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(54) **Window guide carrier for window winder**

(57) The present invention relates to a slide mechanism for window regulators intended to mechanically connect the window regulator rail with the window pane by threading the window regulator rail so that it can slip through the same for the upward and downward movements. The configuration of the slide mechanism presents a minimum number of pieces and is conceived for connection to the window by means of a slotted pivot

expandable by means of an expansion rivet. The configuration of the slide mechanism and of the slotted pivot with rivet assure a strong, secure and noise-free fastening. Use is made likewise of a latch which, during the installation of the window in the slide mechanism allows the temporary retention of the latter until the rivet assures the definitive fastening.

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a slide mechanism for window regulators intended to connect the window regulator rail mechanically with the window pane.

[0002] The slide mechanism is a device that is threaded in the window regulator rail so that it can slide through the same, and at the same time it is joined to the window pane to obtain its upward and downward motion.

[0003] This invention is characterised in a simple configuration, with a minimum number of pieces, based on a union by means of a slotted pivot expanded by an expansion rivet. The configuration of the slide mechanism and of the slotted pivot with rivet assure a strong, secure and noise-free fastening.

[0004] It is likewise characterised in the presence in the slide mechanism of a latch. During the installation of the window in the slide mechanism, this latch allows the temporary retention of the window in the slide mechanism until the rivet assures the definitive fastening.

BACKGROUND OF THE INVENTION.

[0005] The use of slide mechanisms which establish the link between the window regulator rail and the window pane is known in various versions. Each of the solutions adopted is intended to procure a reliable union, noise-free, and if possible complying with the so-called "principle of inviolability".

[0006] Of among the habitual ways of joining the window pane and the slide mechanism, this can be carried out by making use of protuberances or projections which traverse a perforation in the window pane.

[0007] In some cases, like for example when the window is formed by two sheets of glass instead of one, it is very complicated to implement the orifice in both sheets in a coincident position. To overcome this problem an additional piece of plastic or metallic material is used, usually termed "window bottom" so that it is this piece which incorporates the orifice which the slide mechanism protuberance will traverse.

[0008] When making use of the window bottom, the lower edge of the window pane is fixed and rests in the window bottom and it is the window bottom which has the perforation for fastening to the slide mechanism.

[0009] A simple way of stealing a vehicle consists in introducing a tool or a bar through the window seal which strikes the protuberance and breaks it or cuts it, whereby the window is freed and falls into the void in the door. This action is quickly done and provides easy access to the vehicle.

[0010] When use is made of protuberances with a reinforced core, for example metallic, which in some measure impedes the breaking of the protuberance or projection by the previous procedure it is said that the

slide mechanism satisfies the "principle of inviolability".

[0011] The patent with publication number US6332289 is an example of a configuration of the slide mechanism which satisfies the "principle of inviolability".

In this patent the union between the window and the slide mechanism is obtained by means of a hollow protuberance integrated in the body of the slide mechanism.

[0012] The end of the protuberance is the part of the slide mechanism which surpasses the external surface of the window. This end is a clip formed by flexible tabs parallel to the main surface of the window and allows pre-mounting of the slide mechanism on the window to be carried out. Once pre-installed, slide mechanism and window pane are screwed together by making the screw pass through the hole in the protuberance to achieve a strong and secure connection. This connection satisfies, as has already been mentioned, the "principle of inviolability".

[0013] A very similar solution is described in the patent with publication number DE4321616 wherein use is made of a casing with some tabs on the end thereof, which end also traverses a perforation in the window pane. The tabs support the window provisionally and have the same effect as that of the clip of the aforesaid patent until the screw is introduced.

[0014] Means of connection are also known between the slide mechanism and the window pane which make use of 3 pieces. By way of example mention is made of the patent with publication number DE4239601 wherein a slotted pivot is attached which gives place to a set of pegs which finish in flexible latches which clip into the hole of the window pane. This fastening is provisional and allows pre-mounting of the slide mechanism on the window pane. The slotted pivot piece is independent of the main body of the slide mechanism and on its rear part has a jagged surface intended to rest on a rough surface of the slide mechanism in order to increase the friction between the two and prevent noise due to the presence of slackness.

[0015] The presence of a hole in the rough area of the slide mechanism allows a screw to pass, the third piece, for the final fastening of the assembly.

[0016] The main body of the slide mechanism has on its rear part a slot in arc form to thread with the window regulator rail.

[0017] Increasing the number of pieces which form the assembly for connecting the window to the window regulator rail, another solution is known like that described in the patent with publication number FR2693153. In this patent, among other pieces, a plastic piece is included with elastomer areas whose purpose is to prevent noise production.

[0018] The connection between the slide mechanism and the window comprises the combination of a plastic protuberance integrated in the body of the slide mechanism, of the piece with elastomer areas intended to cover the protuberance, of a plastic bushing which en-

compasses the previous assembly on the other side of the window and of a fastening fork for the whole assembly.

[0019] Regarding the assembly process, first the noise-suppressing piece is mounted on the window, then the bushing and the fork are assembled on this piece; and, finally the window regulator assembly is pressed where it is premounted then, by applying, the protuberance is inserted in the preceding assembly already mounted in the previous stage.

[0020] Other solutions are known, not necessarily found in patent documentation, which consist in using a protuberance of plastic material, either integrated in the slide mechanism itself or forming an independent piece, which is made to pass through a hole in the window. This protuberance does not have any metallic element crossing through it.

[0021] On its end, the protuberance has a peripheral slot which accepts a fastening clip. The clip applies a pulling force which presses the main body of the slide mechanism against the window on its inside face. With this pressure, a noise-absorbing element is trapped between the slide mechanism and the window pane.

[0022] None of the aforementioned configurations offers simultaneously a reduced number of pieces, with noise-suppressing solutions, and has a joining action as quick as that based on the use of an expansion rivet, for example a pop type rivet, such as takes place in the present invention. Also, the operation of joining by screw is much slower than that of riveting and requires diverse noise-suppressing additional technical solutions by not providing the same degree of expansion.

DESCRIPTION OF THE INVENTION.

[0023] The present invention relates to a slide mechanism for window regulators, the function of which is that of connecting the window regulator rail with the window pane permitting upward and downward motion.

[0024] The technical solutions which this slide mechanism incorporates, reduce as much as possible the number of pieces which intervene, since the slide mechanism is formed by a single body injected in plastic and a pop type expansion rivet which makes the connection.

[0025] The body of the slide mechanism incorporates a slot into which is threaded the window regulator rail and allows vertical sliding. On one side of the slot there are two channels intended to receive the ends of the pulling cables which drive the upward or downward motion. These channels have recesses suitable for housing the terminations of the cable ends assuring the connection and therefore the traction which produces the sliding in one direction and the other.

[0026] On the opposite side of the slot for threading the rail, the slide mechanism has a slotted pivot with a central perforation passing through. This slotted pivot is a protuberance intended to penetrate into a perforation of the window pane on which the fastening is estab-

lished.

[0027] In the section on background, the possibility was mentioned that perforation of the window could be neither simple nor even feasible and that in such cases an alternative is to use a window bottom as an intermediate piece. In these cases the perforation will be carried out in the window bottom instead of in the window pane. In the course of the specification, whenever reference is made to the perforation of the window pane it is to be interpreted in the widest sense considering that the cases in which use is made of the window bottom the perforation is in the window bottom instead of in the window without this alternative having to be added explicitly.

[0028] The slots of the perforated pivot define flexible sections, at least two, intended to expand and press on the internal surface of the perforation of the window pane. The configuration of the perforation of the window and of the section of the pivot have to be coincident and can be any whatsoever although the simplest configuration is circular.

[0029] The perforation of the pivot, by passing through and therefore accessible from the face opposite to the pivot, allows the subsequent insertion of the pop type expansion rivet.

[0030] A pop type expansion rivet, although well-known, can be described as that which is formed by a shaft with a head which includes a second metal piece, for example of aluminium, more malleable and less resistant near this head. The second metal piece is a cylindrical body of greater diameter than the head of the shaft and which has a skirt. The cylindrical body enters the perforation to be riveted and by means of a riveting gun the internal shaft is drawn forcing the expansion of the malleable metal until the shaft snaps. The expansion is produced by the longitudinal compression that takes place between the head of the shaft and the skirt, and also the head of the shaft, by entering partially inside the cylindrical body of the malleable metal forces a still greater expansion.

[0031] This type of rivet is that employed in the slide mechanism of the invention. Entrance is made through the perforation accessible from the face opposite to the pivot, being introduced in the internal cavity thereof.

[0032] On operating the riveting gun the rivet is expanded and this in turn expands the flexible sections of the pivot.

[0033] This fastening by expansion does not slacken like screwed connections and since the connection is due to the pressure by expansion of the flexible sections on the internal face of the perforation of the window pane, these sections have no play at all in the radial direction which gives rise to the production of noise.

[0034] Nor in the axial direction are there surfaces in contact which can be a source of noise since the base of the pivot has an annular projection which establishes a gap between the window pane and the slide mechanism.

[0035] Since the window is slightly curved, establish-

ing the support for the window pane on the annular projection with a smaller area assures that the window pane rests completely on this surface thereby avoiding the production of noise.

[0036] Since the external face of the pivot has no means for clipping, the slide mechanism has a hook-shaped latch which establishes a temporary securing of the window pane.

[0037] The height of the latch with respect to its base is smaller than the height of the pivot. During the assembly this difference in height allows the pivot to guide the slide mechanism toward the window pane and, once the edge of the window has been clipped in the latch or hook, this prevents the slotted pivot escaping from the corresponding hole until the expansion rivet is shot. If the length of the latch were greater than that of the slotted pivot the latter would escape from the hole.

[0038] The perforation of the window is located near its lower edge and the hook-shaped latch is located below the lower edge of the window pane.

[0039] When the window has been positioned with the partial ingress of the pivot in the perforation, a slight pressure allows the edge of the window pane to overcome the resistance of the latch establishing an independent means of retention which prevents the window pane escaping from the pivot.

[0040] This retention is useful in the pre-mounting up to the point when the rivet is applied since the definitive connection between the slide mechanism and the window becomes the responsibility of the slotted pivot alone due to the expansion produced by the rivet which it houses internally.

[0041] In the connection between the window pane and the slide mechanism, inhibition of vibrations is important so that the connection does not degrade, slackness appear and noise occur. A riveted connection provides all these advantages over a screwed connection. Also, the presence of a metallic core ensures that this connection satisfies the "principle of inviolability".

[0042] The introduction of the rivet through the part opposite the pivot, the internal face of the door, allows fastening of the window pane with good access for the worker. This great accessibility and the short period of time that the riveting operation requires with automatic guns signifies shorter assembly times than those required for screwed connections.

[0043] It is also pointed out that in this sector of the industry it is important to reduce as much as possible the number of references to piece parts and in this invention the number of references is two.

DESCRIPTION OF THE DRAWINGS.

[0044] The present descriptive specification is completed with a set of drawings, which illustrate and in no way restrict the preferred embodiment of the invention.

[0045] Figure 1 shows a door module on which two window regulator guides are installed both with two slide

mechanisms not necessarily like those of the invention. In this figure the location of the elements related with the invention is shown.

[0046] Figure 2 is a perspective of an embodiment of the slide mechanism according to the invention seen from the side of the pivot and in vertical position.

[0047] Figure 3 is another perspective of the same piece in prostrate position.

[0048] Figure 4 is a third perspective of the same piece seen from the rear part.

[0049] Figure 5.a is an outline of the invention in which particular details of embodiment are not represented, instead the relative arrangement is shown in elevation and profile between the window pane, the slide mechanism and the window regulator rail before expansion of the rivet. In this same figure the detail of an expansion rivet is shown. By means of two rectangles in dashed lines, the position of the deformable body of the expansion rivet is indicated in the slide mechanism.

[0050] Figure 5.b is an outline of the invention in which particular details of embodiment are not represented, instead the relative arrangement is shown in elevation and profile between the window pane, the slide mechanism and the window regulator rail after expansion of the rivet.

[0051] Figure 6 is a schematic representation of a cross-section of a door where the relative position is shown of the slide mechanism with respect to the window regulator rail, the window pane and the door.

DETAILED EXPLANATION OF AN EMBODIMENT.

[0052] Figure 1 is a view of a door module (2) which has two window regulator rails (3) preinstalled as well as other door elements.

[0053] This same figure shows the drive cables (4) of the window regulator which after turning at the ends of the window regulator rail (3) reach the slide mechanism (1) from above and from below.

[0054] The window pane (5), not shown in this figure, is firmly joined to the slide mechanisms (1) and will move upwards or downwards according to the direction in which the cables (4) are pulled.

[0055] In figures 2, 3 and 4 three different views are represented of an example of embodiment of the slide mechanism (1) according to the invention.

[0056] In this embodiment the body of the slide mechanism (1) is formed by a single injected plastic piece, in prismatic in shape, traversed by an almost centred, L-shaped slot (1.3), coinciding with the profile which corresponds to the window regulator rail (3).

[0057] On a longer side of the main body (1) there are two oblique channels (1.2) intended to receive the ends of the cables (4) which pull the slide mechanism (1).

[0058] These channels (1.2) include recesses which house the pegs or retention pieces firmly joined to the ends of the cables (4) (not represented in these figures).

[0059] The opposite longer side is projected according to a rounded vertex which prolongs the greater sur-

face of the main body (1). On this projection and on the greater face that is prolonged, a pivot (1.1) emerges perforated (1.1.1) and slotted (1.1.2). In this embodiment use has been made of two slots (1.1.2) perpendicular to each other which cross on the main axis of the slotted pivot (1.1) and which, together with the central perforation (1.1.1), define four flexible elements intended to expand through the action of the rivet (6).

[0060] The base or root of the pivot (1.1) has an annular projection (1.1.3) which establishes a distance between the window pane (5) and the main body of the slide mechanism (1) preventing the occurrence of vibrations by contact for the reasons already explained in the description of the invention.

[0061] Under the pivot (1.1) a latch (1.4) emerges from the same face finished in a wedge-shaped projection. This latch (1.4) with the wedge-shaped projecting end is the means employed to retain the window (5) securing it on its lower edge until definitive fastening by riveting. Besides these essential details, the main body (1) has various recesses (1.4) due to the limitations in design of the injection process which require a constant thickness to be maintained in the piece to avoid the appearance of shrinkage cavities.

[0062] In figure 4, wherein the rear part of the slide mechanism (1) is shown, a circular recess (1.6) appears which makes the perforation (1.1.1) of the pivot (1.1) more accessible from its rear part both for the riveting gun and for the head (6.1) of the rivet (6) to reach the flexible sections of the pivot (1.1) from the interior and for the expansion of both to be possible.

[0063] In figures 5.a and 5.b, a schematic is shown in elevation and profile of the connection between the window regulator rail (3), the slide mechanism (1) and the window pane (5).

[0064] In each of the views of figure 5.a the lower position can be observed of the latch (1.4) for securing and temporary retention of the window (5) before riveting. In the view in profile the difference (d) in height is distinguished between the pivot (1.1) and the latch (1.4). The greater height of the pivot (1.1) (always measured from its base) allows, in the assembly, the latter (1.1) to penetrate into the perforation (5.1) of the window (5) before the latch (1.4) reaches the edge of the window pane (5).

[0065] In the profile view the temporary retention function of the latch (1.4) on the window (5) is demonstrated until the definitive fastening of the pivot (1.1) by expansion due to the rivet (6). In this same section but in figure 5.b, the head (6.1) of the rivet (6) is shown after expansion.

[0066] In figure 5.a, for greater clarity, a detail of the expansion rivet (6) has been included wherein the deformable head (6.1) and the stem (6.2) are distinguished, this latter (6.2) thickened (6.3) on the end of the deformable head (6.1) side. It is on this stem (6.2) that the pulling action with the gun is applied in order to achieve the expansion of the head (6.1) by plastic deformation. By means of two dashed-line rectangles,

connected to each other by means of another line, the deformable head (6.1) of the rivet (6) is located in the slide mechanism (1).

[0067] In these same figures 5.a and 5.b it is also possible to appreciate the gap (s) which is imposed by the annular projection (1.1.3) on the base of the pivot (1.1) between the main body of the slide mechanism (1) and the window pane (5).

[0068] A last figure 6 has likewise been included of the section of a door to demonstrate how the join (7.1) of the "seal" establishes an access to the external face of the window (5) and therefore to the end of the pivot (1.1) for fastening the window pane (5). In the event of not demonstrating the "principle of inviolability", this access would facilitate its breakage and therefore the dropping of the window (5) inside the void of the door (7), and as a consequence, access to the interior of the vehicle.

[0069] In this same view the window regulator rail (3) is distinguished, and near to the lower part thereof the slide mechanism (1) with the pivot (1.1) crossing the window pane (5) and the latch (1.4) for temporary retention.

[0070] The essential nature of this invention is not altered by variations in materials, form, size and arrangement of the component elements, described in a non-restrictive manner, sufficient for the reproduction thereof by an expert.

Claims

1. Slide mechanism for window regulators of vehicles, of among the slide mechanisms for the lifting and lowering of the window which make use of a projection which penetrates into a perforation be it of the window pane, of the window bottom or the like in the event of this existing and having means of temporary retention in pre-mounting, **characterised in that** the slide mechanism (1) is constituted by a monobloc piece which comprises at least:

a slot (1.3) for passage of the window regulator rail (3), anchorages (1.2) for the ends of the pulling cables (4),

anchorages (1.2) of the ends of the pulling cables (4),

a pivot (1.1) slotted (1.1.2) and perforated (1.1.1), with passing-through perforation (1.1.1), giving rise to at least two flexible and expandable sections; pivot (1.1) insertable in a perforation (5.1) of the window (5) with configuration and dimensions coincident with the section of the pivot (1.1),

a latch (1.4) located on the same face of the main body of the slide mechanism (1) as the pivot (1.1), of hooked end for the temporary retention of the window (5) in pre-mounting by

clipping on the edge thereof,
 an expansion rivet (6) which is introduced
 through a rear access (1.6) into the through-
 passing perforation (1.1.1) of the pivot (1.1),

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in such a way that when the rivet is shot the
 expansion thereof takes place causing the flexible
 sections of the slotted pivot (1.1) to expand in turn
 pressing against the internal face (5.1) of the per-
 foration of the window pane (5) or of the window
 bottom or the like similar where it is housed.

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2. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the slot (1.3) for
 passage of the rail (3) is L-shaped. 15

3. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the anchorages
 (1.2) of the ends of the pulling cables (4) comprise
 channels with oblique and opposing inlet with end
 recesses for housing the pieces for retention of the
 ends of the cables (4). 20

4. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the pivot (1.1) has
 two perpendicular slots (1.1.2) which give rise to
 four flexible sections. 25

5. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the pivot (1.1) has
 a cylindrical external configuration of circular cross-
 section. 30

6. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the rear access
 (1.6) to the passing-through perforation (1.1.1) is a
 circular recess. 35

7. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the hook-ended
 latch (1.4) is configured by means of a wedge-
 shaped end thickening. 40

8. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the base of the piv-
 ot (1.1) has an annular projection (1.1.3). 45

9. Slide mechanism for window regulators according
 to claim 1 **characterised in that** the height of the
 slotted pivot (1.1) is greater than the height of the
 latch (1.4). 50

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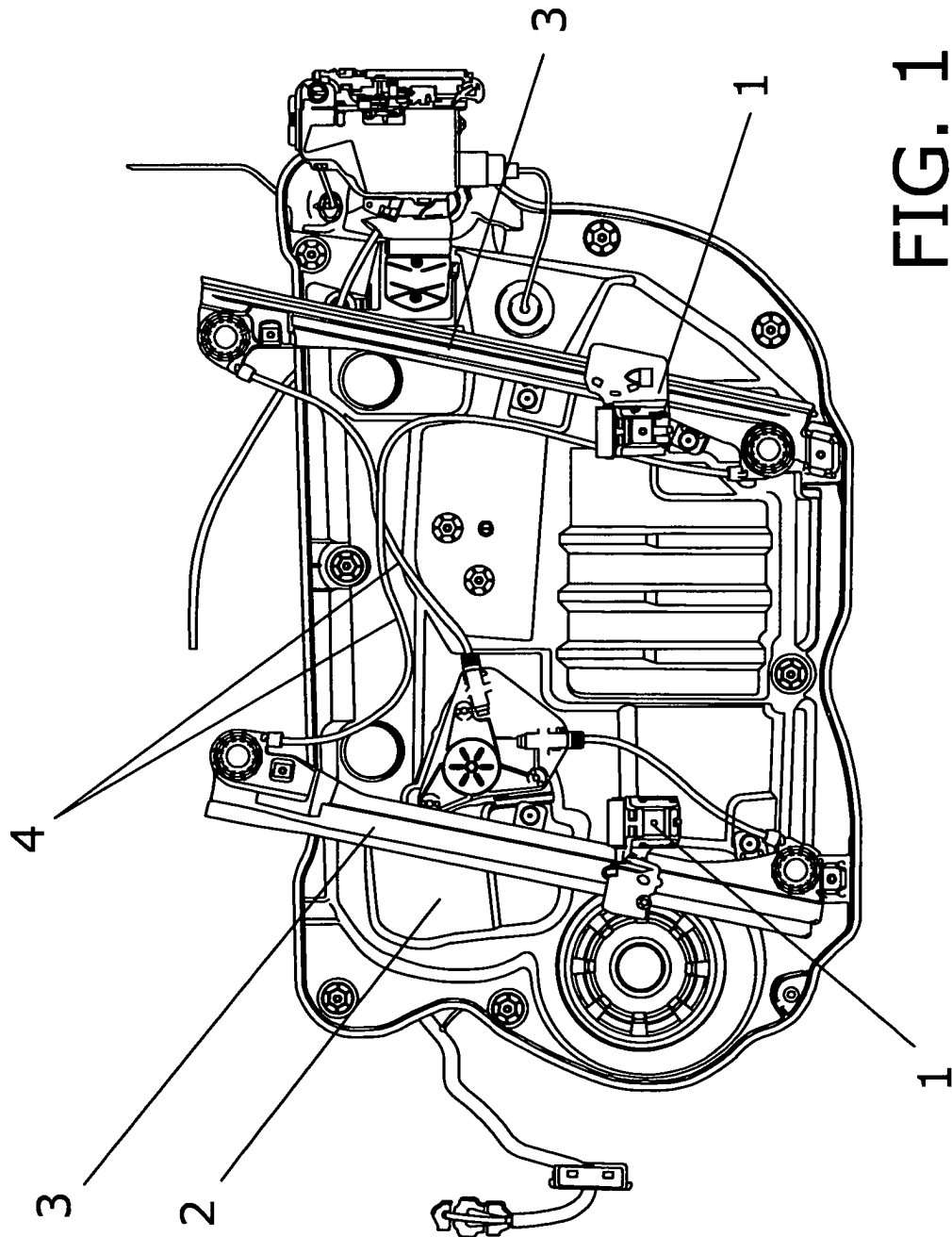
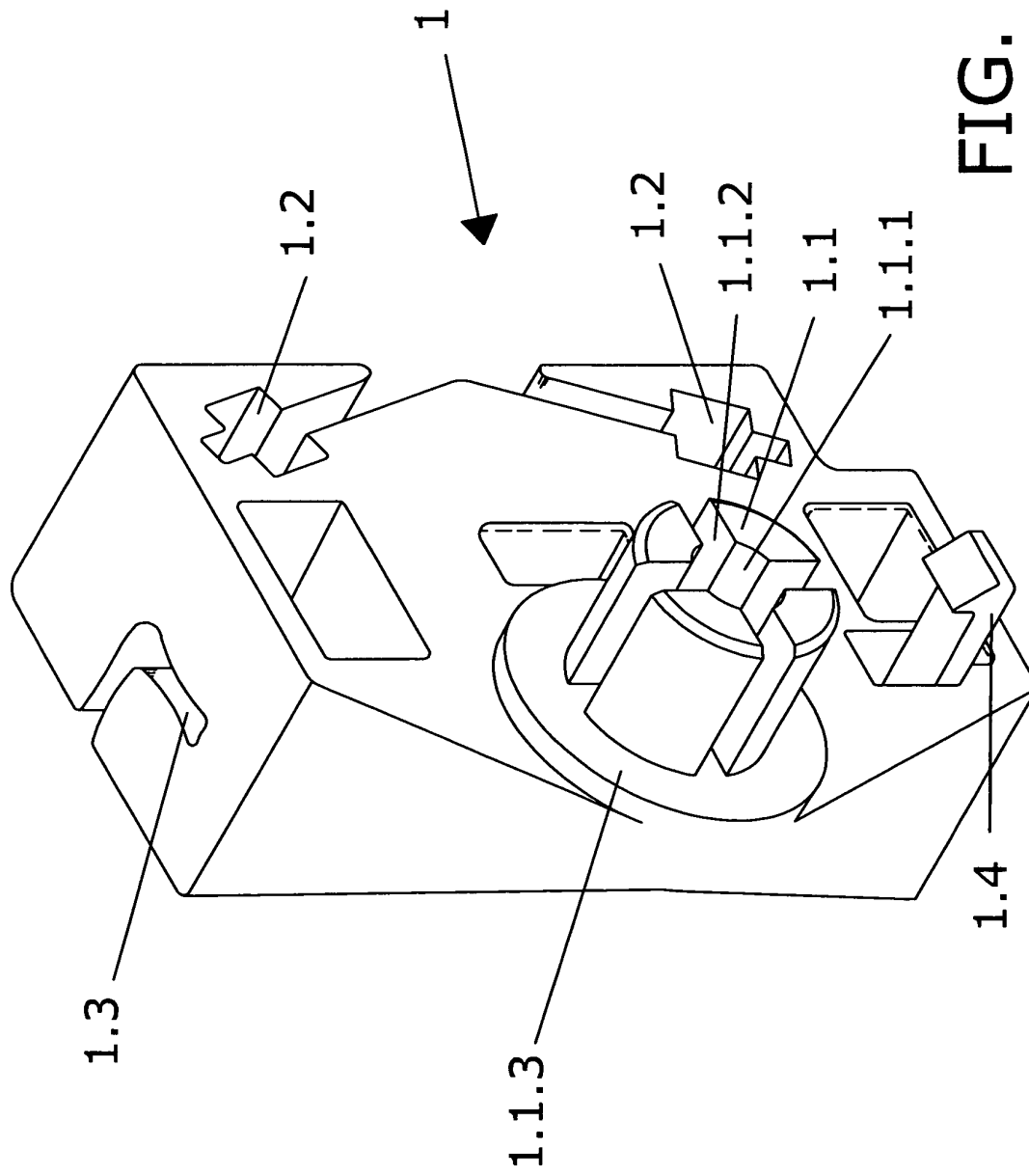
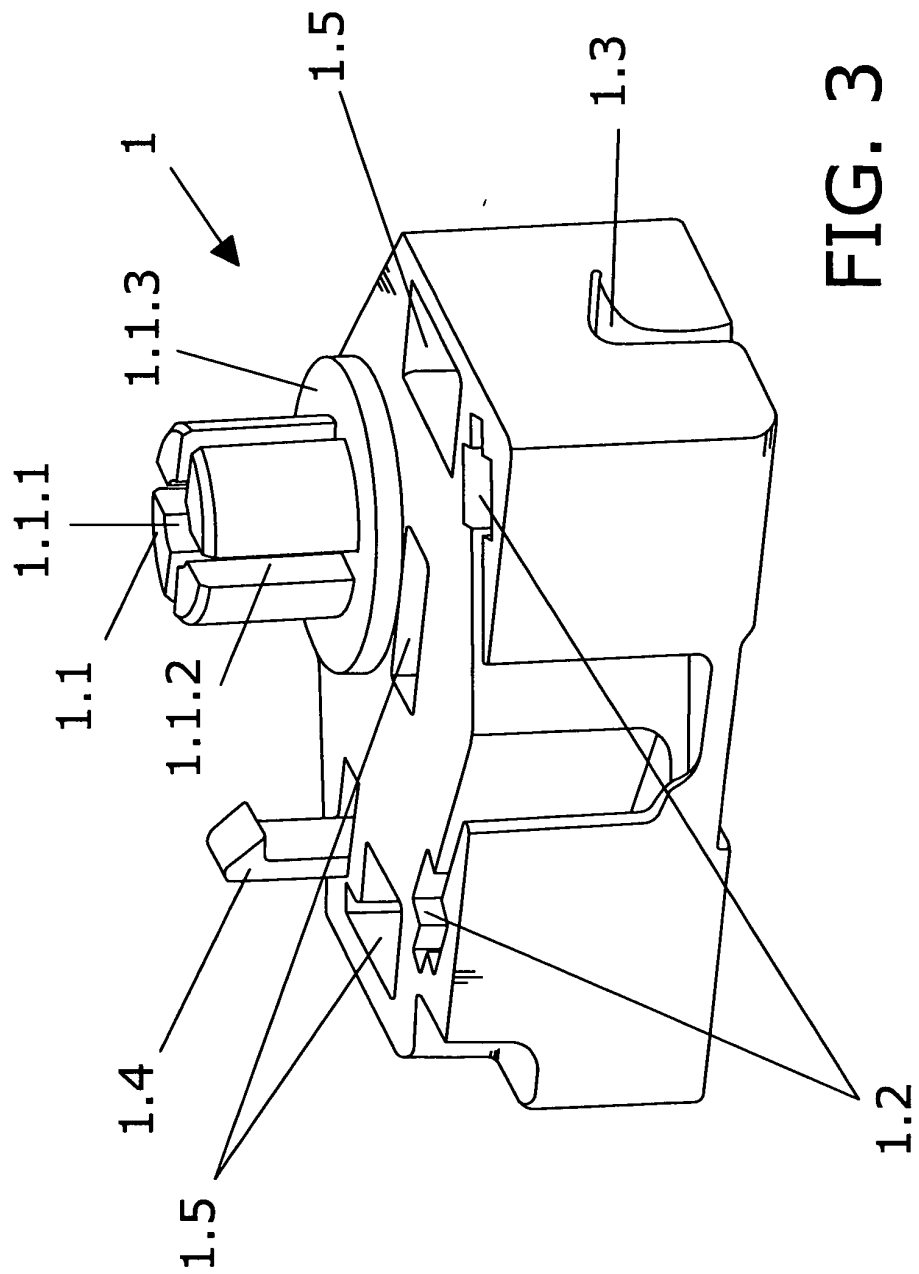
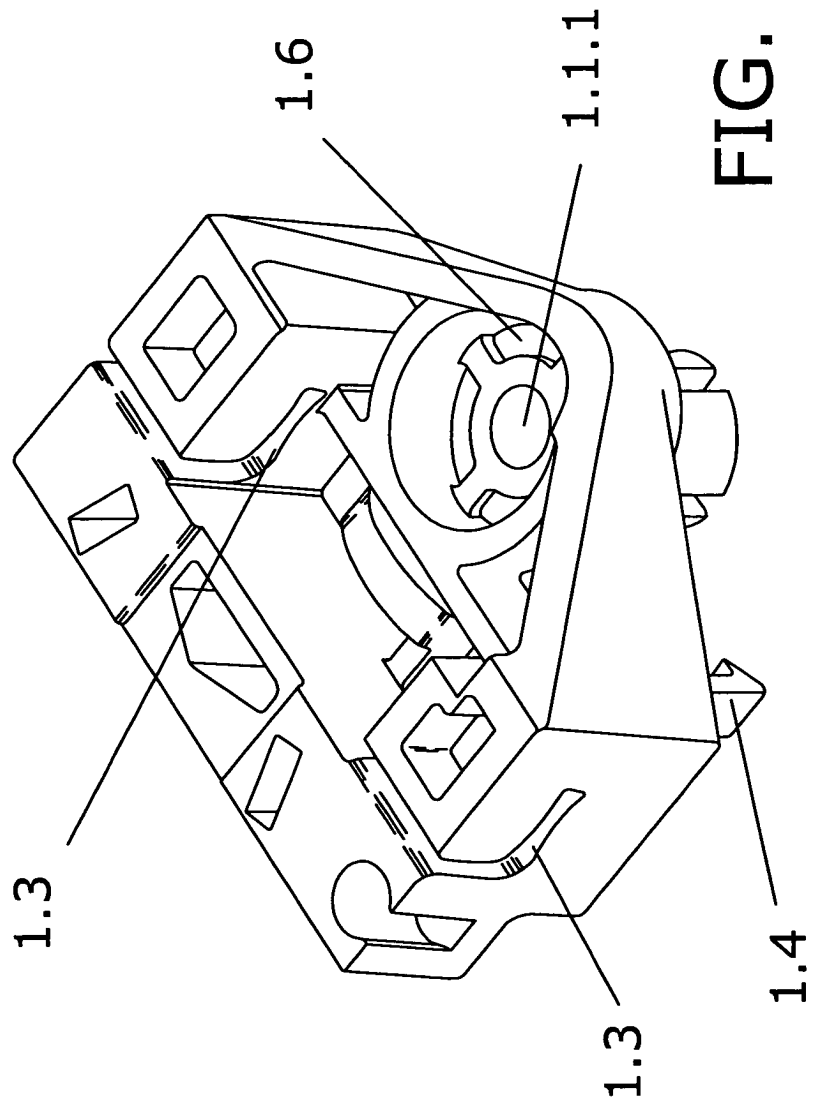


FIG. 1







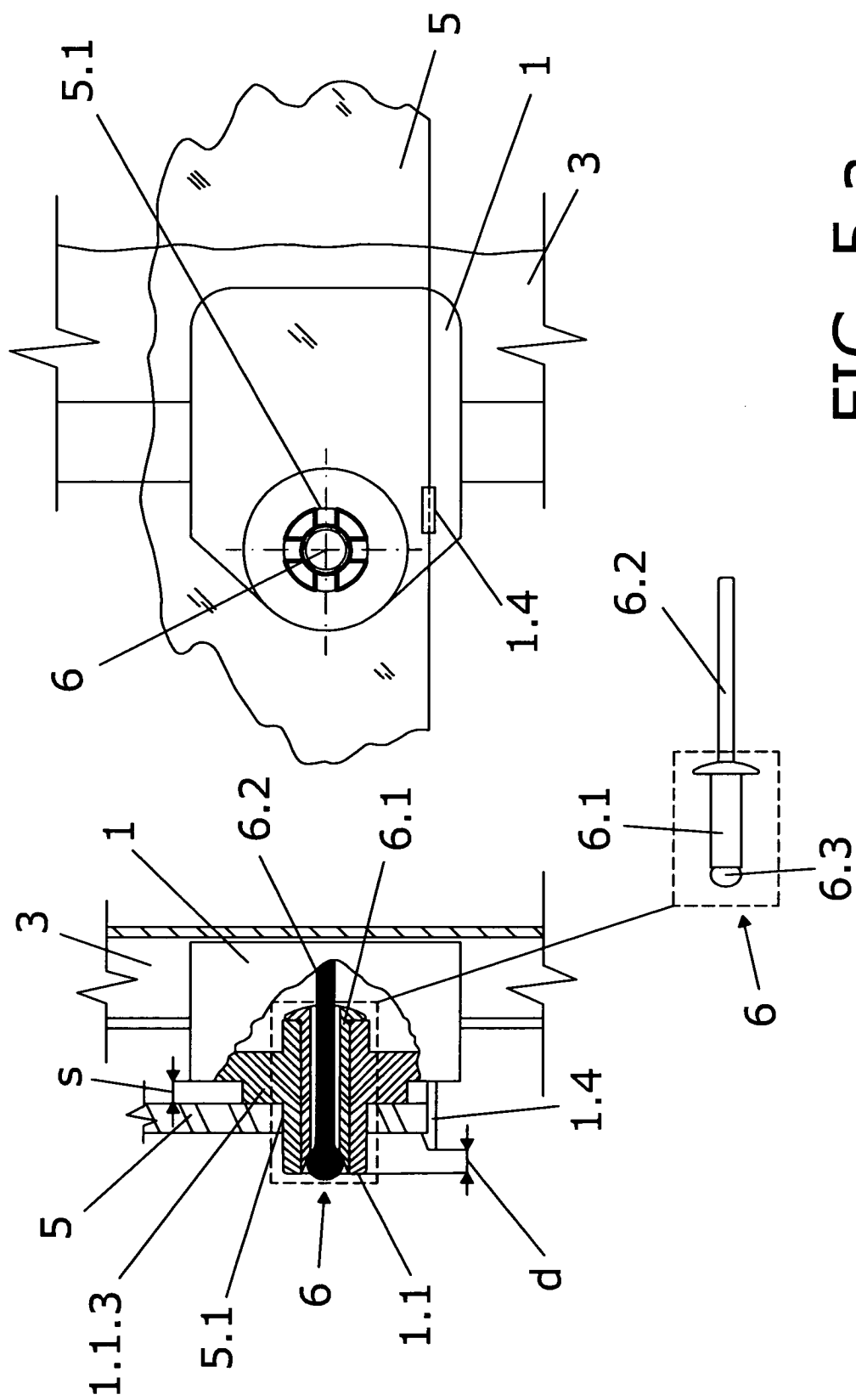


FIG. 5.a

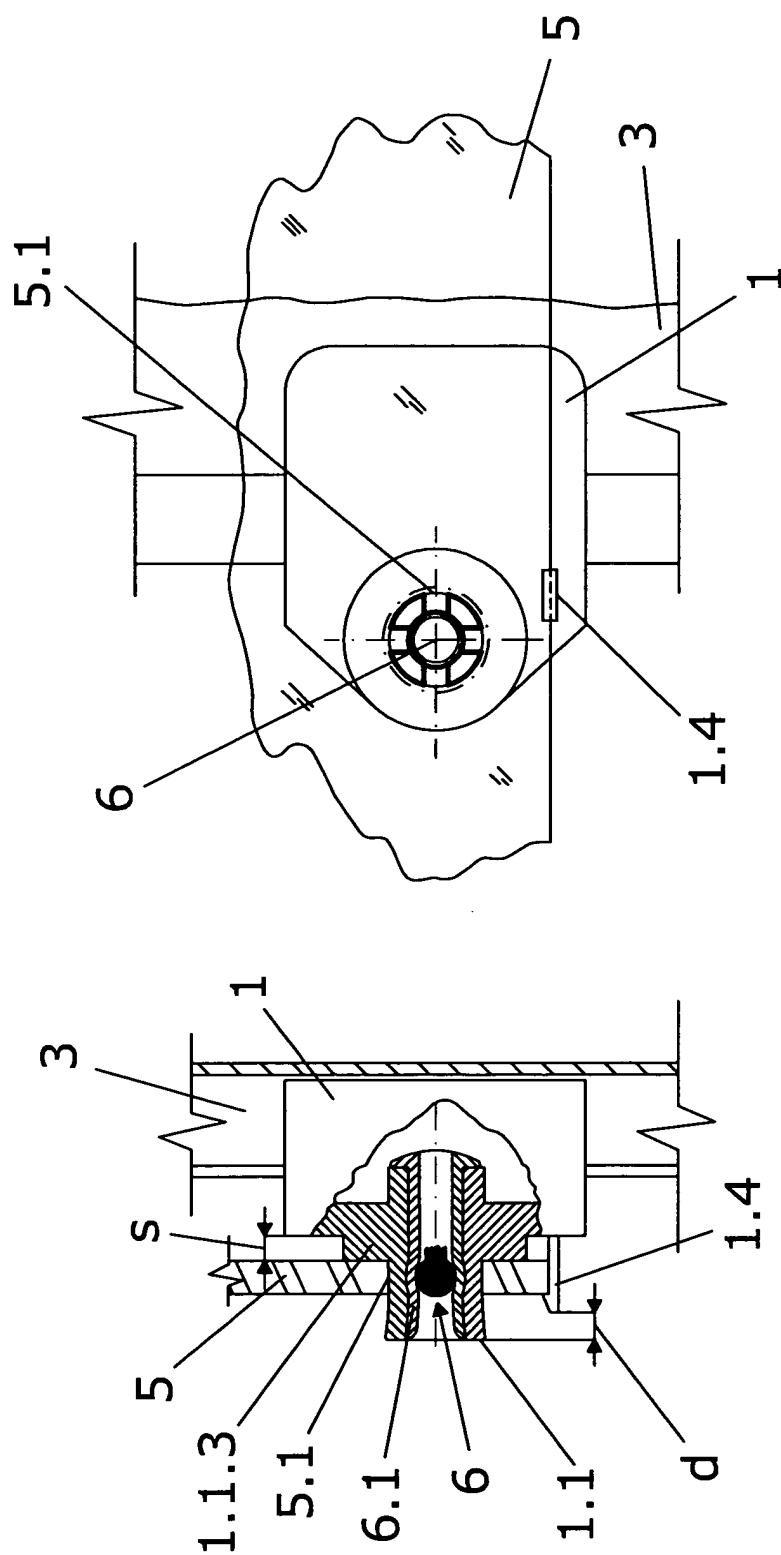


FIG. 5.b

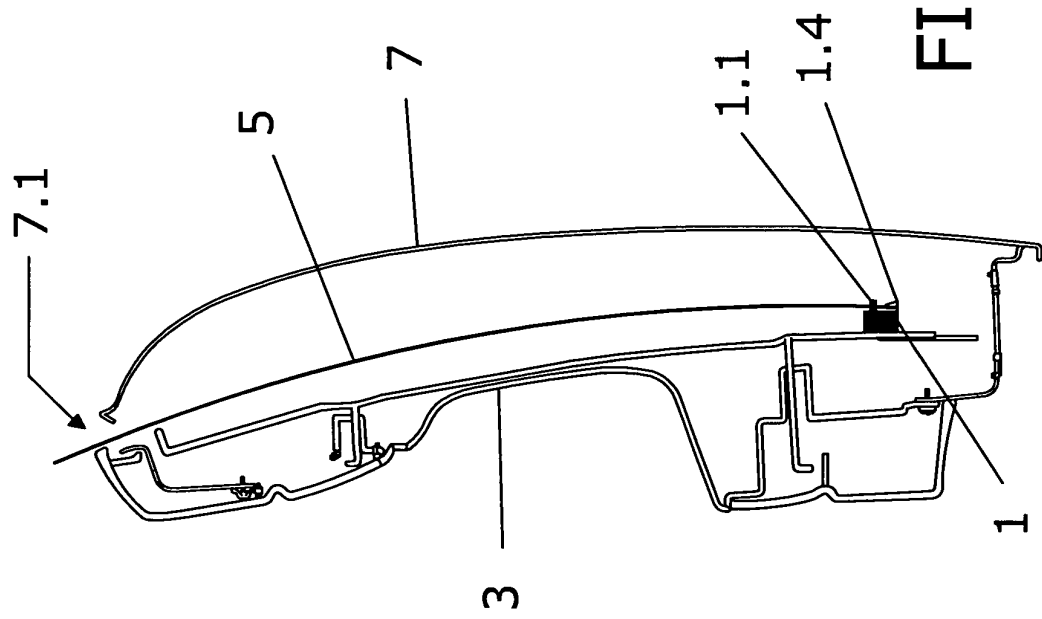


FIG. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 04 38 1008

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)
Y	DE 196 54 524 A (BROSE FAHRZEUGTEILE) 25 September 1997 (1997-09-25) * column 7, line 4 - line 51; figures 4,5 *	1,2,4-9	E05F11/38
D,Y	DE 42 39 601 A (BAYERISCHE MOTOREN WERKE AG) 26 May 1994 (1994-05-26) * column 2, line 41 - line 42 * * column 2, line 49 - line 50; figures 1,2 *	1,2,4-9	
A	DE 102 20 948 A (BROSE FAHRZEUGTEILE ; VOLKSWAGENWERK AG (DE)) 20 November 2003 (2003-11-20) * column 9, line 19 - line 26; figure 2a * *****	3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 August 2004	Examiner Guillaume, G
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EPO FORM 1503 03.82 (P04C01)

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

EP 04 38 1008

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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27-08-2004

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