

Sept. 17, 1963

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3,104,124

AUTOMATIC CAR DOOR LOCK

Filed Nov. 24, 1961

9 Sheets-Sheet 1

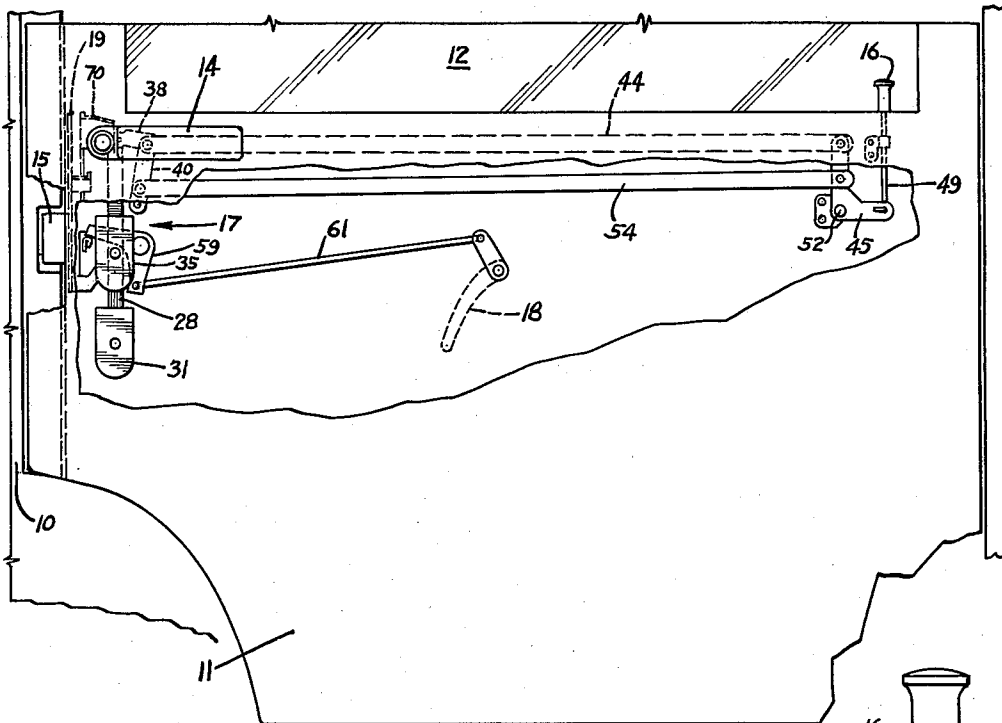


FIG. 1

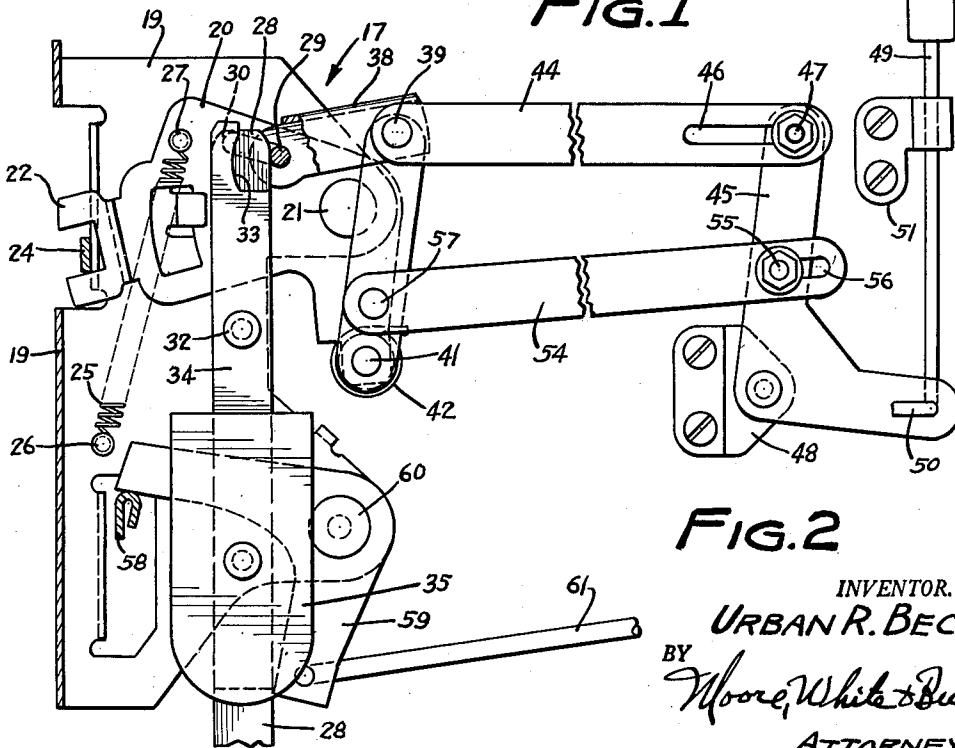


FIG. 2

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9 Sheets-Sheet 2

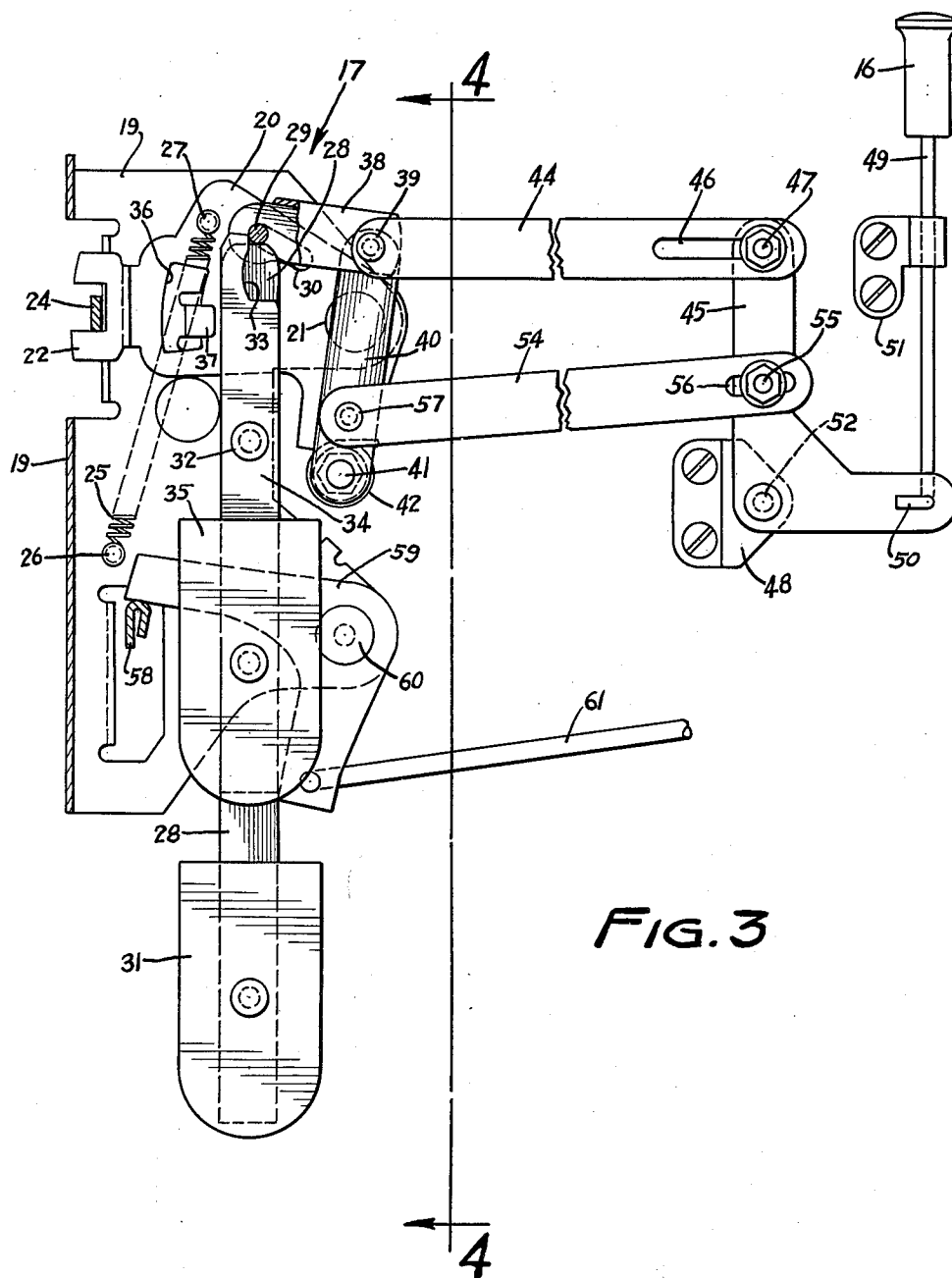


FIG. 3

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9 Sheets-Sheet 3

FIG. 4

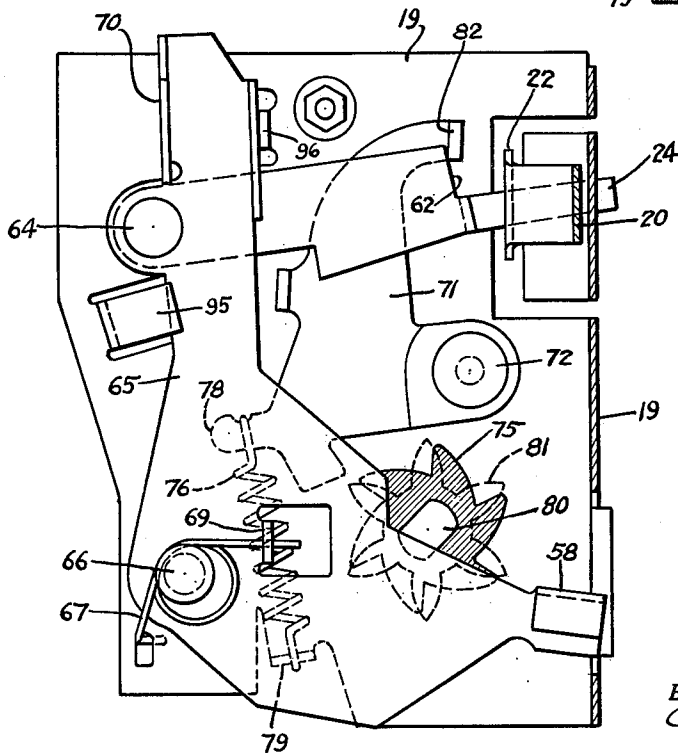
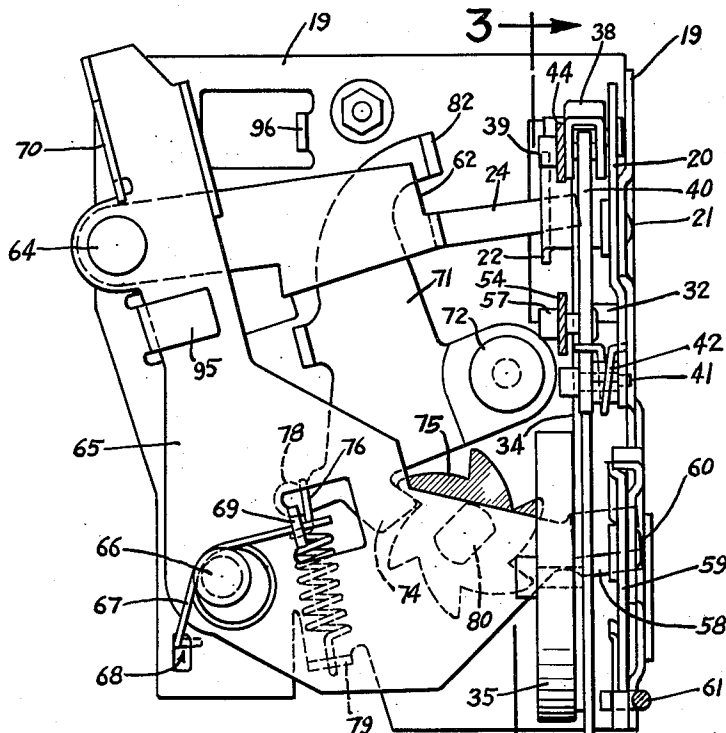


FIG. 5

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9 Sheets-Sheet 4

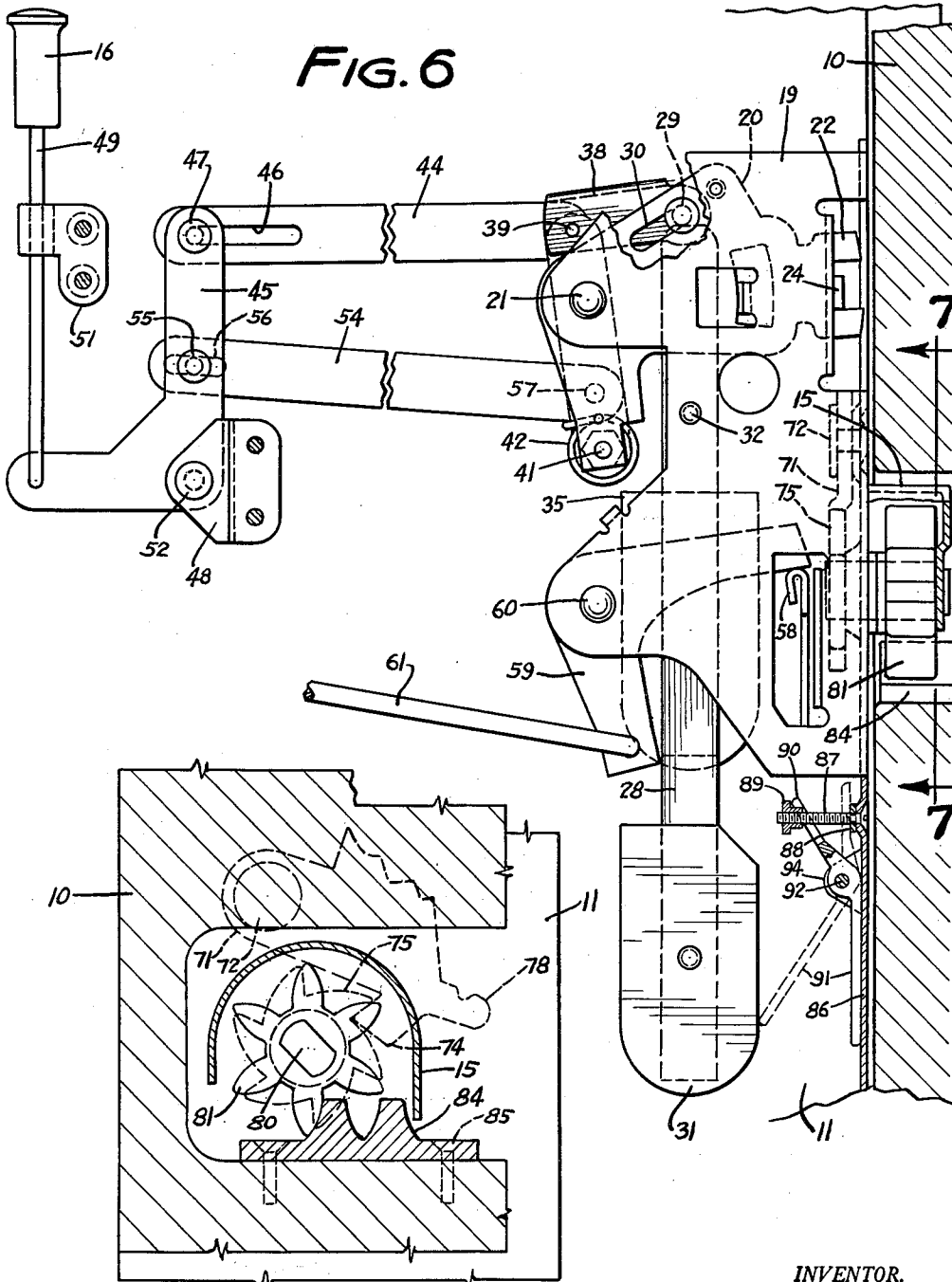


FIG. 7

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AUTOMATIC CAR DOOR LOCK

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9 Sheets-Sheet 5

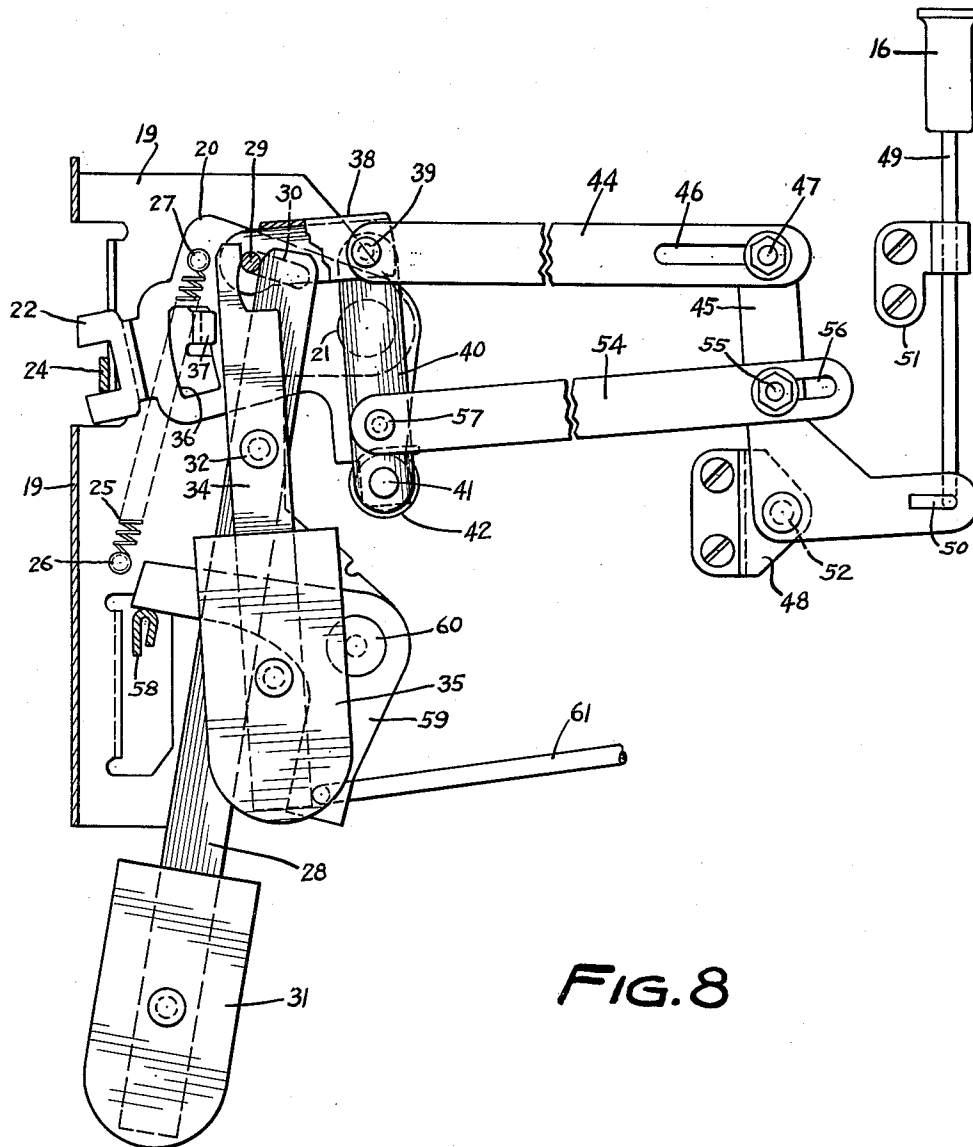


FIG. 8

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AUTOMATIC CAR DOOR LOCK

3,104,124

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9 Sheets-Sheet 6

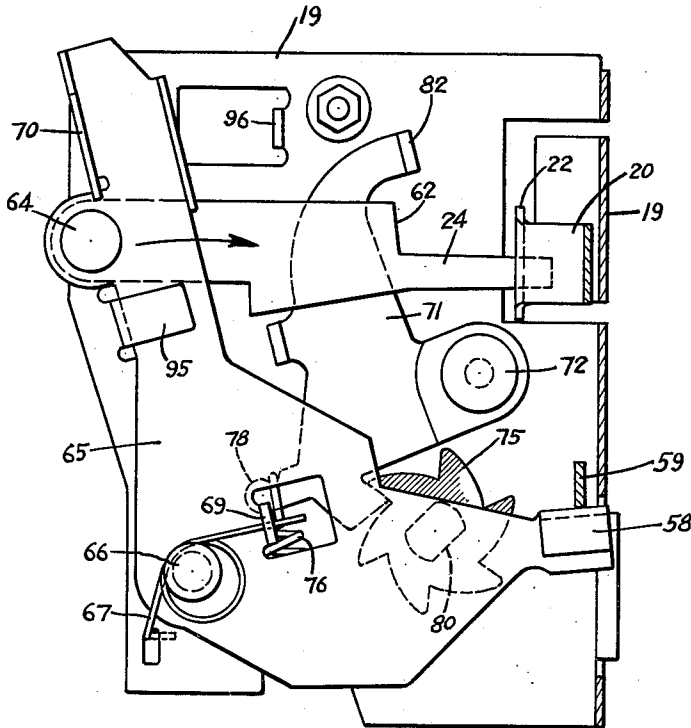


FIG. 9

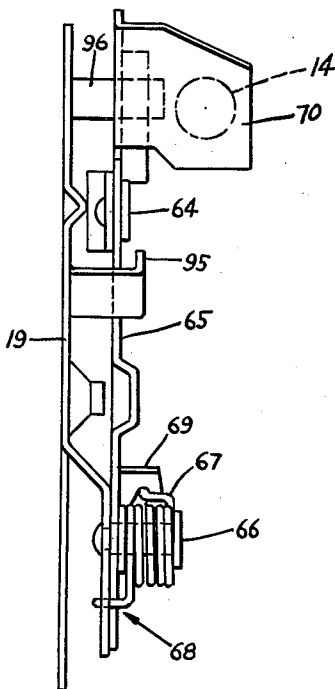


FIG. 10

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AUTOMATIC CAR DOOR LOCK

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9 Sheets-Sheet 7

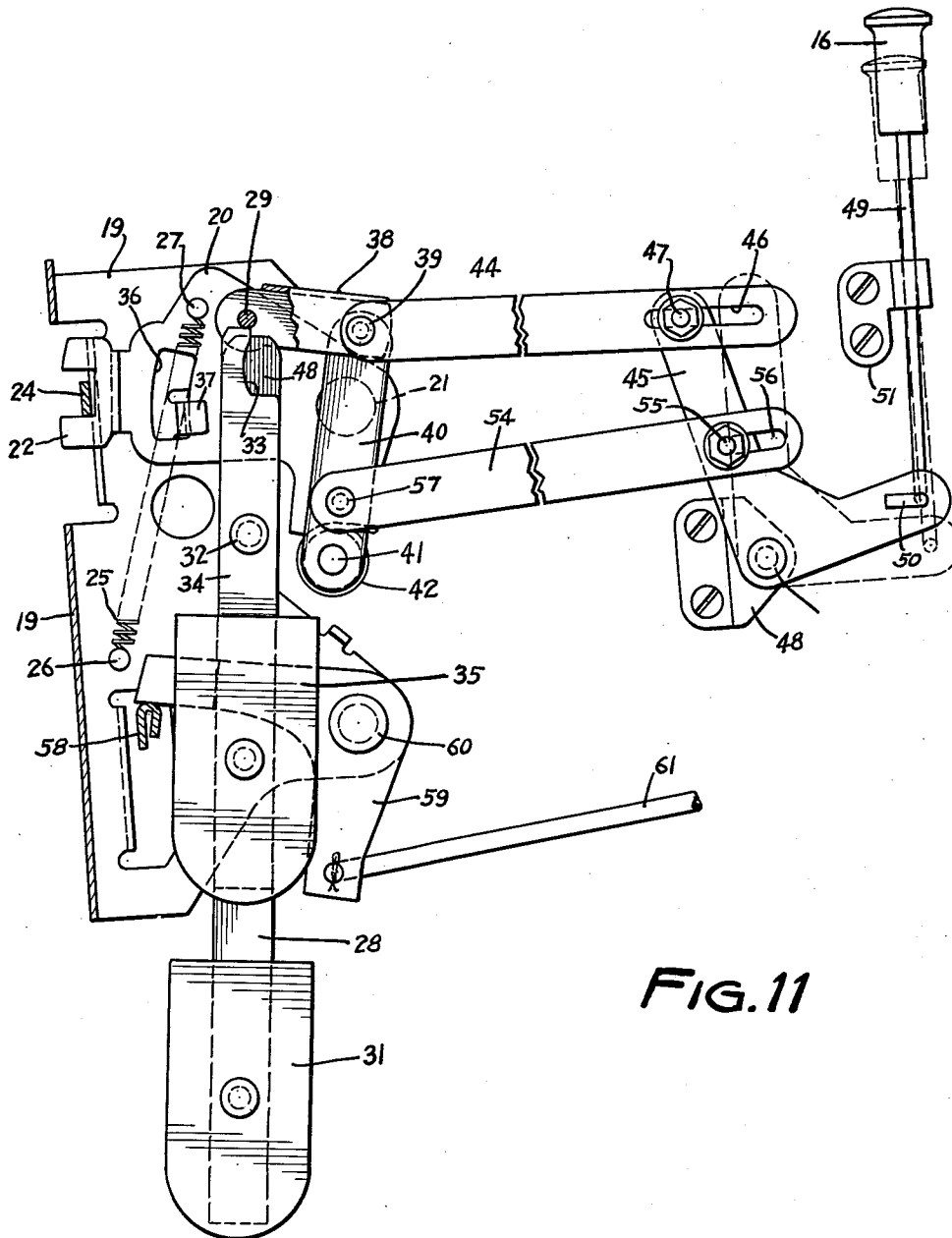


FIG. 11

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AUTOMATIC CAR DOOR LOCK

3,104,124

Filed Nov. 24, 1961

9 Sheets-Sheet 8

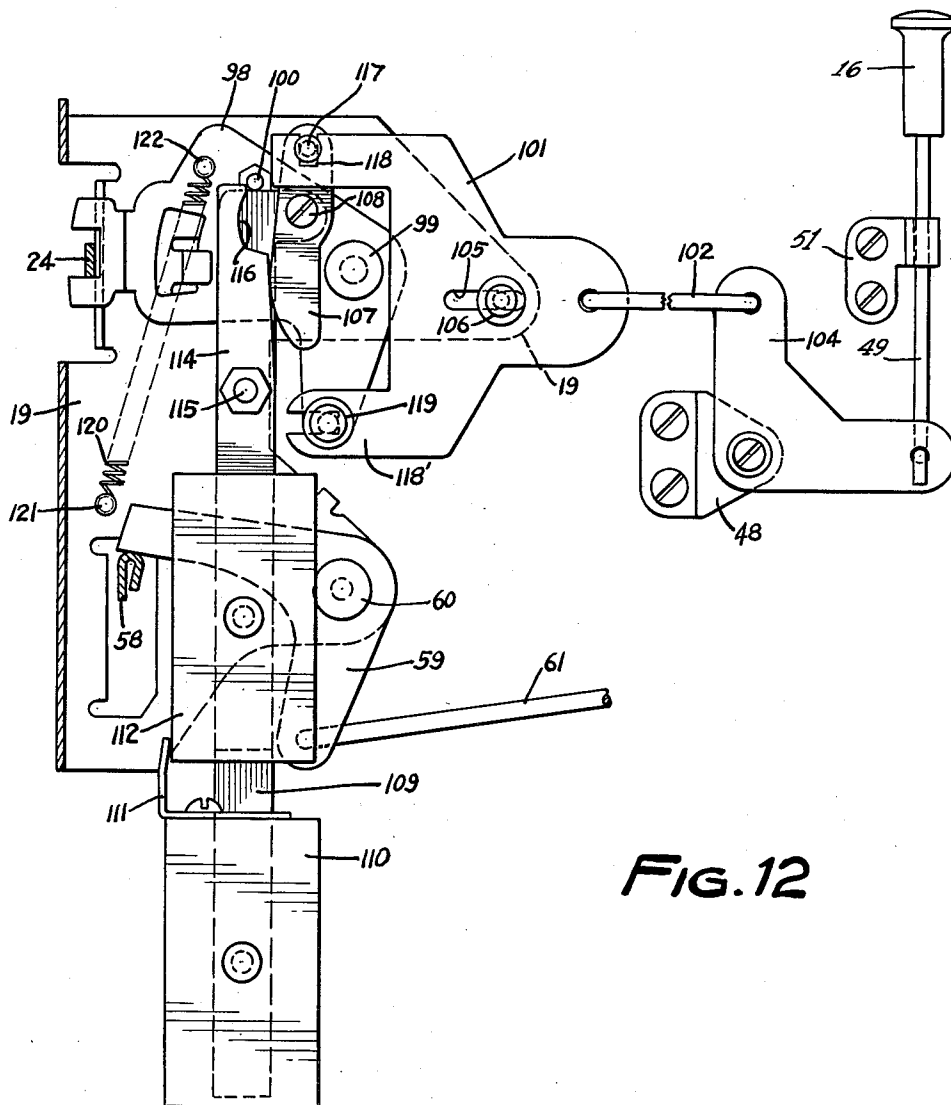


FIG. 12

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AUTOMATIC CAR DOOR LOCK

Filed Nov. 24, 1961

9 Sheets-Sheet 9

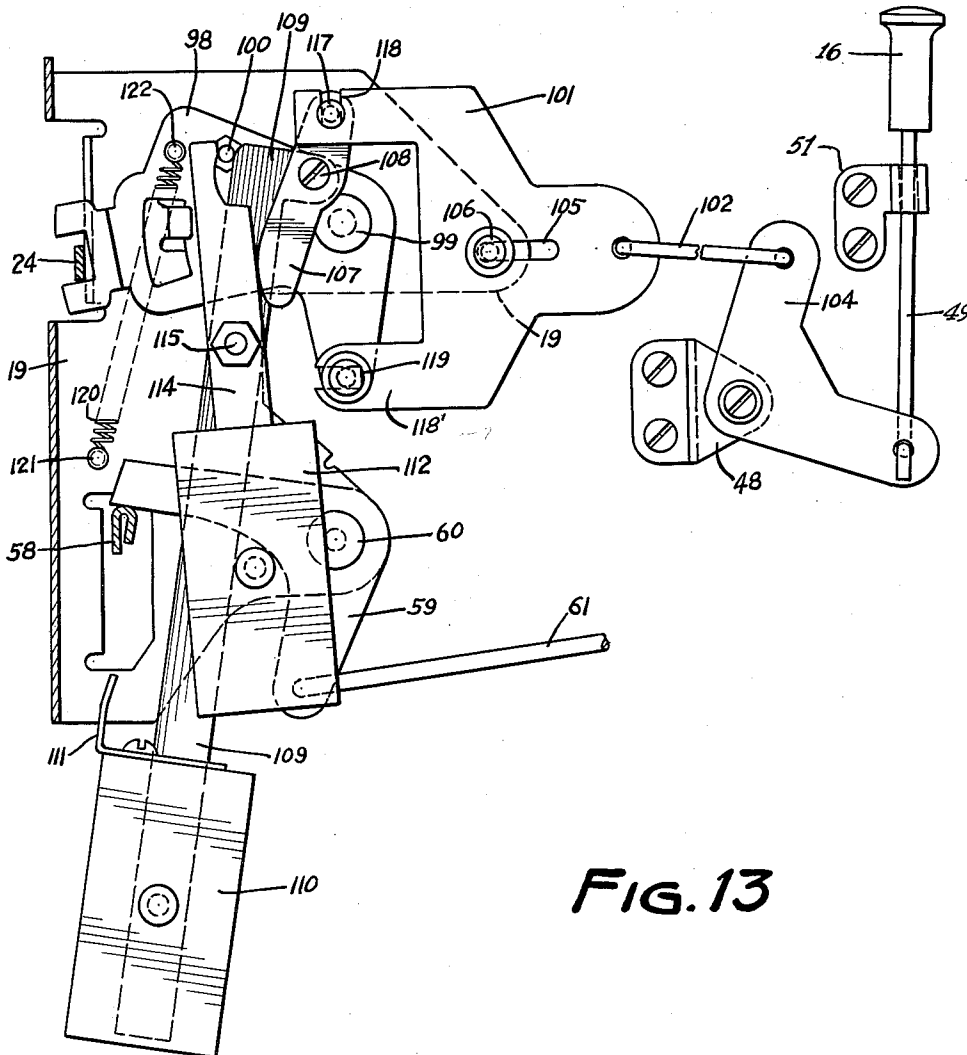


FIG. 13

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AUTOMATIC CAR DOOR LOCK

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Filed Nov. 24, 1961, Ser. No. 154,597

15 Claims. (Cl. 292—280)

This invention is a novel automatic locking device for the latches of automobile doors. A principal element of its novelty resides in the fact that it is operated by a simple, mechanical inertial device which operates instantly and invariably with an acceleration of the vehicle. A pendulum controlled support operates to either hold a control member in a position supporting the latch mechanism in operative position or allows the control member to shift its position and thereby render the latch operating mechanism inoperative. The structure is further novel in having a second or auxiliary pendulum arranged to prevent undesired operation of the automatic lock as when the vehicle is parked on an incline. The structure of this invention is also novel in providing means for rendering it totally ineffective if desired and in having the main pendulum assure the return to a vertical or normal position of the incline pendulum.

There have been many automatic locking devices proposed for automobile vehicle doors. Most of them have drawbacks of one sort or another. All known proposed automatic locks have been relatively complex requiring either involved hydraulic or electrical mechanisms for operation. In many cases, some specific act must be performed consciously before these locks come into effect. Those which are triggered by inertia devices are provided with some kind of a manual switch for rendering the lock ineffectual when on incline. These devices, that require conscious acts in order to render the system effectual to take into account various situations in which the vehicle is used, are not entirely satisfactory as automatic safety locks, because they are frequently in an inoperative condition when it is most essential that they be operative. Also, of course, the complexity of many of these other proposed automatic locks has caused them to be so expensive as to limit the number of persons who are willing to have them installed.

Accordingly, it is a principal object of this invention to provide a novel automatic latch locking mechanism for automotive vehicles.

It is a further object of this invention to provide such an automatic latch locking mechanism that is constantly operative without any conscious act on the part of the user.

It is a further object of this invention to provide such an automatic latch locking mechanism that automatically adjusts itself to inclined parking so as to operate only as intended.

It is yet another object of this invention to provide an automatic latch locking mechanism which will automatically re-establish itself in operating condition when the vehicle that was parked on an incline has been moved to a substantially level roadway.

It is yet another object of this invention to provide an automatic door latch locking device which is simple enough to be relatively inexpensive for the purchaser.

Still another object of this invention is to provide an automatic door latch locking device which although automatic and constantly re-adjusting itself to changing conditions as to be ready for operation at any time, is nevertheless capable of being rendered ineffective when desired.

Still another object of this invention is to provide an automatic door latch locking device that is adaptable to door latches commonly in use on automatic vehicles.

2

Yet another object of this invention is to provide an automatic door latch locking device that is operated by the inertia of a pendulum and requires no outside source of energy to function.

It is a further object of this invention to provide an automatic door latch locking device, the parts of which are substantially interchangeable from right to left hand side of the vehicle and equally applicable for the front or rear doors.

Other and further objects of the invention are those inherent and apparent in the apparatus as described, pictured and claimed.

To the accomplishment of the foregoing and related ends, this invention then comprises the features herein-after fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention will be described with reference to the drawings in which corresponding numerals refer to the same parts and in which:

FIGURE 1 is a fragmentary, reduced scale, side elevational view of an automobile door with portions thereof broken away to illustrate the location of the automatic latch locking mechanism; hidden parts are illustrated with broken lines;

FIGURE 2 is a side elevation of the locking mechanism with portions thereof broken away to conserve space and hidden parts shown with broken lines; the scale is full size; as are the balance of the figures;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 4 which is the structure illustrated in FIGURE 2 but with the parts shown in different adjusted position; broken lines again illustrate hidden parts;

FIGURE 4 is a vertical section of the locking mechanism taken on the line and in the direction of the arrows 4—4 on FIGURE 3; and with the latch mechanism shown in side elevation; broken lines illustrate hidden parts;

FIGURE 5 is a view of the latch portion of the mechanism illustrated in FIGURE 4 shown in a different adjusted position; broken lines illustrate hidden parts;

FIGURE 6 is a fragmentary view of the structure shown in FIGURE 1 but viewed from the opposite side; again portions of the structure are deleted to conserve space and to illustrate portions of its construction more fully and hidden parts are shown with broken lines; broken lines also illustrate an adjusted position of one part;

FIGURE 7 is a fragmentary sectional view taken on the line and in the direction of the arrows 7—7 of FIGURE 6; broken lines illustrate hidden parts;

FIGURE 8 is a view of the mechanism shown in FIGURE 3 but with the parts in a different adjusted position, broken lines illustrate hidden parts;

FIGURE 9 is a view of the structure shown in FIGURE 5 but with the parts in a different adjusted position; broken lines show hidden parts; FIGURE 8 is an additional view of the structure illustrated in FIGURE 3 in a different adjusted position;

FIGURE 10 is a sectional view taken on the line and in the direction of the arrows 10—10 of FIGURE 9; broken lines illustrate hidden parts;

FIGURE 11 is a similar view to that illustrated in FIGURES 3 and 8 but with the device shown as it would be with the vehicle on an incline; broken lines illustrate hidden and adjusted positions of parts;

FIGURE 12 is a view similar to FIGURES 3, 8 and 11 showing a modified form of the automatic locking mechanism; broken lines illustrate hidden parts; and

FIGURE 13 is a view of the mechanism illustrated in

FIGURE 12 with parts in a different adjusted position; broken lines illustrate hidden parts.

With reference to FIGURE 1, at 10 is shown a portion of a car body, in this case, the back edge of a rear door opening but which shows how the parts would be arranged also at the center post for a front door. The outside panel of the door is shown at 11. Door 11 is provided with the usual window 12 and door opening handle 14. At 15 may be seen the shield which surrounds the gear on the door which reacts with the rack secured to the car to latch the door. Button 16 is used to manually either lock or unlock the latch mechanism which in general is designated by the number 17. At 18 is the usual inside door handle by means of which the latch mechanism may be operated to open the door from the inside.

Turning next to FIGURE 3, there is shown a latch frame 19 to which is secured pivotally a control member 20. The pivotal connection between the control member 20 and frame 19 is designated 21. Control member 20 has an extending end that is bifurcated as at 22 between the bifurcations of which extends the end of a latch linkage member 24.

In the position shown in FIGURE 2, linkage member 24 has been placed in such a position as to render it useless in the linkage chain necessary for releasing the latch mechanism of the door.

Referring again to FIGURE 3, a suitable resilient member such as the tension spring 25 is secured as to anchor 26 on frame 19 and to a pin 27 on control member 20. Spring 25 then constantly urges control member 20 into the position shown in FIGURE 2 in which the linkage member 24 is rendered inoperative. To resist this tendency of control member 20 to pivot down a pillar bar 28 is provided on top of which a pin 29 that is associated slidably with control member 20 rests to hold the control member in a position shown in FIGURE 3 except under specific circumstances to be detailed under the heading Operation. The slot in member 20 in which the pin 29 slides is identified by the numeral 30. Pillar bar 28 has an inertia energized weight 31 secured to it and the bar is pivoted to frame 19 suitably as on pivot 32.

A secondary pivot bar or one referred to herein as the incline pillar bar 34 is also pivoted to frame 19 and preferably on the same axis as pillar bar 28. Weight 35 provides a means for moving incline pillar bar 34 under certain circumstances to be detailed under operation.

Control member 20 is provided with guide means comprising a cut-out slot 36 and a lip 37 formed and bent from frame 19 to engage lightly the control member and merely to hold the outer end thereof in a tracking position with respect to its pivot 21.

Pin 29 is embraced by a link member 38 which is pivoted as at 39 to the upper end of a fulcrum link 40. Fulcrum link 40 is pivoted to control plate 20 suitably as at 41 and by suitable means such as the spring 42 is constantly urged toward the left as shown in FIGURE 3. This urging is adequate to keep pin 29 at the left hand end of slot 30, as viewed in FIGURE 3, so long as button 16 is not depressed. A long connecting link 44 extends from the same pivot 39 that secures link 38 to fulcrum link 40. Long link 44 is secured to bell crank 45 with a lost motion means such as slot 46. Any suitable means such as nut and bolt assembly 47 may be used to secure the two.

Bell crank 45 is suitably pivoted as to the bracket 48 which is secured to the door itself. Rod 49 engages and is secured to bell crank 45 by having a hook bend in its end at 50. A bracket 51 stabilizes rod 49 for vertical sliding motion. By pushing rod 49 up and down and preferably with a suitable handle or button such as that shown at 16, bell crank 45 may be pivoted about its pivot point 52 on bracket 48. In so doing, the upper end of the bell crank will move to the right when 16 is pushed down and to the left when 16 is pulled up. A

second control link 54 is also secured to the bell crank 45 with bolt and nut assembly 55, a shorter lost motion slot 56 and pivoted to fulcrum link 40 suitably as shown at 57.

At 58 is shown a portion of the linkage which releases the door latch. It is engaged by a bell crank 59 pivoted to frame 19 as at 60, used to translate the action of door handle 18 (FIGURE 1) via rod 61 into motion that will depress member 53.

Turning now to FIGURE 4, there is seen in side elevation a portion of frame 19 to which the latch mechanism per se is secured. The latch linkage member 24 has a shoulder 62 formed thereon and additionally is pivoted as at 64 to the fulcrum link member 65. This fulcrum link member 65 is also pivoted as at 66 to frame 19. A suitable resilient means such as spring 67 engages the frame as at 68 and extends through a pierced ear 69 on fulcrum link 65 so as to urge the latter constantly into the position illustrated in FIGURE 4. A portion 58 of fulcrum link 65 extends through the portion of frame 19 that is oriented at 90 degrees to the portions here in side elevation and appears in FIGURE 3 at the left hand side of the drawings. It is through this extension 58 that bell crank 59 is able to pivot the fulcrum link 65 to the position shown in FIGURE 5 for purposes of opening the door with the inside door handle.

Flat surface 70 formed near the top of fulcrum link 65 is the portion of the fulcrum link that is engaged by the door opening push button of the outside door handle 14. The door latch may be released either by pushing the outside door handle button or by manipulating the inside door handle, and in each case fulcrum link 65 is tipped to the position shown in FIGURE 5.

Also pivoted to the frame member 19 is the dog link 71. The pivot for this link may be any suitable member such as the rivet 72. Dog link 71 has a dog 74 thereon which engages the ratchet gear 75 under the influence of spring 76 under conditions of repose as shown in FIGURE 4. Spring 76 is engaged over a boss 78 on the dog link 71 and a similar boss 79 on frame 19.

Ratchet gear 75 is mounted to be fixed in relation to a shaft 80 on which is also mounted as shown by the broken lines in FIGURE 5, the door latching gear 81. As shown in FIGURE 5, when linkage member 24 is held elevated by the bifurcated ears 22 of support member 20 and the fulcrum link 65 is advanced to the right as shown in FIGURE 5, shoulder 62 of link 24 engages a bent over finger or other suitable projection 82 on dog link 71 thereby pivoting the latter to a position in which the dog 74 is free from the ratchet gear 75. Under those conditions, the lock gear 81 is free to rotate in either direction and the door may be opened. When the pivot link 65 is allowed to move to the position to which it is urged by spring 67, however, the dog 74 engages with the ratchet gear 75 and then rotation only in a clockwise direction as viewed in FIGURE 4 is possible. Under these conditions, the door latch gear 81 may rotate in a direction to permit closing the door but cannot be rotated in the other direction, hence the door will be latched and held shut.

In FIGURE 6, an enlargement of the latch mechanism shown in FIGURE 1 is disclosed. Here is shown clearly the relationship between the locking gear 81 and the ratchet gear 75. Shield 15 illustrated in FIGURE 1 appears clearly in this figure. Locking gear 81 reacts with the fixed rack member 84. This reaction is illustrated best in FIGURE 7 where the gear and rack are shown engaged as they would be with the door closed and latched. Stationary rack 84 is secured to the car body in any suitable manner as by screws 85 or the like.

At the lower right hand side of FIGURE 6 is shown a structure which permits rendering the automatic locking device inoperative. In the wall 86 of a door 11 is mounted a screw 87. It is preferably a flat headed screw and the wall is provided with a countersunk hole to

receive its head so that it is flush with the edge of the wall 86. A washer as at 88 embraces the screw on the inside of the door and the screw 87 is thereby held immobile with respect to the door except for rotation. A nut 89 is threadably engaged on the screw 87 and has a portion thereof which extends between the bifurcated ears 90 of L-lever 91. The lever is pivotally secured to the door by suitable means such as the pin 92 extending through the lever and the ears 94 secured to the door panel 86. When the L-lever 91 is in the position shown in solid lines in FIGURE 6, the weight 31 of pillar bar 28 is free to swing toward the right. When screw 87 is rotated, however, so as to draw the nut 89 toward the door panel and thereby pull the bifurcated ears of L-lever 91 to the position shown in broken lines, the depending portion of L-member 91 is pivoted outwardly to engage weight 31 and thereby prevent it from moving toward the door panel 86. This will render the automatic locking device inoperative as will be explained in detail under the heading "Operation."

The structure shown in FIGURE 8 is substantially that illustrated in FIGURE 3 and is merely shown in a different adjusted position which will be explained under the heading entitled "Operation."

In FIGURE 9 is shown the structure that is illustrated in FIGURE 5, and it is shown in a condition in which the bifurcated end 22 of control member allows link member 24 to drop down. Under these conditions, it is clear that advancing the fulcrum link 65 will not produce any movement of dog link 71 because shoulder 62 of link member 24 has dropped below the finger 82 of the dog link 71. This is the condition of the latching mechanism when it is locked. Manipulation of either the inside or outside door handle will merely move the fulcrum link 65 without in any way affecting the spring loaded position of dog link 71.

As appears clearly in FIGURE 9, a guide finger 95 is bent out of frame 19 and engages the side of latch fulcrum link 65 to keep it in approximate parallelism with the frame 19, as the link pivots.

A stop 96 is also formed on frame 19 to prevent latch fulcrum link 65 from being moved farther forward than necessary to operate the latch. FIGURE 5 shows fulcrum link 65 against the stop 96.

FIGURE 10 shows the relationship of fulcrum link 65 to frame 19 and link member 24.

FIGURE 11 is another view of the structure illustrated in FIGURE 3 and showing a different adjusted position of the parts which again will be described in detail under the heading "Operation."

In FIGURE 12 is shown a view of a modified form of the structure illustrating the same portions thereof as shown in FIGURES 3 and 11. In the modified form shown in FIGURE 12, frame 19 remains the same as in the basic unit illustrated in FIGURES 1 through 11. The same is true of linkage member 24. This is also true of bell crank 59 and the internal door latch connecting rod 61.

The support member 98 is very similar but has some slight modifications to it and is hence assigned a new identifying numeral. It is pivoted to frame 19 as at 99 substantially the same as support member 20. The principal difference between the two support members is that pin 100 in the modified form is fixed in relation to the support member 98 and does not slide. Also, the control bars 44 and 45 and lock fulcrum link 40 are replaced by a yoke member 101 connected by a connecting rod 102 to a bell crank 104 that is pivoted on a bracket identical to the one illustrated in FIGURES 1 through 11 and assigned the same number, 48. The control rod is substantially identical and hence also numbered 49 and the control button is 16. Its bracket is also identical and numbered 51. Yoke 101 is provided with a slot 105 through which a suitable rivet 106 extends and is anchored in frame 19. This provides the sliding connec-

tion between frame 19 and yoke 101. A cam lever 107 is suitably pivoted as at 108 to a portion of the pillar bar 109.

The weight 110 of pillar bar 109 is similar to the weight 31 except that it carries a finger member 111 which may engage the bottom of the weight 112 of incline or auxiliary pillar bar 114. The pivot support for both of these pillar bars is designated 115. As seen clearly in FIGURE 12, the incline pillar bar extends slightly above the top of the main pillar bar 109 and has a cutaway portion 116, the purpose of which will be explained in detail under the heading "Operation." As the two pillar bars are pivoted on the same shaft and lie adjacent to each other, cam lever 107 will engage the upper portion of pillar bar 114.

A pin as at 117 is rigidly secured to the upper end of the cam lever 107 and fits within a notch 118 of yoke 101. Thus, the cam lever 107 is pivoted in one direction or the other whenever the yoke member 101 slides. The lower arm 118' of yoke 101 slidably embraces a rivet 119 which is rigidly secured to the support member 98. As the slot in arm 118' of yoke 101 is open at the left end as viewed in FIGURE 12, it will exert a positive force on support 98 in only one direction. In the other direction it serves as a lost motion connection between the two pieces.

As in the case of the unit illustrated in FIGURES 1 through 11, a spring 120 is secured to an anchor 121 in frame 19 and a similar anchor 122 in support member 98 to constantly urge that member to drop its outer end which supports the link 24. Pin 100 resting on top of the pillar bar holds the support member 98 in the position illustrated in FIGURE 12.

FIGURE 13 is another view of the structure shown in FIGURE 12 but with the parts in an adjusted position which will be explained in connection with operation of the device.

Operation

As shown in FIGURE 3, the automatic locking device is inoperative and the latch could be released as shown in FIGURE 5, if desired. With the initial forward motion of the car, however, weight 31 will tend to remain stationary as the car advances and hence will tip pillar bar 28 to the position shown in FIGURE 8. Since the top of incline pillar bar 34 extends slightly above the top of pillar bar 28, pin 29 will not slide to the top of the incline pillar bar but instead will slide off pillar bar 28 and into the cutout portion 33 of pillar bar 34. Support member 20, consequently, moves to the depressed position to which it is constantly urged by spring 25. Under these conditions, latch linkage member 24 is in the position illustrated in FIGURE 9. Obviously, movement of latch fulcrum link 65 to the right will produce no effect whatever on dog link 71 as the latter is not engaged by shoulder 62 of the linkage member 24. This is the automatic lock condition of the device on an initial start of the vehicle on a level ground.

Referring again to FIGURE 3, in which the car is standing stationary on level ground, the doors may be locked by depressing button 16. When button 16 is depressed, the upper end of bell crank 45 is moved toward the right, thereby applying a pull on long link 44. This causes the top of lock fulcrum link 40 to be moved to the right also, which in turn, via connecting link 38 slides pin 29 from the top of pillar bar 28 thereby allowing pin 29 and hence control member 20 to drop to a lower level and again member 20 assumes the position illustrated in FIGURE 8 although the pin 29 would be on the opposite side of pillar bar 28 under these conditions. Effectively, however, link 24 is moved so as to disassociate shoulder 62 from finger 82 and hence the latch controlling handles are again rendered inoperative.

Pin 29 may be returned to its raised position by moving button 16 in the opposite direction. When button 16 is raised with pin 29 on either side of pillar bar 28 (with the vehicle standing on an approximately hori-

zontal surface and not accelerating) the top of bell crank 45 is pivoted toward the left as viewed in FIGURE 3. When the lock mechanism is locked as shown in FIGURE 8, the forward application of motion to the left of bell crank 45 by pulling up on button 16 causes long link 54 to move in a leftward direction. Since pin 29 is as far to the left in slot 30 under these circumstances as it can be, lock fulcrum link 40 cannot be pivoted to the left and hence a pivoting force is applied to support member 20 at a point below its pivot point 21. This force overcomes the force of spring 25 and support member 20 is pivoted up to the position shown in FIGURE 3. Pillar bar 28 is allowed to reassume the supporting position under the pin by reason of weight 31 trying to hang straight down from pivot 32.

If the mechanism had been locked manually and pin 29 was at the rear of slot 30, the force applied to lock fulcrum link 40 by long link 54 produces a dual action of sliding pin 29 forward in slot 30 and up over the rounded corner of pillar bar 28 and simultaneously tipping support member 20 up to aid in getting pin 29 back on top of pillar bar 28. Thus, pulling up on button 16 unlocks the structure regardless of how the lock was actuated.

Referring once more to FIGURE 8, we see the position that the mechanism would be in in the event that the vehicle were parked heading up a hill. Under these circumstances, any raising of button 16 would merely raise control member 20 and pin 29 up in the air but there would be nothing for the pin to rest on if pillar bar 28 and main weight 31 were the only means of holding pin 29 up. Pillar bar 28 would remain in the relative position with respect to frame 19 as shown in FIGURE 8. Release of button 16 would permit a return to the locked position.

Referring to FIGURE 11, however, as soon as button 16 is raised to lift the pin 29 by pivoting the support member 20 as described in connection with manual unlocking, the incline pillar bar 34 under the influence of its weight 35, swings to the position shown in FIGURE 11 and pin 29 is supported by the upper end of the incline pillar bar 34. From this position, the mechanism may be manually locked or unlocked as described with the vehicle in a horizontal position and standing still. As soon as the vehicle is moved to level ground, however, pin 29 drops back to the top of pillar bar 28 as the result of the pillar bars swinging to a strictly vertical position as shown in FIGURE 3. Thus, the system is automatically prepared for automatic locking upon acceleration of the vehicle, even though the pendulum lock mechanism is inoperative while the vehicle is resting facing up an incline.

The operation of the modification illustrated in FIGURES 12 and 13 is similar to but not identical to that illustrated in FIGURES 1-11. Pillar bar 109 supports pin 100 to hold support member 98 in its upper position and therefore supporting link 24 in an operative condition as in the case of pin 29 with pillar bar 28. When there is forward motion of the car to the right as viewed in FIGURES 12 and 13, weight 110 tends to stand stationary, thus apparently moving it to the left as viewed in FIGURE 13. As shown in FIGURE 12, pin 100 is below the top surface of incline pillar bar 114. For this reason pin 100 will lack support when pillar bar 109 is pivoted from beneath the pin by the inertia of weight 110. Under these conditions, pin 100 drops between the pillar bars to allow member 98 to assume the inoperative position illustrated in FIGURE 13.

When pin 100 drops, support member 98 pivots down applying a rearward thrust to pin 119 which in turn impinges on the yoke member 101 and forces it forward or to the right as viewed in FIGURES 12 and 13. This action, through linkage 102, pivots the bell crank 104 to the position shown in FIGURE 13 and pulls the locking button 16 down as though pushed down manually.

When button 16 is raised manually, a leftward pivoting action is applied at pin 119 through the control linkage and this pivots the control member 98 about its pivot point 99 raising pin 100 and also relieving pressure on the cam lever 107. The mechanism would therefore be returned to the position illustrated in FIGURE 12.

When button 16 is depressed manually, the member 101 is drawn toward the right via linkage 102 and the bell crank 104 thereby applying a rightward motion to pin 117 at the upper end of cam lever 107. As cam lever 107 is secured to the upper end of pillar bar 109 and applies leverage against incline pillar bar 114, there is a dual action of pulling the upper end of pillar bar 109 to the right and forcing the incline pillar bar upper portions to the left. Again a slot is opened up into which pin 100 may drop, thereby locking the mechanism in the identical fashion achieved when inertia moves the weight 110.

When the vehicle is stopped facing up an incline, the door may be manually unlocked and retained in that position by pulling up on button 16 and thereby raising pin 100 to the point where it will rest on the top of incline pillar bar 114. When the vehicle is returned to a level condition, two pillar bars assume a vertical position as shown in FIGURE 12 with respect to the rest of the mechanism. Ear 111 of the heavier main weight 110 assures that pillar bar 114 will not by reason of the weight of pin 100 resting on it, be kept from assuming the vertical position shown in FIGURE 12.

One advantage of this modification as opposed to the structure shown in FIGURES 1-11 is that the locking button 16 always discloses accurately and visually the condition of the latch mechanism. In the form of the device illustrated in FIGURES 1-11, the lost motion linkage makes it possible for button 16 to be depressed only slightly when the device is locked as by the weight 31. Under these conditions, the vehicle door is locked but the lock button is not depressed as far as it might be in the case of manual locking. A comparison of the position of button 16 in relation to bracket 51 in FIGURES 2 and 8 will illustrate this point clearly.

The structure shown in FIGURES 12 and 13 has the further advantage that there are fewer pieces involved and pin 100 may be made stationary as opposed to the sliding construction of pin 29 illustrated in FIGURES 1-11.

In the case of either of these structures, however, the incline pillar bar serves to prevent automatic operation of the device if the vehicle incorporating it is parked facing up a sloping street, but it will automatically become effective again as soon as the vehicle approaches anything approximating a level condition. Thereafter, any acceleration of the vehicle will be adequate to cause the automatic lock to come into operation.

It is also an important feature of this automatic locking device that it will not interfere with the operation of structure in the latch mechanism which unlocks the latch if the door is merely slammed with the lock on. The purpose of this feature is to prevent accidentally locking oneself out of the car. Whether the latch is locked by depressing button 16 or by the action of the weight in swinging the door closed, this unlocking structure will function to release the lock as the lock gear engages the rack during latching unless the button on handle 14 is held depressed during latching. This is true, because this automatic locking mechanism applies no direct locking force to the latch but only removes the support for link 24.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

What is claimed:

1. A door lock having a frame, a latch, control handles

and linkage members interconnecting said latch and control handles,

- A. at least one of said linkage members being pivotally secured to another of said linkage members for movement into and out of operable relationship with a third of said linkage members, 5
- B. a control plate
 - (1) pivoted to said frame and
 - (2) engaging said pivoted linkage member
 - (3) for moving said pivoted linkage member into and out of operable position selectively, 10
- C. a pin
 - (1) secured to said control plate,
- D. support means
 - (1) movably secured to said frame and 15
 - (2) engaging said pin for holding said control plate in a position to make said pivoted linkage member operable, and
- E. inertia means secured to said support means for moving it away from said pin in response to motion of said door lock in a given direction. 20
2. The structure of claim 1 in which
- F. manual means is
 - (1) secured to said control plate
 - (2) for moving said control plate to a position in which said pin is above said support means. 25
3. The structure of claim 2 in which
- G. an auxiliary support means is
 - (1) movably secured to said frame near said control plate 30
 - (2) said auxiliary support means having a portion thereof that is engaged by said pin to prevent said pin from being supported by said auxiliary support means normally, and
- F. said manual means 35
 - (3) being adapted to move said control plate to place said pin above said auxiliary support means.
4. The structure of claim 1 in which
- G. an auxiliary support means is 40
 - (1) movably secured to said frame near said support means,
 - (2) said auxiliary support means extending above said support means to engage said pin when said control plate is raised and said lock is disposed at an angle to the horizontal as to cause said inertia means secured to said support means to move it as though the door were being moved in said given direction. 45
5. A door lock mechanism having a frame and a latch, 50
 - A. including two misalignable portions for actuating said latch when said two misalignable portions are aligned,
 - B. a control plate 55
 - (1) movably secured to said frame and
 - (2) engaging one of said two misalignable portions for moving it into and out of operable position selectively,
 - C. a boss secured to said control plate, 60
 - D. a pillar bar
 - (1) pivoted to said frame and
 - (2) engaging said boss to hold said control plate in a position supporting said one misalignable portion in operable position, and 65
 - E. a weight
 - (1) secured to said pillar bar
 - (2) spaced from its point of pivotal attachment to said frame,
 - (3) whereby inertia in said weight will pivot said pillar bar from under said boss when said door lock is moved in a given direction. 70
 6. The structure of claim 5 in which an
 - F. auxiliary pillar bar is secured to said frame on the pivot of said pillar bar, 75

- G. a weight
 - (1) secured to said auxiliary pillar bar,
 - (2) said auxiliary pillar bar having a portion of its top cut away to form a boss receiving notch,
 - (3) the balance of its top extending above said pillar bar, and
- H. manual means
 - (1) secured to said control plate
 - (2) for moving said control plate to a position in which said boss is above both of said pillar bars.
7. The structure of claim 6 in which said weight (G) secured to said auxiliary pillar bar (F) is adjacent said weight (E) secured to said pillar bar (D)
- I. a finger
 - (1) secured to said pillar bar weight and
 - (2) engaging said auxiliary pillar bar weight when said door lock is moved in a direction opposite to said given direction.
8. The structure of claim 6 in which means movably mounted near said frame is selectively engaged with and removed from the weight (E) of said pillar bar (D) to prevent movement thereof relative to said frame and allow freedom of movement alternatively.
9. The structure of claim 6 in which said manual means comprises:
 - J. a fulcrum link
 - (1) pivoted to said support member
 - (2) near said boss
 - K. a spring
 - (1) secured between said fulcrum link and said control plate,
 - C. said boss
 - (2) being slidably secured to said control plate,
 - L. a boss link
 - (1) secured to said boss and said fulcrum link and
 - M. means secured to said fulcrum link for applying pivoting force to it in two directions.
10. The structure of claim 6 in which said manual means comprises:
 - N. a cam lever
 - (1) pivoted to said control plate,
 - (2) and engaging said auxiliary pillar bar above its pivot,
 - O. a yoke
 - (1) slidably secured to said frame,
 - (2) one side of said yoke secured to said cam lever,
 - (3) the other side of said yoke engaging said control plate below its pivot by a lost motion means and
 - P. manual means secured to said yoke for sliding it in two directions.
11. The structure of claim 5 in which there is
 - H. a manual means
 - (1) secured to said control plate
 - (2) for moving said control plate to place said boss above both of said pillar bars and comprising
 - J. a fulcrum link
 - (1) pivoted to said support member
 - (2) near said boss
 - K. a spring
 - (1) secured between said fulcrum link and said control plate,
 - C. said boss
 - (2) being slidably secured to said control plate,
 - L. a boss link
 - (1) secured to said boss and said fulcrum link and
 - M. means secured to said fulcrum link for applying pivoting force to it in two directions.
12. An improved automobile door latch structure having a frame, a latch secured to said frame and operating handles normally connected to said latch by interconnecting linkage, said interconnecting linkage including a

11

linkage member pivotally secured to another portion of said linkage, a latch ratchet gear, and a latch dog pivotally secured to said frame and engaging said latch ratchet gear, said linkage member having a shoulder thereon and said latch dog having a finger thereon, said shoulder normally engaging said finger to complete said interconnecting linkage, the improvement comprising:

- A. a control member
 - (1) pivotally secured to said frame,
 - (2) engaging said linkage member and supporting it in latch dog engaging position. 10
- B. a spring
 - (1) secured to said frame and said control member
 - (2) constantly urging said control member into a position disassociating said linkage member finger and said latch dog shoulder, 15
- C. a pin slidable in said control member,
- D. a pillar bar
 - (1) pivotally secured to said frame and 20
 - (2) engaging said pin to hold said control member against the urging of said spring,
- E. a weight
 - (1) secured to said pillar bar
 - (2) spaced from its point of pivotal attachment to said frame 25
 - (3) for pivoting said pillar bar by inertia, and
- F. manual linkage
 - (1) secured to said pin and said control member
 - (2) for alternately sliding said pin from the top of said pillar bar and pivoting said control member to a position supporting said linkage member in operable position and
 - (3) simultaneously sliding said pin to the top of said pillar bar when it is vertical. 35
- 13. The structure of claim 12 in which

12

G. a means is

- (1) movably mounted near said weight and
- (2) selectively engaged with said weight to inhibit its movement relative to said frame and
- (3) disengaged from said weight to leave it free to move relative to said frame selectively.
- 14. The structure of claim 13 in which
- H. an incline pillar bar
 - (1) is pivoted to said frame near said pillar bar,
 - (2) said incline pillar bar top being taller than said pillar bar and
- F. said manual means
 - (4) is capable of pivoting said control member to raise and slide said pin to the top of said incline pillar bar when said door lock is inclined in a given direction.
- 15. The structure of claim 12 in which
- H. an incline pillar bar
 - (1) is pivoted to said frame near said pillar bar,
 - (2) said incline pillar bar top being taller than said pillar bar and
- F. said manual means
 - (4) is capable of pivoting said control member to raise and slide said pin to the top of said incline pillar bar when said door lock is inclined in a given direction.

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