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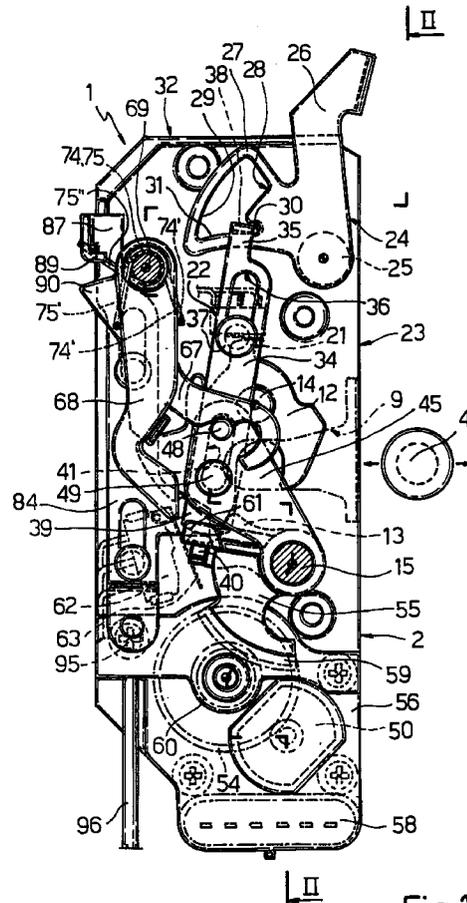
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(54) Electrically operated vehicle door lock

(57) An electrically operated vehicle door lock (1) presenting a fork-and-catch lock mechanism (3) movable between a release position enabling relative movement of the lock (1) and a striker element, and a lock position engaging and preventing the striker element (4) from moving in relation to the lock (1); a manual release lever (24); and a safety mechanism (5) interposed between the release lever (24) and the lock mechanism (3) and movable between a safety-off position wherein the release lever (24) is mechanically connected to and may release the lock mechanism (3), and a safety-on position wherein the release lever (24) is disconnected from the lock mechanism (3); the lock (1) presenting a single electric actuator (50) for controlling electric release of the lock mechanism (3), and for switching the safety mechanism (5) from the safety-on to the safety-off position and vice versa.



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Description

The present invention relates to an electrically operated lock, particularly for a vehicle door.

As is known, vehicle door locks normally comprise a fork-and-catch lock mechanism movable between a release position enabling relative movement of the lock and a striker element, and a lock position wherein it engages and prevents the striker from moving in relation to the lock; a manual release lever; and a safety mechanism interposed between the release lever and the lock mechanism, and movable between a release position in which the release lever is mechanically connected to and may release the lock mechanism, and a lock position in which the release lever is disconnected from the lock mechanism.

Increasing use is now being made of locks in which the safety mechanism is controlled by an electric actuator in turn controlled by a central electronic unit, for achieving a so-called "centralized locking" function whereby the actuators on all the doors - and possibly also the rear door of the vehicle - are activated simultaneously when the safety mechanism of one of the locks is connected or disconnected (e.g. by remote control, using a key, or by manually operating the button in the passenger compartment).

Electrically released locks have also been proposed which feature a second electric motor which is activated by the central control unit to release the lock mechanism when the inside or outside door handle is operated.

Such locks present the advantage of being released with no manual effort required on the part of the user, by virtue of the lock mechanism being released by the electric motor via appropriate transmission mechanisms.

By virtue of featuring two actuators and respective transmission mechanisms, known electrically released locks are fairly complex and therefore expensive to produce, are of considerable weight and size, and as such have so far been applied on only a limited scale.

On the other hand, electrically released locks are indispensable in applications in which, contrary to normal practice, the lock is fitted to the door post and only the striker to the door. In which case, as the door handle must in any case be fitted to the door for it to be opened, no mechanical transmission can be formed for transmitting the action of the handle to the lock.

It is an object of the present invention to provide an electrically released lock designed to overcome the aforementioned drawbacks typically associated with known locks.

According to the present invention, there is provided an electrically operated vehicle door lock of the type comprising a lock mechanism movable between a release position enabling relative movement of the lock and a striker element, and a lock position wherein it engages and prevents the striker element from moving in relation to the lock; a manual release lever; and a safety mechanism interposed between the release lever and the lock mechanism, and designed to assume a

safety-off status wherein the release lever is mechanically connected to and may release the lock mechanism, and a safety-on status wherein the release lever is disconnected from the lock mechanism; characterized in that it comprises a single actuator for electrically releasing the lock mechanism, and for switching the safety mechanism from said safety-on status to said safety-off status and vice versa.

A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a front view, with parts removed for clarity, of a lock in accordance with the teachings of the present invention;

Figure 2 shows a section along line II-II in Figure 1; Figures 3, 4, 5, 6, 7, 8 show front views, with parts removed for clarity, of the Figure 1 lock in various operating positions;

Figure 9 shows a schematic side view of a vehicle featuring a lock in accordance with the present invention.

Number 1 in Figures 1 and 2 indicates an electrically controlled lock for the door 101 of a vehicle 102 (Figure 9).

Lock 1 substantially comprises a casing 2 in which are housed: a lock mechanism 3 cooperating with a striker element or striker 4; and a safety mechanism 5 for locking the lock mechanism in a position engaging striker 4, or for enabling striker 4 to move in relation to lock 1. Lock 1 is fitted to the post 103 defining the opening of door 101, and striker 4 to door 101 itself (Figure 9).

Casing 2 comprises an intermediate body 6 substantially in the form of a shaped plate and molded from plastic material; and a pair of plates 7, 8 fitted to opposite faces of the intermediate body and defining with it two chambers 10, 11 respectively housing lock mechanism 3 and safety mechanism 5. Casing 2 presents a lateral opening 9 for enabling insertion of striker 4 and formed in body 6 and plate 7.

The lock mechanism (Figures 2, 3 and 4) comprises in known manner a fork 12 and a catch 13 hinged about respective pins 14, 15 projecting from plate 7. Fork 12 presents a C-shaped seat 16 for receiving striker 4 and defined by two substantially radial appendixes 17, 18, and rotates between a release position (Figure 4) - wherein seat 16 faces opening 9 in casing 2 to enable release of striker 4 from lock mechanism 3 - and a lock position (Figure 3) - wherein striker 4 is locked inside seat 16 and prevented from withdrawing by appendix 17 closing opening 9. The lock position is defined by appendix 18 of fork 12 contacting catch 13, which is forced into engagement with fork 12 by a spring 19 (Figure 2) wound about pin 15; and fork 12 is forced into the release position by a spring 20 wound about pin 14.

Fork 12 presents a radial projection 21 extending diametrically opposite seat 16 and cooperating with a microswitch 22 (Figures 1 and 2) which switches when

the fork is set to the lock position, and acts as an open-door indicator.

Lock 1 comprises in known manner a substantially square manual release lever 24 which is hinged to a pin 25 projecting from plate 7 and fitted through an opening (not shown) in body 6 into chamber 11, close to side 23 of casing 2 presenting opening 9, and close to the longitudinal end 32 of the casing.

Lever 24 presents a first arm 26 extending outwards of casing 2 and connectable, possibly via the interposition of a tie 104, to a manual emergency release lever 105 (not shown) suitably located inside the passenger compartment, conveniently on the door post; and a second arm 27 presenting a shaped opening 28 comprising a curved opening 29 with its center of curvature at the axis of pin 25, and a slot 30 extending radially towards pin 25 from the furthest end 31 of opening 29 in relation to arm 26. By means of a spring (not shown, and wound about pin 25), lever 24 is loaded clockwise (in Figure 1) into a stop position wherein it contacts a stop portion (not shown) forming part of casing 2.

Safety mechanism 5 comprises an elongated transmission lever 34 presenting, close to one end 35, a longitudinal slot 36 engaging in sliding manner a guide pin 37 fitted to body 6 (Figure 2); and a tooth 38 extending from end 35 and bent 90° in relation to the plane of lever 34 engages opening 28 in arm 27 of lever 24. The opposite end 39 of transmission lever 34 cooperates with an actuating pin 40 projecting from catch 13, and lever 34 also presents a second longitudinal slot 41 close to end 39 and for the purpose described later on.

According to the present invention, lock 1 comprises a single electric motor 50 for controlling both lock mechanism 3 and safety mechanism 5. Motor 50 is connected via a reduction gear 54 to a transmission element 55 hinged to pin 15 of catch 13; and motor 50 and reduction gear 54 are housed inside an end portion 64, opposite end 32, of body 6 of casing 2, and are enclosed by a cover 56 fitted to portion 64 and integrally defining the casing 57 of an electric connector 58 constituting the interface between lock 1 and the outside, as described in more detail later on.

Transmission element 55 comprises an integral sector gear 59 meshing with the output pinion 60 of reduction gear 54; and a thrust portion 61 cooperating with catch 13 and a safety control lever 45.

More specifically, thrust portion 61 consists of a substantially radial appendix of transmission element 55, which appendix, when transmission element 55 is in the intermediate or idle angular position (Figure 1) wherein pinion 60 meshes with an intermediate portion of sector gear 59, faces the control pin 40 of catch 13, on the same side as transmission lever 34, so as to cooperate with pin 40 when transmission element 55 is rotated anticlockwise.

Safety control lever 45, which also forms part of mechanism 5, pivots on pin 15 of catch 13, and, as shown more clearly in Figures 5 to 7, is substantially in the form of an obtuse triangle, and presents one end 46

hinged to pin 15, an opposite end 47 with a pin 48 described later on, and an intermediate pin 49 offset in relation to pins 15 and 48, and which engages in sliding manner the slot 41 in transmission lever 34. By means of a spring 51 (Figure 1) wound about pin 15, lever 45 is loaded (anticlockwise in Figures 1 and 5-7) towards thrust portion 61 of transmission element 55, and is normally maintained contacting the opposite side of portion 61 to that facing pin 40 of catch 13.

Thrust portion 61 cooperates with a microswitch 62 (Figure 1) which presents a contact blade 63 cooperating with portion 61, and which switches when transmission element 55 moves into said intermediate position.

Safety mechanism 5 also comprises a safety lock lever 67 and a safety release lever 68 (Figures 5-7) which are hinged at one end to a common pin 69 fitted to plates 7, 8 and through body 6 substantially to the side of pin 25 of manual release lever 24 and close to the opposite side 72 of casing 2, and which extend, partially overlapping each other in scissor fashion, towards safety control lever 45. The lateral edge of lever 67 facing side 72 of casing 2 presents a projection 70 which is bent 90° to define a stop for the shaped lateral edge 71 of lever 68.

Lever 68 presents a free end 76 cooperating with thrust portion 61 of transmission element 55; and the side of lever 67 facing end 76 of lever 68 presents two adjacent concave seats 77, 78 separated by a tooth 79. Seat 78 is deeper than seat 77, and is located towards the free end 80 of lever 67.

As described later on, seats 77, 78 are engaged by pin 48 of safety control lever 45.

Safety mechanism 5 also comprises a remote-control emergency release rod 84 housed inside casing 2, along side 72 of the casing, and which is guided longitudinally by two pins 85 sliding inside respective longitudinal slots 86 in the rod. Close to the end portion 87 facing end portion 32 of casing 2, rod 84 presents a bent lateral appendix 88 defining a transverse shoulder 89 cooperating with a serrated lateral projection 90 of safety lock lever 67; and at the opposite end 94, rod 84 presents a connecting element 95 for a Bowden cable 96 (Figures 1, 9) connected to a manual emergency release lever (not shown) conveniently located in the boot 107 of the vehicle, and preferably in a locked compartment 108. Rod 84 presents a lateral, substantially trapezoidal projection 91 extending on the opposite side to appendix 88 and close to end 94, and which cooperates with pin 40 of catch 13.

Lever 67 is loaded clockwise by a spring 74 wound about pin 69 and presenting one end (not shown) secured to casing 2, and another end 74' cooperating with the lateral edge of the lever to maintain it normally contacting pin 48 of control lever 45.

A second spring 75 wound about pin 69 presents a first end 75' cooperating with the lateral edge of lever 68 facing side 72 of casing 2, and a second end 75" cooperating with appendix 88 of rod 84; which spring 75 provides for pushing lever 68 anticlockwise so that it is normally maintained contacting tooth 70 of lever 67, as

well as for exerting pull on rod 84 to withdraw projection 91 away from pin 40 of catch 13.

Electric connector 58 presents a number of electric terminals 97 connected to the cables of motor 50 and microswitches 22, 62, and is in-service connected, by means of wiring 98 shown schematically in Figure 2, to a central electronic unit 99 for controlling electric motor 50 and which operates in a number of control modes in response to input signals 100 received from a number of control or consent members (not shown), e.g. switches on the inside and outside door handles and front-door locks; a remote-control unit; and one or more pushbuttons in the passenger compartment for selecting special functions, such as fully disabling electric release, enabling release by the inside handles only, or enabling release by the inside front-door handles only (child safety function).

Operation of lock 1 will now be described as of the Figure 1 position wherein lock 1 is locked, the safety mechanism is released, and the electric release function is assumed enabled.

On receiving a signal 100 to release the lock (via the inside or outside handle), central unit 99 operates motor 50 so as to rotate transmission element 55 anticlockwise from the Figure 3 position to the Figure 4 limit position wherein element 55 mechanically contacts a stop portion of casing 2. In the course of the above movement, thrust portion 61 of element 55 cooperates with pin 40 of catch 13; catch 13 is rotated anticlockwise to release fork 12; and, by virtue of spring 20, fork 12 releases striker 4 and swings into the release position (Figure 4). After a predetermined wait time, central unit 99 reverses motor 50; and transmission element 55 is restored to the intermediate idle position in which it is arrested upon switching of the input signal generated by microswitch 62.

In the event of failure of the electric system, the lock may be released manually by means of lever 24. When lever 24 is rotated anticlockwise, thrust is exerted on tooth 38 of transmission lever 34, which is engaged inside slot 30; transmission lever 34, guided by pins 37, 49, slides longitudinally so that end 39 cooperates with pin 40 of catch 13; and catch 13 is rotated in the same way as for electric release.

Figures 5 and 6 show the intermediate and final positions of the safety lock function, i.e. for disabling manual release of the lock.

On receiving an input signal corresponding to the above function, central unit 99 operates motor 50 so as to rotate transmission element 55 clockwise from the intermediate position shown in Figure 1. In this case, thrust portion 61 cooperates with control lever 45 to rotate it clockwise about pin 15; during which rotation, pin 49 rotates transmission lever 34 about fixed pin 37; tooth 38 of lever 34 is released from slot 30 and moves into portion 29 of opening 28 in lever 24; and, at the same time, pin 48 abandons seat 77 in safety lock lever 67, moves past tooth 79, raising lever 67 slightly (Figure 5 shows the transient position of the mechanism just after pin 48 moves past tooth 79), and, by virtue of the pull

exerted by spring 74 on lever 67, is seated firmly inside seat 78. Engagement of pin 48 inside seat 78 provides for angularly arresting lever 45 and transmission element 55; and, after a predetermined wait time, central unit 99 reverses motor 50 to restore transmission element 55 to the intermediate idle position (Figure 6) in which it is again arrested upon switching of microswitch 62. In the course of the above movement, portion 61 moves past the free end 76 of safety release lever 68; and, by virtue of spring 75, lever 68 is arrested contacting tooth 70 of lever 67, so that the free end 76 of lever 68 is interposed between portion 61 of transmission element 55 and control lever 45.

In the above safety-on position, manual operation by means of lever 24 is disabled in that, when lever 24 is rotated, no pressure is transmitted to lever 34 by virtue of tooth 38 of lever 34 being housed idly inside portion 29 of opening 28.

Figures 7 and 1 respectively show the intermediate and final positions of the safety release function. In response to the corresponding input signal, the safety mechanism is released by again operating motor 50 in the same direction as for the safety lock function. In this case, however, as opposed to acting on lever 45, thrust portion 61 raises lever 68 which, by edge 71 contacting tooth 70, transmits the thrust exerted by portion 61 to lever 67; lever 67 is raised (Figure 7) to free pin 48 of control lever 45 from seat 78 and so permit lever 45 to be rotated anticlockwise by spring 51; and the rotation of lever 45 is transmitted by pin 49 to transmission lever 34 which moves into the safety-off position shown in Figure 1.

As already stated, the safety function provides solely for preventing release of the lock from the inside by means of manual emergency release lever 24; and, being an electrically controlled lock, release by the inside and/or outside door handles is disabled by central unit 99 as a function of input signals 100.

By appropriately combining the safety-on and handle-disabling functions, various configurations may be achieved, such as:

- 1) Total door lock: by means of a key or remote-control unit from outside the vehicle, release by the inside or outside handles is disabled, and the safety function is activated. In addition to preventing the lock from being released using the outside handle, this also prevents release by breaking into the vehicle, e.g. by breaking the window or inserting a tool through the window seals to gain access to the inside handle or emergency release lever.
- 2) Disabling release by the outside handles, while enabling electric or mechanical emergency release from the inside: normal driving condition for preventing access to the passenger compartment from the outside.
- 3) Disabling electric or mechanical emergency release from the inside: particularly useful for the rear doors by substituting for the child safety function of traditional mechanical locks. In this case,

when one of the doors is opened from the outside, the safety mechanism must be reconnected automatically by the central unit when the door is closed.

In the event of failure of the central unit or electric system, emergency mechanical release of the lock is always possible by operating Bowden cable 96 from the boot, which pulls rod 84 (downwards with reference to Figure 8) in opposition to spring 75 to produce two effects: firstly, the safety mechanism is disconnected by shoulder 89 pushing on projection 90 of lever 67 which moves up to free pin 48 as described for the same function operated electrically; and, secondly, projection 91 moves into contact with pin 40 of catch 13, and moves it (downwards with reference to Figure 8) so as to rotate catch 13 and so release lock 1.

The advantages of lock 1 according to the present invention will be clear from the foregoing description.

In particular, by virtue of the release and safety on/off functions being performed by a single electric motor, the lock is extremely straightforward, compact and cheap to produce.

Moreover, by virtue of all its functions being controllable electrically, the lock according to the invention permits the implementation of control logics for ensuring optimum on-road safety of the vehicle and for drastically reducing theft by the vehicle being broken into, while at the same time enabling mechanical operation of the lock in any operating mode, in the event of failure of the electric system, the central unit, or the actuator.

Clearly, changes may be made to lock 1 as described and illustrated herein without, however, departing from the scope of the present invention.

In particular, lock 1 may be fitted to the door in the normal way, as opposed to the door post. If fitted to the door post, the lock may conveniently be inverted in relation to the position shown, so that the fork, by cooperating from underneath with the striker when the door is closed, contributes towards supporting the weight of the door, thus reducing the load on the door hinges. Finally, changes may be made to the logics electrically controlling the lock.

Claims

1. An electrically operated vehicle door lock (1) of the type comprising a lock mechanism (3) movable between a release position enabling relative movement of the lock (1) and a striker element (4), and a lock position wherein it engages and prevents the striker element (4) from moving in relation to the lock (1); a manual release lever (24); and a safety mechanism (5) interposed between the release lever (24) and the lock mechanism (3), and designed to assume a safety-off status wherein the release lever (24) is mechanically connected to and may release the lock mechanism (3), and a safety-on status wherein the release lever (24) is disconnected from the lock mechanism (3); characterized in that it com-

prises a single actuator (50) for electrically releasing the lock mechanism (3), and for switching the safety mechanism (5) from said safety-on status to said safety-off status and vice versa.

2. A lock as claimed in Claim 1, characterized in that it comprises transmission means (55) operated by said actuator (50) as of an idle position, and which cooperate with said lock mechanism (3) in the course of an operating stroke in a first operating direction of said actuator (50), and with said safety mechanism (5) in the course of an operating stroke in a second operating direction of said actuator (50).
3. A lock as claimed in Claim 2, characterized in that it comprises control means (99, 62) for controlling said actuator (50) and for restoring said transmission means (55) to said idle position at the end of each said operating stroke.
4. A lock as claimed in Claim 3, characterized in that said safety mechanism (5) comprises a safety control lever (45) movable by said transmission means (55) between a first and second position corresponding to two different states of said safety mechanism (5) in the course of an operating stroke in said second operating direction of said actuator; return means (51) for restoring said safety control lever (45) to said first position; lock means (67) for locking said safety control lever (45) in said second position; and release means (68) operated by said transmission means (55) in the course of a subsequent operating stroke in said second operating direction of said actuator, so as to cooperate with and release said lock means from said control lever.
5. A lock as claimed in Claim 4, characterized in that said lock means comprise a safety lock lever (67) presenting engaging means (77, 78) for engaging said safety control lever (45) in said first and second positions thereof; and first elastic means (74) acting on said safety lock lever (67) to maintain said engaging means (77, 78) firmly contacting said control lever (45); said release means comprising a safety release lever (68) operated by said transmission means (55) and presenting one-way engaging means (70) for engaging said lock lever and which are active in such a rotation direction as to release said safety lock lever (67) from said safety control lever (45); and second elastic means (75) acting on said safety release lever (68) to maintain said one-way engaging means (70) contacting said safety lock lever (67), and to predispose said safety release lever (68) for operation by said transmission means (55).
6. A lock as claimed in Claim 4 or 5, characterized in that said lock mechanism (3) comprises a fork (12) and a catch (13); said transmission means compris-

ing a transmission element (55) pivoting on a hinge pin (15) and presenting a toothed portion (59) connected angularly to an output member (60) of said actuator (50), and a substantially radial thrust portion (61) cooperating with said safety control lever (45), with said safety release lever (68), and with a pin (40) on said catch (13). 5

7. A lock as claimed in Claim 6, characterized in that said safety mechanism (5) comprises a transmission lever (34) interposed between said manual release lever (24) and said catch (13); said transmission lever (34) being movable by said safety control lever (45) between a safety-off position wherein it is connected mechanically to said manual release lever (24), and a safety-on position wherein it is idle in relation to said manual release lever (24). 10 15

8. A lock as claimed in Claim 6 or 7, characterized in that it comprises emergency manual release means (84) connected to a mechanical remote-control element (96) and presenting thrust means (91) cooperating with said catch (13) to move said lock mechanism (3) into the release position, and with said safety lock lever (67) to free said safety control lever (45) by means of said remote-control element (96). 20 25

9. A vehicle (102) comprising at least one door (101); a door post (103) defining the opening of said door; and lock means (1, 4) interposed between said door (101) and said door post (103); characterized in that said lock means comprise a lock (1) as claimed in any one of the foregoing Claims and fitted to said door post (103); and a striker (4) fitted to said door (101). 30 35

10. A vehicle as claimed in Claim 9, characterized in that said manual release lever (24) of said lock (1) is connected to a manually operated member (105) located inside said vehicle (102). 40

11. A vehicle as claimed in Claim 9 or 10, characterized in that said remote-control element is a Bowden cable (96) operated from the boot (107) of said vehicle (102). 45

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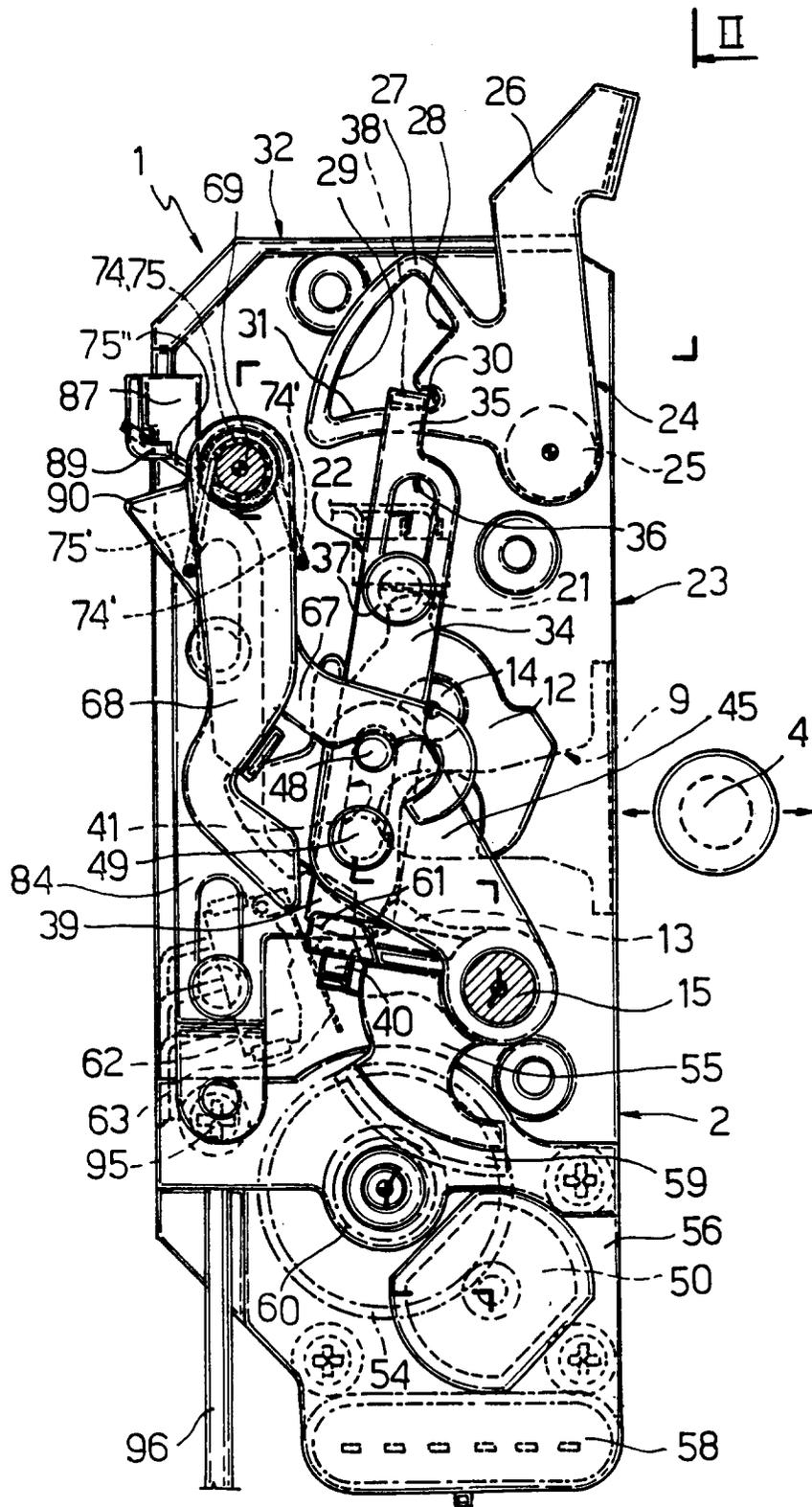


Fig.1

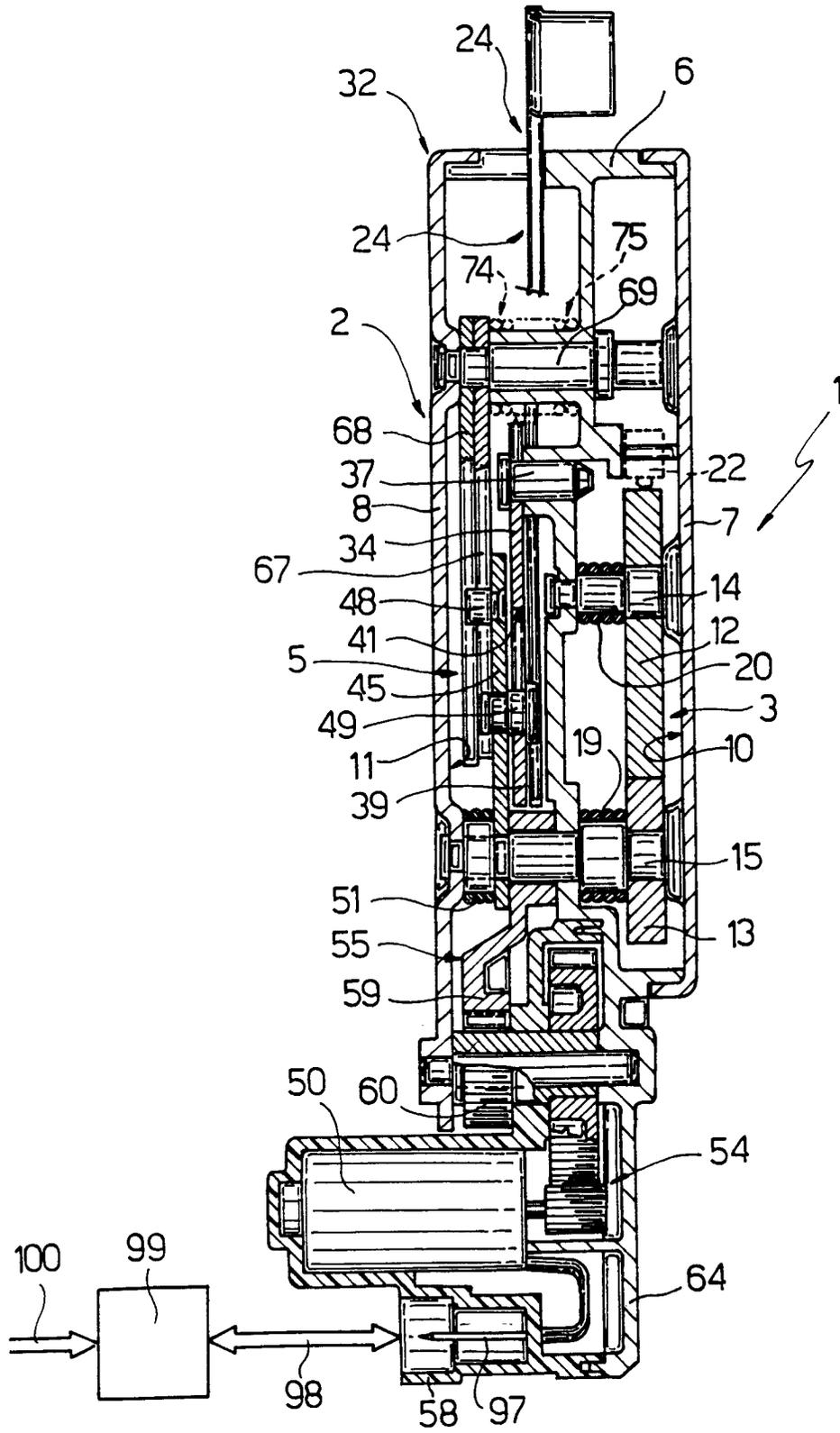
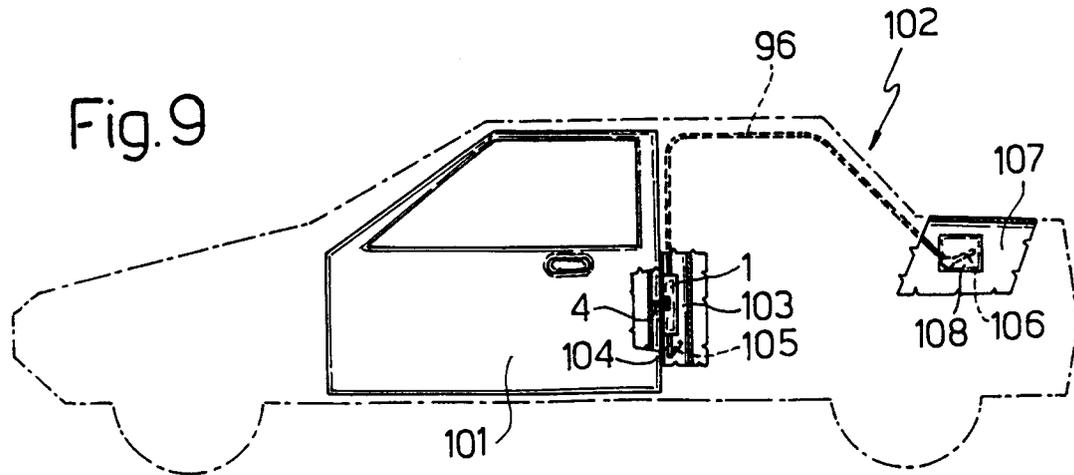
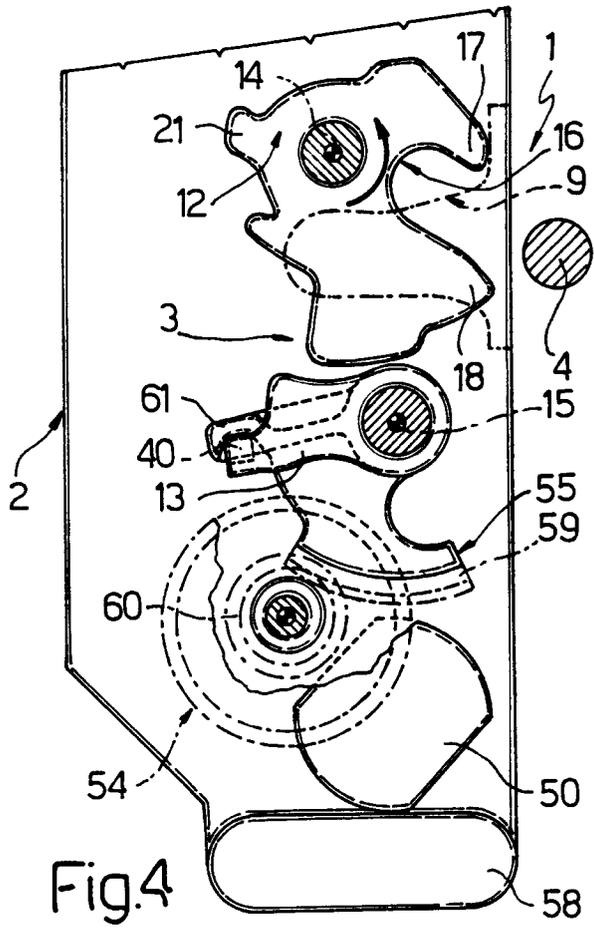
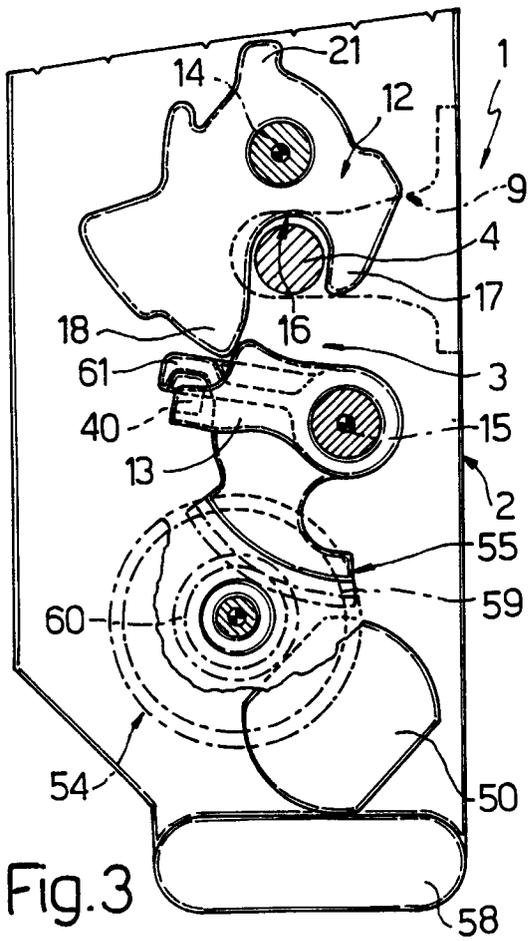


Fig.2



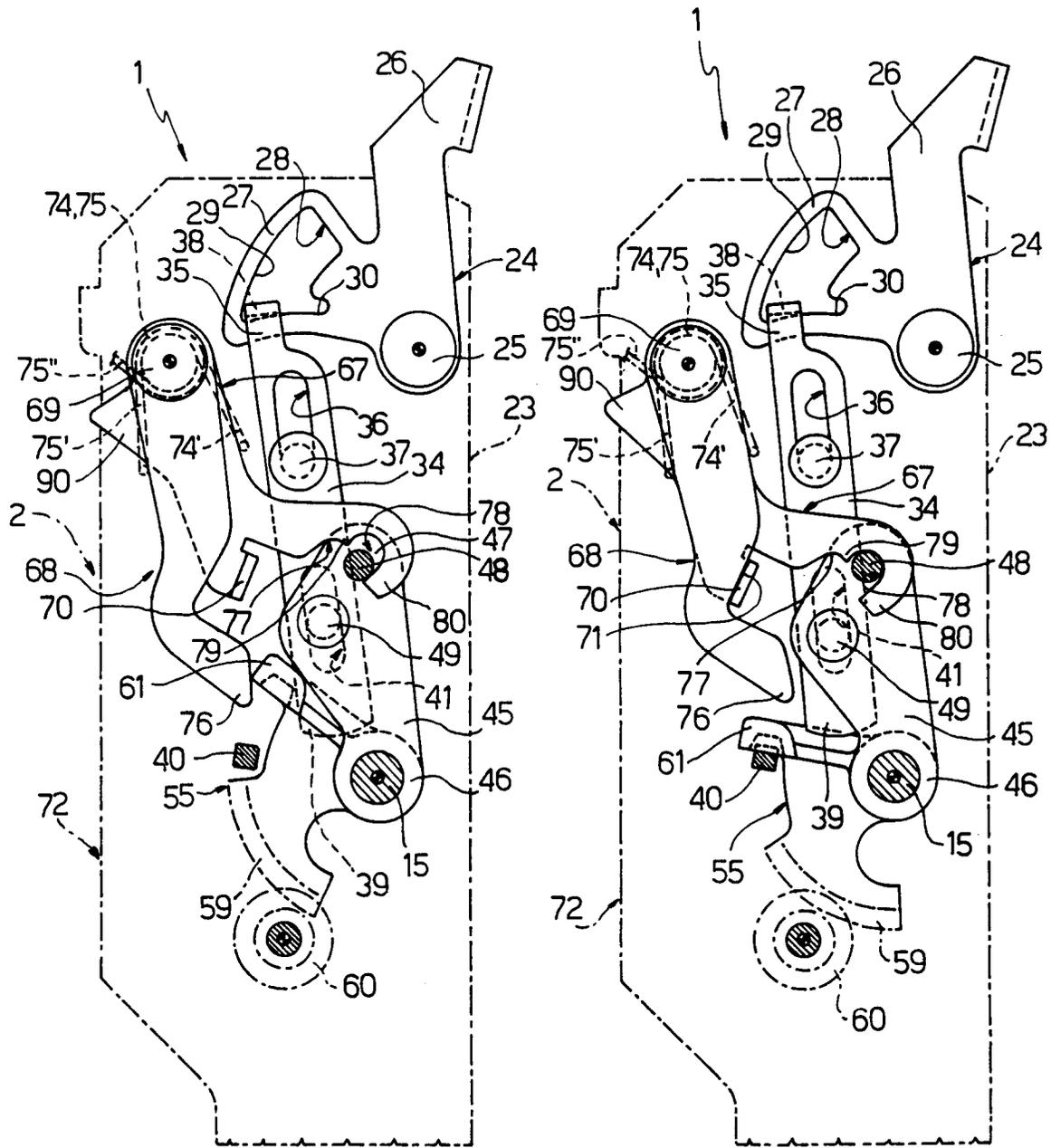


Fig. 5

Fig. 6

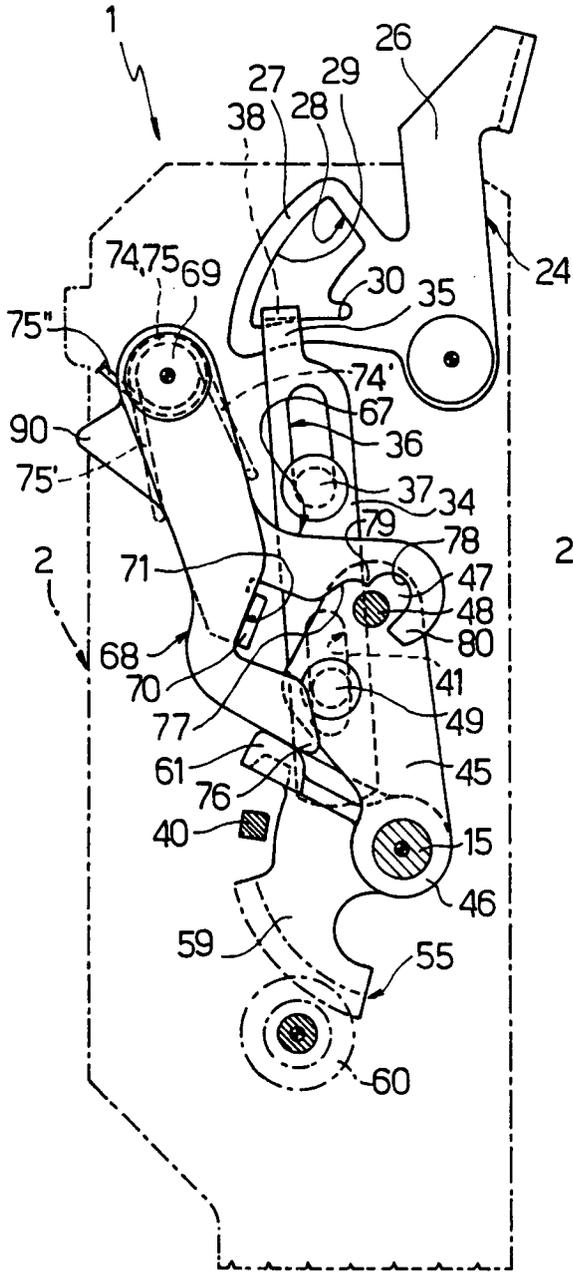


Fig.7

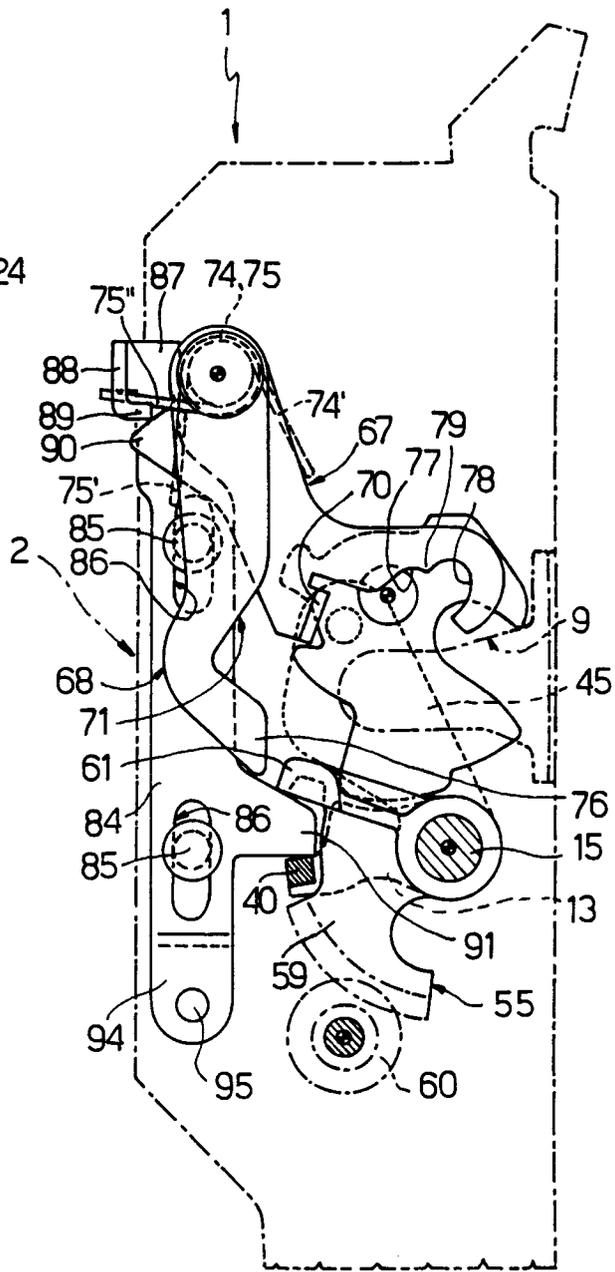


Fig.8



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Application Number
EP 95 11 5642

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)
X	FR-A-2 635 355 (KIEKERT GMBH CO KG) 16 February 1990	1	E05B47/06 E05B63/00
Y	* page 2, line 13 - page 3, line 38 * * page 4, line 24 - page 8, line 18; figures * ---	2-4,9-12	
X	FR-A-2 452 564 (KIEKERT SOEHNE ARN) 24 October 1980	1,12	
A	* page 6, line 1 - page 10, line 35; figures * * page 1, line 1 - page 5, line 21 * ---	2,4-11	
X	WO-A-94 01644 (BOSCH GMBH ROBERT ;URSEL ECKHARD (DE); DILGER WERNER (DE); SCHAPER) 20 January 1994	1,12	
A	* page 3, paragraph 3 - page 10, line 6; figures * ---	4-11	
Y	EP-A-0 267 423 (AISIN SEIKI) 18 May 1988	2-4	
A	* column 7, line 33 - column 15, line 23; figures * * column 3, line 45 - column 5, line 38 * ---	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Y	GB-A-2 268 966 (FORD MOTOR CO) 26 January 1994	9-12	E05B
A	* page 3, line 20 - page 8, line 16; figures * -----	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 January 1996	Examiner Henkes, R
CATEGORY OF CITED DOCUMENTS		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	
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