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(54) Latch

(57) An override unlocking latch having a latch bolt for releasably retaining a latch striker the latch bolt having a closed and open position,

a rotatable pawl having an engaged position for retaining the latch bolt in the closed position and a released position in which the latch bolt is not retained in the closed position,
an inside release lever (18) having a rest position and an actuated position and being operable to rotate the pawl to the released position,
an outside release lever operable to rotate the pawl to the released position,
a locking system having a locked condition in which operation of the outside release lever does not rotate the pawl to the released position and an unlocked condition in which operation of the outside release lever rotates the pawl to the released position,
an override unlocking system (21) having a locked position and an unlocked position corresponding to the locked and unlocked conditions respectively,
the override unlocking system further including an over ride unlocking lever having a first arm and a second arm,
the inside release lever (18) having a first abutment operable to rotate the inside release lever, a second abutment (59) engageable with a pawl release abutment to move the pawl to the release position and a third abutment engageable with the override unlocking lever, in which, starting in the locked condition, actuation of the first abutment causes the inside lever to rotate such that the second abutment engages the pawl release abutment to move the pawl to the released position thereby allowing the latch bolt to open, and the third abutment engages the first arm of the override unlocking lever to move the override second arm to engage a part of the locking system to move the locking system towards the unlocked condition, in which an end of the first arm is resiliently moveable relative to an end of the second arm.

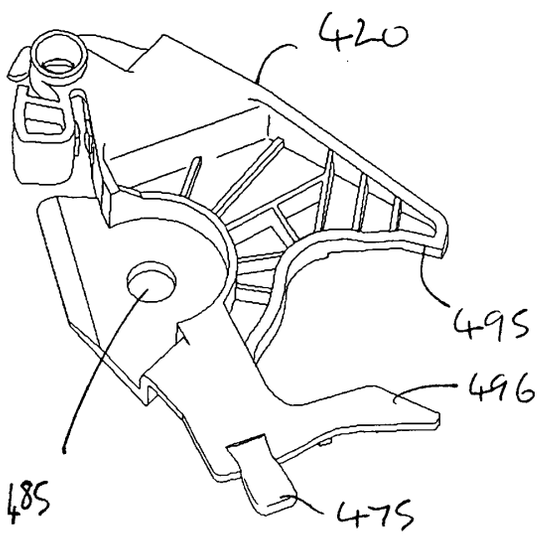

FIG 16

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Description

[0001] The present invention relates to a latch, in particular an override unlocking latch, especially for a road vehicle such as a car or truck.

[0002] The prior art override unlocking latch 10 (described below) has certain problems (described below).

[0003] An object of the present invention is to provide an improved form of override unlocking latch.

[0004] Thus, according to the present invention there is provided latch according to the accompanying independent claims.

[0005] The invention will now be described, by way of example only, with respect to the accompanying drawings in which:-

Figures 1 to 4 are isometric views of part of a known latch 10,
Figures 5 to 8 are side isometric views of certain components of figure 1,
Figure 5A shows a schematic view of certain components of latch 10,
Figures 9 to 14 show various views of an override unlocking latch according to the present invention,
Figure 15 shows a second embodiment of an override unlocking lever for use with an override unlocking latch according to the present invention, and
Figures 16 to 20B show various views of components of a second embodiment of an override unlocking latch according to the present invention.

[0006] With reference to figures 1 to 8 there is shown a known override unlocking latch 10 (only part of which is shown). Latch 10 is typically mounted on a door of a vehicle and the door will include an inside release handle 12 (shown schematically in figure 1) and an outside release handle 14 (shown schematically in figure 1). Latch 10 has a locking system part of which is shown generally at 16.

[0007] The latch 10 further includes a latch bolt, in the form of a rotatable claw which is obscured by the components shown in figure 1 but which rotates about claw axis A. The claw releasably retains a latch striker (not shown) which is typically mounted on fixed structure of the vehicle, such as a B-post or C-post of a car. The claw has a closed position wherein it retains the door in a closed position, and an open position wherein the door can be opened. The claw can be retained in its closed position by a rotatable pawl, which is obscured by the components shown in figure 1 but which rotates about pawl axis B. The pawl has an engaged position wherein it can retain the claw in the closed position and a released position wherein the claw is not retained in the closed position, i.e. the claw is free to move to the open position when the associated door is opened. The applicant's copending European patent application number EP01302300.7 shows a typical example of a striker, rotating claw, and rotatable pawl.

[0008] In summary, operation of the inside release handle 12 causes the inside release lever 18 to simultaneously release the latch and put the locking system into an unlocked condition by rotating the override unlocking lever 20 as will be further described below. This functionality is known as "override unlocking" and it ensures that when a vehicle user exits the vehicle by opening the door using the inside release handle, that user is not subsequently locked out of the vehicle upon closing of the door.

[0009] In more detail, latch 10 includes a metal retention plate 22 having a claw pivot pin and a pawl pivot pin secured thereto with the pivot pin axes being coincident with the respective claw and pawl axes A and B. A plastics housing 24 is mounted on the claw and pawl pivot pins and receives various components of the latch. A metallic plate 26 (known as a backplate) (not shown in figures 3 or 4) includes holes 27 and 28 for mounting on the claw and pawl pivot pins respectively, and rectangular holes 29 and 30 for mounting on tabs 31 and 32 of the retention plate 22. During manufacture, the ends of the claw and pawl pivot pins and the tabs are plastically deformed to secure the plate 26 to the retention plate 22, thereby sandwiching the plastics housing 24 and certain other latch components.

[0010] A pawl lifter 34 (best seen in figures 3 and 4) is mounted on the pawl pivot pin and is rotationally secured to the pawl via projections (not shown) which project downwardly when viewing figures 3 and 4 and engage in recesses in the pawl. Pawl lifter 34 includes an inside release arm 36 (which is generally L-shaped with one leg of the L projecting radially relative to axis B and the other leg of the L projecting generally upwardly when viewing figures 3 and 4, i.e. parallel to axis B), an outside release arm 38 and a spring arm 40. A spring (not shown) engages spring arm 40 to bias the pawl lifter 34 in a clockwise direction when viewing figures 3 and 4.

[0011] In summary when the inside release handle 12 is operated, the inside release lever 18 is rotated and engages inside release arm 36 of pawl lifter 34 to rotate the pawl (anticlockwise when viewing figures 3 and 4) to the release position, thereby releasing the latch, as will be further described below. When the outside release handle 14 is operated when the latch is in the unlocked condition, certain components of the latch locking system operate such that peg 41A of lock link 41 engages outside release arm 38 to rotate the pawl lifter anticlockwise when viewing figures 3 and 4 thereby moving the pawl to the released position, as will be further described below.

[0012] Plate 26 further includes hole 42 having axis C and hole 44 having axis D. The regions of plate 26 immediately surrounding holes 42 and 44 are parallel to each other, and are orthogonal relative to the regions of plate 26 immediately surrounding holes 27 and 28. Thus, axis A and B are parallel to each other. Axis C and D are parallel to each other. Axis A and B are skew relative to axis C and D. A pivot pin (not shown) is secured

in hole 42 and rotatably mounts inside release lever 18 and inside actuating lever 19. Inside release lever 18 therefore pivots about axis C and includes a first forked arm 46, a second arm 48 and a third arm 50.

[0013] Forked arm 46 includes fork tines 52 and 53 which together define slot 54. An inner edge of fork tine 53 defines a first abutment 56 operable to rotate the inside release lever as will be further described below.

[0014] Second arm 48 has a tab 58 bent therefrom which defines a second abutment 59 which is engageable with the inside release arm 36 (also known as a pawl release abutment) as will be further described below.

[0015] Third arm 50 includes a tab 60 bent therefrom defining a third abutment 61 which is engageable with the override unlocking lever 20 as will be further described below.

[0016] Inside actuating lever 19 includes a forked arm 63 having fork tines 64 and 65. Fork tines 64 and 65 define a slot 66 therebetween. Fork tine 65 includes a further arm 67 bent therefrom having a forked end 68 which receives a cable nipple of a bowden cable inner of bowden cable 69 (shown schematically in figures 1 and 7).

[0017] A pin 70 (shown schematically in figures 5 and 6) can be moved between the figure 5 and figure 6 positions. When in the figure 5 position, pin 70 is at a region of slot 54 which has been locally widened by recess 55 and is also in a region of slot 66 that has been locally widened by recess 66A. Thus, when the inside release handle 12 is operated, bowden cable 69 causes the inside actuating lever 19 to rotate clockwise about axis C. However, recesses 55 and 66A and pin 70 are dimensioned such that inside release lever 18 does not move, and hence the latch does not open. Thus, pin 70 can be used to provide a child safety "on" condition, and/or a superlocked condition of the latch.

[0018] As shown in figure 6 pin 70 is situated in a narrow portion of slots 54 and 66. Under these circumstances, operation of the inside release handle 12 again causes the inside actuating lever 19 to rotate in a clockwise direction about axis C, but now pin 70 is moved by the inside actuating lever 19 and engages and moves the first abutment 56 of the inside release lever 18.

[0019] A pivot pin (not shown) is secured in hole 44 and rotatably mounts override unlocking lever 20. Thus override unlocking lever 20 is pivotable about axis D.

[0020] Override unlocking lever 20 includes a first arm 72 having a first surface 73 and a second arm 74 having an override abutment 75.

[0021] Override unlocking lever 20 includes pivot bearing surfaces 76 and 77 which face each other. Pivot bearing surface 77 is resiliently mounted relative to pivot bearing surface 76 to facilitate the mounting of the override unlocking lever 20 onto its associated pivot pin via slot 78. In particular, slots 79 and 80 are provided such that relatively narrow regions 81 and 82 are formed. During assembly of the override unlocking lever 20 onto its associated pivot pin via slot 78, relatively narrow portions 81 and 82 can flex to allow the narrow portion of slot 78 to expand as it passes over the pivot pin and then contract as the pivot pin fully engages against pivot bearing surfaces 76 and 77.

[0022] However, the override unlocking lever 20 is sufficiently rigid such that, in use, the first arm 72 is substantially rigidly mounted relative to second arm 74.

[0023] Figure 2A shows schematically an outside actuating lever 6 having a first arm 6A and a second arm 6B. Outside actuating lever 6 is pivotally mounted about axis B just above the pawl lifter 34 (when viewing figure 2) but below backplate 26. The end of second arm 6B is connected to the outside bowden cable 83. First arm 6A engages peg 41A when the outside door handle is operated and the latch is in an unlocked condition, as will further be described below.

[0024] With the latch unlocking system is in an unlocked condition, peg 41A is positioned proximate outside release arm 38 of pawl lifter 34. Operation of outside release handle 14 causes bowden cable 83 (shown schematically in figure 1) to operate an outside release system (in this case the pivotable outside actuating lever 6) that acts on peg 41A to move the pawl lifter in an anticlockwise direction when viewing figure 2 to release the latch. The latch locking system can be operated to change to a locked condition which results in peg 41A being moved in the direction of arrow E (figure 2) such that it no longer faces the outside release arm 38 of the pawl lifter 34. Under such circumstances, operation of the outside release handle will again operate the outside release system, but since peg 41A has been removed from the transmission path between the outside release system and the outside release arm 38, the pawl lifter will not move and hence the latch will remain closed. The latch locking system can be alternated between a locked and unlocked condition by one or more of manual operation of an inside sill button, manual operation of an outside key barrel or powered movement of a lock motor, such as an electric lock motor.

[0025] Lock link 41 is pivotally mounted at end 41b on pivot pin 2 of common lock lever 3. Common lock lever 3 is pivotally mounted about axis G and includes an array of gear teeth 4. Common lock lever 3 also includes two spaced apart lugs 5A and 5B which together define a fork within which sits override abutment 75. As shown in figures 1 to 4, the latch is in the unlocked condition since common lock lever 3 has been pivoted anticlockwise about axis G thereby moving peg 41A of lock link 41 to a position between arm 6A of outside actuating lever 6 and outside release arm 30A of the pawl lifter 34. To lock the latch, common lock lever 3 can be pivoted clockwise about axis G whereupon pivot pin 2 will move the lock link 41 and hence withdraw peg 41 A from between first arm 6A and outside release arm 38. Under such circumstances operation of the outside door handle will simply cause outside actuating lever 6 to rotate anticlockwise about axis B whereupon first arm 6A will

approach outside release arm 38. However, the design of the system is such that the amount of travel available on the outside door handle does not result in first arm 6A actually contacting the outside release arm 38 and hence the door will not open if the outside door handle is actuated when the latch is locked.

[0026] The common lock lever 3 can be pivoted about its axis G by a motor driving a pinion having gear teeth which engage the array of gear teeth 4. Thus, the latch can be electrically locked or electrically unlocked.

[0027] It is also possible to move the common lock lever from the locked position to the unlocked position by operation of the inside door handle (override unlocking) as will further be described below.

[0028] Operation of the override unlocking is as follows:-

[0029] As shown in figure 5, the inside release lever 18 is in a rest position and the override unlocking lever is in a locked position which corresponds to a locked condition of the latch locking system i.e. the common lock lever 3 has been rotated in a clockwise direction when viewing figure 1 about axis G, thereby withdrawing peg 41A from between first arm 6A of the outside actuating lever 6 and the outside release arm 38 of the pawl lifter 34. Third abutment 61 of the inside release lever 18 faces first surface 73 of the override unlocking lever 20. Second abutment 59 is proximate the inside release arm 36 (shown schematically in figures 5 and 6). In order to open the latch using the inside release handle 12, pin 70 is moved to the narrow portion of slots 54 and 66. This ensures that inside release lever 18 is coupled to inside actuating lever 19 when the release handle is actuated. Thus, actuation of the inside release handle causes second abutment 59 of inside release lever 18 to engage inside release arm 36 causing the pawl lifter 34 to rotate anticlockwise (when viewing figure 4) about axis B, thereby causing the pawl to disengage the claw and hence allow the latch to open. Figure 5 shows schematically the inside release arm 36 (in particular that leg of L-shaped arm 36 that lies parallel to axis B as described above) in the pawl engaged position, and figure 6 shows the inside release arms 36 in the pawl released position.

[0030] Override unlocking occurs simultaneously with unlatching of the latch. Thus, actuation of the inside release handle also causes the inside actuating lever 19 to rotate clockwise about axis C which drives pin 70 into engagement with first abutment 56 of the inside release lever 18, thereby causing inside release lever 18 to also rotate clockwise about axis C. The third abutment 61 of inside release lever 18 then engages first surface 73 of override unlocking lever 20 causing override unlocking lever 20 to rotate clockwise about axis D to a position shown in figure 6. A comparison of figure 5 and figure 6 will show that the override abutment 75 has moved from the right hand position shown in figure 5 to the left hand position shown in figure 6. This in turn will have rotated the common lock lever 3 in an anticlockwise direction (when viewing figure 1) about axis G (since the override abutment 75 will have moved lug 5A). This in turn will have caused peg 41A of lock link 41 to move between first arm 6A and outside release arm 38 thereby putting the latch into an unlocked condition.

[0031] Figure 5A shows schematically those components which form a mechanical transmission path between the inside door handle and the pawl when the latch is not superlocked or is not in a child safety on mode. Thus, operation of the inside door handle 12 causes the bowden cable 69 to move which in turn moves the inside actuating lever 19 which in turn moves the pin 70 which in turn moves inside release lever 18 which in turn moves the second abutment 59 of the inside release lever 18 which in turn moves the inside release arm 36 of the pawl lifter 34 which in turn moves the pawl lifter 34 which in turn moves the pawl.

[0032] Figure 5A also shows the transmission path between the outside door handle 14 and the pawl. Thus, operation of the outside door handle when the latch is unlocked causes the outside door handle 14 to move the bowden cable 83 which in turn moves the outside actuating lever 6 which in turn moves the peg 41A of lock link 41 which in turn moves the outside release arm 38 of pawl lifter 34 which in turn moves the pawl lifter 34 which in turn moves the pawl.

[0033] Figure 5A also shows schematically the override unlocking system (generally at 21) and how it interacts with the transmission path between the inside door handle and the pawl and the transmission path between the outside door handle and the pawl. The main components of the override unlocking system are the override unlocking lever 20, the common lock lever 3, and the lock link 41. Thus, as described above, starting with the latch in a locked child safety off condition, actuation of the inside door handle will cause inside release lever 18 to move as described above. Inside release lever 18 will then also cause override unlocking lever 20 to move common lock lever 3 which in turn moves the lock link which in turn moves peg 41A to a position between first arm 6A and outside release arm 38, thereby unlocking the latch.

[0034] It is important to recognise that transmission path between the inside door handle and the pawl is independent of override unlocking lever 20 and common lock lever 3. Thus, unlatching of the latch and unlocking of the latch occur substantially simultaneously (as opposed to sequentially).

[0035] One of the problems with prior art override unlocking latch 10 is that under certain circumstances the override unlocking action of the override unlocking lever 20 does not move the latch locking system fully to the unlocked condition. Thus, it will be appreciated that, starting at the position shown in figure 5, initial clockwise rotation of inside release lever 18 will cause third abutment 61 to engage and start to move first surface 73. During this initial movement, third abutment 61 slides across first surface 73 since third abutment 61 is pivot-

ing about a different axis (axis C) to the axis (axis D) about which first surface 73 is pivoting. Part way through the movement, the top edge 61A of the third abutment moves under the bottom edge 73A of first surface 73 following which the third abutment becomes disengaged from the first surface. Further movement of the inside release lever in a clockwise direction has no effect on the override unlocking lever. Thus, under certain circumstances, due to a build up of manufacturing tolerances, the third abutment 61 may have disengaged from the first surface 73 prior to the override unlocking lever 20 reaching a position where it can be moved to the fully unlocked position.

[0036] The latch unlocking system will typically include an "overcentre" spring (not shown) which acts to hold the latch locking system in either of the locked or unlocked conditions. The overcentre spring operates such that as the latch locking system nears say its locked condition, then the overcentre spring will act to force the locking system to the locked condition. Similarly, if the latch locking system approaches its unlocked condition, then the overcentre spring will force the locking system to the unlocked condition. However, such an overcentre system requires the locking system to be moved to a position near its locked or unlocked condition before the overcentre action of the overcentre spring takes effect. If the latch locking system is not moved close enough to its locked or unlocked condition, then the overcentre spring cannot take over the final movement of the system to its fully locked or fully unlocked conditions.

[0037] As shown in figure 6, the latch locking system is in the locked condition and top edge 61A is positioned at radius R1 from axis C. Bottom edge 73 is positioned at distance D1 from axis C. In particular, radius R1 is less than distance D1. This difference arises because, during override unlocking, once bottom edge 73A is spaced from axis C by radius R1, then the overcentre spring (as mentioned above) takes over and moves bottom edge 73A to distance D1 from axis C, thereby ensuring that the override unlocking lever is in the fully unlocked position, and hence ensuring that the latch unlocking system is in the fully unlocked condition.

[0038] As mentioned above, due to build up of manufacturing tolerances top edge 61A may disengage from bottom edge 73A at a position of the override unlocking lever whereby the overcentre spring of the latch unlocking system does not move the override unlocking lever to the fully unlocked position.

[0039] A further problem with the prior art override unlocking latch 10 is that it may be possible for the override unlocking lever 20 to jam part way between the figure 5 and figure 6 positions. In particular, it may jam at a position whereby the distance D1 from axis C to bottom edge 73A is less than radius R1. If this were to happen with the inside release lever 18 in the actuated position (as shown in figure 6), then top edge 61 may become jammed under bottom edge 73A when the inside release handle is subsequently released. This would result in inside release arm 36, and hence pawl lifter 34 not fully returning to the engaged position and the latch cannot be relatched.

[0040] As mentioned above, due to a build up of manufacturing tolerances, operation of the inside door handle with the latch locked may cause the door to unlatch but remain in its locked condition. Under such circumstances, a person exiting the vehicle could be locked out of the vehicle. Furthermore, a build up of manufacturing tolerances in opposing sense could result in the latch moving to the unlocked position significantly before the latch has unlatched. Under these circumstances it is possible for the override unlocking lever 20 to prevent the inside release lever moving to the fully unlatched position and thereby prevent opening of the door by operation of the inside door handle.

[0041] Thus, the prior art override unlocking latch 10 must have certain dimensions and tolerances tightly controlled to ensure that both unlocking and unlatching are achieved by operating the inside door handle. The tight control of certain dimensions and tolerances is expensive.

[0042] In order to overcome these problems, the applicant has invented an improved override unlocking lever 120 as shown in figures 9 to 14.

[0043] Thus, an override unlocking latch 110 is provided according to the present invention by substituting the override unlocking lever 120 of figure 9 in place of the override unlocking lever 20 of figure 1.

[0044] Override unlocking lever 120 is made from a plastics material and includes a first arm 172 and a second arm 174 having an override abutment 175.

[0045] Override unlocking lever 120 includes a hole 185 which is used to mount the lever on the override unlocking lever pivot pin. In this case the bearing surface 186 of hole 185 is continuous, i.e. there are no slots equivalent to slot 78 and 79 of override unlocking lever 20.

[0046] First arm 172 includes a first surface 187 having a first region 188 and a second region 189. First region 188 faces third abutment 61 of the inside release lever 18 when the inside release lever is in its rest position and the override unlocking lever is in its locked position (see figures 9, 10 and 11). The second region 189 is defined by an edge 90 of an elongate rib 91. As is best seen in figure 13 (a view taken in the direction of arrow F of figure 14), the rib 91 is approximately a quarter of the width of the first region 188. Since the edge of the rib is curved, then the second region 189 is less than a quarter of the width of the first region 188. The first and second regions are contiguous and angled at approximately 110 degrees relative to each other (see figure 9). Arm 172 is connected to a region 192 which immediately surrounds hole 185 by a relatively narrow portion 193 which acts as a "live hinge" as will be further described below. It will be noted that the elongate rib 191 terminates just prior to the relatively narrow portion

193.

[0047] Operation of override unlocking latch 110 is as follows. Starting in the positions shown in figures 9, 10 and 11, third abutment 61 faces the first surface 187 of lever 120, and in particular faces the first region 188. Rotation of the inside release lever 18 in a clockwise direction when viewing figure 9 by operation of the inside release handle causes clockwise rotation of lever 120 as the third abutment 61 slides across the first region 188. When the top edge 61A passes the bottom edge 173A of the first region 188, unlike override unlocking latch 10 wherein levers 18 and 20 become disengaged, top edge 61A remains in engagement with lever 120, and in particular in engagement with edge 190 of elongate rib 191 until the fully unlocked condition is achieved. Thus, the final part of clockwise rotation of lever 18 ensures that lever 120 is moved to its fully unlocked position. Levers 18 and 120 are arranged such that with lever 18 in its actuated position and with lever 120 in its unlocked position, relatively narrow portion 193 must elastically deform to allow first arm 172 to rotate slightly clockwise relative to second arm 174. Bearing this in mind, figure 12 is a schematic view showing lever 18 in its actuated position and lever 120 in its unlocked position but without having relatively narrow portion 193 flex. The view is simply to indicate the degree of interference between top edge 61 A and elongate rib 191. In practice of course relatively narrow portion 193 will elastically deform such that top edge 61A is in touching contact with rib 191. Under these circumstances, lever 120 can be moved fully to the unlocked position by lever 18 without having to rely on an overcentre spring as described in relation to override unlocking latch 10 above.

[0048] Furthermore, in the event that second arm 174 of override unlocking lever 120 becomes jammed part way between the locked and unlocked positions, movement of lever 18 will simply cause first arm 172 to flex allowing lever 18 to move to the fully actuated position, and also return to the rest position without becoming jammed itself. Figure 14 shows lever 120 jammed in the fully locked position nevertheless, because of the sliding contact between top edge 161A and rib 191, the inside release lever 18 can move to the fully actuated position, thereby releasing the latch. Subsequent release of the inside release handle will allow edge 161 A to slide along rib 191 as inside release lever 18 returns to the rest position. A comparison of figure 14 and figure 10 shows that relatively narrow portion 193 has flexed to allow first arm 172 to move relative to second arm 174. Furthermore, first arm 172 has moved relative to the region of the override unlocking lever 120 immediately surrounding hole 185 (known as a pivot region).

[0049] The relatively narrow edge of rib 191 ensures minimum friction between top edge 61A and rib 191 thereby helping to ensure that lever 18 can be returned to the rest position.

[0050] It will be appreciated that the flexing of relatively narrow portion 193 provides two distinct functions, namely: -

a) movement of the override unlocking lever 120 to the fully unlocked position during normal operation of the latch, and

b) movement of inside release lever 18 between the rest and actuated positions when, under exceptional circumstances, when second arm 174 becomes jammed between the locked and unlocked positions.

[0051] Figure 15 shows a second embodiment of an override unlocking lever 220 in which features that fulfil the same function as those of override unlocking lever 120 are labelled 100 greater. In this case override unlocking lever 220 is made from sheet steel, such as sprung steel. Elongate rib 291 can be formed by a pressing process thereby locally stiffening the adjacent portion of first arm 272. Portion 293 is therefore relatively narrow when compared with the overall thickness of first arm 272 in the region of elongate rib 291. Thus relatively narrow portion 293 will act as a live hinge in a manner similar to relatively narrow portion 193 as described above.

[0052] As mentioned above, by providing a separate inside release lever 18, inside actuating lever 19, and coupling or decoupling these levers via pin 70 provides for child safety and/or superlocking. Where these options are not required, pin 70 can be deleted and levers 18 and 19 combined into a single lever. The resulting single lever will typically have three arms being the equivalent of arms 67 of lever 19 and arms 48 and 50 of lever 18.

[0053] Override unlocking latch 110 might typically be used on a front passenger side door of a car wherein an outside key barrel is generally not fitted. However, on the drivers side door of the car, a key barrel will typically be fitted in order to be able to unlock the door in the event of failure of the electric unlocking system, such as occurs when the vehicle battery is flat. The key barrel will be connected to a mechanism housed in region 397 (see figure 1). Such a mechanism includes a lever which will operate to rotate the override unlocking lever between the locked and unlocked positions. In order to achieve this, the override unlocking lever of a driver's door includes further arms 395 and 396 shown schematically on figure 14. Clearly, the override unlocking lever used in conjunction with passenger doors and rear doors of a vehicle will not include arms 395 and 396.

[0054] Figures 16 to 20B show a further embodiment of an override unlocking latch 410 according to the present invention, in which components equivalent to those of override unlocking latch 110 are labelled 300 greater and components equivalent to those in override unlocking latch 10 are labelled 300 greater.

[0055] The inside release lever 18 and inside actuator lever 19 of figure 1 have been combined to form a single

lever 418/419. Thus, it is not possible to superlock latch 410, nor is it possible to put latch 410 into a child safety on condition.

[0056] Latch 410 includes a lever 498 which is operable by an outside key barrel. Lever 498 includes arm 498A which acts on arm 495 to lock the latch and acts on arm 496 to unlock the latch.

Override unlocking lever 420 is made from a plastics material.

[0057] An attachment feature 499 is provided to which is connected a manually operable inside locking device, such as a sill button. First arm 472 is divided into two portions by the relatively narrow portion 493 which acts as a hinge (in this case a live hinge). Portion 472A is operably between hinge 493 and the axis D' about which the lever pivots and is substantially rigid. Portion 472B is flexibly mounted via hinge 493 relative to portion 472A.

[0058] Figure 18 shows the latch in a locked condition. Figure 18A shows the lever 418/419 having been actuated by the inside door handle and having moved the override unlocking lever 420 to the unlocked position. Figures 19 and 20 show composite views of how the third arm 450 interacts with portion 472B of first arm 472. Figures 19A, 19B, 20A and 20B show how, with different dimensional tolerances arm 450 and portion 472B interact upon actuation and release of arm 450. In particular, compare and contrast the positions of the components in figures 19A and 20A and compare and contrast the position of the components in figures 19B and 20B. The resilient nature of hinge 493 allows the wider tolerances on the various components whilst still ensuring that the override unlocking aspect of the latch functions correctly i.e. lever 450 ensures that override unlocking lever 420 moves to the fully unlocked position, override unlocking lever 420 does not prevent lever 450 from unlatching the latch, and the end of arm 450 does not get jammed underneath portion 427B once the outside door handle has been released.

[0059] Note in particular that region 472B' of portion 472B has engaged region 472A' of portion 472A in figures 19A and 20A. When this occurs, no more movement of portion 472B towards portion 472A can occur and hence no more movement at hinge 493 can occur. Such an arrangement assists in ensuring correct functioning of the latch whilst having relatively wide tolerances on various components of the latch.

[0060] Note that part of portion 472B that is engaged by lever 450 is closer to axis D' than the hinge 493.

Claims

1. An override unlocking latch having a latch bolt for releasably retaining a latch striker the latch bolt having a closed and open position,
a rotatable pawl having an engaged position for retaining the latch bolt in the closed position and a released position in which the latch bolt is not retained in the closed position,
an inside release lever having a rest position and an actuated position and being operable to rotate the pawl to the released position,
an outside release lever operable to rotate the pawl to the released position,
a locking system having a locked condition in which operation of the outside release lever does not rotate the pawl to the released position and an unlocked condition in which operation of the outside release lever rotates the pawl to the released position,
an override unlocking system having a locked position and an unlocked position corresponding to the locked and unlocked conditions respectively,
the override unlocking system further including an override unlocking lever having a first arm and a second arm,
the inside release lever having a first abutment operable to rotate the inside release lever, a second abutment engageable with a pawl release abutment to move the pawl to the release position and a third abutment engageable with the override unlocking lever,
in which, starting in the locked condition, actuation of the first abutment causes the inside lever to rotate such that the second abutment engages the pawl release abutment to move the pawl to the released position thereby allowing the latch bolt to open, and the third abutment engages the first arm of the override unlocking lever to move the override second arm to engage a part of the locking system to move the locking system towards the unlocked condition,
in which an end of the first arm is resiliently moveable relative to an end of the second arm.

2. An override unlocking latch as defined in claim 1 in which the override unlocking lever includes a hinge to allow the end of the first arm to move resiliently relative to the second arm.

3. An override unlocking latch as defined in any preceding claim in which the hinge is a live hinge.

4. An override unlocking latch as defined in claim 3 in which the live hinge is made from a plastics material or made from steel.

5. An override unlocking latch as defined in any preceding claim in which the override unlocking lever is pivotable about an axis.

6. An override unlocking latch as defined in claim 5 when dependent upon claim 2 in which the hinge is proximate the axis.

7. An override unlocking latch as defined in any pre-

ceding claim when dependent upon claims 2 and 5 in which the override unlocking lever has a surface engageable by the third abutment and the surface is spaced from the axis by a distance that is less than a distance between the hinge and the axis.

8. An override unlocking latch as defined in any preceding claim when dependent upon claim 2 in which the hinge allows the end of the first arm to move resiliently relative to another portion of the first arm.

9. An override unlocking latch as defined in claim 8 in which the end of the first arm is spaced from the other portion of the first arm in a rest condition and the hinge allows the end of the first arm to engage the other portion of the first arm.

10. An override unlocking latch as defined in any preceding claim in which the override unlocking lever is pivotally mounted via a pivot region and said end of the first arm is resiliently moveable relative to the pivot region and the second arm is substantially rigidly connected to the pivot region.

11. An override unlocking latch as defined in any preceding claim in which the first arm is resiliently moveable relative to the second arm so as to bias the locking system into the locked condition when the inside release lever is in the actuated position.

12. An override unlocking latch as defined in any preceding claim in which the first arm is resiliently moveable relative to the second arm such that in the event of the second arm becoming jammed between the locked and unlocked positions of the override unlocking lever the first arm moves resiliently relative to the second arm to allow the inside release lever to move to the actuated and rest positions.

13. An override unlocking latch as defined in any preceding claim in which the first surface has a first region facing the third abutment when the inside release lever is in the rest position and a second region facing the third abutment when the inside release lever is in the actuated position, said first and second regions being angled relative to each other.

14. An override unlocking latch as defined in claim 13 in which the first and second regions are contiguous.

15. An override unlocking latch as defined in claim 13 or 14 in which the second region is narrower than the first region.

16. An override unlocking latch as defined in any one of claims 13 to 15 in which the second region is defined by an elongate rib.

17. An override unlocking latch as defined in claim 6 when dependent upon claim 2 in which the elongate rib terminates proximate the hinge.

18. An override unlocking latch having a latch bolt for releasably retaining a latch striker, the latch bolt having a closed and open position,
a rotatable pawl having an engaged position for retaining the latch bolt in the closed position and a released position in which the latch bolt is not retained in the closed position,
an inside release lever having a rest position and an actuated position and being operable to rotate the pawl to the released position,
an outside release lever operable to rotate the pawl to the released position,
a locking system having a locked condition in which operation of the outside release lever does not rotate the pawl to the released position and an unlocked condition in which operation of the outside release lever rotates the pawl to the released position,
an override unlocking lever having a locked position and an unlocked position corresponding to the locked and unlocked conditions respectively,
the override unlocking lever having a first arm having a first surface and a second arm having an override abutment,
the inside release lever having a first abutment operable to rotate the inside release lever, a second abutment engageable with a pawl release abutment to move the pawl to the release position and a third abutment engageable with the override unlocking lever,
in which, starting in the locked condition, actuation of the first abutment causes the inside lever to rotate such that the second abutment engages the pawl release abutment to move the pawl to the released position thereby allowing the latch bolt to open, and the third abutment engages the first surface of the override unlocking lever to move the override abutment to engage a part of the locking system to move the locking system towards the unlocked condition,
characterised in that the first surface has a first region facing the third abutment when the inside release lever is in the rest position and a second region facing the third abutment when the inside release lever is in the actuated position, said first and second regions being angled relative to each other.

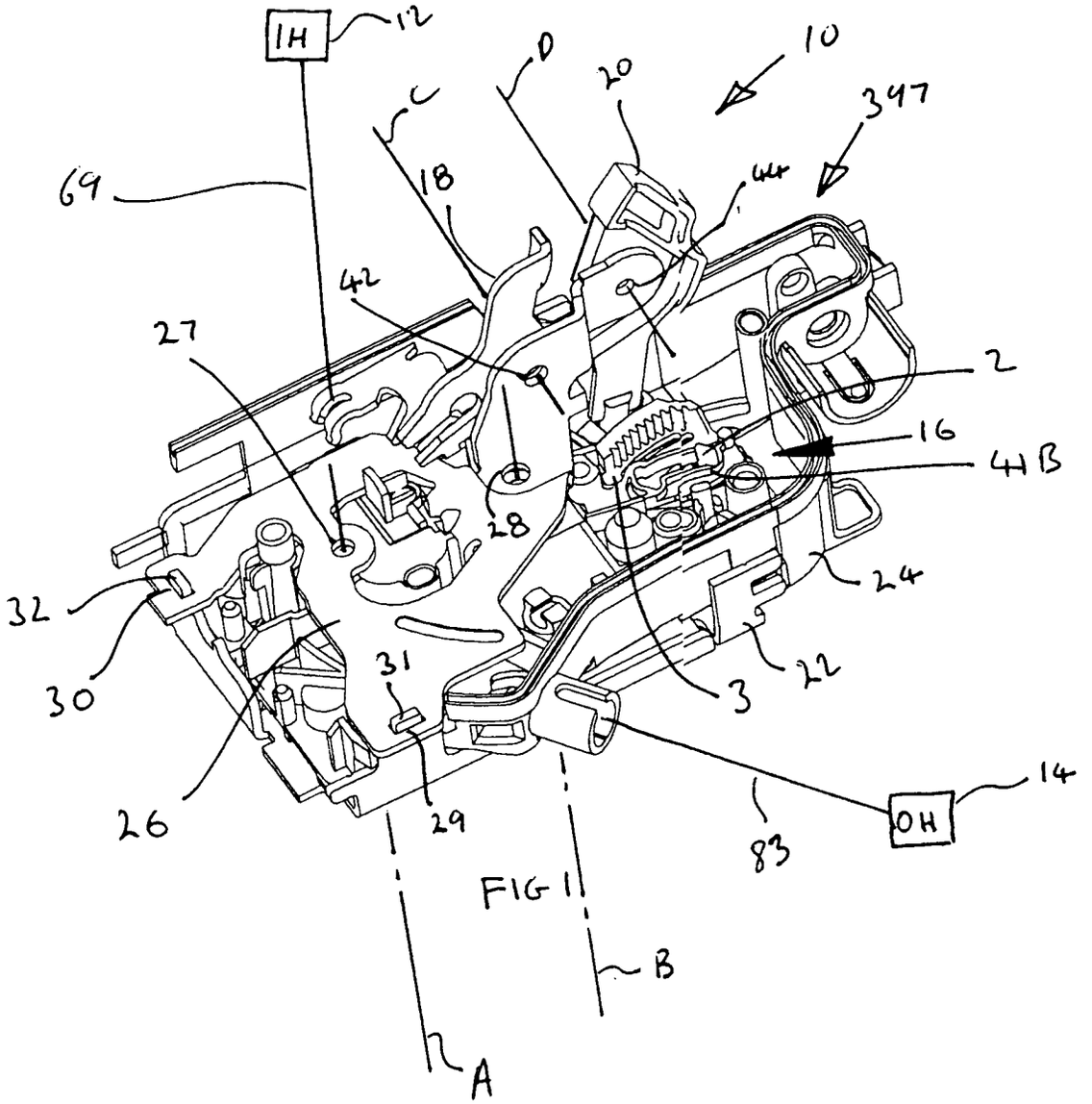

IH
12
D
C
20
10
347
69
18
44
42
27
2
16
41B
28
24
32
30
31
22
3
26
29
83
OH
14
A
B

FIG 1

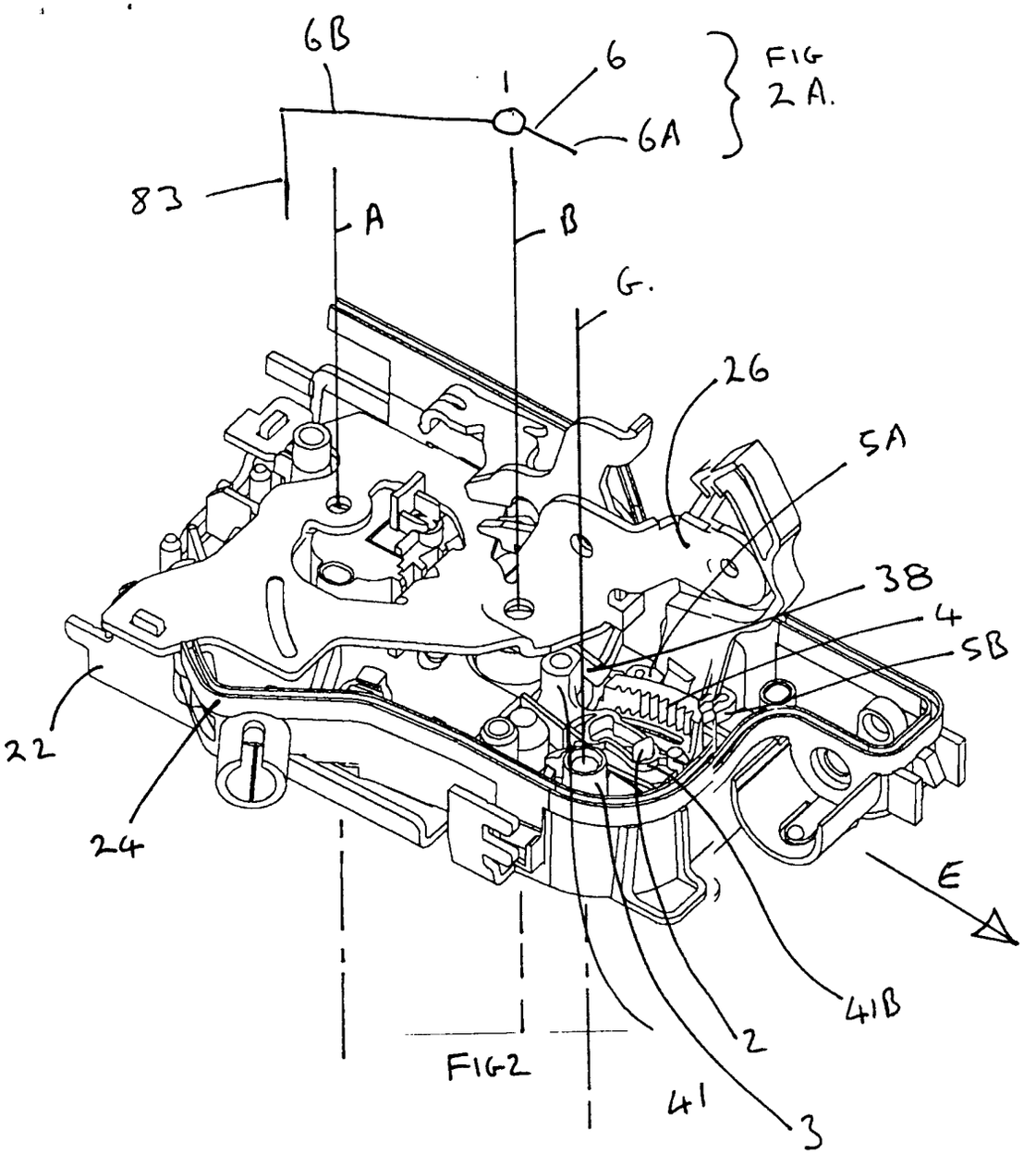


FIG2

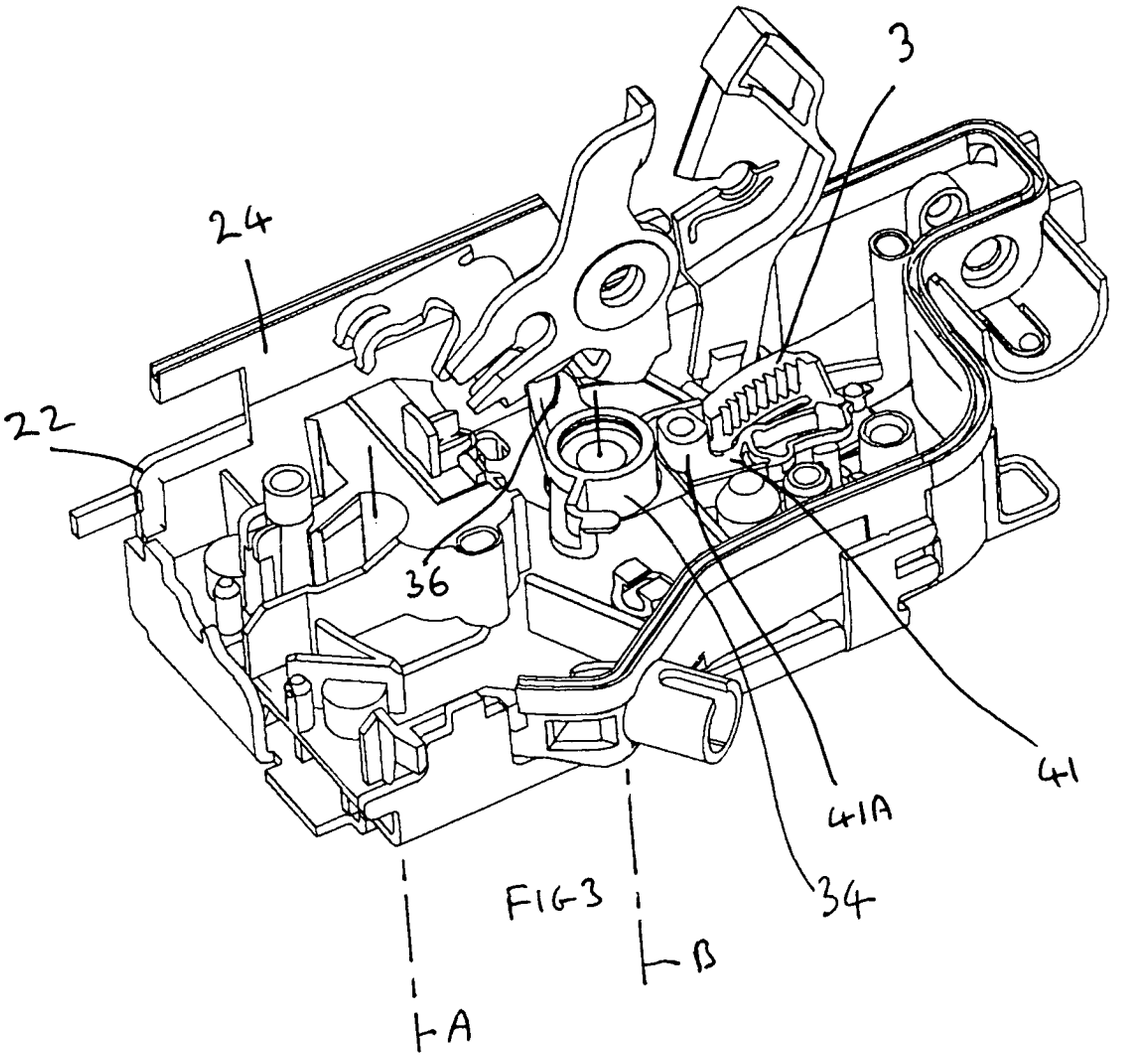


FIG-3

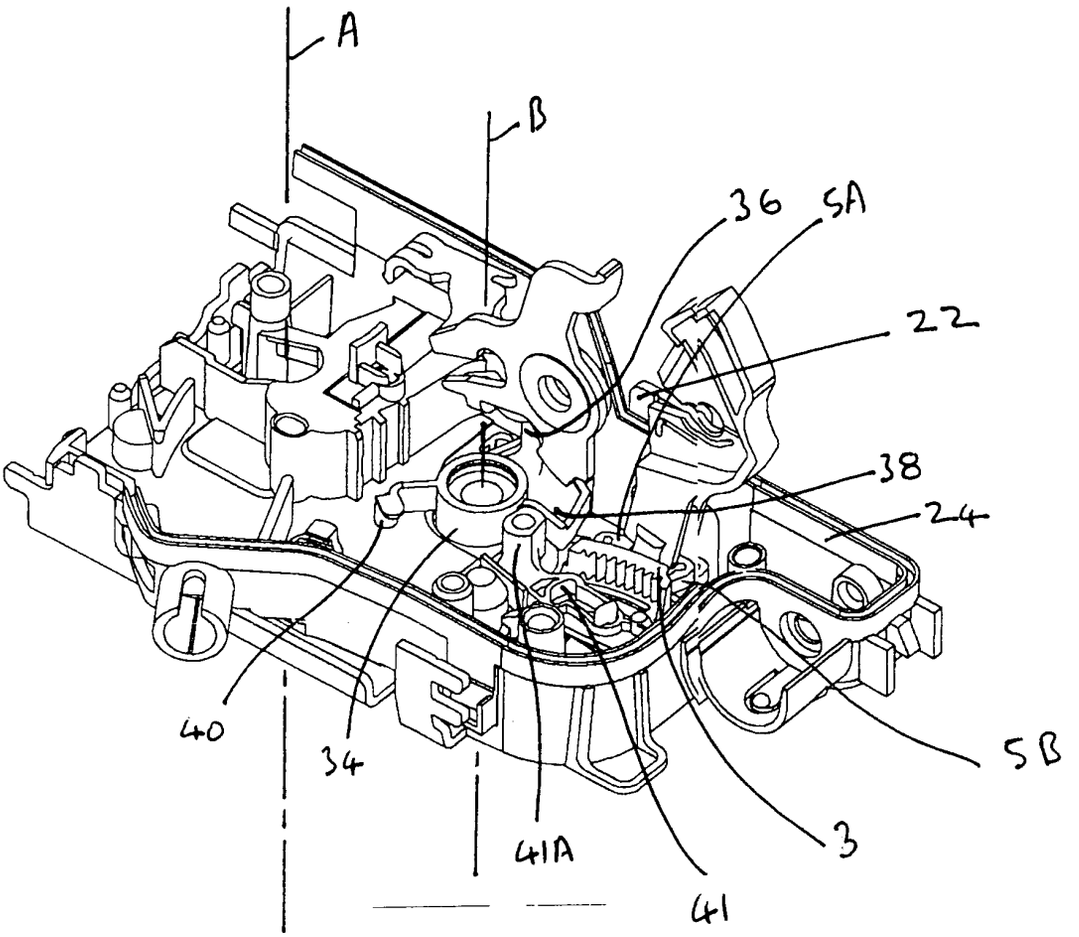


FIG4

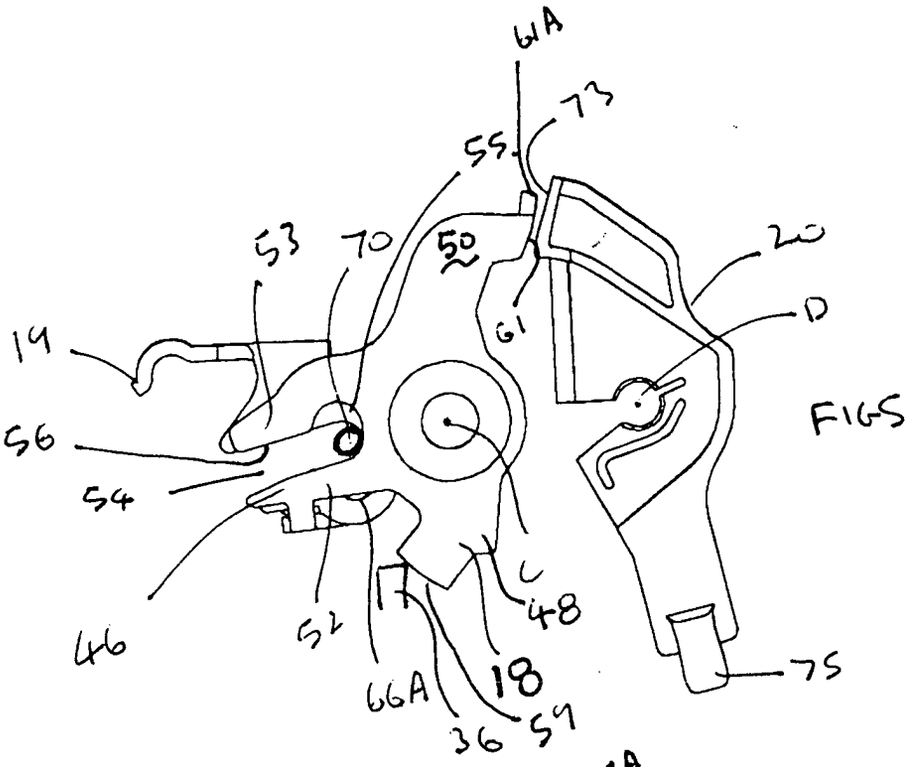

6A
73
55
53
70
50
20
61
D
14
56
54
46
52
48
C
66A
18
36
57
75

FIG5

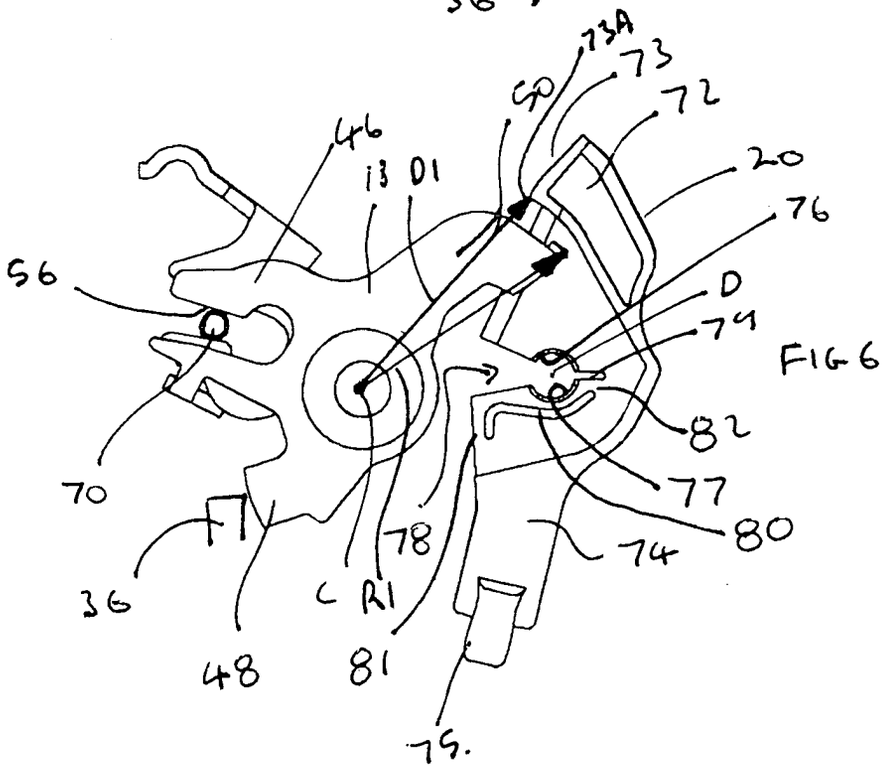

73A
73
72
60
46
13
D1
20
76
56
D
74
82
70
77
80
78
74
36
C
R1
48
81
75.

FIG6

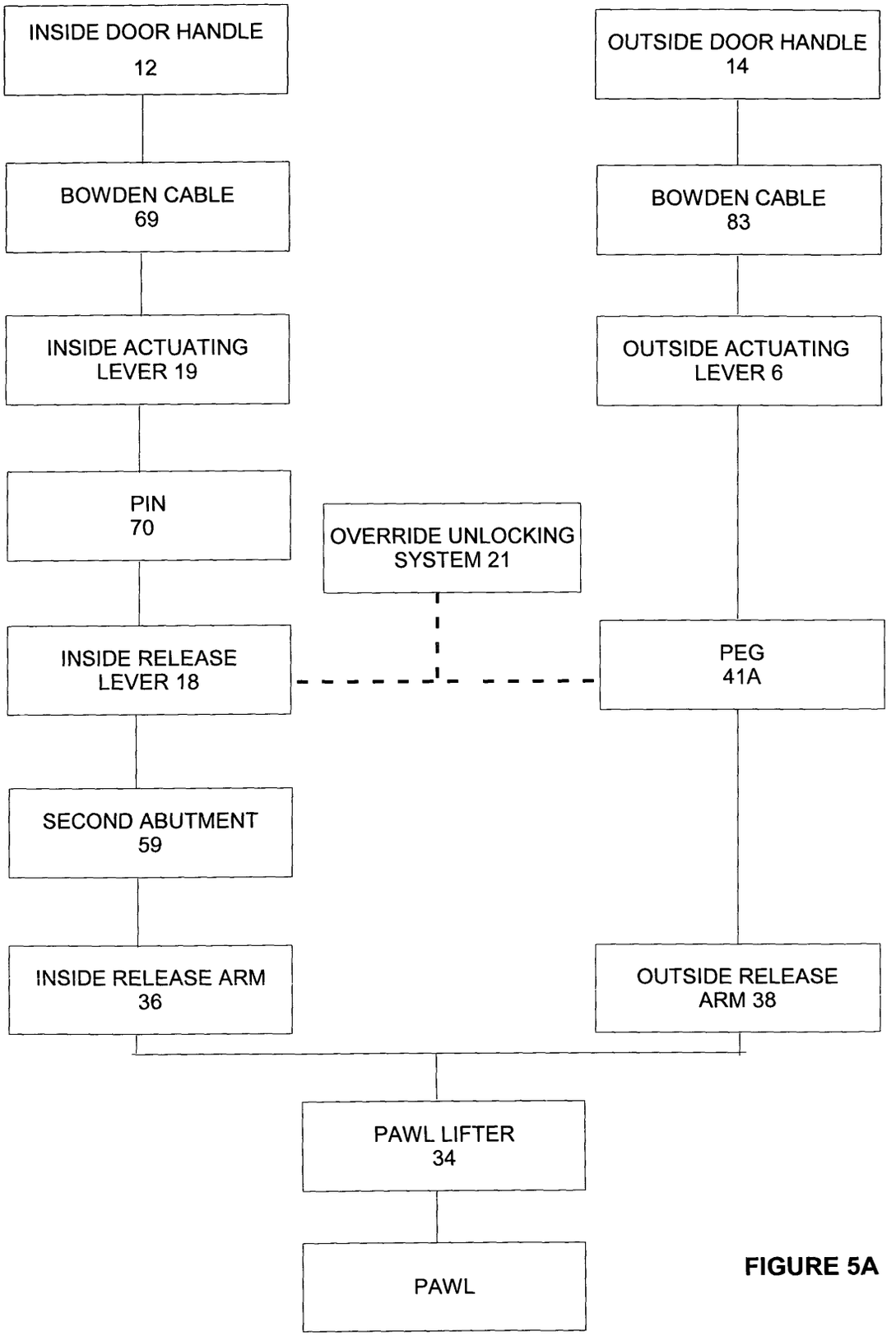

INSIDE DOOR HANDLE
12
OUTSIDE DOOR HANDLE
14
BOWDEN CABLE
69
BOWDEN CABLE
83
INSIDE ACTUATING
LEVER 19
OUTSIDE ACTUATING
LEVER 6
PIN
70
OVERRIDE UNLOCKING
SYSTEM 21
INSIDE RELEASE
LEVER 18
PEG
41A
SECOND ABUTMENT
59
INSIDE RELEASE ARM
36
OUTSIDE RELEASE
ARM 38
PAWL LIFTER
34
PAWL

FIGURE 5A

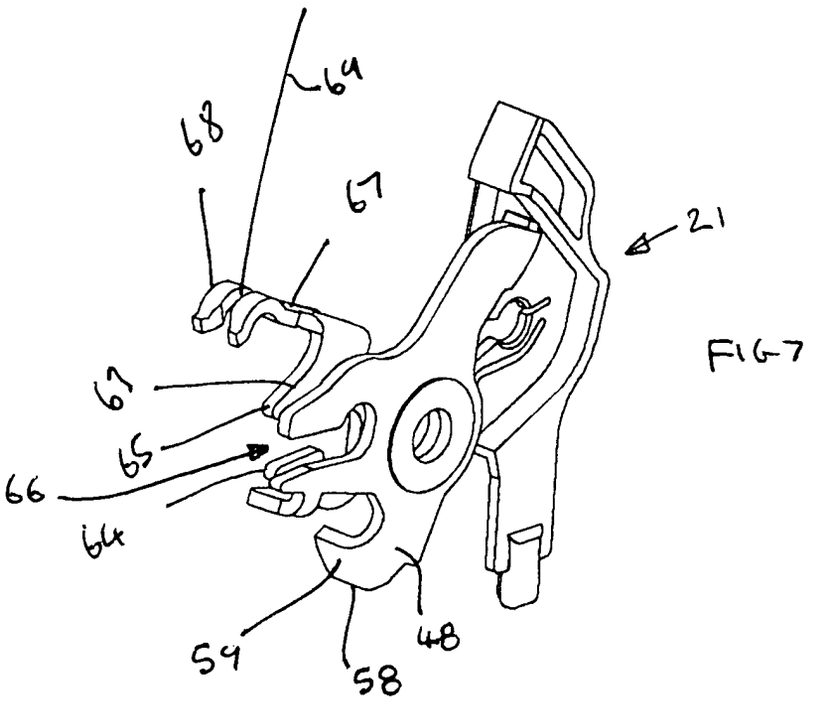


FIG-7

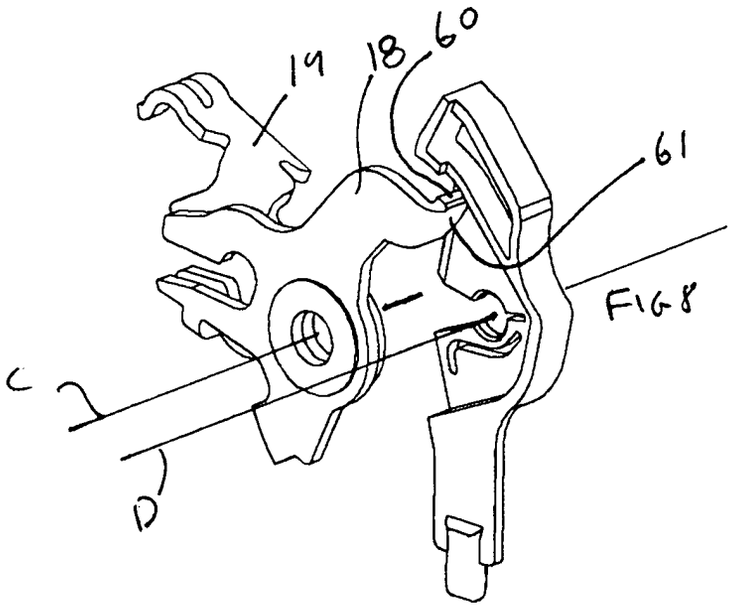


FIG 8

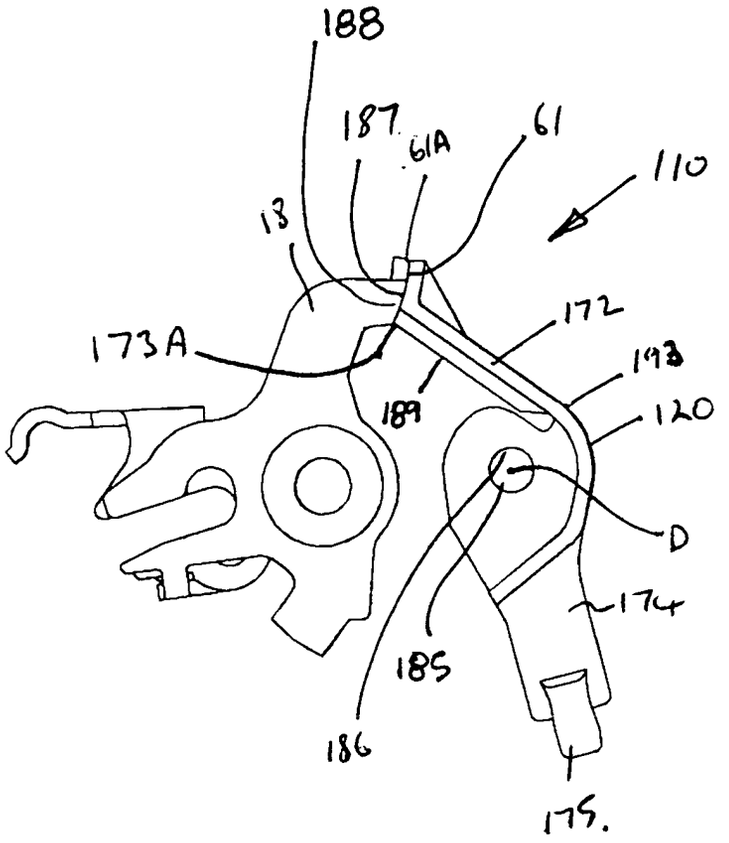


FIG 9

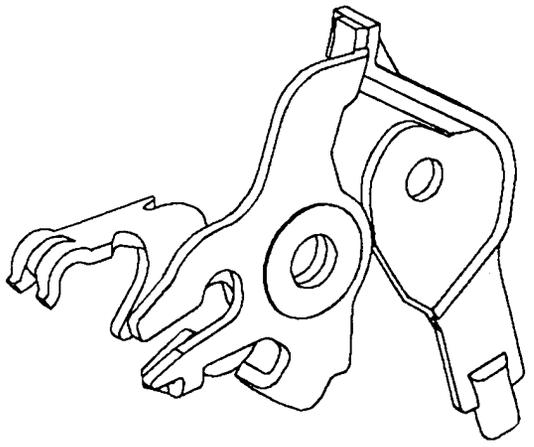


FIG 10

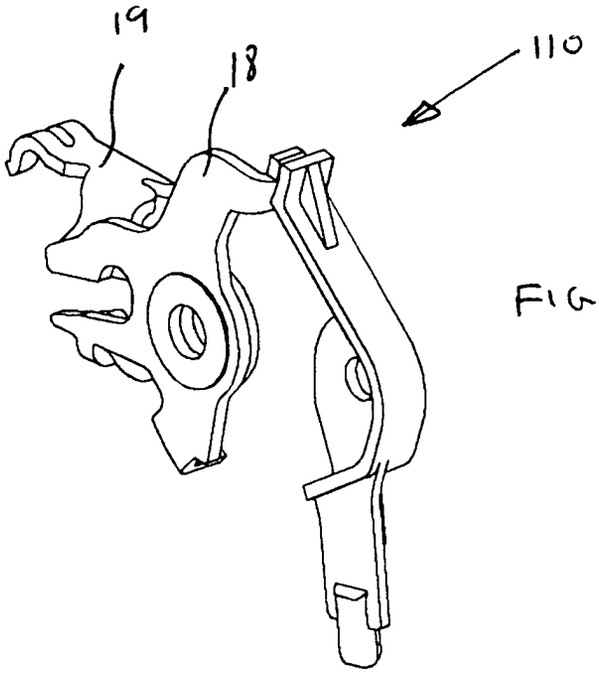


FIG11

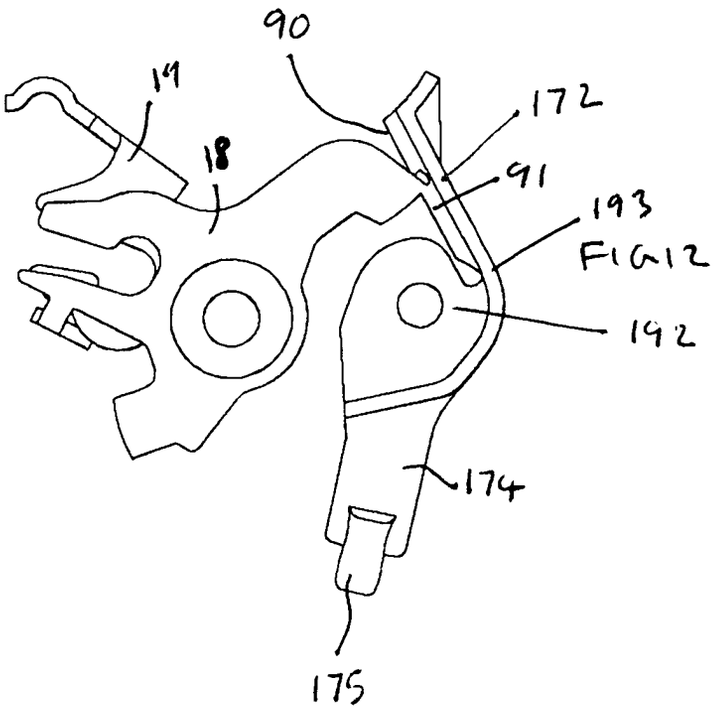


FIG12

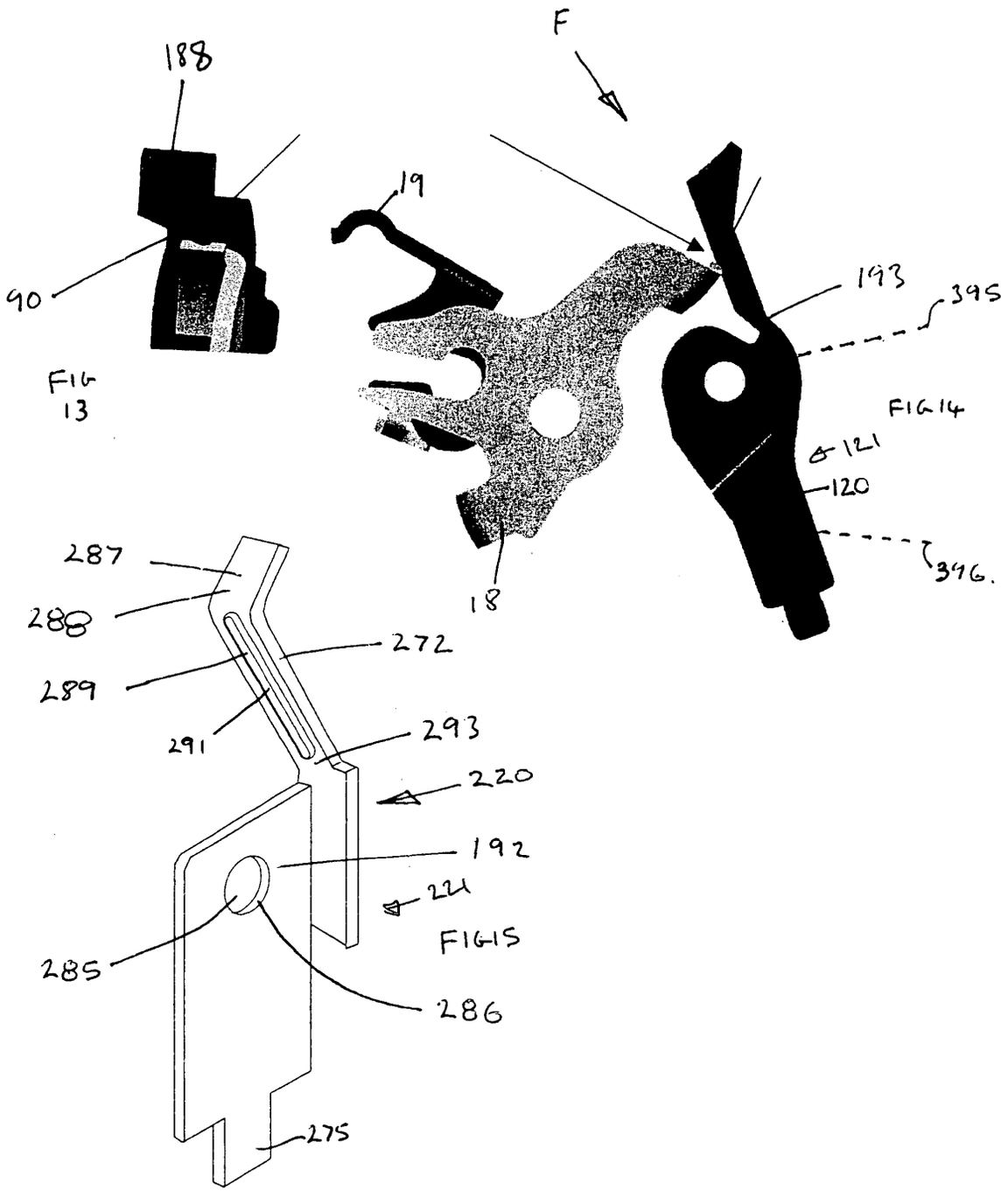


FIG 13

FIG 14

FIG 15

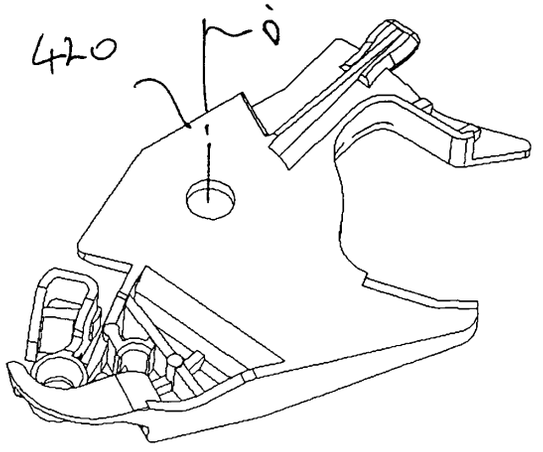


FIG17

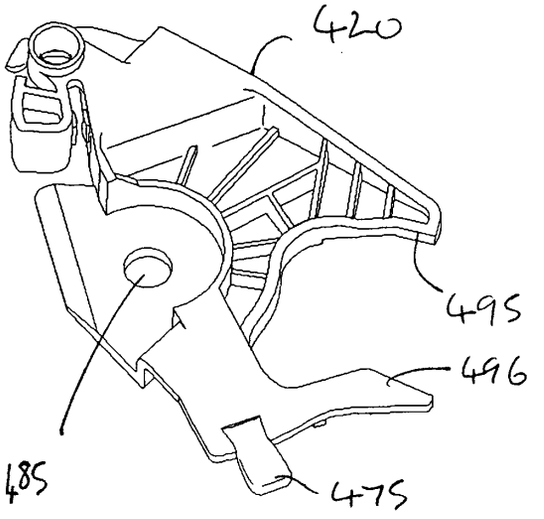


FIG16

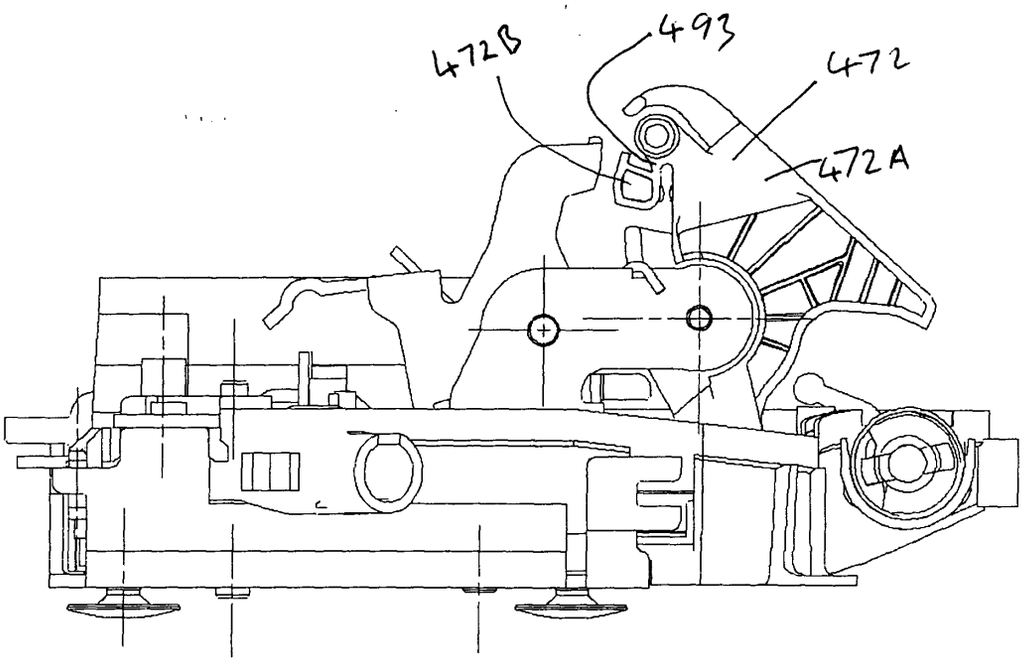


FIG-18

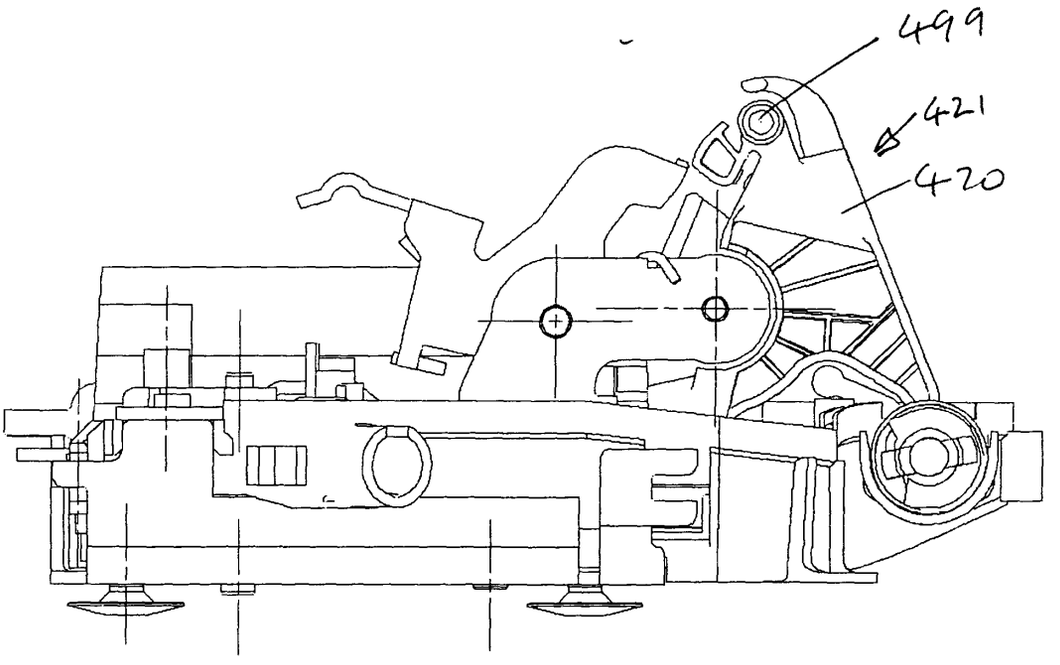
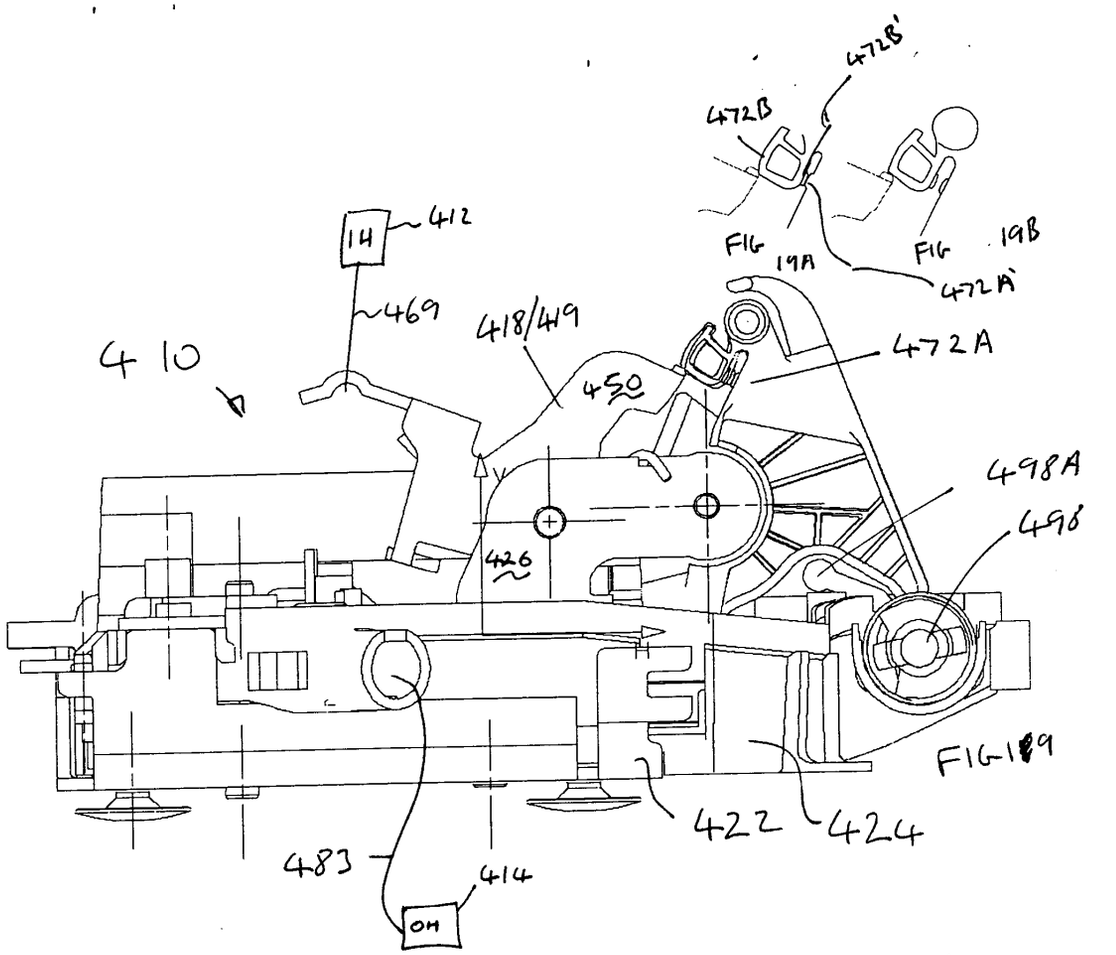


FIG-18A.


472B'
472B
FIG 19A
FIG 19B
472A'
1H
412
469
418/419
410
450
472A
498A
498
426
FIG 19
422
424
483
414
OH

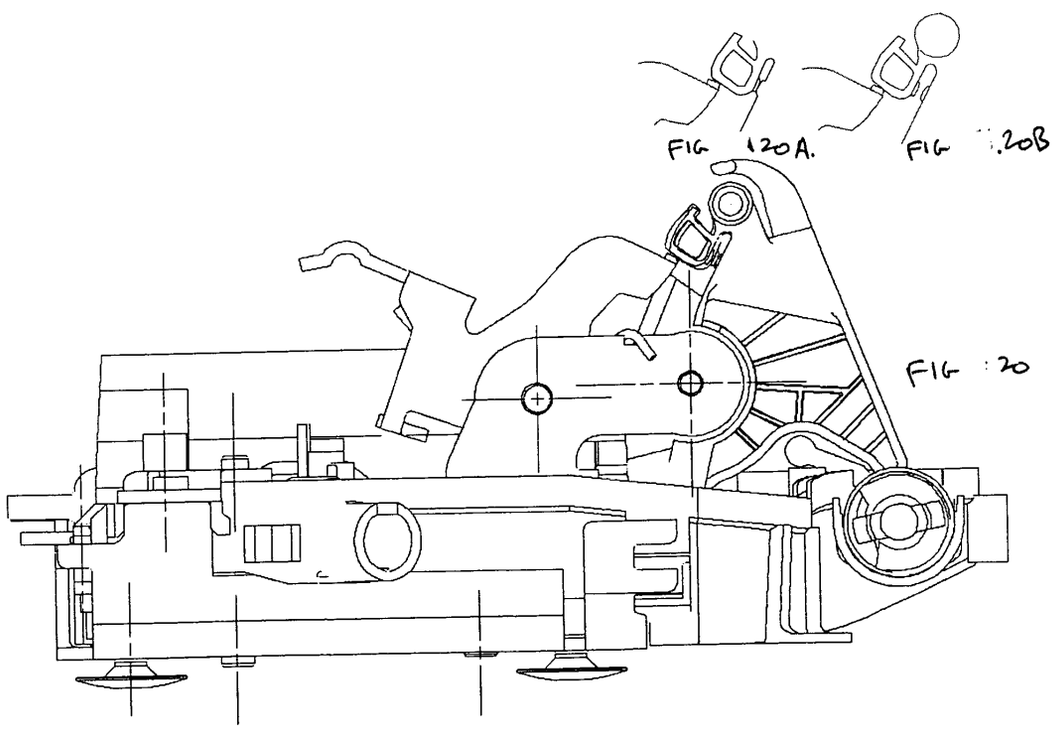


FIG 20A.
FIG 20B
FIG 20