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54 **A hinge for a motor vehicle door or hatchback door.**

57 A hinge for a motor vehicle door or hatchback door comprising two fastening elements (3,4) attached to the vehicle bodywork (1) and to the door (2) respectively, said elements being movably connected by a first connecting rod (6), and a second connecting rod (12) facing the first and in which the

first connecting rod comprises a control and stop device (23) for the door movement, and the second connecting rod comprises a pin (19) capable of working together with said control and stop device (23) during use.

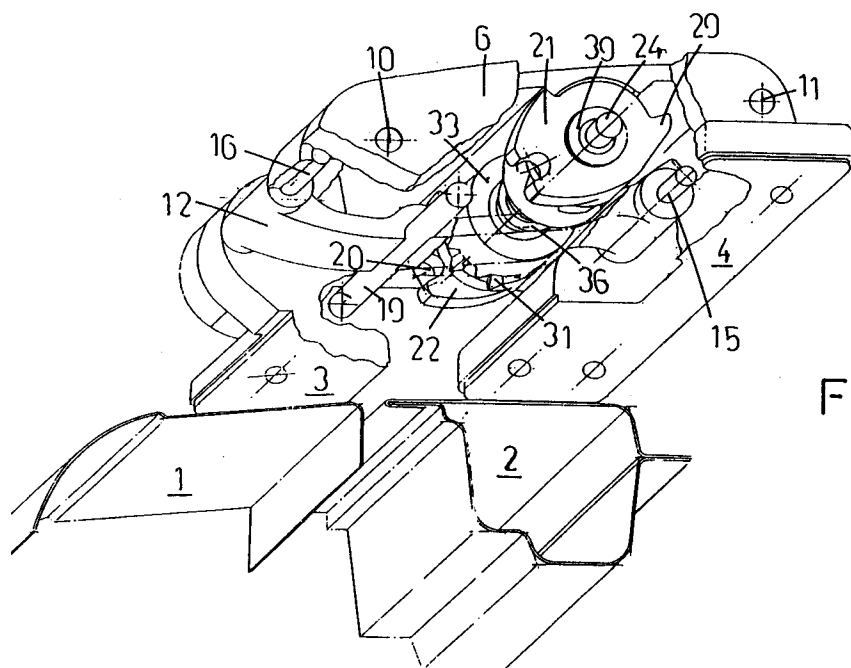


FIG.3

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This invention refers to a hinge for a motor vehicle door or hatchback door, in particular for rear doors of commercial vehicles.

It is well known that the main problems of hinges of the above type lie in the angle they allow the door to open, and in the reliability of the stop device once the door has been completely opened.

In some cases the door can also be required to stop in more than one position in order to facilitate the loading and unloading of goods.

The hinges which are commonly in use at present do not allow the door to open wider than 180°, since its rotation is hindered by the motor vehicle side to which it is attached.

Furthermore, in order to hold the door open, stop devices positioned outside the motor vehicle are used, said body is often damaged by the blows, however involuntary, to which it is subjected.

The aim of this invention is to overcome the above mentioned drawbacks.

This and other aims are achieved by the invention, the subject of which is a hinge for a motor vehicle door or hatchback door capable of letting the door complete a rotation angle of more than 180 degrees, comprising two fastening elements attached respectively to the vehicle bodywork and the motor vehicle door, these elements being movably connected by a first connecting rod by means of two first rotation pins which are parallel and positioned at the ends of the connecting rod; a second connecting rod, facing the first one and being connected at its ends to said two fastening elements by means of two second rotation pins positioned parallel to said first pins, characterized in that the first connecting rod has, on its surface facing the second connecting rod, a control and stop device for the door movement and in that the second connecting rod has, on its surface connecting the first connecting rod, a small pin which is capable of working with said control and stop device during use in order to make it rotate.

Further characteristics and advantages will become more clear from the following description in which reference is made to the attached drawings, supplied by way of example only, in which:

Fig. 1 is a plan view of a hinge according to this invention in its open and closed positions;

Fig. 2 is a cross section view of the invention along line II-II of Fig. 1;

Fig. 3 is a perspective view, partially cutaway, of the hinge according to the invention;

Fig. 4 is a view of another embodiment of a detail of Fig. 1;

Fig. 5 is a plan view of a second embodiment of a hinge according to the invention in a closed position; and

Fig. 6 is a cross-sectional view of the invention taken along line V-V of Fig. 5.

With reference to the drawings, (1) indicates the bodywork of a motor vehicle and, particularly, the rear end of a commercial vehicle, while (2) indicates the door frame.

The first fastening element (3) and the second fastening element (4) are connected, by means of screws (5) to the bodywork (1) and the door (2), respectively. The two fastening elements are rotatably connected together by a first connecting rod (6) at points (7) and (9) on the first and second element, respectively. The connection is obtained by means of two pins (10) and (11) having parallel axes. The connecting rod has a U-shaped profile with its ends facing the vehicle, almost forming a closed inner compartment.

Facing the first connecting rod (6) is a second connecting rod (12) which is connected to the fastening elements at points (14) and (15) by means of pins (16) and (17). Said second connecting rod is substantially contained inside the first connecting rod (6), while the axes of the two connecting pins (16) and (17) lie on the same plane comprising the axis of the pin (10) which connects the first connecting rod to the first element.

The second connecting rod (12) supports a small pin (19) which can engage, during use, with a seat (20) machined in the upper and lower rollers (21) and (22) of a control and stop device (23) which is fixed to the inner side of the connecting rod (6) by means of a pin (24).

With reference to figure (4), the end of the second connecting rod could also be connected to the second fastening element by means of an adjustable attachment. The one in the figure comprises a tie rod (25) with an eyelet head (26) and a corresponding centering bushing (27).

The control and stop device (23), besides rollers (21) and (22), which are hinged so as to rotate freely on the pin (24), and which rollers have, furthermore, limit (rotation) stops (29) and (30) and a tothing (31) on their inner surface, comprises two bushings (32) and (33) which are coaxial to and axially slidable on the pin, said bushings having a tothing (35) on the surface facing the tothing (31).

The bushings (32,33) are biased against the corresponding rollers (21,22) by a spring (36), which is interposed coaxially to the pin (24) and which is adjustable by means of a threaded ring nut (37), in such a way that the toothings can engage.

On the external surfaces of the rollers (21,22) there are two washers (39) to avoid friction with the inner surface of the connecting rod (6).

On the inner surface of the connecting rod (6) ridges (40) and (41) are machined in order to

engage with the corresponding limit stops (29) and (30) obtained on the rollers (21,22), while a projection (42) again obtained on the surface of the connecting rod (6) works in conjunction with seats (not shown) obtained on the bushings (32) and (33) in order to prevent the rotation around the pin (24).

The hinge according to the invention works in the way described below.

When the door is opened, the frame (2) and therefore the element (4) attached to the frame complete an arc rotation which carries them to the position shown by the dashed line in figure 1.

At the same time the movement of the element 4, the pin 19 dragged by the second connecting rod 12 has been positioned into the seats 20, and continuing its pattern shown by the dashed line B-B, it gives the counter-clockwise movement to the rollers 21, 22 of the control and stop device 23.

The rotation given to the rollers makes the toothings 31 and 35 engage when the door reaches the end of its travel, thus stopping the door without using separate elements fixed to the bodywork.

There can be a plurality of toothings so that more than one stop can be provided for, while the force necessary to unlock the door can be adjusted through different settings of the threaded ring nut 37.

Referring to Figures 5 and 6, there is described a second embodiment of the present invention, wherein like numerals designate like parts.

In this second embodiment, the connecting rod 12 of the first embodiment is formed into two parts, a substantially straight main connecting rod 50 and a secondary curved connecting rod 52. Connecting rods 50, 52 are interconnected therebetween at respective ends 53, 54 by means of a pin 55 enabling the two connecting rods to rotate with respect to each other. The opposite ends of connecting rods 50, 52 are still rotatably connected by means of a pin, as in the first embodiment, to fastening elements 3 and 4, respectively.

The pin 55 on which the ends 53 and 54 of connecting rods 50 and 52 are pivoted, is force fitted on rollers 21, 22 forming the control and stop device 23.

The other parts of the hinge according to the invention remain substantially the same as those shown in the first embodiment.

Operation of the hinge according to this second embodiment is substantially the same as the first one, except that as pin 55 is permanently secured to the control and stop device 23, useless strokes are avoided. Therefore, in this way it is possible to increase the number of stopping positions of the hinge.

Claims

1. A hinge for a motor vehicle door or hatchback door capable of letting the door complete a rotation angle of more than 180 degrees, comprising two fastening elements (3, 4) attached respectively to the vehicle bodywork and the motor vehicle door, these elements being movably connected by a first connecting rod (6) by means of two first rotation pins (7, 9) which are parallel and positioned at the ends of the connecting rod; a second connecting rod (12), facing the first one and being connected at its ends to said two fastening elements by means of two second rotation pins (14, 15) positioned parallel to said first pins, characterized in that the first connecting rod (6) has, on its surface facing the second connecting rod (12), a control and stop device (23) for the door movement and in that the second connecting rod has, on its surface connecting the first connecting rod (6), a small pin (19) which is capable of working with said control and stop device (23) during use in order to make it rotate.
2. A hinge according to claim 1, characterized in that the control and stop device comprises a pair of toothed rollers (21, 22) contained inside the walls of the connecting rod, said rollers rotating on a pin (24) supported by the connecting rod and having seats for receiving said small pin (19) supported by the second connecting rod, said rollers being separated by toothed bushings (32, 33) axially slidable along the pin (24), against said rollers (21, 22) under the action of an elastic element (36), whereby the respective toothings engage.
3. A hinge according to claim 2, characterized in that the toothed rollers (21, 22) have limit stops (29, 30) which are capable of engaging with corresponding projections (40, 41) machined on the surface of said first connecting rod (6).
4. A hinge according to claim 2, characterized in that the elastic element is a spring (36) which can be calibrated by means of a threaded ring nut (37) positioned on one of the toothed bushings (32).
5. A hinge according to claim 1, characterized in that the first connecting rod (6) has a U-shaped section and is capable of containing the second connecting rod (12) and the control and stop element (23).

6. A hinge according to claim 1, characterized in that said second connecting rod (12) is formed into two parts, a main connecting rod (50) and a secondary connecting rod (52) connected therebetween by means of a pin (55) enabling the two connecting rods to rotate with respect to each other. 5
7. A hinge according to claims 1 and 6, characterized in that said pin (55) connecting the main connecting rod to the secondary one is secured to said control and stop element. 10

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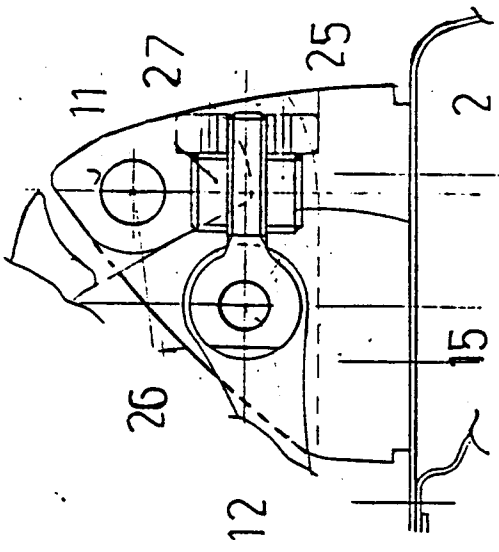


FIG. 2

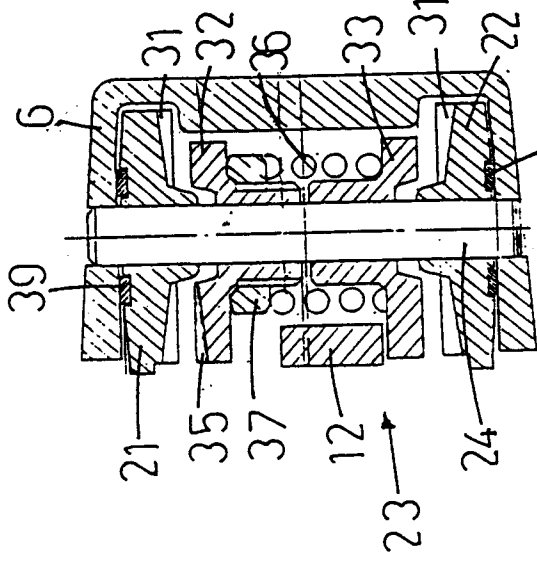


FIG. 4

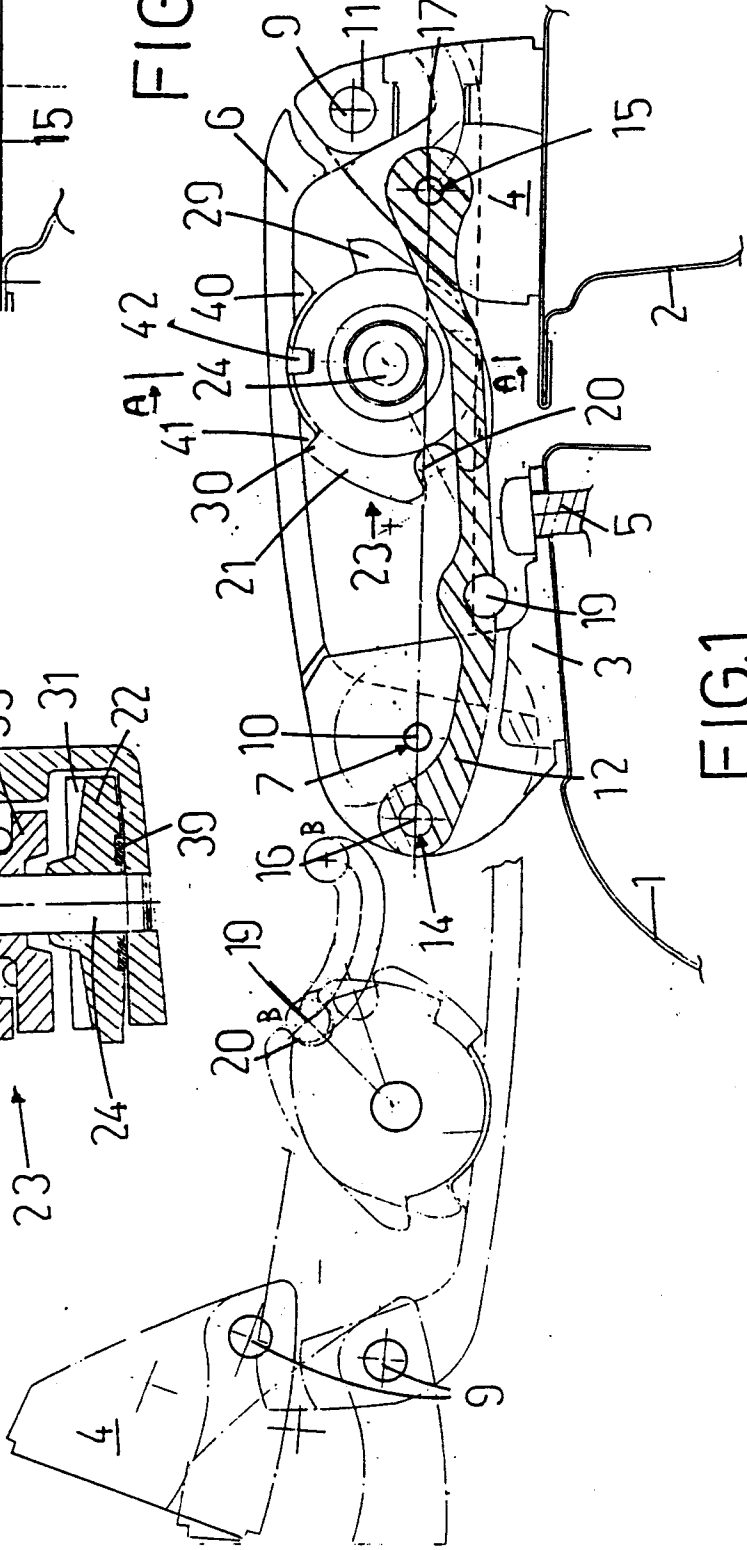


FIG. 1

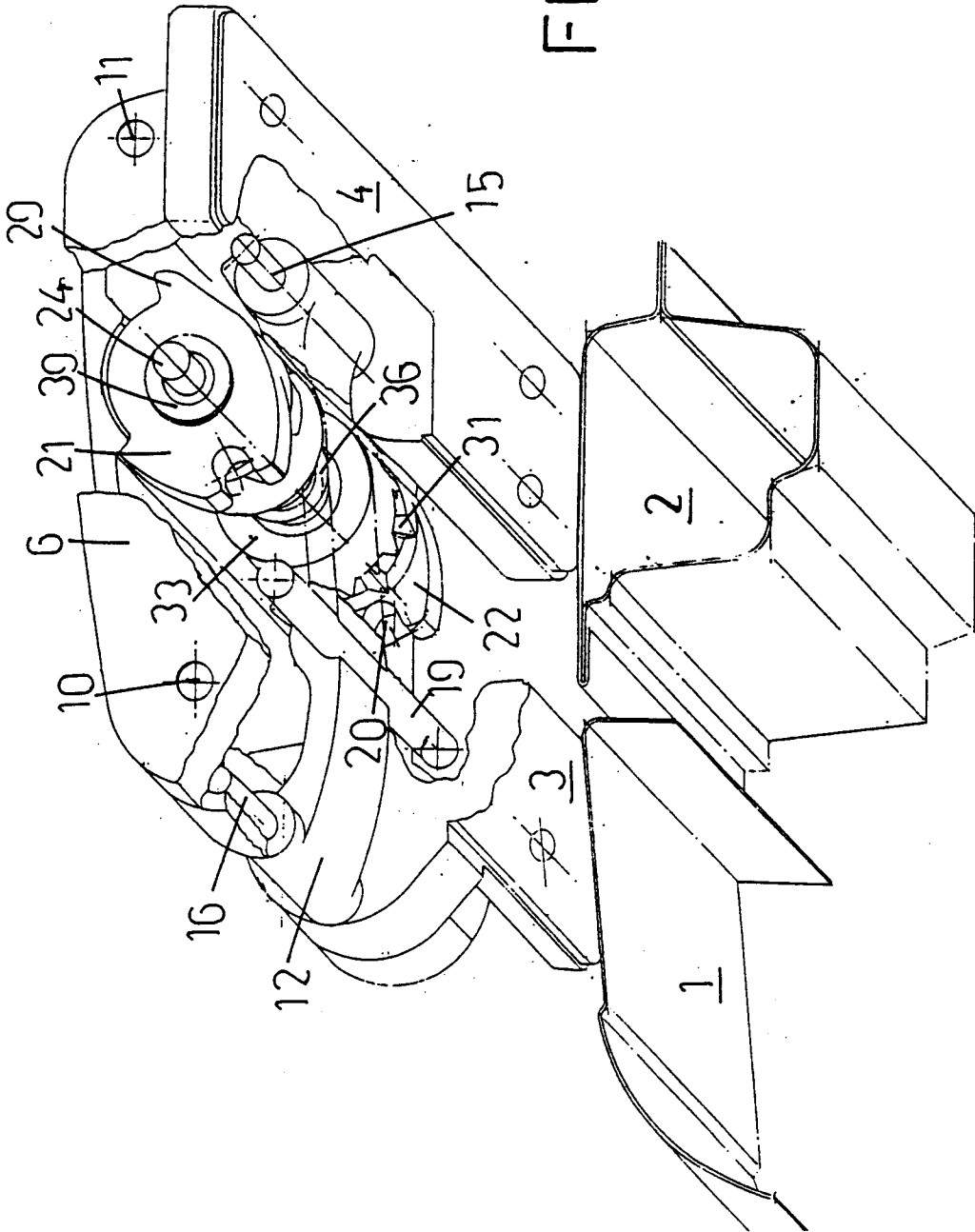


FIG. 3

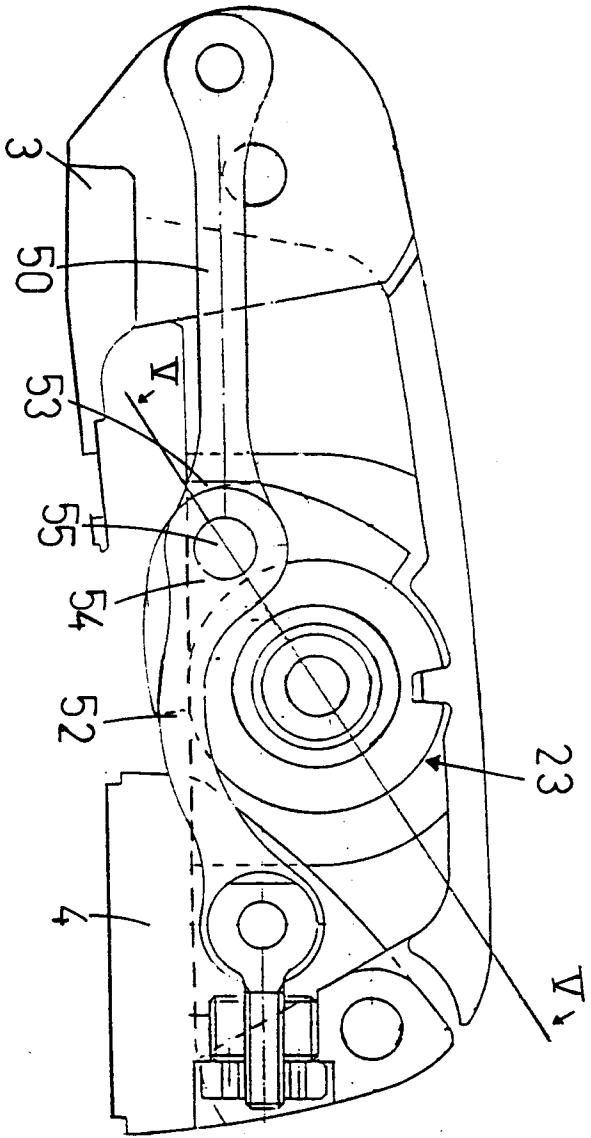


FIG. 5

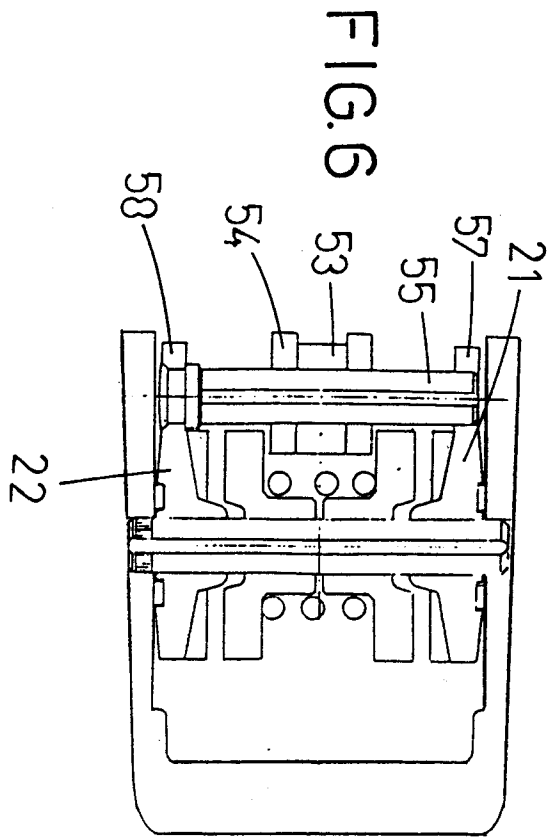


FIG. 6



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.6)
A	GB-A-2 196 053 (CHASE) * page 1, line 73 - page 2, line 4; figures 1-6 *	1	E05D3/06 E05D11/10 E05D11/06
A	GB-A-435 662 (AUTOMOTIVE PRODUCTS COMPANY LTD) * page 3, line 49 - line 51; figures 1-4 *	1	
A	FR-A-2 352 142 (COMPAGNIE INDUSTRIELLE DE MECANISMES) * page 5, line 11 - page 6, line 13; figures 1-6 *	2-4	
A	DE-A-36 33 630 (AUDI AG) * abstract; figures 1,2 *	2,4	
A	DE-A-15 59 876 (ALFRED GRASS KG) * page 13, line 3-8; figures 4,5 *	5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		25 January 1995	Van Kessel, J
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	