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(54) **Electrically operated vehicle door lock**

Elektrisch betätigtes Autotürschloss

Serrure actionnée électriquement pour porte de véhicule

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Description

[0001] The present invention relates to an electrically operated lock, particularly for a vehicle door

[0002] 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.

[0003] 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).

[0004] 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.

[0005] 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.

[0006] 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.

[0007] 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 EP 0 589 158 discloses an electrically operated vehicle door lock as defined in the preamble of claim 1.

[0008] 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.

[0009] According to the present invention, there is provided an electrically operated vehicle door lock as claimed in claim 1.

[0010] 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.

[0011] Number 1 in Figures 1 and 2 indicates an electrically controlled lock for the door 101 of a vehicle 102 (Figure 9).

[0012] 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).

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] 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.

[0021] 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.

[0022] 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.

[0023] Thrust portion 61 cooperates with a micro-switch 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.

[0024] 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.

[0025] 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.

[0026] As described later on, seats 77, 78 are engaged by pin 48 of safety control lever 45.

[0027] 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.

[0028] 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.

[0029] 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.

[0030] 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).

[0031] 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.

[0032] 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.

[0033] 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.

[0034] Figures 5 and 6 show the intermediate and final positions of the safety lock function, i.e. for disabling manual release of the lock.

[0035] 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.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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.

[0041] The advantages of lock 1 according to the present invention will be clear from the foregoing description.

[0042] 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.

[0043] 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.

[0044] Clearly, changes may be made to lock 1 as described and illustrated herein without, however, departing from the scope of the present invention as defined in claim 1.

[0045] 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); a safety mech-

anism (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); a single actuator (50) for electrically actuating the lock mechanism (3) moving it to said release position, and for switching the safety mechanism (5) from said safety-on status to said safety-off status and vice versa; 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); and 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;

said safety mechanism (5) comprising 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; and return means (51) for restoring said safety control lever (45) to said first position, **characterized by** comprising 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.

2. A lock as claimed in Claim 1, **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).

3. A lock as claimed in Claim 1 or 2, **characterized in**

that said lock mechanism (3) comprises a fork (12) and a catch (13); said transmission means comprising 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).

4. A lock as claimed in Claim 3, **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).
5. A lock as claimed in Claim 3 or 4, **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).
6. 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).
7. A vehicle as claimed in Claim 6, **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).
8. A vehicle as claimed in Claim 6 or 7, **characterized in that** said remote-control element is a Bowden cable (96) operated from the boot (107) of said vehicle (102).

Patentansprüche

1. Elektrisch betätigtes Fahrzeugtürschloß (1) des Typs mit einem Schließmechanismus (3), der bewegbar ist zwischen einer Entriegelungsposition, die eine Relativbewegung des Schlosses (1) und eines Anschlagelementes (4) zueinander zuläßt, und einer Schließposition, in welcher dieser an das

Anschlagelement (4) angreift und dieses daran hindert, sich in bezug zu dem Schloß (1) zu bewegen; einem handbetätigten Entriegelungshebel (24); einem Sicherheitsmechanismus (5), der zwischen dem Entriegelungshebel (24) und dem Schließmechanismus (3) angeordnet ist und so ausgebildet ist, daß er einen Sicherheits-Aus-Status annimmt, in welchem der Entriegelungshebel (24) mechanisch mit dem Schließmechanismus (3) verbunden ist und diesen lösen kann, und einen Sicherheits-Ein-Status annimmt, in welchem der Entriegelungshebel (24) von dem Schließmechanismus (3) getrennt ist; einem einzelnen Stellglied (50) zum elektrischen Betätigen des Schließmechanismus (3), um diesen in die Entriegelungsposition zu bewegen, und zum Umschalten des Sicherheitsmechanismus (5) von dem Sicherheits-Ein-Status zu dem Sicherheits-Aus-Status und umgekehrt; einer durch das Stellglied (50) betätigten Übertragungseinrichtung (55) in einer Ruheposition, welche mit dem Schließmechanismus (3) im Verlauf eines Arbeitstaktes in einer ersten Betriebsrichtung des Stellgliedes (50) und mit dem Sicherheitsmechanismus (5) im Verlauf eines Arbeitstaktes in einer zweiten Betriebsrichtung des Stellgliedes (50) zusammenwirkt; und einer Steuereinrichtung (99, 62) zum Steuern des Stellgliedes (50) und zum Zurückbringen der Übertragungseinrichtung (55) in die Ruhestellung am Ende jedes der Arbeitstakte; wobei der Sicherheitsmechanismus (5) umfaßt einen Sicherheits-Steuerhebel (45), der durch die Übertragungseinrichtung (55) zwischen einer ersten und einer zweiten Position bewegbar ist, die den zwei unterschiedlichen Zuständen des Sicherheitsmechanismus (5) im Verlauf eines Arbeitstaktes in der zweiten Betriebsrichtung des Stellgliedes entsprechen; und Rückkehrmittel (51) zum Zurückbringen des Sicherheits-Steuerhebels (45) in die erste Position; **dadurch gekennzeichnet, dass** er umfaßt Verriegelungsmittel (67) zum Verriegeln des Sicherheits-Steuerhebels (45) in der zweiten Position; und Entriegelungsmittel (68), die durch die Übertragungseinrichtung (55) im Verlauf eines nachfolgenden Arbeitstaktes in der zweiten Betriebsrichtung des Stellgliedes betätigt werden, um so mit den Verriegelungsmitteln zusammenzuwirken und diese von dem Steuerhebel zu lösen.

2. Schloß nach Anspruch 1, **dadurch gekennzeichnet, daß** die Verriegelungsmittel umfassen einen Sicherheits-Verriegelungshebel (67), der Eingreifmittel (77, 78) zum Angreifen an den Sicherheits-Steuerhebel (45) in der ersten und der zweiten Position desselben aufweist; und ein erstes Elastikmittel (74), das auf den Sicherheits-Verriegelungshebel (67) einwirkt, um das Eingreifmittel (77, 78) in festem Kontakt an dem Steuerhebel (45) zu halten; wobei das Entriegelungsmittel umfaßt einen Si-

cherheits-Entriegelungshebel (68), der durch die Übertragungseinrichtung (55) betätigt wird und ein Einweg-Eingreifmittel (70) zum Angreifen an den Verriegelungshebel aufweist, welches in einer solchen Drehrichtung aktiv ist, daß es den Sicherheits-Entriegelungshebel (67) von dem Sicherheits-Steuerhebel (45) löst; und ein zweites Elastikmittel (75), das auf den Sicherheits-Entriegelungshebel (68) wirkt, um das Einweg-Eingreifmittel (70) in Berührung mit dem Sicherheits-Verriegelungshebel (67) zu halten und den Sicherheits-Entriegelungshebel (68) zur Betätigung durch die Übertragungseinrichtung (55) vorzupositionieren.

3. Schloß nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** der Verriegelungsmechanismus (3) umfaßt eine Gabel (12) und eine Falle (13); wobei die Übertragungseinrichtung umfaßt ein Übertragungselement (55), das an einem Scharnierstift (15) angelenkt ist und einen gezahnten Abschnitt (59) aufweist, der winklig mit einem Ausgangsteil (60) des Stellgliedes (50) verbunden ist, und einen im wesentlichen radialen Schubabschnitt (61), der mit dem Sicherheits-Steuerhebel (45), dem Sicherheits-Entriegelungshebel (68) und mit einem Stift (40) auf der Falle (13) zusammenwirkt.
4. Schloß nach Anspruch 3, **dadurch gekennzeichnet, daß** der Sicherheitsmechanismus (5) einen Übertragungshebel (34) umfaßt, der zwischen dem handbetätigten Entriegelungshebel (24) und der Falle (13) angeordnet ist; wobei der Übertragungshebel (34) durch den Sicherheits-Steuerhebel (45) zwischen einer Sicherheits-Aus-Stellung, in welcher dieser mechanisch mit dem handbetätigten Entriegelungshebel (24) verbunden ist, und einer Sicherheits-Ein-Stellung, in welcher dieser in bezug zu dem handbetätigten Entriegelungshebel (24) freiliegt, bewegbar ist.
5. Schloß nach Anspruch 3 oder 4, **dadurch gekennzeichnet, daß** es umfaßt eine handbetätigte Not-Entriegelungseinrichtung (84), die mit einem mechanischen Femsteuerungselement (96) verbunden ist und ein Schubmittel (91) aufweist, das mit der Falle (13) zusammenwirkt, um den Schließmechanismus (3) in die Entriegelungsposition zu bewegen, und mit dem Sicherheits-Verriegelungshebel (67), um den Sicherheits-Steuerhebel (45) mit Hilfe des Femsteuerungselements (96) freizubekommen.
6. Fahrzeug (102) mit wenigstens einer Tür (101); einem Türpfosten (103), der die Öffnung der Tür begrenzt; und einer Schloßeinrichtung (1,4), die zwischen der Tür (101) und dem Türpfosten (103) angeordnet ist; **dadurch gekennzeichnet, daß** die Schloßeinrichtung ein Schloß (1) nach einem der

vorstehenden Ansprüche umfaßt und an dem Türpfosten (103) sitzt; und einem Anschlag (4), der an der Tür (101) sitzt.

- 5 7. Fahrzeug nach Anspruch 6, **dadurch gekennzeichnet, daß** der handbetätigte Entriegelungshebel (24) des Schlosses (1) mit einem handbetätigten Teil (105) verbunden ist, das innerhalb des Fahrzeugs (102) angeordnet ist.
- 10 8. Fahrzeug nach Anspruch 6 oder 7, **dadurch gekennzeichnet, daß** das Fernsteuerelement ein Bowdenzug (96) ist, der vom Kofferraum (107) des Fahrzeugs (102) aus betätigt wird.

Revendications

- 20 1. Serrure à commande électrique (1) de porte de véhicule, du type comprenant un mécanisme de verrouillage (3) mobile entre une position de déblocage permettant un mouvement relatif entre la serrure (1) et un élément percuteur (4), et une position de verrouillage dans laquelle il est en prise avec l'élément percuteur (4) et l'empêche de se déplacer par rapport à la serrure (1), un levier de déblocage manuel (24) ; un mécanisme de sécurité (5) interposé entre le levier de déblocage (24) et le mécanisme de verrouillage (3), et conçu pour prendre un état à sécurité hors service dans lequel le levier de déblocage (24) est lié mécaniquement au mécanisme de verrouillage (3) et peut le débloquent, et un état à sécurité en service dans lequel le levier de déblocage (24) est dégagé du mécanisme de verrouillage (3) ; un actionneur unique (50) pour actionner électriquement le mécanisme de verrouillage (3) pour le mettre en position de déblocage, et pour faire passer le mécanisme de sécurité (5) de l'état à sécurité en service à l'état à sécurité hors service et vice versa ; des moyens de transmission (55) actionné par l'actionneur (50) à partir d'un position inactive, et qui coopère avec le mécanisme de verrouillage (3) au cours d'une course d'actionnement dans une première direction d'actionnement de l'actionneur (50), et avec le mécanisme de sécurité (5) au cours d'une course d'actionnement dans une deuxième direction d'actionnement de l'actionneur (50) ; et des moyens de commande (99, 62) pour commander l'actionneur (50) et ramener les moyens de transmission (55) en position inactive à la fin de chaque course d'actionnement ;
le mécanisme de sécurité (5) comprenant un levier de commande de sécurité (45) que les moyens de transmission (55) peuvent déplacer entre une première position et une deuxième position correspondant à deux états différents du mécanisme de sécurité (5) au cours d'une course d'actionnement dans la deuxième direction d'actionnement

de l'actionneur ; et des moyens de rappel (51) pour ramener le levier de commande de sécurité (45) dans sa première position, **caractérisée par le fait qu'elle** comprend des moyens de verrouillage (67) pour verrouiller le levier de commande de sécurité (45) dans sa deuxième position ; et des moyens de déblocage (68) actionnés par les moyens de transmission (55) au cours d'une course suivante d'actionnement dans la deuxième direction d'actionnement de l'actionneur, de façon à coopérer avec les moyens de verrouillage et les dégager du levier de commande.

2. Serrure selon la revendication 1, **caractérisée par le fait que** les moyens de verrouillage comprennent un levier de verrouillage de sécurité (67) présentant des moyens de prise (77, 78) destinés à venir en prise avec le levier de commande de sécurité (45) dans la première et la deuxième positions de celui-ci ; et des premiers moyens élastiques (74) agissant sur le levier de verrouillage de sécurité (67) pour maintenir les moyens de prise (77, 78) en contact ferme avec le levier de commande (45) ; les moyens de déblocage comprenant un levier de déblocage de sécurité (68) actionné par les moyens de transmission (55) et présentant des moyens de prise unidirectionnels (70) destinés à venir en prise avec le levier de verrouillage et qui sont actifs dans un sens de rotation tel qu'ils dégagent le levier de verrouillage de sécurité (67) du levier de commande de sécurité (45) ; et des deuxièmes moyens élastiques (75) agissant sur le levier de déblocage de sécurité (68) pour maintenir les moyens de prise unidirectionnels (70) en contact avec le levier de verrouillage de sécurité (67), et pour prédisposer le levier de déblocage de sécurité (68) à un actionnement par les moyens de transmission (55).
3. Serrure selon l'une des revendications 1 et 2, **caractérisée par le fait que** le mécanisme de verrouillage (3) comprend une fourche (12) et un élément d'arrêt (13) ; les moyens de transmission comprenant un élément de transmission (55) monté pivotant sur un axe d'articulation (15) et présentant une partie dentée (59) jointe angulairement à un élément de sortie (60) de l'actionneur (50), et une partie sensiblement radiale de poussée (61) qui coopère avec le levier de commande de sécurité (45), avec le levier de déblocage de sécurité (68) et avec un axe (40) prévu sur l'élément d'arrêt (13).
4. Serrure selon la revendication 3, **caractérisée par le fait que** le mécanisme de sécurité (5) comprend un levier de transmission (34) interposé entre le levier de déblocage manuel (24) et l'élément d'arrêt (13) ; ce levier de transmission (34) pouvant être déplacé par le levier de commande de sécurité (45) entre une position à sécurité hors service dans la-

quelle il est lié mécaniquement au levier de déblocage manuel (24) et une position à sécurité en service dans laquelle il est inactif par rapport au levier de déblocage manuel (24).

5. Serrure selon l'une des revendications 3 et 4, **caractérisée par le fait qu'elle** comprend des moyens de déblocage manuels de secours (84) relié à un élément mécanique de commande à distance (96) et présentant des moyens de poussée (91) qui coopèrent avec l'élément d'arrêt (13) pour amener le mécanisme de verrouillage (3) en position de déblocage, et avec le levier de verrouillage de sécurité (67) pour libérer le levier de commande de sécurité (45) au moyen de l'élément de commande à distance (96).
6. Véhicule (102) comprenant au moins une porte (101) ; un montant de porte (103) délimitant l'ouverture de la porte ; et des moyens de verrouillage (1, 4) interposés entre la porte (101) et le montant de porte (103) ; **caractérisé par le fait que** les moyens de verrouillage comprennent une serrure (1) selon l'une des revendications précédentes montée sur le montant de porte (103) et un percuteur (4) monté sur la porte (101).
7. Véhicule selon la revendication 6, **caractérisé par le fait que** le levier de déblocage manuel (24) de la serrure (1) est relié à un élément à commande manuelle (105) situé à l'intérieur du véhicule (102).
8. Véhicule selon l'une des revendications 6 et 7, **caractérisé par le fait que** l'élément de commande à distance est un câble bowden (96) actionné depuis le coffre (107) du véhicule (102).

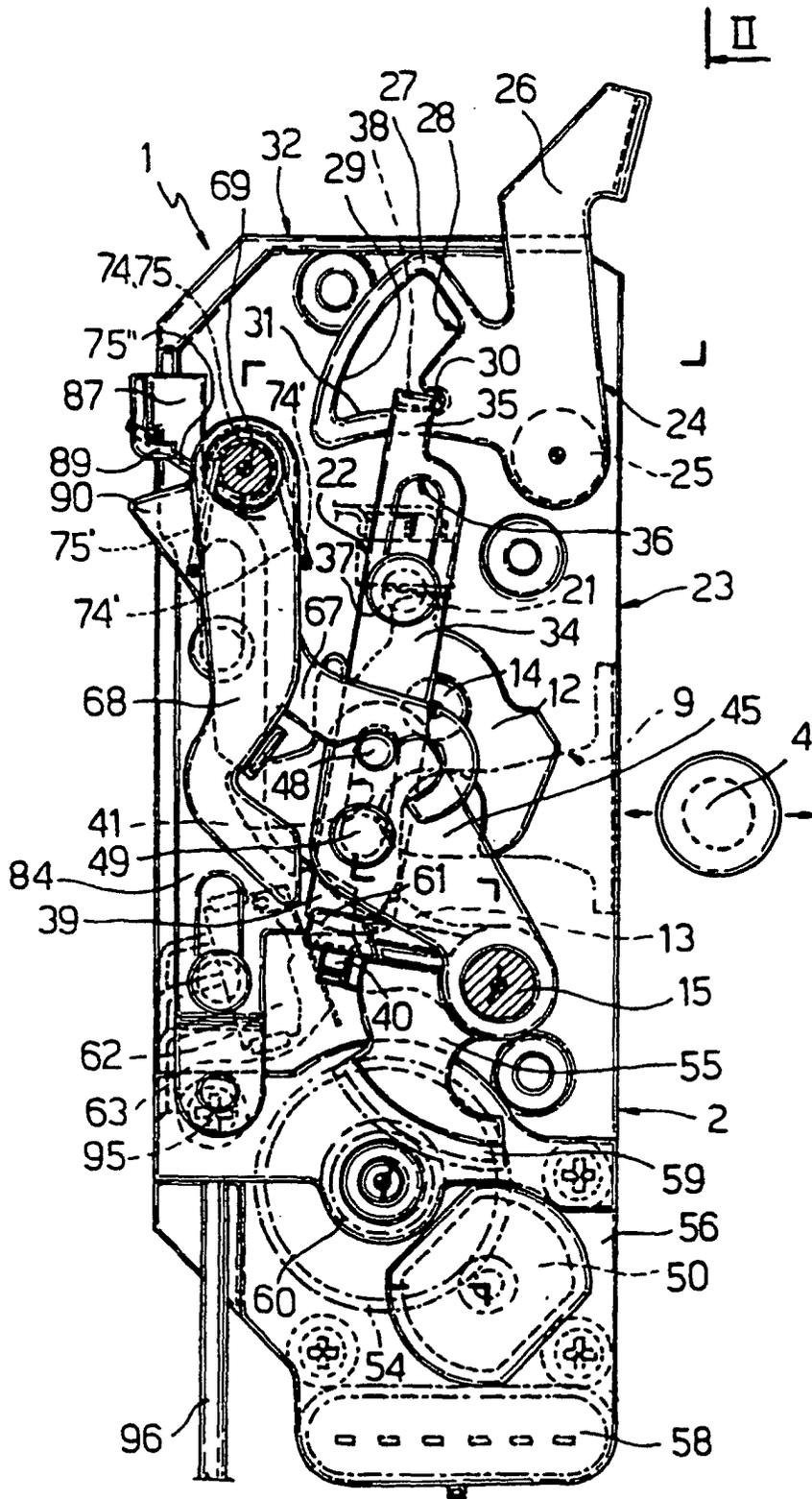


Fig.1

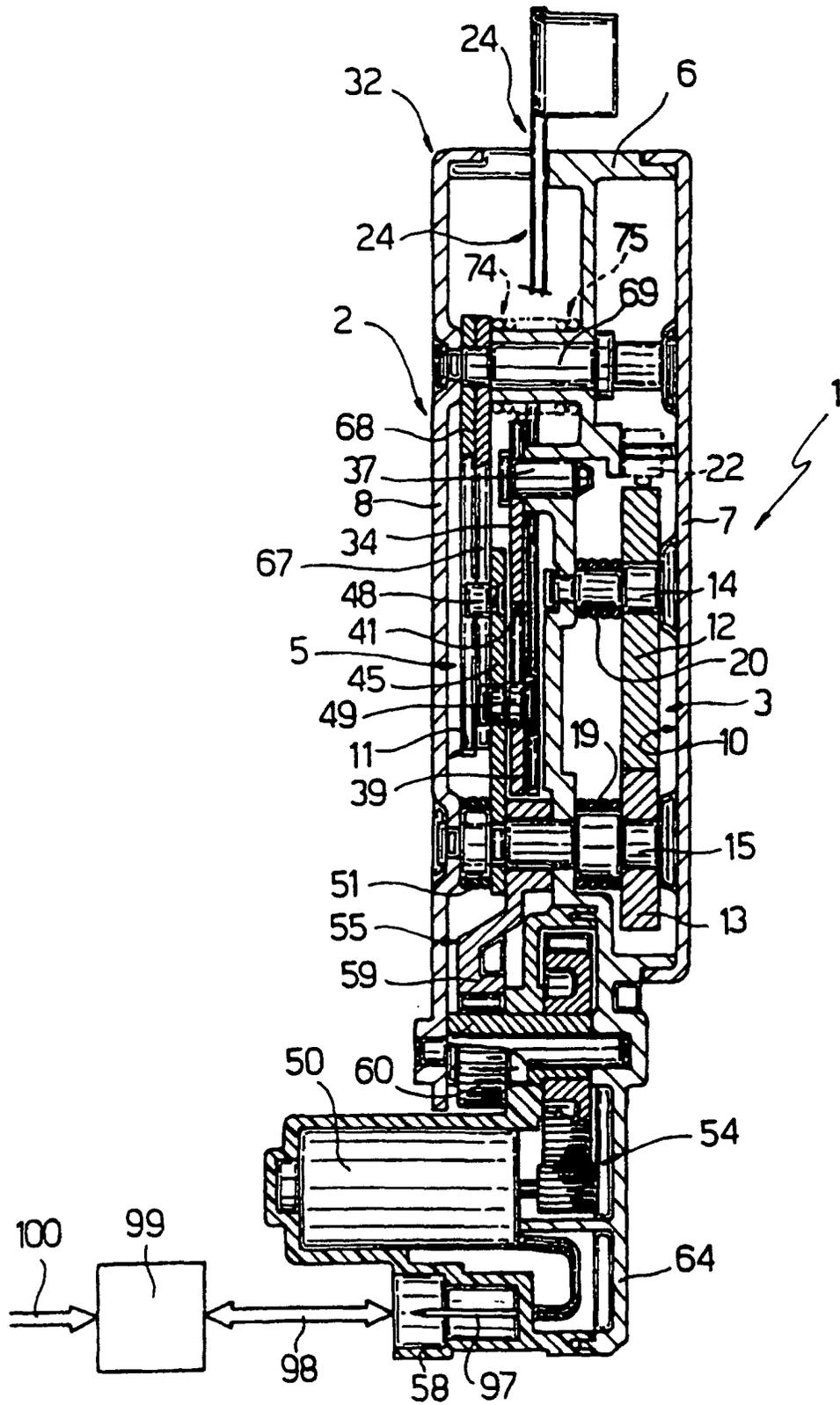
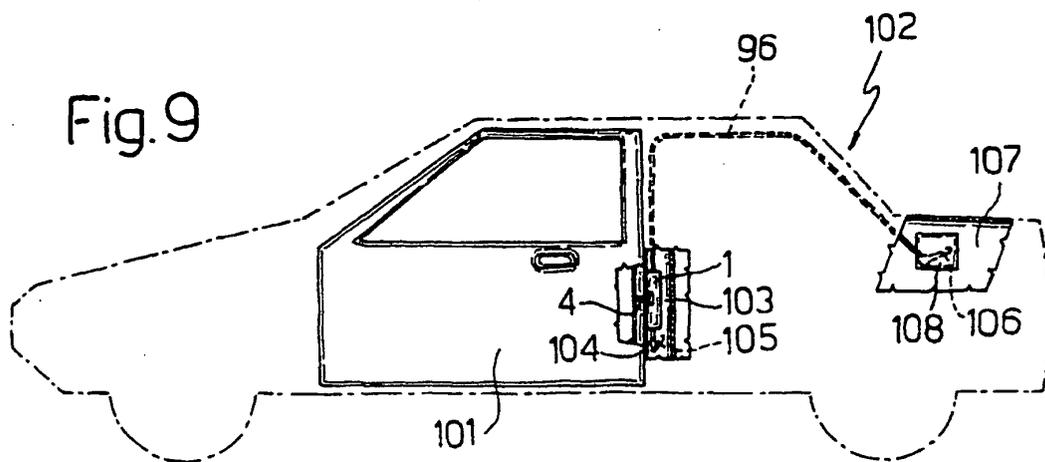
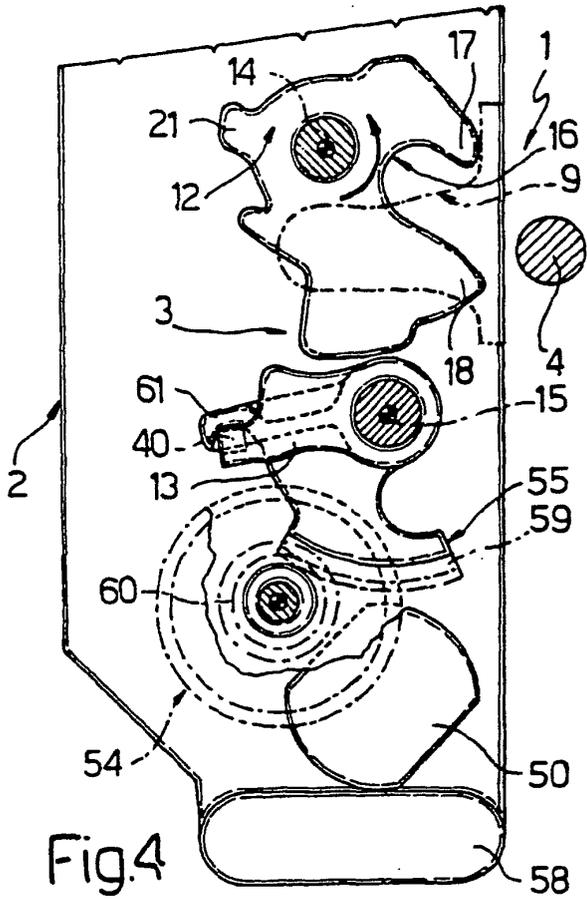
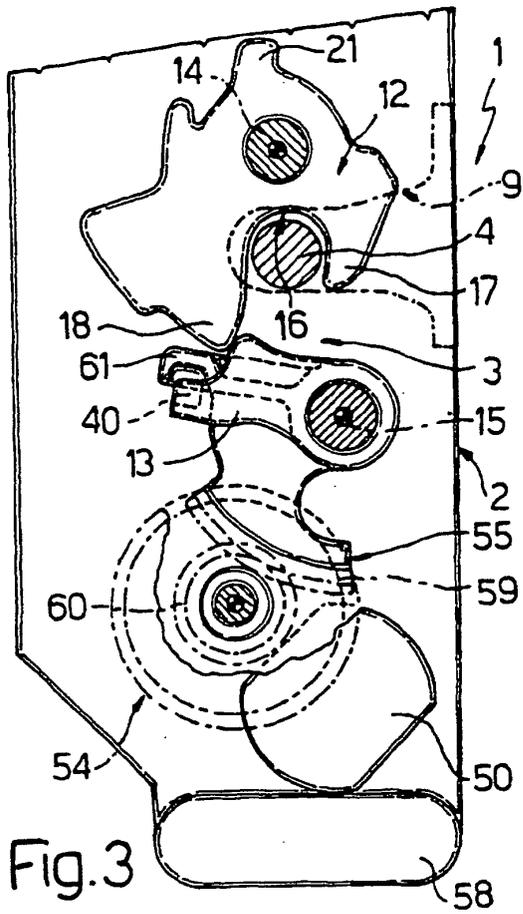


Fig. 2



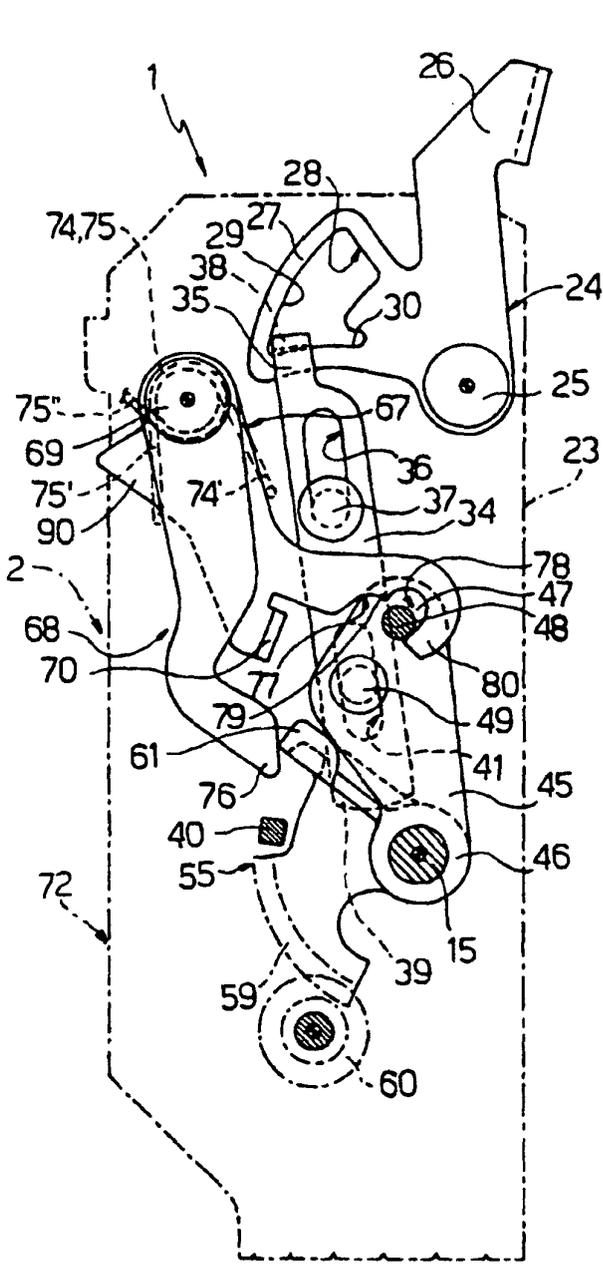


Fig. 5

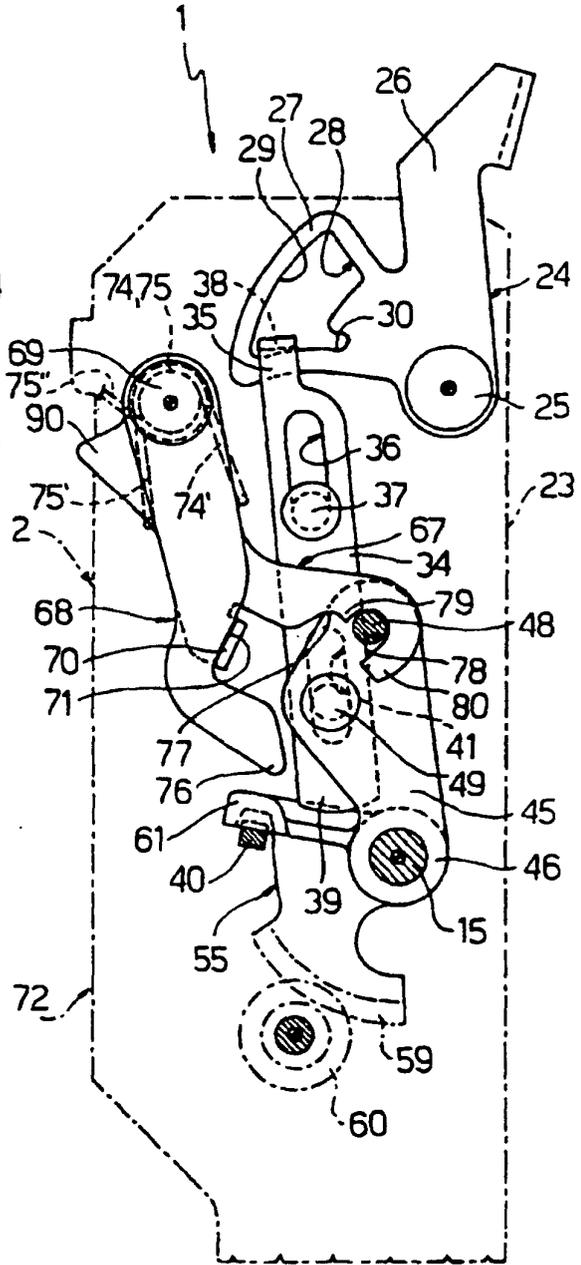


Fig. 6

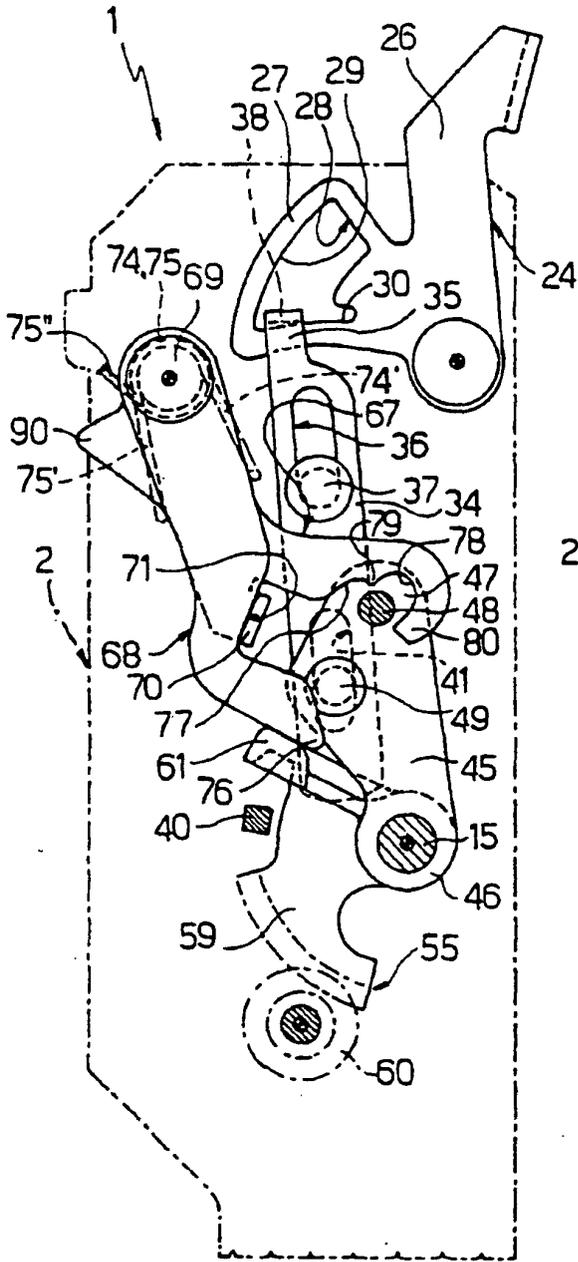


Fig.7

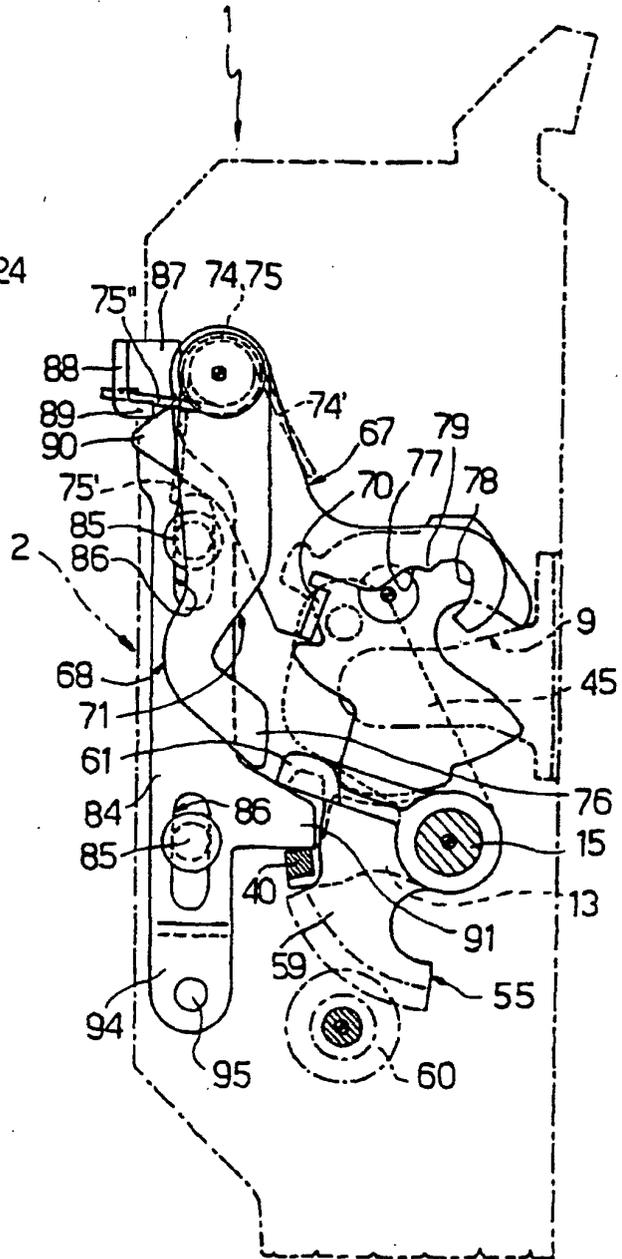


Fig.8