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(54) **Internal opening system for the rear doors of vehicles**

(57) An internal opening system for the rear doors of vehicles, provided with two doors, one of which is opened from the exterior and the other is then opened from the interior. An opening system located on the edge of the door is proposed for the second leaf. The mechanism has a butterfly (4) operated by an exterior handle (2), which together with as set of supports (5, 6) pull on the cables for the upper and lower locks of the leaf of the door.

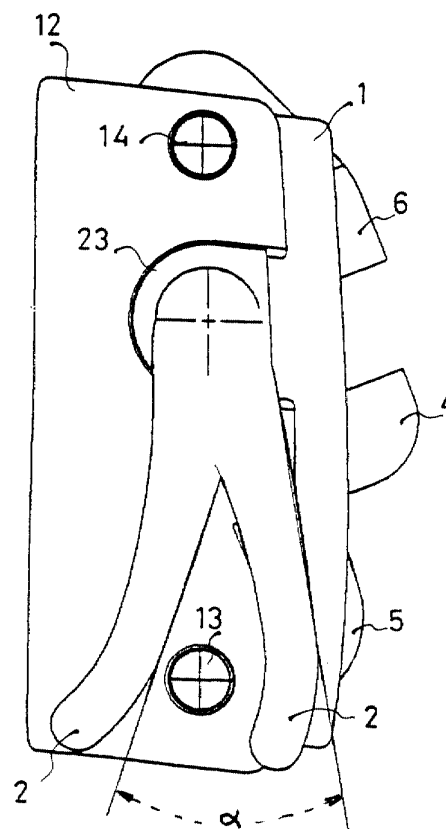


Fig: 3

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Description

[0001] This invention relates to an internal opening system for the rear doors of vehicles, normally in industrial vehicles, provided with rear doors. These vehicles generally have two doors, which might be equal to each other in size or different from each other, and in order to open them it is first necessary to open one of the doors from the exterior and then open the other door from the interior.

[0002] The opening systems are usually large in size due to the fact that the doors themselves are large and have a lot of space between the inner and outer metal panels of the doors.

[0003] Nevertheless, there are doors that do not have so much space between the inner and outer metal panels, in which case the solution usually adopted is to locate the opening mechanism on the interior of the door fixed to its inner metal panel.

[0004] This type of location has several disadvantages, such as uncomfortable access from the exterior of the vehicle in order to open the door; the movement that it is necessary to apply onto the operating handle for opening the door is not very natural as it does not follow the opening direction of the door because the movement of the handle is perpendicular to the turning direction of the door; there is the possibility that the load in the vehicle might shift and prevent access for internal opening, so that it would be necessary to move away the shifted load in order to proceed with opening.

[0005] One object of this invention is to provide an internal opening system for the rear doors of vehicles which is small in size and enables it to be fixed in the edge of small doors.

[0006] Another object of the invention is to provide an internal opening system that noticeably reduces the final effort to be applied on the opening handle.

[0007] Another object of the invention is to provide an internal opening system that helps to reduce the opening torque of the locks in the handle, as well as limiting the travel of the handle for this opening.

[0008] To put these objectives into practice, the invention claims an opening system which is mounted on the interior of the edge of the door leaf or wing which is opened from the interior, i.e. the door leaf which is open in second place, with a communication that passes through the said edge, allowing the placing of a handle with limited turning in order to carry out the opening of the door leaf in question.

[0009] Thus, on the interior side of the edge, a rectangular-shaped flat casing is placed, which has a wide through hole towards one side of its centre, an approximately centred projection towards the interior of the door and two holes, one at each end of this casing.

[0010] An L-shaped piece of trim or ornament, slightly longer than the length of the casing, is placed on the external part of the edge of the door and assemble to it by clipping, taking in the corner, the edge and

part of the interior side of the door. One of the wings or sides of this trim, the longer one, is placed over the edge of the door and the shorter one over the interior side of the door.

5 **[0011]** The clipping on of the trim is carried out by an internal ledge in its shorter wing, which is inserted by pressing it into an opening made in the interior side of the door.

10 **[0012]** The longer wing of the trim is provided with two end holes, which are separated from each other the same distance as the two end holes in the casing referred to previously, and a transversal recess open to the exterior and directed towards the exterior of the door, with the position of this recess corresponding with that of the larger hole in the casing described earlier.

15 **[0013]** The spindle or neck of a handle passes through the larger hole in the casing and through the opening in the trim, with a torsion spring around this spindle and housed in the interior of a groove. The spindle protrudes inward and receives a toothed pinion, on which a bushing or sleeve is placed that surrounds a small axial closure part received in an axial blind hollow in the spindle.

20 **[0014]** Towards one side of this assembly and in the end holes in the casing and in the trim, a bolt is passed through, with its free end receiving a support. This support is an uneven part with two flat portions parallel to each other and also parallel to the planes of the trim and of the casing, with both portions being connected by a vertical sector.

25 **[0015]** The lower portion is placed on the casing and is provided with a hole through which the previously mentioned bolt passes and is secured by a weldable nut.

30 **[0016]** The higher portion of this support has a hole in which the bushing of the handle is positioned and fixed by the head of the axial closure part.

35 **[0017]** This higher portion of the support is provided with a wide vertical projection with a free U-shaped end, in which the end of the sheath of the cable is held, that comes from the upper door closer in the frame of the vehicle.

40 **[0018]** The previously described spring is fixed to the base of the mechanism and to the pinion of the handle so that the latter returns to its rest position once the handle is released after being operated.

45 **[0019]** The support described is fixed and the handle makes the pinion turn when it is operated by the user from the exterior of the edge of the door.

[0020] On the inward centred projection of the casing is situated firstly the base of a second adjustable support, which also has a wide vertical projection finishing in a U-shaped end, in which the part of the cable that comes from the lower lock of the door will be accommodated.

50 **[0021]** The base of this projection has a cut-out, into which the centred projection of the casing enters, with this base resting on the surface of the casing and on its other end there is another cut-out that remains at the

height of the other hole in the casing and in the trim.

[0022] Above the base of this adjustable support and on the centred projection of the casing is arranged a second pinion that engages with that of the handle and over this is the holed base of a butterfly-shaped part ("butterfly") fixed by a bushing, which in turn is secured in position by the head of another small axial closure part that is housed in an axial blind hollow in the centred projection of the casing.

[0023] The butterfly is provided with two vertical projections, aligned with each other and on both sides of its central hole, with these two projections having U-shaped ends, which remain in the same theoretical horizontal continent plane in relation to the ends of the two projections of the fixed support and adjustable support.

[0024] The U-shaped ends of the projections of the butterfly receive the ends of the cables that come from the two locks, upper and lower, and from the projections of the two supports, in such a way that the turning of the handle is transmitted to its pinion, which transmits it to the pinion of the butterfly, causing it to turn.

[0025] The projections on the butterfly remain individually substantially superficially opposite the projections of the two supports when the hand is in its non-operated or rest position, with the ends of the sheaths of the cables secured to the U-shaped ends of the projections of the two supports, fixed and adjustable.

[0026] In this position, and on turning the handle and the butterfly, it puts tension non the two ends of the cable, causing the opening of the two locks, upper and lower, given that in the position of the unit prepared to be operated, both supports are fixed.

[0027] The turning of the handle is very small, for instance of the order of 28 degrees, with which it does not protrude from the plan view of the edge of the door.

[0028] As stated previously, one of the bolts that connects the trim, the casing and the support is fixed, so the support on that side has been called fixed support.

[0029] The other support, called adjustable, can have some play in its position in order to eliminate the problem known as "double opening", which occurs when one of the two locks on the door opens before the other one and this can be noticed when the mechanism is operated.

[0030] The opening mechanism, instead of including the said fixed bolt, can have a lug for fastening this side of the operating or drive system and on the other side a bolt to fasten and allow the appropriate adjustment of the opening.

[0031] The size of the butterfly is small, and the size of the operating or drive system is too, helping to this effect in the reduction of the lock opening torques on the handle.

[0032] As described, the transmission of stresses from the door locks to the opening handle are carried out by means of the pinions described, which reduce the final effort required for opening the door.

[0033] These pinions can be replaced by a system of

cams in order to obtain the desired result as regards operating torques.

[0034] A preferential solution for the opening device is represented on the attached sheets of drawings, in which, without any restrictive nature, the following are shown:

- Figure 1 is a front view of the rear part of a vehicle in which the invention is applied.
- Figure 2 is a perspective of the centre of the door in which the invention is applied.
- Figure 3 is an external elevation of the opening mechanism.
- Figure 4 is a view of Figure 3, as seen from behind.
- Figure 5 is a view in accordance with direction M in Figure 4.
- Figure 6 is the result of the cross section made along I-I in Figure 4.
- Figure 7 is a view of Figure 4, as seen from the left.
- Figure 8 is a detail of the assembly of the mechanism in the door.

[0035] Looking now at Figure 1, we can appreciate the two rear doors (18, 19) of a vehicle, with the locks (20, 20') of both, in which those in the position (20) correspond to the smaller door (18) and those of the position (20') correspond to the larger one. The larger leaf (19) is opened from the exterior by means of the external handle or control (21) and the smaller leaf is opened from the interior with the conventional handle (22).

[0036] The invention claims the application of the internal opening of the leaf (18) from its edge (17), once that the larger leaf (19) has been opened.

[0037] The arrangement of the said internal opening system for the leaf (18) is described externally in Figure 2, in which the trim (12) is shown, fixed to the side by means of its being clipped onto its surface. The opening system remains behind the edge (16) and protrudes along the internal face (15) of the door.

[0038] In accordance with Figure 3, it is possible to appreciate the trim (12) with its recess (23) in order to allow the passage of the handle (2) and the fastenings (14, 13) for the mechanism mounted on the rear casing (1), in which the fixed support (6), the butterfly (4) and the adjustable support (5) can also be observed. The handle (2) indicates its maximum turning movement (□).

[0039] According to Figure 4, we can appreciate the fixed support (6) secured to the casing (1) and trim (12) by means of the weldable bolt (14) and also secured by the head of the small axial part (28) onto the bushing of the handle (2). On one side the projection (23) can be

observed and below it the pinion (10) on the handle (2).

[0040] Towards the centre is situated the butterfly (4) with its two aligned projections (24), as well as the pinion (9) engaged with the pinion (10) of the support (6). This butterfly turns on the small axial part (29) when the handle is turned.

[0041] Below is positioned the adjustable support (5), which includes the vertical projection (25) and the encased nut (13), and towards the right we can observe the internal projection or recess (26) by which the trim

will be clipped into an open cavity in the leaf of the door. **[0042]** For the placing of this mechanism, a corresponding cavity will be prepared in the surface of the edge (16) of the door leaf, as it is obvious to point out, so that in this cavity the appropriate means are formed for the fixing of the casing (1), for instance. These means might be lugs that protrude from the thickness of the edge towards the cavity and are holed, to which the casing in question is fixed, as suggested by Figure 8, in which a cavity (30) can be observed, cut into the edge (17), with the holed lugs (31) protruding into this cavity.

[0043] In Figure 5 we can point out the U-shaped ends of the four projections, two of which (23, 25) are on the fixed and adjustable supports respectively, and the other two (24) are on the butterfly, with each of the latter being aligned with each of the former.

[0044] Figure 6 allows us to check the joint assembly of all the items, from the exterior trim (12) on which the casing (1) is fixed and, secured to a cavity in the edge (17) holds the rest of the mechanisms.

[0045] Thus, we can appreciate the two supports, fixed (5) and adjustable (6). The first of these is secured to the casing (1) by the system (14) on its lower portion and by the bushing (7) mounted on the closure part (28) of the spindle of the handle (2).

[0046] Passing through the adjustable support (6) are the projection (32) from the casing, through a cut-out (33) in the support, and the system (13) at the end, permitting the appropriate adjustment, which has already been referred to previously.

[0047] The spindle of the handle includes a pinion (10) that engages with the pinion (9) of the internal projection (32), which is situated on the support (6). Above the pinion (9), the base of the butterfly (4) is supported, controlled by the bushing (8).

[0048] The movement of the handle (2) causes its pinion to make the other pinion (9) turn, causing the turning of the butterfly (4). When this turning is carried out the spring (3) on the spindle of the handle makes this handle return to its initial position.

[0049] From Figure 7, we can point out the positions of the projections (23) of the support (6), (24) of the butterfly (4) and (25) of the support (5), whose free U-shaped allow them to take in the ends of the sheaths of the cables that come from the upper and lower locks (20).

[0050] Therefore, the end of the sheath of the cable from the upper lock is fixed in the projection (23) and the

end of the corresponding cable is fixed in the projection (24) parallel and aligned with it. For its part, the sheath that comes from the lower lock is fixed in the projection (25), while the end of the corresponding cable is fixed in the nearby projection (24).

[0051] With the turning of the handle (2), the turning of the butterfly (4) takes place and consequently the projections (24) move away from the projections (23, 25) so that tension is placed on the cables of the upper and lower locks, causing them to open. When the action on the handle is released, the torsion spring (3) makes the system return to its initial position.

15 Claims

1. Internal opening system for the rear doors of vehicles, of the type which are connected to the upper and lower locks (20) of a door leaf (18) by means of a control (22), generally internal and operated from the internal side of the said leaf, which is characterised by;

- a unit or assembly which is mounted on the edge (17) of the door leaf (18) in which a handle (2) is situated that turns in a substantially parallel plane to the surface of the said edge, protruding slightly from the surface mentioned on which a piece of trim (12) is situated and clipped to the body of the door, with this trim being provided with a horizontal side opening (23), open towards one side, and two end holes, upper and lower,
- a plate by way of a casing (1), which is situated on the internal side or face of the trim with a hole through which the spindle of the handle (2) passes and another two end holes that coincide with those of the trim, as well as a projection (32) towards the interior of the edge of the door, in that this casing is situated over a cavity (30) in the surface of the edge, and is secured to this cavity through means of connection to lugs (31) on this cavity,
- a toothed pinion (10) fixed to the spindle of the handle (2) by an upper bushing (7), with this bushing being secured by the head of an axial part (28) which becomes housed in an axial blind hollow in the said spindle, with the bushing (7) in turn receiving a flat portion of a fixed support (5) with an uneven shape, whose other portion is fixed to one of the end holes in the casing and secured to the trim by means of a bolt and weldable nut (14), in that the pinion (10) turns with the spindle of the handle and is connected with a torsion spring (3) fastened to the base of the mechanism,
- another support (6) with a cut-out hole (33) through which the projection (32) from the cas-

ing passes through and secured to the other end of the said casing and to the other end of the trim by means of a bolt and an encased nut (13), in that above this support and on the projection (32) is accommodated a toothed pinion (9) which receives at the top the flat base of a butterfly (4), which is arranged below a bushing (8) and closed by the head of a closure part (29) lodged in an axial hollow hole in the projection (32), in that the pinion turns when the pinion (10) of the handle turns, causing the butterfly (4) to turn,

- some vertical projections protruding towards the interior and finishing in U-shaped ends that stand out from the two supports (5, 6), with one projection on each one (23) and (25) respectively and two projections (24) on the butterfly, which are aligned at the upper end and equally separated from the centre on which the said butterfly turns, in that in the rest position of the mechanism, each projection on the supports is to be found in a position parallel to each one of the projections on the butterfly,
- the ends of the sheaths of the cables that come from the locks (20) are secured to each of the projections on the supports, whereas the ends of the cables are secured to the projections on the butterfly.

2. Internal opening system for the rear doors of vehicles, in accordance with claim 1, characterised in that the two pinions (10, 9) can be replaced by cams in order to obtain the result desired as regards operating or drive torques.

3. Internal opening system for the rear doors of vehicles, in accordance with claim 1, characterised in that the fastening for the trim (12) and the casing (1) at one of its ends can be carried out by means of a lug on the trim that is received in a recess in the casing.

4. Internal opening system for the rear doors of vehicles, in accordance with claim 1, characterised in that the angular travel of the handle (2) is preferably of about 28 degrees.

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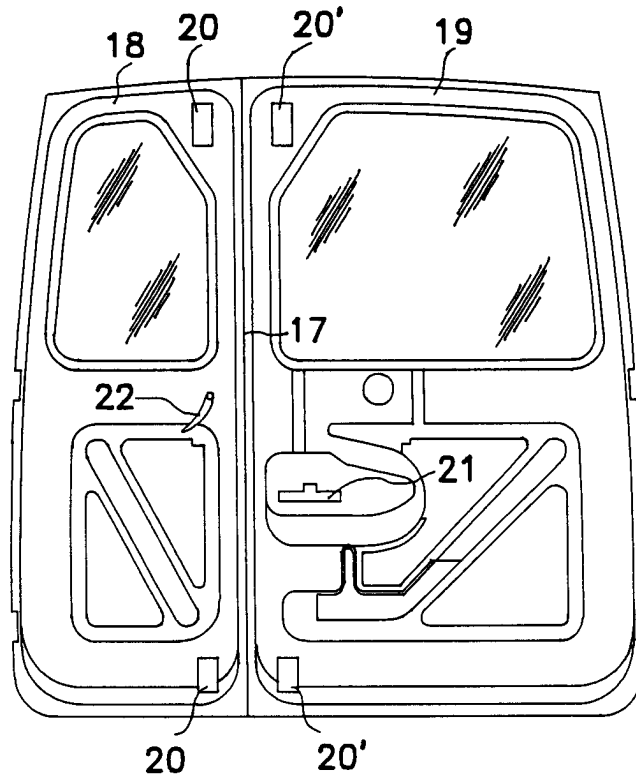


Fig:1

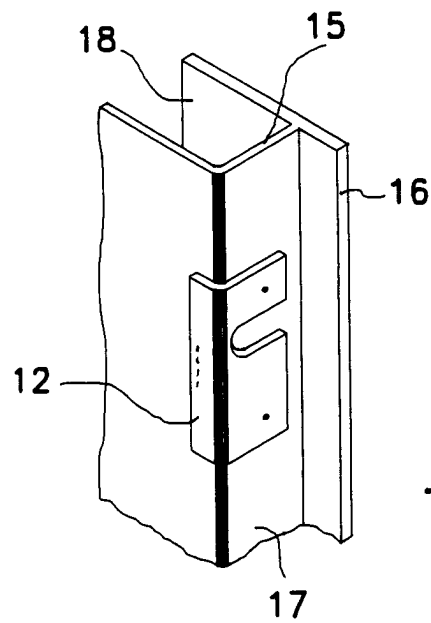


Fig:2

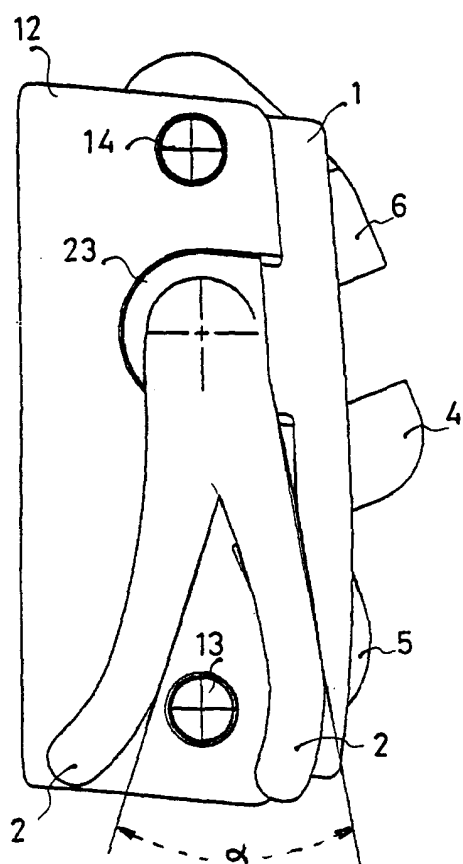


Fig: 3

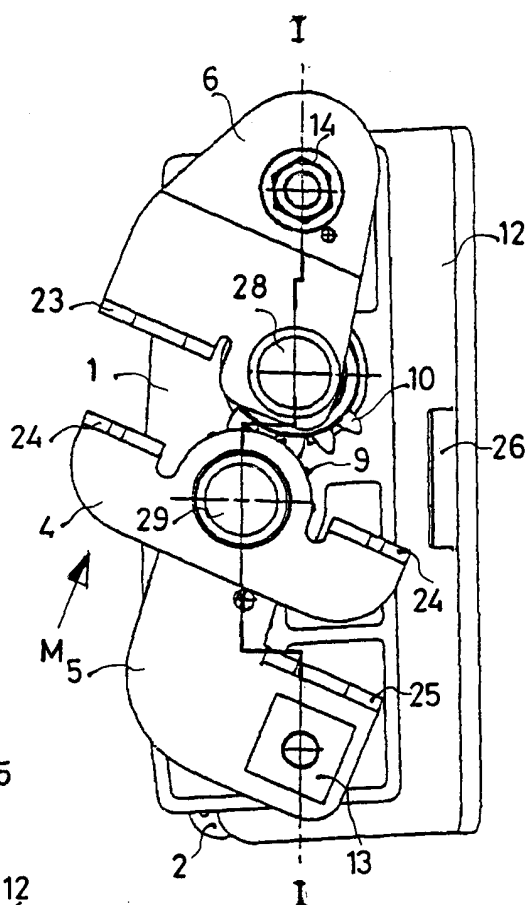


Fig:4

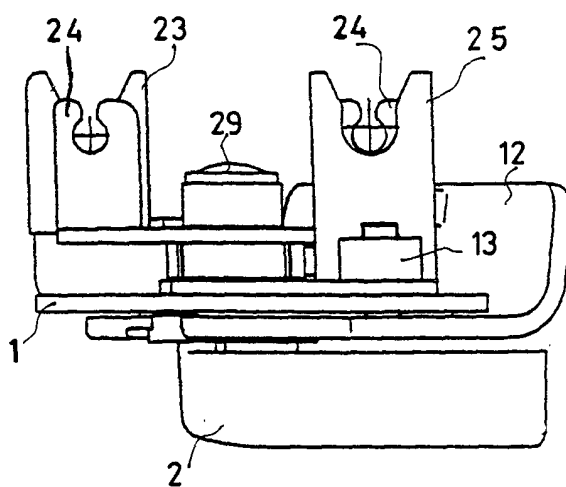
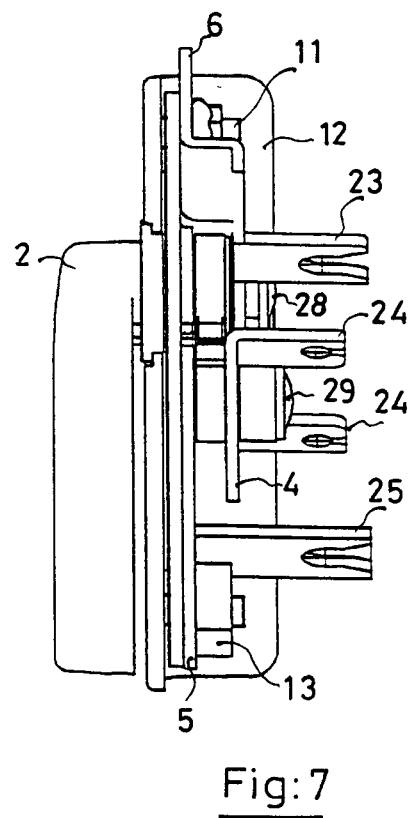
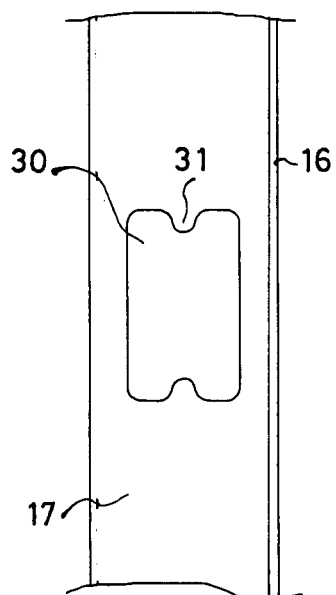
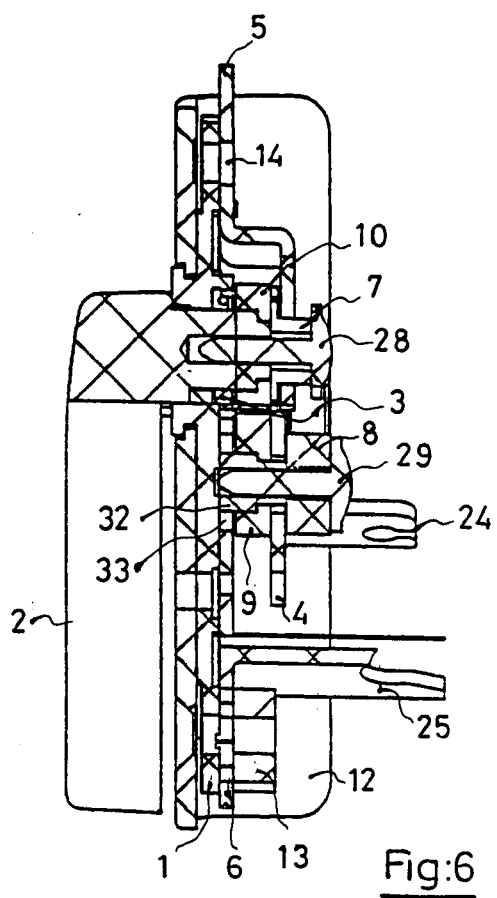


Fig:5





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EUROPEAN SEARCH REPORT

Application Number
EP 99 50 0219

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)
A	DE 92 14 220 U (ALFRED GROSSSTEINBECK GMBH & CO. KG) 28 January 1993 (1993-01-28) * the whole document *	1	E05B65/16 E05C7/04
A	GB 2 275 962 A (FORD MOTOR COMPANY LIMITED) 14 September 1994 (1994-09-14) * figures 1-6 *	1	
A	US 3 919 808 A (DONALD F. SIMMONS) 18 November 1975 (1975-11-18) * figures 1-10 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B E05C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 Apr 11 2000	Examiner PEREZ MENDEZ, J
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 99 50 0219

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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03-04-2000

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GB 2275962	A	14-09-1994	NONE	
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