positions are defined. The extreme positions include a position in which the pivotal window is closed and a position in which the window sash and thus the second hinge part is turned outside at a maximum in relation to the closing position.

[0003] EP 1038083 discloses a hinge fitting of the stated kind which, by means of a leaf spring entering in frictional engagement with a guide pin, retains the pivotal window in an infinitely variable frictional engagement during a part of the pivoting movement of the window from the closed to the open position.

[0004] EP 0165954 discloses a hinge fitting in which the braking effect is optimised by means of a spring with waveform placed on the side of the leaf spring facing away from the guide.

[0005] Even though this form appeared to be satisfactory, the problem is, however, that a high wind can bring the open pivotal window out of the position in which the user has placed it.

[0006] However, it is also desirable to have one or more fixed intermediate positions in the pivoting movement such that the user can choose between several fixed window positions and thus adjust the ventilation without using an adjuster arm or the like.

[0007] WO 01/31155 indicates a hinge for a pivotal window in which the parts of the guide and/or the slide bar are all formed of a wear-resisting plastic material. In an embodiment without a leaf spring, the hinge comprises the said fixed intermediate positions, the convex side of the guide being provided with grooves, such that a more secure frictional engagement is obtained at these places.

[0008] Said grooves are designed as an integrated part of the guide. Since this very part of the hinge is exposed

to a considerable load, it is worn, which means that the hinge on the whole loses its functional performance before the expiry of the life of the remaining parts of the hinge. Therefore, it will usually be necessary to replace the entire hinge or at least major parts hereof, which results in costs for a new hinge and for work to be done by trained staff. Furthermore, the hinge will have to be produced in several different forms in order to meet the demand as to the number/situation of ventilation positions.

[0009] Therefore, the object of the invention is to provide a hinge fitting of the initially stated kind permitting to obtain a generally longer life of the hinge and a larger liberty of choice as to ventilation positions.

[0010] This object is obtained by a hinge fitting characterized in that the leaf spring is provided with at least one arresting point for engagement with at least one element of said engagement set on the second hinge part during the pivoting movement.

[0011] The invention provides a hinge fitting to solve the problem of lacking functional performance due to wear and tear in the engagement element which comprises one or more arresting points as the leaf spring is not an integrated part of the guide, the designation "leaf spring" being understood as a separate spring element of the hinge. It can thus be replaced if it is worn before the remaining parts of the hinge. This entails considerably fewer working costs in connection with the replacement itself as this is a simple task which can be accomplished e.g. by the user himself. As the invention also permits to avoid the need for replacement of the entire hinge or at least major parts hereof, the costs are consequently reduced, a leaf spring being a relatively low-cost element compared to the expenses for a completely new hinge. The lifetime of the hinge is thus prolonged in a way which is more economical and easier in terms of mounting.

[0012] The leaf spring not being an integrated part of the guide, provides the user with the further advantage that he can easily and inexpensively choose the number of fixed positions, the leaf spring being merely chosen in accordance with this number, either by the initial mounting of the pivotal window or by replacement of the leaf spring in the mounted pivotal window. The user may e.g. choose two or three arresting points in the leaf spring which consequently results in two and three, respectively, predefined intermediate positions of the pivotal window. Furthermore, the user may choose a leaf spring which is e.g. more tight or more slack so that special demands from e.g. elderly people with less strength can be met. Obviously, the initially chosen leaf spring is replaceable by a new or different leaf spring if this is required at any given time.

[0013] In a preferred embodiment of the invention, each arresting point comprises a groove which is designed such that at least one element of said engagement set is adapted to be moved into and retained in a more secure frictional engagement in the groove.

[0014] Thus, a hinge fitting is provided to retain the

pivotal window in a fixed intermediate position by means of a secure frictional engagement between at least one element of the engagement set on the second hinge part and at least one groove of the leaf spring. The more secure frictional engagement in at least one groove of the leaf spring provides the user with the advantage that the window can be placed in the same position each time when desired, and thus give the same ventilation opening. It is a further advantage that the user easily and fast can choose a desired ventilation position, the fixed positions being predetermined and easily sensed by the user during the pivoting movement.

[0015] Since the user has to use a considerable force in order to remove the pivotal window out of said more secure frictional engagement, the invention has the further advantage in relation to wind load, that the window is not blown open or out of the chosen ventilation position when placed in this more secure frictional engagement.

[0016] In a further development of the preferred embodiment of the invention, the guide pin is the element of the engagement set on the second hinge part which enters into frictional engagement with the leaf spring.

[0017] In a particularly preferred embodiment, the guide pin is at a section facing the leaf spring provided with a projecting portion for improved securing of the guide pin in the groove.

[0018] In a second embodiment of the invention, the slide bar is the element of the engagement set on the second hinge part to enter into frictional engagement with the leaf spring. The slide bar is provided with at least one projecting portion for frictional engagement with said at least one groove of the leaf spring, and a slide block is provided with a corresponding longitudinal groove for passage of the slide bar with the projecting portion during the pivoting movement of the window.

[0019] In a further embodiment of the invention, both the guide pin and the slide bar enter into frictional engagement with the leaf spring.

[0020] In a preferred embodiment, the leaf spring is provided with two to six grooves, preferably five.

[0021] The leaf spring can be produced from another material compared to the material from which one or more of the remaining parts of the hinge are made. The other material can e.g. be a softer material in order to reduce tear and wear on the element of the engagement set on the second hinge part which enters into frictional engagement with the leaf spring. The material can be plastic or any other appropriate material with said properties.

[0022] In an alternative embodiment, each arresting point comprises a bulging portion, and said engagement set is provided with at least one corresponding groove.

[0023] In another aspect of the invention, a window is provided with a set of such two hinge fittings, and the use of such hinge fittings in a window.

[0024] In the following, the invention will be explained in more detail with reference to the schematic drawing, where

Fig. 1 shows a schematic side view of an embodiment of a hinge fitting according to the invention, Fig. 2 is a schematic exploded perspective view of a second embodiment of a hinge fitting according to the invention,

Fig. 3 is a schematic plan view on a larger scale of a detail of the hinge fitting according to the invention in Fig. 2, and

Fig. 4 is a schematic sectional view of a portion of the hinge fitting according to an alternative embodiment of the invention.

[0025] In the following description, the same referential numbers are used for similar elements in the described embodiments.

[0026] Fig. 1 shows a hinge fitting for a pivotal window comprising a first hinge part 1 which is with a base plate 2 adapted to be secured on a not shown side member for the frame of the window, and a second hinge part 3, which is also provided with a base plate 4 to secure on a similar and not shown frame side member. It should be noted that individual parts, such as the base plate 4 of the second hinge part 3, are made transparent in Fig. 1 with a view to the readability of the drawing. It is further obvious that a corresponding but reverse hinge fitting is mounted on the opposite pair of frame or sash side members to determine a pivot axis essentially parallel to the top and bottom members of the frame and the sash.

[0027] On the base plate 2 of the first hinge part 1, a plate piece 6 is secured by means of rivets or screws 5 and at a distance from the base plate 2 and provided with a circular slit constituting a control means or a guide 7 for a slide bar 8 essentially similar to the guide and arranged on the second hinge part 3 during a part of the opening and closing movement of the window. The guide 7 comprises a convex side or wall 11 and a concave side or wall 12. The slide bar 8 is by means of a hinge pin 9 pivotally connected with the base plate 4 of the second hinge part 3 which also has a guide pin 10, the function of which will be explained in the following.

[0028] The convex side or wall 11 of the guide 7 comprises beside the plate piece 6 one or more lamellae placed between the plate piece 6 and the base plate 2, and which together with the plate piece forms an abutment face for the slide bar 8 and the guide pin 10. In the convex side 11 of the guide 7 between the plate piece 6 and the base plate 2, a spring mechanism is inserted with a leaf spring 15 which is with folded ends fastened to two rivets 5 in this side, and which is more curved than the guide 7 such that the centre portion hereof projects most in the guide and thus is situated at some distance from the convex side 11. The leaf spring 15 is provided with one or more arresting points, in the embodiment shown in Fig. 1 in the form of a bulging portion 15c, for engagement with the element of the engagement set entering into engagement with the leaf spring during the pivoting movement of the window. In the shown embodiment, the slide bar 8 can e.g. be provided with at least one corre-

sponding groove such that the bulging portion and the groove enter into engagement with each other during the pivoting movement of the window in order to be placed in a ventilation position.

[0029] In the position shown in the figure, the window sash and thus the second hinge part 3 are turned out to an opening angle of about 135° from the closing position, e.g. with a view to cleaning the outside of the window.

[0030] The slide bar 8 is displaced at a maximum out of the guide 7, i.e. until a stop pin 13 on the slide bar has been caught in a recess 14 in the plate piece 6. The base plate 4 is then turned further about the hinge pin 9. when closing the window again, this base plate 4 is not turned back until the guide pin 10 has entered the guide 7 where it rests in front of the forward end of the slide bar 8. At the same time, a driving pin 9a brings the slide bar 8 in a position on the base plate 4, which position is fixed during the remaining part of the re-closing of the window. The driving pin 9a can be designed as an upward bent portion of the base plate 4. In order to minimize noise, the driving pin 9a can be provided with a separate bush component in e.g. plastic, so that least noise is produced when the driving pin 9a gets into contact with the rear portion of the slide bar 8. It is also possible to design one or more parts of the first and/or second hinge part as upward bent portions of the relevant base plate. By the further closing, the guide pin 10 and the slide bar 8 are displaced inward in the guide, where a slide block 20 with a slide face 21 is first passed, and at least one element of an engagement set on the second hinge part 3 cooperates with braking effect with the leaf spring 15 as it enters into frictional engagement herewith, the closing movement of the window frame being stopped.

[0031] In the embodiment of the invention mentioned below, the guide pin 10 constitutes the element of the engagement set on the second hinge part 3 which enters into frictional engagement with the leaf spring 15. The guide pin can, however, have different forms which are described below in connection with Figs 3 and 4.

[0032] The exploded view in Fig. 2 shows a second embodiment of the invention in which a spring mechanism is inserted in the concave side 12 between the plate piece 6 and the base plate 2 and comprises a leaf spring 15 which is attached by the bent ends on the outermost of the rivets 5 in this side and which is less curved than the guide 7, such that the centre portion projects farthest in the guide and thus is situated at some distance from the concave side 12. The leaf spring 15 is provided with at least one groove 15a, 15b, preferably between two and six grooves 15a, 15b, more preferably five grooves 15a, 15b. As shown, the leaf spring 15 can e.g. be provided with five grooves, of which the outermost groove 15b situated at the entrance of the guide serves as a slope for the guide pin 10 once having entered the guide 7. This entails an easier inlet in the guide 7, the guide pin essentially having clearance in the first part of the guide 7. With a view to the mounting, the leaf spring 15 can be provided with such a slope groove 15b at the extremity

of both ends such that the leaf spring 15 does not happen to be turned in the wrong direction at the mounting. The leaf spring 15 can be subjected to a coating providing or facilitating the desired properties hereof. E.g. the leaf spring 15 can be treated with Benzinal® preventing rust.

[0033] The leaf spring 15 can also be subjected to a coating resulting in a stiffening of the leaf spring 15.

[0034] In order to reduce noise, the leaf spring 15 can be fit tightly about the rivets such that the leaf spring is not loose and thus cannot rattle.

[0035] By way of example, the grooves 15a, 15b in the leaf spring 15 can be provided in the form of an adapter unit which can be arranged on an existing leaf spring without the desired profile, e.g. without any grooves. The adapter unit can be provided with any desired profile such that provided with an existing leaf spring 15, it may procure a desired number of grooves 15a, 15b.

[0036] Furthermore, the leaf spring 15 can be provided with zones of a material which is softer than the rest of the leaf spring 15, such that the grooves 15a, 15b are formed by the deflection and/or compression of this other material caused by the contact between the element of the engagement set entering into engagement with the leaf spring 15 and such a zone.

[0037] Fig. 3 shows a first embodiment of the guide pin 10 being provided with a projecting portion 10a for improved securing of the guide pin 10 in the groove 15a. The projecting portion 10a extends over a part of the axial extension of the guide pin 10 such that a good engagement is secured between the guide pin 10 and the leaf spring 15 and the grooves 15a hereof, and at the same time the guide pin 10 can pass the slide block 20 and the guide 7.

[0038] In an alternative embodiment, the guide pin 10 can be provided with a square pin to be mounted in the base plate 4 of the second hinge part 3, the base plate consequently being provided with a corresponding hole.

[0039] The guide pin 10 can be produced from a material which is different from that of the remaining parts of the hinge, such as massive bronze, which makes the guide pin 10 more resistant to wear and tear.

[0040] Alternatively, the guide pin 10 can be provided with a separate bush component extending over essentially the entire axial extension of the guide pin 10. Such a guide pin device can e.g. be designed in the way shown in EP 1038083 B1.

[0041] Furthermore, the guide pin 10 can be provided with a separate bush component as mentioned above, where the bush component is produced from a softer material, such as plastic.

[0042] In Fig. 4, a second embodiment of the invention is seen, where the slide bar 8 forms the element of the engagement set on the second hinge part 3 entering into frictional engagement with the leaf spring 15. The slide bar is provided with at least one projecting portion 8a for frictional engagement with at least one groove 15a of the leaf spring 15. The slide face 21 which is opposite in relation to the slide bar 8 during the pivoting movement

of window is provided with a longitudinal groove 22 corresponding to the projecting portion 8a and permitting the at least one projecting portion 8a of the slide bar 8 to pass during the pivoting movement of the window. Fig. 3 shows the slide bar 8 with the projecting portion 8a arranged opposite the slide block 20, as seen during a part of the pivoting movement of the window. The longitudinal groove 22 is dimensioned such that an appropriately light passage for the at least one projecting portion 8a is present during the pivoting movement.

[0043] Alternatively, the engagement with the leaf spring 15 is obtained in the way that the slide bar 8 is provided with a spring-loaded ball entering into engagement with the leaf spring 15 during at least a part of the pivoting movement.

[0044] It is to be understood that the invention is not limited to the embodiments shown on the drawing and mentioned in the above.

Claims

1. A hinge fitting for a pivotal window with a frame and a sash connected to the frame at a hinge axis, comprising a first hinge part (1) to be secured on the frame and a second hinge part (3) to be secured on the sash, in which the first hinge part (1) on a base plate (2) is provided with a control means in the form of a circular arc-shaped guide (7) cooperating with an engagement set comprising a slide bar (8) essentially similar to the guide and rotationally mounted on a base plate (4) for the second hinge part (3) and a guide pin (10) to provide a pivoting movement for the window, and in which in connection with the guide (7) on the first hinge part (1), a braking device is provided with a leaf spring (15) which, during at least a part of the pivoting movement, is in frictional engagement with at least one element of the engagement set on the second hinge part (3), **characterized in that** the leaf spring (15) is provided with at least one arresting point (15a,15b;15c) for engagement with at least one element of said engagement set on the second hinge part (3) during the pivoting movement
2. A hinge fitting according to claim 1, **characterized in that** each arresting point comprises a groove (15a,15b) which is designed such that at least one element of said engagement set is adapted to be moved into and retained in a more secure frictional engagement in the groove (15a,15b).
3. A hinge fitting according to claim 2, **characterized in that** the guide pin (10) is the element of the engagement set on the second hinge part (3) which enters into frictional engagement with the leaf spring (15).
4. A hinge fitting according to one of the claims 2 and 3, **characterized in that** the guide pin (10) is at a section facing the leaf spring provided with a projecting portion (10a) for improved securing of the guide pin (10) in the groove (15a,15b).
5. A hinge fitting according to one of the claims 2-4, **characterized in that** the slide bar (8) is the element of the engagement set on the second hinge part (3) to enter into frictional engagement with the leaf spring (15) and is provided with at least one projecting portion (8a) for frictional engagement with said at least one groove (15a,15b) of the leaf spring (15a), and that a slide block (20) is provided with a corresponding longitudinal groove (22) for passage of the slide bar (8) with the projecting portion (8a) during the pivoting movement of the window.
6. A hinge fitting according to one of the claims 2-5, **characterized in that** both the guide pin (10) and the slide bar (8) enter into frictional engagement with the leaf spring (15).
7. A hinge fitting according to one of the claims 2-6, **characterized in that** a separate bush component is arranged on the guide pin (10).
8. A hinge fitting according to one of the claims 2-7, **characterized in that** the leaf spring (15) is provided with two to six grooves (15a,15b) facing the guide, preferably five grooves (15a,15b).
9. A hinge fitting according to one of the claims 1-8 **characterized in that** at least the side of the leaf spring (15) facing the guide (7) is produced from material which is alternative in relation to one or more of the remaining parts of the hinge, and which is preferably softer than one or more of the remaining parts of the hinge, where the material is preferably plastic.
10. A hinge fitting according claim 1, **characterized in that** each arresting point comprises a bulging portion (15c), and said engagement set is provided with at least one corresponding groove.
11. A window with a hinge fitting where the sash of the window is connected to the frame of the window via a set of hinge fittings, and the placing of the hinge fitting set on the sash and frame defines an axis of rotation for the window, **characterized in that** said set comprises two hinge fittings according to one of the claims 1-10.
12. Use of a hinge fitting according to any of the claims 1-10 in a window with frame and sash.

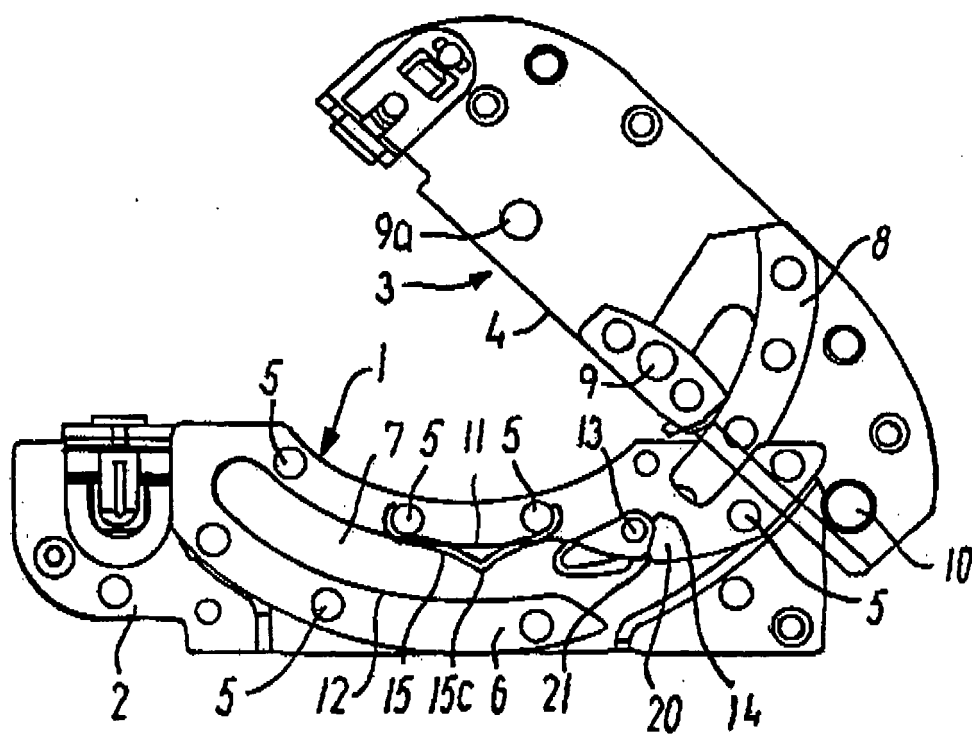


FIG. 1

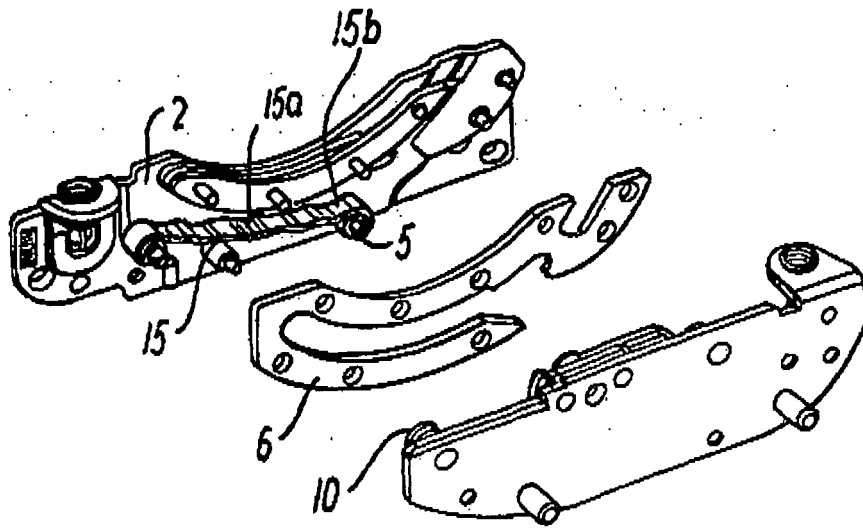


FIG. 2

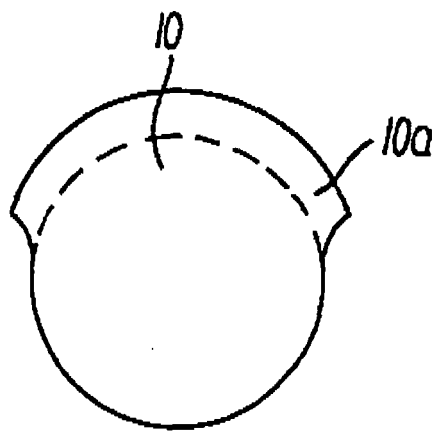


FIG. 3

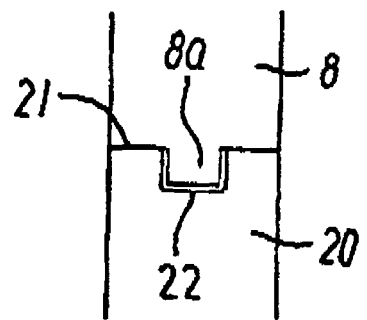


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 38 8045

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,D Y	EP 0 165 954 B (RASMUSSEN HOLDING AS V KANN) 30 September 1987 (1987-09-30) * column 1, line 26 - line 51 * * column 2, line 63 - column 3, line 7; figures *	1,9,11, 12 2,3	E05D7/086 E05D1/04
Y	US 2 948 916 A (WERNER LEWIN GUNNAR ERIK) 16 August 1960 (1960-08-16) * column 2, line 48 - line 53 * * column 3, line 36 - line 40; figures *	2,3	
X,D A	EP 1 038 083 B (VELUX IND AS) 27 March 2002 (2002-03-27) * the whole document *	1,11,12 7	
A,D	WO 01/31155 A (COYLE JOHN ; KEYSTONE LINTELS LTD (GB)) 3 May 2001 (2001-05-03) * the whole document *	1-12	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 November 2004	Examiner Di Renzo, R
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	

2

EPO FORM 1503 03.82 (P04C01)

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

EP 04 38 8045

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.

11-11-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0165954	B	02-01-1986	DK 578883 A	16-06-1985
			AT 30058 T	15-10-1987
			DE 3466568 D1	05-11-1987
			DE 8490192 U1	31-10-1985
			WO 8502646 A1	20-06-1985
			EP 0165954 A1	02-01-1986
			ES 291745 U	01-05-1986
			HU 38136 A2	28-04-1986
			IT 1198983 B	21-12-1988
			JP 61500678 T	10-04-1986
			NO 853109 A	06-08-1985
			US 4654931 A	07-04-1987

US 2948916	A	16-08-1960	NONE	

EP 1038083	B	27-09-2000	DK 128297 A	12-05-1999
			AT 215169 T	15-04-2002
			AU 1143999 A	16-06-1999
			DE 69804500 D1	02-05-2002
			DE 69804500 T2	21-11-2002
			EP 1038083 A1	27-09-2000
			PL 340597 A1	12-02-2001
			SI 1038083 T1	31-08-2002
			WO 9928581 A1	10-06-1999
			ES 2174504 T3	01-11-2002

WO 0131155	A	03-05-2001	AU 7936000 A	08-05-2001
			EP 1290304 A1	12-03-2003
			WO 0131155 A1	03-05-2001
			GB 2369405 A	29-05-2002
