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AUTOMOBILE DOOR LOCKING AND UNLOCKING MEANS
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The present invention relates to apparatus for automatically locking or unlocking a plurality of locks from a single control station, and particularly to apparatus for automatically locking or unlocking all of the doors of an automotive vehicle by the single operation of locking or unlocking doors of two doors thereof.

While the prior art has heretofore proposed concepts which are of a general character similar to that defined above, in the prior art the door latching means, as well as the means for barring or locking the latch, were intended to be automatically actuated. This, of course, presents substantial problems with respect to the power required to operate the apparatus. These problems, together with the expense of the necessary instrumentalties, has rendered the prior art door locking and unlocking apparatus impractical and commercially unacceptable.

It is an object of my invention to provide an improved automatic control for existing manually operated door locking and unlocking means, which control merely conditions the means to accommodate or prevent manual opening of the doors. My improved control is adapted to be utilized with existing door latching devices, either as an accessory thereof or a built-in component part thereof, and it is therefore of a highly economical nature and possesses great commercial practicality.

In distinction to the endeavors of the prior art, the present invention is not concerned with the provision for means for automatically latching and unlatching the doors of an automotive vehicle, but has for its object the provision of means for rendering all of the door unlatching means operative or inoperative from a single control point. It will be readily appreciated that the rendering of the door unlatching means operative or inoperative is in effect that which is accomplished by means of a key in a lock, or any other locking mechanism.

According to my invention, I provide, for example, in a 4-door passenger vehicle, all of the doors with controlled means for rendering the door unlatching means selectively effective or ineffective. Two of the doors of the vehicle have controlling means, each of which is adapted to control the aforementioned controlled means of the other three doors. In practice, the rear doors of the vehicle are provided simply with controlled devices, while the front doors of the vehicle are provided with universal devices for either controlling or being controlled, so that all four doors of the vehicle can be locked or unlocked by operation of either of the front door controls.

In the preferred embodiment of my invention, the controlled means are electrically energized from the storage battery of the vehicle and each controlling means comprises simply a switch. Each controlling switch is adapted to be attached to, or incorporated with, the latch conditioning means of a front door of the vehicle. The latch conditioning means, as hereinafter referred to, is defined as that which renders the door unlatching means either operable or inoperative. If the door unlatching means is rendered ineffective by the latch conditioning means, the door is locked, whereas the door is unlocked when the latch conditioning means renders the unlatching means operative.

The controlled portion of my invention comprises a pair of circuits having a source of power from the storage battery, and including a plurality of solenoids connected in series therein. The latch conditioning device on each of the doors has associated therewith a pair of solenoids which, respectively, operate the latch conditioning means to render the door unlatching means effective or ineffective. The controlling means includes an electrical transfer means which is operable by the operation of the latch conditioning means on one of the two selected doors to selectively energize one of said two circuits. Thus, when either of the front door latch conditioning means is operated, one of the two circuits is temporarily energized to similarly operate the latch conditioning means on the other three doors of the vehicle.

It is an object of my invention to provide a control system of the character above described which may be readily installed in the existing door-latching means of vehicles without alteration thereof.

It is a further object of my invention to provide a system whereby all doors may be locked or unlocked from either of the front doors.

Still another object of my invention is to provide a locking system in which the use of a key on the outside of either front door or the locking button on the inside thereof will lock or unlock all of the doors of the vehicle.

Other objects and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment of my invention.

Now, in order to acquaint those skilled in the art with the manner of making, installing and using the door locking and unlocking means of this invention, I shall describe, in connection with the accompanying drawings, a preferred embodiment of the invention and a preferred mode of constructing the same.

In the drawings, wherein like reference numerals indicate like parts:
Figure 1 is a vertical cross-section of a front door of a vehicle showing, in the form of an accessory, one of the universal controlling and controlled devices of the invention in operative association with the latch conditioning means of door; Figure 2 is a side view, with the outer door panel removed, of the apparatus shown in Figure 1; Figure 3 is a detailed representation of the switch means of the universal device; Figure 4 is a detailed representation of the upper portion of one of the controlled devices provided on the rear doors of the vehicle; and Figure 5 is a schematic circuit diagram of the control circuits of my invention.

Referring now to the drawings, in Figures 1 and 2, I have shown a conventional latch mechanism L for a vehicle door D. The master, or controlling, solenoid and transfer switch unit of the present invention is indicated at M and is shown in the form of an accessory mounted on the inside window reveal of the door. The door latch 11 comprises a rotatable gear mounted on the edge of the door adapted to cooperate with a rigid shoulder 12 in the door frame to hold the door closed. The latch 11 is keyed to a shaft 13 which is rotatably journaled in a plate 13 and has a star wheel 14 keyed to the inner end thereof. Rotation of the latch 11 is controlled by the star wheel 14 which is normally held against rotation in the clockwise direction (as viewed in Figure 1) by a blocking lever 16. The blocking lever 16 is pivotally mounted on the plate 13 at a point intermediate its ends and is nor-
nally biased into engagement with the star wheel by means of a torsion spring 17. The coil of the spring 17 is disposed about the pivot pin of the lever 16 and the operating lever 19 is pivotally anchored to a blocking lever 16 and to the lower extremity 21 of an operating lever 19. The operating lever 19 is pivotally mounted on the plate 13 by a pivot pin 22 and is urged to rotate in a counter-clockwise direction by the action of the spring 17. At its upper end the lever 19 includes an enlarged plate portion 20 and is engaged and moved to the right (as viewed in Figure 1) by the outside door handle. A bell crank 24 is pivotally journaled on the plate 13 by a pivot pin 26 and has a lefthand extension 27, an upright extension 28 terminating in a horizontal projection, and a righthand extension 29. The lefthand extension 27 of the bell crank 24 is engaged in a cam slot 31 on the blocking lever 16 so that the blocking lever 16 and the bell crank 24 are co-operative to rotate simultaneously in opposite directions about their respective pivot pins. The operating lever 19 pivotally carries adjacent its upper end, a bifurcated member 32, one bifurcation 33 of which is slidably positioned in a guide slot 34 of the latch conditioning plate 36. The second bifurcation 37 of the member 32, when the plate 36 is in the position shown in Figure 1 wherein the unlaying means is rendered operative, is positioned to be engageable with the horizontal extremity of the upright portion 28 of the bell crank 24 to rotate the bell crank 24 clockwise about its pivot 26 in response to movement of the member 32 to the right. The latch conditioning plate 36 (as shown in Figure 2) is suitably journaled on a right angle extension of the plate 13 so as to be rotatable through a predetermining area about its pivot 33, and is adapted to be held at either end of the arc by a suitable overcenter detent means (not shown). When the latch conditioning plate 36 is rotated from the position shown in Figure 2 to its counter-clockwise position, the guide slot 34 in the plate moves the member 32 downward so that the lower bifurcation thereof is displaced from the plane of the horizontal extremity of the upright extension 28 of the bell crank 24, whereby the member 32 is incapable of actuating the crank 24.

A latch conditioning bell crank 38 is pivotally pinned to the plate 13 at 39 and has one projection 41 thereof engaged in a cam slot 42 on the latch conditioning plate 36. A second projection 43 of the bell crank 38 is articulated to the outside door handle 44 which is projected through the inside window reveal 51 of the door normally to accommodate manual locking and unlocking of the door. The arrangement is such that when the rod 44 is pushed down or pulled up the plate 36 is rotated counter-clockwise or clockwise, respectively, as the same is viewed in Figure 2. A vertical link 54 is also articulated with the latch conditioning plate 36 at a point suitable to impart oscillatory motion to the plate. At the end opposite its connection to the plate 36, the link 54 is articulated with the inner end of a lever 56 which is journaled on the plate 13 by a pivot pin 57. The outer end 58 of the lever 56 is formed to cooperate with the key operated lock member (not shown) of the vehicle door, whereby turning of the key in the lock imparts limited motion to the lever 56 to effect vertical reciprocation of the link 54 to oscillate the plate 36 about its pivot to either of its two above-men
dicted positions. The righthand extension 29 of the bell crank 24 is positioned to be operated by an extension 47 on a bell crank 46, which is adapted to be actuated by the inside door handle (not shown), to rotate the bell crank 24 and the blocking lever 16. The blocking lever 16 is formed with a projection 48 thereon, the projection 48 is engaged with a similar projection 49 on the bifurcated member 32, when said member is in its lower position, to rotate both the member 32 and the latch conditioning plate 36 to the positions shown in Figures 1 and 2.

In operation, assuming that the conditioning plate 36 is in the position shown in Figures 1 and 2, wherein the door is unlocked, actuation of the inside door handle 44 to the right result in the operating lever 19 whereupon the bifurcated member 32 is moved to the right to engage the bell crank extension 28 and rotate the bell crank 24 clockwise which imparts counter-clockwise rotation to the blocking lever 16 to move it out of engagement with the star wheel 14, thereby freeing the latch 11 to permit operation of the door. When the outside door handle is released, the lever 19 is returned by the spring 17 to its initial position, and the spring similarly returns the blocking lever 16 into engagement with the star wheel 14 and, in turn, the bell crank 24 to its original position. When the door is closed, the lever 16, in cooperation with the cam surfaces of the teeth on the star wheel 14, serves merely as a spring-pressed detent to permit such rotation of the latch 11 and wheel 14 as is necessary to relatch the door; the lever 16 thereafter blocking the latch 11 to retain the door in latched position.

If, in its latched position, the door is to be locked from the outside with a key, the lock actuated members engage the portion 55 of the lever 56 to move the same upwardly, thereby moving the link 54 downwardly to rotate the latch conditioning plate 36 and member 32 downwardly to door locking position. Rotation of the plate 36 results in rotation of the bell crank 38, due to the cooperation of the projection 41 of the bell crank 38 in the cam slot 42 of the plate 36, thereby moving the latch conditioning rod 44 downwardly. This same end result can be attained from the inside of the door, in reverse order, when the door is latched by manually depressing the rod 44.

In the position of the plate 36 above described, the bifurcation 37 is moved out of alignment with the bell crank 24, whereupon actuation of the outside door handle will result solely in movement of the operating lever 19 and the member 32 with no further result, whereby the door is effectively locked. To unlock the door, it is merely necessary to either operate the key lock from the outside of the door or pull up the rod 44 from the interior of the car, whereupon the elements of the mechanism are returned to the positions shown in Figures 1 and 2. The door may also be locked, when leaving the car, by depressing the rod 44 when the door is open, moving the outside door handle 44 and closing the door with the handle in said position. As the door closes, the lever 16 acts in its normal detenting manner to permit latching of the door. Since the door handle is in normal opening position, the member 32 is in its rightward position so that the projections 48 and 49 are not aligned, whereby detente engagement of the lever 16 has no effect on the position of the member 32 and the conditioning plate 36. If the outside door handle were not in its normal opening position, the projection 48 on the lever 16, in detenting movement thereof, would engage the projection 49 on the member 32 to return the member 32 and the plate 36 to unlocked position, thereby preventing inadvertent locking of the door. The inside door handle is effective to unlatch the door whether the latching mechanism be locked or unlocked, the inside handle in the latter case also unlocking the door. Specifically, actuation of the inside door handle effects direct rotation of the bell crank 24 clockwise through cooperation of the extension 47 with the right hand extension 29 of the bell crank 24. Clockwise rotation of the bell crank 24 imparts counter-clockwise rotation to the blocking lever 16, as described above, to move the blocking lever 16 out of engagement with the star wheel 14, thereby freeing the latch 11 to permit opening of the door. If the latch conditioning plate 36 is in its locked position, the projection 48 on the lever 16 engages the projection 49 on the member 32 to move the member 32 and plate 36 to unlocked position.
The general form of latch mechanism described above is widely used in automotive vehicles at the present time, both front doors of most vehicles being provided with key locks for locking and unlocking the door from the outside. In four-door vehicles, the latching and locking mechanism on the rear doors is essentially the same as that described and shown, except that no provision is made for key operation of the rear doors. Also, the mechanism is frequently modified to the extent that the inside door handle on the rear doors is rendered ineffectual when the push rod 44 is depressed (the door is locked), for purposes of safeguarding the welfare of small children riding in the rear seat. When locking such vehicles, it is necessary manually to lock each of the doors. Also, when driving, it is necessary manually to lock each of the rear doors to afford the safety measure above described.

The object of the present invention is to provide means for automatically locking or unlocking all of the doors at one time by the simple expedient of locking or unlocking a single one of the two front doors of the vehicle. The invention may be applied either as an accessory attachment to existing vehicles or may be incorporated directly in new vehicles, a preferred embodiment of the invention being disclosed herein in the form of an accessory attachment.

The device to be attached to each of the front doors comprises a universal or combined controlling and controlled device as indicated at M in Figures 1 and 2. The device comprises a frame 60 of generally C-shape, a pair of solenoid coils 61 and 62 mounted in vertical axial alignment within the frame, a solenoid armature 63 (see Figure 3) moveably mounted within the coils, a controlling switch 64 and an enclosure 65 for the components 60-64. The frame 60 includes a downwardly depending threaded tubular extension 66, which is aligned axially with the coils 61 and 62 and the armature 63, by means of which the device may be bolted to the window reveal 51 within the hole through which the rod 44 extends. The rod 44 is normally provided at its upper end with a screw thread by means of which a push-button 67 is normally attached to the rod above the reveal 51. In mounting the device of the invention, the pushbutton is removed and the device M is secured in position as described. The armature 63 is provided at its lower end with a threaded socket by means of which the same may be attached to the rod 44 in axial alignment therewith. At its upper end, the armature includes a reduced extension 68 extending upwardly through one blade of the switch 64 and to the exterior of the enclosure 65. At its upper end, the extension 68 is threaded for reception of the push button 67, the armature 63 and extension 68 constituting a rigid link between the push button and the rod 44 whereby the rod 44 may be manually actuated in the manner previously described.

In addition, momentary energization of the upper solenoid coil 61 will pull the armature 63 upwardly, and momentary energization of the lower solenoid coil 62 will pull the armature 63 downwardly to move the rod 44, bell crank 38 and conditioning plate 36 to their unlocked and locked positions, respectively, the said elements 36, 38, and 44 and the armature 63 being retained in the position to which moved by the detent means associated with the plate 36. Thus the door is adapted to be locked manually or automatically.

The switch 64 comprises a pair of spaced parallel stationary contact blades 69 and 70 and a movable contact blade 71 disposed between the stationary blades, the three blades being arranged in a common set of ends in a stack 72 which insulates the three blades from one another and mounts the same on the upper leg of the frame 60. The movable blade 71 is resilient, having a normal position spaced from both blades, and is of a length greater than the stationary blades. At the free end thereof, the blade 71 is apertured for reception of a plastic grommet 73, suitably formed of nylon or the like, through which the armature extension 68 extends. The grommet 73 has a frictional sliding fit with the extension 68 so that upon initial movement of the extension 68, the blade 71 will be moved therewith to bring one of its contacts into engagement with the contact carried by one of the stationary blades 69 and 70, the blade 71, due to its resiliency, thereafter returning to its normal position.

The controlled devices to be provided on the rear doors of the vehicle, as indicated at C in Figure 5 and as shown in part in Figure 4, are essentially the same as the devices for the front doors with the exceptions that the switch is omitted, a short indicator stem 74 is substituted for the armature extension 68 and a transparent closure cap 75 is provided over the upper end of the solenoid armature 63 and the stem 74 normally to prevent manual actuation of the push rod 44. The indicator stem 74 is suitably colored red and affords, when viewed through the cup 75, a visual indication that the door is unlocked. When the door is locked, the stem 74 is out of sight within the interior of the upper solenoid coil.

Referring to Figure 5, I have shown a diagram of the circuits whereby two of the front door motor devices M and two of the rear door controlled devices C are electrically connected for automatic operation to lock or unlock all four doors of the vehicle when one of the front doors is locked or unlocked. An unlocking circuit is comprised of the upper or unlocking solenoid coils 61 of the four devices, which coils are indicated respectively at 61a, 61b, 61c, and 61d and referred to collectively as 61, and the upper stationary contact blades 69 of the two controlling switches, which blades are indicated respectively at 69a and 69b. The two blades 69 are connected in parallel by a conductor 80 and the four coils 61 are connected in series with one another and the conductor 80 by leads or conductors 81 and thence to ground at 82. A locking circuit is comprised, in a similar manner, of the four lower or locking coils, 62a, 62b, 62c, and 62d, respectively, and the two lower stationary contact blades 70a and 70b, the blades 70 being connected in parallel by a conductor 83 and the coils 62 being connected in series with said conductor and one another by leads 84 and thence to ground at 85. The movable contact blades 71a and 71b of the two switches are connected in parallel by a conductor 86 which is in series with the vehicle battery B, the battery being grounded at one side as is conventional.

It will be noted from the schematic representation in Figure 5 that the operating circuits for either the four locking solenoids or the four unlocking solenoids are actuated from the motivating current of the battery B which is selectively supplied to either of the aforementioned operating circuits through either of the center contact blades 71a or 71b.

In operation, when either of the front or controlling doors is locked by way of either the outside key lock or the pushbutton 67, the latch conditioning rod 44 thereof is moved in a downward direction, causing the movable contact blade 71 of the respective unit M to move downwardly from its normal or neutral position. Whether either of the contact blades 71 is moved in a downward direction, the lower contact thereon comes into engagement with the contact on the lower stationary blade 70 to supply operating current from the battery through the conductor 86, the blade 71, the blade 70, the conductor 83 and the leads 84 to each of the locking solenoid coils 62a, 62b, 62c, and 62d and thence to ground at 85, whereby the conditioning rod 44 of each door latch mechanism is moved to locked, or lowered position.

The energizing of the locking solenoid coils is momentary, and is terminated when the resilient blade 71 returns to its normal position. Once the latch conditioning plate 36 (Figures 1 and 2) has been moved to either of its positions, in this case the locking position, it is retained there by detent means so there is no need for continuous operation of the solenoid coils.
The unlocking of all the doors through the operation of one of the front doors is accomplished in a similar manner upon the rod 44 of the respective front door being moved upward by a vertical rod extending upward. Upward movement of the rod effects upward movement of the movable blade 71 of the respective unit M to bring the cooperating contacts into engagement to complete a circuit from the battery through the conductor 86, the contact blade 71, the contact blade 69, the conductor 80 and the leads 61a, 61b, 61c and thence to ground at 82, whereby the conditioning rods 44 of all four doors are raised to unlock the doors.

As was pointed out in the detailed description of the operation of the door latch, operation of the latch mechanism by way of a key, or by one of the inside front door handles when the doors are locked, imparts reciprocating motion to the rod 44, so that the above described operating circuits will be energized automatically to place all of the doors in the same condition, i.e., locked or unlocked, as the one front door.

If it should be necessary to lock or unlock one of the rear or other doors independently of the other doors, it is merely necessary to remove the cap 75 (Figure 4) and depress or pull up the indicator stem 74 as desired. Since the controlled doors do not have any transfer mechanism to actuate a control circuit, manual operation of the controlled latch conditioning rod 44 will not affect the position of the latch conditioning means on any of the other doors in the system.

While I have shown and described what I believe to be a preferred embodiment of my present invention, it will be appreciated that various re-arrangements and modifications may be made therein without departing from the scope of my invention, as defined by the appended claims.

I claim:

1. Automatic door locking and unlocking means for vehicle doors equipped with a latch mechanism having a rod adapted to be actuated to lock and unlock the door and which is moved longitudinally in one direction each time the door is locked and moved longitudinally in the opposite direction each time the door is unlocked, comprising a pair of solenoid coils disposed generally in end to end relation in axial alignment with one another and the said rod adjacent the free end of the rod, a solenoid armature connected to the free end of the rod coaxial therewith and extending into the interior of said coils, an armature energization of one of said coils being moved in one direction to move the rod in that direction and upon energization of the other of said coils being moved in the opposite direction to move the rod in that direction thereby to effect locking and unlocking of the door, and a switch having a pair of relatively stationary contacts means, said movable contact means being operatively associated with said armature to be moved thereby into engagement with one of said stationary contact means upon movement of said armature in said opposite direction, said one stationary contact means being electrically connected to said one coil, and said other stationary contact means being electrically connected to said other coil.

2. Automatic door locking and unlocking means for vehicle doors equipped with a latch mechanism having a generally vertical rod extending upward toward the door panel which is adapted to be pushed downward to lock the door and pulled upward to unlock the door and which is moved longitudinally downward each time the door is locked and moved longitudinally upward each time the door is unlocked, comprising a pair of coaxial solenoid coils disposed generally in end to end relation with the other in axial alignment with the rod adjacent but above the free end of the rod, a solenoid armature connected to the free end of the rod coaxial therewith and extending upward into the interior of said coils, said armature upon energization of the upper one of said coils being moved upward to move the rod upward to unlock the door and upon energization of the lower one of said coils being moved downward to move the rod downward to lock the door, said armature including an extension projecting upwardly above said coils, said extension being exposed at its upper end to facilitate manual movement of said armature and rod, and a switch disposed between said upper ends of said coils and the upper end of said extension, said switch having a pair of relatively stationary contact means and a movable contact means, said movable contact means normally being biased to an intermediate position spaced from said stationary contact means and having sliding frictional engagement with said extension to be moved thereby into engagement with one of said stationary contact means upon upward movement of said armature and into engagement with the other of said stationary contact means upon downward movement of said armature, said movable contact means upon cessation of movement of said extension in either direction being returned due to the normal bias thereof to said intermediate position, said one stationary contact means being electrically connected to the upper one of said coils and said other stationary contact means being electrically connected to the lower one of said coils.

3. Automatic door locking and unlocking means for vehicles having a battery and a plurality of doors, including a pair of front doors, the doors each being equipped with a latch mechanism having a rod adapted to be actuated to lock and unlock the door and which is moved longitudinally in one direction each time the door is locked and moved longitudinally in the opposite direction each time the door is unlocked, the front doors of the vehicle each also having a key operated device for manually actuating the rod from the exterior of the door, said means comprising a unit on each of the doors and electrical connections therebetween, each of said units comprising a pair of solenoid coils disposed generally in end to end relation in axial alignment with one another and the respective rod adjacent the free end of the rod, and a solenoid armature connected to the free end of the rod coaxial therewith and extending into the interior of said coils, said armature energization of one of said coils being moved in one direction to move the rod in that direction and upon energization of the other of said coils being moved in the opposite direction to move the rod in that direction thereby to effect locking and unlocking of the respective door, the units on the front doors each including an extension on the armature projecting to the exterior of the coils of the respective unit and facilitating manual actuation of the rod in the respective door from the interior of the door, the units on the front doors each also including a switch having a pair of relatively stationary contact means and a movable contact means, said movable contact means being operatively associated with the armature of the respective unit and being movable thereby into engagement with one of said stationary contact means upon movement of said armature in said one direction and into engagement with the other of said stationary contact means upon movement of said armature in said opposite direction, said one stationary contact means being electrically connected to said one coil, and said other stationary contact means being electrically connected to said other coil.

4. Automatic door locking and unlocking means for vehicle doors equipped with a latch mechanism having a generally vertical rod extending upward toward the door panel which is adapted to be pushed downward to lock the door and pulled upward to unlock the door and which is moved longitudinally downward each time the door is locked and moved longitudinally upward each time the door is unlocked, comprising a pair of coaxial solenoid coils disposed generally in end to end relation with the other in axial alignment with the rod adjacent but above the free end of the rod, a solenoid armature connected to the free end of the rod coaxial therewith and extending upward into the interior of said coils, said armature upon energization of the upper one of said coils being moved upward to move the rod upward to unlock the door and upon energization of the lower one of said coils being moved downward to move the rod downward to lock the door, said armature including an extension projecting upwardly above said coils, said extension being exposed at its upper end to facilitate manual movement of said armature and rod, and a switch disposed between said upper ends of said coils and the upper end of said extension, said switch having a pair of relatively stationary contact means and a movable contact means, said movable contact means normally being biased to an intermediate position spaced from said stationary contact means and having sliding frictional engagement with said extension to be moved thereby into engagement with one of said stationary contact means upon upward movement of said armature and into engagement with the other of said stationary contact means upon downward movement of said armature, said movable contact means upon cessation of movement of said extension in either direction being returned due to the normal bias thereof to said intermediate position, said one stationary contact means being electrically connected to the upper one of said coils and said other stationary contact means being electrically connected to the lower one of said coils.
in said one direction, in electrical energization of all of the said one coils, and upon movement of the rod in said opposite direction, in electrical energization of all of the said other coils to effect simultaneous locking and unlocking of all of the doors.

4. Automatic door locking and unlocking means as set forth in claim 3, each of the units other than the front door units including means preventing manual actuation of the respective rod.

5. Automatic door locking and unlocking means for vehicles having a battery, a pair of front doors and a pair of rear doors, the doors each being equipped with a latch mechanism having a generally vertical rod extending upward toward the door reveal which is adapted to be pushed downward to lock the door and to be pulled upward to unlock the door and which is moved longitudinally downward each time the door is locked and moved longitudinally upward each time the door is unlocked, the front doors of the vehicle each also having a key operated device for manually actuating the rod from the exterior of the door, said means comprising a unit on each of the doors and electrical connections therebetween, each of said units comprising a pair of coaxial solenoid coils disposed one above the other in axial alignment with the respective rod adjacent but above the free upper end of the rod, and a solenoid armature connected to the free end of the rod coaxial therewith and extending upwardly into the interior of said coil, said armature upon energization of the upper one of said coils being moved upward to move the rod upward to unlock the respective door and upon energization of the lower one of said coils being moved downward to move the rod downward to lock the respective door, the units on the front doors each including an extension of the armature projecting upwardly above said coils, said extension being exposed at its upper end to facilitate manual movement of the respective armature and the rod in the respective door, the units on the front doors each also including a switch disposed between the upper end of the coils of the respective unit and the upper end of the respective armature extension, each of said switches having a pair of relatively stationary contact means and a movable contact means, said movable contact means normally being biased to an intermediate position spaced from said stationary contact means and having sliding frictional engagement with the armature extension of the respective unit to be moved thereby into engagement with one of said stationary contact means upon upward movement of the respective armature and into engagement with the other of said stationary contact means upon downward movement of the respective armature, said movable contact means upon cessation of movement of the respective armature extension in either direction being returned due to the normal bias thereof to said intermediate position, the said one stationary contact means and the said other stationary contact means of the front door units being connected, respectively, in parallel circuits, the said upper coils of all of said units being connected in series with one another and the said circuit of said one stationary contact means, the said lower coils of all of said units being connected in series with one another and the said circuit of said one stationary contact means, the said movable contact means of the front door units being connected in parallel with one another and in series with the vehicle battery, whereby manual actuation of the rod in either of the front doors of the vehicle results, upon movement of the rod upwardly, in momentary electrical energization of all of said upper coils, and upon movement of the rod downwardly, in momentary electrical energization of all of said lower coils to effect, respectively, simultaneous unlocking and locking of all the vehicle doors, said coils remaining deenergized except for momentary energization thereof upon locking and unlocking of the doors, the latch mechanism in each of the doors including detent means normally retaining the respective rod in the position to which the same is moved.

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