This invention relates to a door latch control mechanism, particularly for use in connection with motor vehicle door latches and is an improvement over the systems as shown in our co-pending applications Serial No. 662,870, filed April 17, 1946, now Patent No. 2,459,029, granted Jan. 11, 1949, and Serial No. 696,306, filed September 11, 1946, and over the application of David T. Ayers, Jr., Serial No. 667,124, filed May 7, 1946.

In our co-pending applications referred to, we have provided novel electrically operated door latching mechanisms wherein opening of any of the doors of the vehicle from the inside thereof is possible under any conditions, even when the doors are locked against outside entrance. The apparatus employs a door latch mechanism wherein each door latch includes an element normally arranged in a door-locking position and forming a control element for the latch, such element being automatically moved to door-opening position upon initial movement of one of the outside door handles so that the door may be normally opened.

The control element referred to is moved to door-opening position by the closing of a normally operable circuit energized upon initial movement of an outside door handle. By a simple push button operation from within the vehicle, the operator can render the normally operable electric circuit incapable of operation upon initial movement of any outside door handle. Under such conditions, all doors will be locked from the outside.

The systems provide the novel features referred to together with means operable by an inside door handle for restoring the normal condition of the systems when an occupant leaves the front seat of a vehicle. By the use of such a system, the driver may lock all of the doors against entrance from the outside, thus protecting himself or herself against unauthorized entrance into the vehicle, for example by so-called "red light" handles. However, the operation of an inside door handle renders the locking system inoperative, and accordingly the driver cannot inadvertently leave the vehicle with the doors locked against outside entrance. This is an important feature in a system of this character since the operator need not keep in mind the fact that the doors are locked from the outside when leaving the vehicle since the mere act of opening the door and leaving the vehicle restores the normal condition of the system.

In the co-pending application of David T. Ayers, Jr., referred to above, an improvement is provided in the system to prevent the operator from inadvertently leaving the vehicle, setting the locking system and shutting the doors, and leaving the ignition key locked in the vehicle.

There are other conditions to be considered and protected against, and several of such conditions are taken care of with the present construction. For example, it is an important object of the present invention to provide a door locking system of the character discussed above wherein the rear doors of a four-door sedan cannot be opened while the vehicle is under way, thus preventing children riding in the rear of the vehicle from opening the doors and falling out.

A further object is to provide a locking system of the character referred to wherein any of the vehicle doors can be opened from the inside when the vehicle is at rest, and wherein an auxiliary control means is provided which affects only the rear doors of a four-door sedan to prevent any one in the rear compartment, for example children, from opening the rear doors from the inside while the vehicle is under way.

A further object is to provide a vehicle door locking system wherein any of the vehicle doors can be opened from the inside under predetermined conditions, for example when the vehicle is at rest, and wherein an auxiliary control means is provided which affects only the rear doors of a four-door sedan and includes a control switch particularly adapted to be speed-controlled and thus to be opened when the vehicle is under way, to prevent the opening of the rear doors of the vehicle.

Other objects and advantages of the invention will become apparent during the course of the following description. In the drawings we have shown one embodiment of the invention. In this showing

Figure 1 is a perspective view of a locking mechanism for one of the front doors of a motor vehicle, parts being broken away and certain electrical connections being diagrammatically shown.

Figure 2 is a similar view of a locking mechanism for one of the rear doors of a four-door sedan.

Figure 3 is a diagrammatic view of the electrical system.

Figure 4 is a fragmentary perspective view of a portion of one of the front vehicle doors showing the preferred location of the push buttons operable for locking the doors, and

Figure 5 is a detail sectional view on line 5—5 of Figure 1.

As will become apparent, the locking mechanisms for the front and rear doors of a four-door sedan are quite similar and where identical parts are employed, they will be designated by the same reference numerals. It also will become apparent that while the invention has been particularly illustrated and described as applied to door locking mechanisms of the positive lock type, it is equally applicable to door locks of the so-called "free wheeling" type.

Referring to Figures 1 and 2, the numeral 10
designates a door-carried latch plate as a whole bent at an angle to form portions 11 and 12 extending longitudinally and transversely, respectively, of the motor vehicle. The plate 12 is flush with the free edge of the door, as will be apparent, while the plate 11 lies toward the inner face of the door. The present device is illustrated in association with a conventional type of rotary door lock. Such lock or latch means is now shown, but its construction is conventional as stated and is adapted to be rotated by a step-by-step movement to successive locking positions by the turning of a shaft 13 by a wheel 14 lying against the inner face of the plate portion 12.

The wheel 14 has a plurality of flat faces 15 each of which has an end 17 projecting beyond the plane of the next adjacent face 16. Successive faces 16 are engageable by the extremity of one arm 18 of a bell crank lever 19 journaled on a pin 20 carried by the plate portion 12. The other arm 21 of the bell crank lever is operable in a manner to be described, such arm projecting toward and terminating adjacent the plate portion 11 in accordance with conventional practice in certain types of motor vehicles. A leaf spring 22 urges the bell crank lever 18 to turn in a counter-clockwise direction as viewed in Figure 1 to its limit of movement, as shown.

A vertically moveable plate 25 is provided with a slot 26 in which is slidably a pin 27 fixed to the plate portion 11. Adjacent its lower end, the plate 25 is reduced in size and slides in a guide 28, and the plate 25 is urged upwardly by a leaf spring 29 engaging the lower end of the plate 25 and having one end anchored to the plate portion 11, as shown.

The conventional outside door handle, indicated in dotted lines by the numeral 32, is carried by a shaft 33 extending into the door from the outside thereof and having its inner end journaled in the plate 11 by means of a suitable extension 34 in accordance with conventional practice. The shaft 33 carries a crank arm 35 engageable with an inwardly extending lip 36 on the plate 25, and such plate is provided with an additional lip 37 engageable with the top of the lever arm 21. It will be apparent that rotation of the shaft 33 in the direction indicated by the arrow will cause the arm 35 to tend to move the plate 25 downwardly and transmit movement through lip 37 to the bell crank lever 18 to free the arm 18 thereof from the wheel 14. Under such conditions, the latch is free to turn upon the pulling of the door handle 32 to open the door, the wheel 14 advancing one step so that, upon releasing of the parts referred to, the lower end of the lever arm 18 will swing downwardly into engagement with the next adjacent face 16.

As previously stated, the present device is particularly adapted for use with a door locking mechanism of the type wherein the handle 32 is immovable when the door is locked. For this purpose, the plate 25 is provided with a shoulder 38 engageable with the upper end of a normally operable arm 39 (39 in Figure 2) of a bell crank lever 46, such lever being pivoted to the plate portion 11 as at 41. The other arm 42 of the lever 40 is urged upwardly by a spring 43 whereby the lever 40 is urged to the normal operative position shown in Figures 1 and 2.

Each lever arm 40 is pivoted as at 44 to the upper end of a depending link 45 the other end of which is connected to the armature 46 of a solenoid 47. Upon energization of this solenoid, the lever arm 40 will swing in a clockwise direction as viewed in Figure 1, thus moving the upper end of the arm 29 from beneath the shoulder 38 to permit a door-unlocking movement of the handle 22. One terminal of the solenoid 47 is grounded as at 48, and the other terminal is connected to one end of a wire 49.

A central switch 50 indicated as a whole by the numeral 51 is arranged above the plate 25. The wire 49 is connected to one terminal of the switch 50 and the other terminal of such switch is connected to a wire 52 the circuit of which will be described later. The switch 51 is provided with an operating button 53 engaged by a vertical projection 54 carried by the plate 25. The projection 54 normally holds the button 53 in its upper position, under which conditions the switch 51 is open. Under such conditions, the circuit for the solenoid 47 will normally be broken and the bell crank lever 40 will remain in the position shown in Figure 1.

The pin 27 pivotally supports a lever 55 having a projection 57 overlying the lever arm 21. Rotation of the lever 55 in a counter-clockwise direction as viewed in Figure 1 under all conditions. For reasons which will be referred to later, it is desirable to render the inside door handle 65 of the rear vehicle doors inoperative for opening such doors under predetermined conditions. In the present construction, therefore, the lever 55 of each rear door is provided with a projection 59 (Figure 2) normally arranged beneath the projection 57 and is urged to turn in a counterclockwise direction to its normal position shown in Figure 1 by a leaf spring 60. The crank 61 is operable by a shaft 62 which is connected the usual inside door handle indicated in dotted lines by the numeral 63.

In the mechanism shown in our co-pending application, Serial No. 686,300, referred to above, the lever 55 is free to rock in a counter-clockwise direction as viewed in Figure 1 under all conditions. For reasons which will be referred to later, it is desirable to render the inside door handle 65 of the rear vehicle doors inoperative for opening such doors under predetermined conditions. In the present construction, therefore, the lever 55 of each rear door is provided with a projection 59 (Figure 2) normally arranged beneath the projection 57 and is urged to turn in a counterclockwise direction to its normal position shown in Figure 1 by a leaf spring 60. The crank 61 is operable by a shaft 62 which is connected the usual inside door handle indicated in dotted lines by the numeral 63.

Referring to Figure 4, a portion of one of the front vehicle doors is illustrated and is designated by the numeral 66. This door has the usual window 69 having a lower sill 76, and with each front door 68 there is associated a switch 71 having a push button 72 projecting upwardly through the sill 76.

The plate portion 11 and other portions (not shown) of each front door rotatably support a shaft 73, provided adjacent its outer end with the usual door key-controlled lock (not shown). A cam 74 is carried by the shaft 73 and engages one arm 75 of a bell crank 76 to the plate portion 11 by a pin 77. The other arm 78 of the lever 76 is connected by a link 79 with the lever 55 through a slot and pin connection 80-81. The lever arm 78 is adapted to operate the push button 82 of a switch 83, the switch being normally held in open position and thus become apparent. One terminal of the switch 83 is grounded as at 84 and the other terminal is connected by a wire 85 to be referred to later.
A link 86 is pivoted to the pin 77 and to the link 45 as at 85', and a small pin 76', carried by the lever 76, limits turning movement of the lever 76 in a clockwise direction relative to link 86. It will become apparent that upon rotation of the lever 76 in a clockwise direction by the cam 74 upon a key-operated turning movement of the shaft 73, the lever arm 78 will close the switch 83 and will also move the link 86 downwardly. This transmits downward movement to the link 45, independently of operation of the solenoid 47, to move the lever end 39 to inoperative position. This is important if the vehicle battery should be "dead" when the operator attempts to enter the vehicle.

It will be apparent that energization of the solenoid 47 of any door is necessary in the operating thereof by the associated outside door handle 32. The inside handle 65 of either front door can open such door through movement of the lever 56. However, the projection 65 of the lever 56 of each rear door prevents manual operation thereof by the associated inside door handle. Each such handle therefore must control the associated solenoid 47. To this end a switch 87 is operable by each inside rear door handle 56, the extended lower end of the associated lever 51 holding the button 58 of such switch normally in open position. One terminal of switch 87 is connected as at 58 to the associated wire 45, and the other terminal will be referred to later.

The wiring system for the mechanism is shown diagrammatically in Figure 3 and the mechanism associated with each individual door has been embodied within a dotted line rectangle designated by suitable legends to indicate the respective doors. Referring to Figure 3, numeral 90 indicates as a whole the master switch through which the locking and unlocking functions of the apparatus is controlled. This master switch comprises a pair of solenoids 91 and 92 respectively provided with armatures 93 and 94 connected to a switch 105 pivoted intermediate the armatures as at 95. The lever 95 is provided with a projected end 97 to which is connected an over-center spring 98 for holding the lever 95 in either of its two positions to be referred to. A lateral projection 99 on the lever 95 is engageable with a switch arm 100 whereby, upon energization of the solenoid 92, such switch arm will be moved into engagement with a stationary contact 101.

A source of current, such as the vehicle battery, is indicated by the numeral 102, and has one terminal grounded as at 103. A main supply wire 104 is connected to the other terminal of the battery and is provided with branches 105 and 106 each of which is connected to one terminal of one of the solenoids 91 and 92. The wire 105 leads to the stationary contact 101.

The second terminal of the solenoid 91 is connected to one end of a wire 118 which leads through the wires 85 to the switch arms 117 in the respective key-operated switches 88. Each of these switch arms is normally out of engagement with an associated stationary contact 118 and is held in normal position by a spring 119. Each switch arm 117 is provided with one of the operating buttons 82 engageable by the lever 76 (Figure 1) to close the switch 83 of the associated key-operated shaft 73 (Figure 1). Each stationary contact 118 is connected to one of the grounds 84.

The switch arm 100 of the master switch is connected to one end of a wire 125 and this wire is provided with four branches 126. Each of these branches leads to a stationary contact 127 in each of the switches 51. Each switch 51 is provided with a switch arm 128 engageable with the associated contact 127 and urged into engagement therewith by a spring 129. Each switch arm 128 is provided with an operating button or like 53 normally engaged by the extension 54 (Figure 1) to normally keep the switch arms 128 in open position. Each switch arm 128 is connected by one of the wires 49 to one terminal of the associated solenoid 47, and the other terminal of each of the solenoids is grounded as at 68, as previously stated.

Referring to Figure 3, it will be noted that the system is provided with a control switch indicated as a whole by the numeral 150 in series with the locking solenoid 91. This switch may be conveniently connected in the wire 187 and comprises a stationary contact 151 and a switch arm 152 biased to closed position by a spring 153. The switch arm 152, being in series with the locking solenoid 91, it is obvious that this solenoid cannot be energized by closing one of the switches 71 if the switch 182 is open.

The switch 150 is associated with the ignition lock indicated as a whole by the numeral 155. This lock comprises the usual body 156 having a barrel 157 therein in which the ignition key 158 is insertable. This key is provided with the usual notches for operating the tumbler pins of conventional type all but one set of which are indicated by the numeral 159. These tumbler pins are all biased to locking position by springs 160. In accordance with the usual practice each set of tumbler pins is in two parts and the abutting ends of these pins coincide with the cylindrical surface of the barrel 157 when the key is in the lock, thus permitting the barrel 157 to be rotated.

In the present invention, an additional set of tumbler pins is provided, the inner one being indicated by the numeral 164 and the outer one by the numeral 165. The abutting ends of these two pins coincide with the surface of the tumbler 187 when the key is inserted in the lock, as is true of the other tumbler pins referred to. The spring 153, associated with the switch 105, pushes the tumbler pin 165 inwardly, and when the key is inserted in the lock, the pins 164 and 165 move to open the switch 152, this being the condition illustrated in Figure 3. It will be obvious, therefore, that with the key 158 in the ignition lock in and in the off position illustrated in Figure 3, the locking solenoid 91 cannot be energized and the vehicle doors accordingly cannot be locked. Referring to Figure 5 it will be noted that the barrel 157, in the transverse plane of the pin 164, is cut away as at 178 to provide a cam. To turn on the ignition, the operator will rotate the key
in a counterclockwise direction as viewed in Figure 5, in which case the pin 164 will be turned angularly toward the left out of alignment with the pin 165, and when the ignition switch reaches the "on" position, the lower end of the pin 168 will hold the switch shaft 23 in a clockwise direction from the position shown in Figure 1. The crank arm 35 will be turned in the same direction and will engage the lip 36 to move the plate 25 downwardly. The shoulder 38 is normally spaced from the upper end of the lever arm 39, (or 39') so that the initial downward movement of the plate 25 and before the shoulder 39 contacts the lever arm 39, (or 39') the projection 54 will release the switch button 33 and the associated switch arm 128 (Figure 5) will move into engagement with the corresponding contact 127.

This action completes a circuit from source 102 through wires 104 and 125, thence through the wire 126 of the switch 51 thus operated, and through the associated solenoid 47 and back to the source through the grounds 49 and 103. Energization is open, none of the solenoids 47 can be energized. The switch 51 again being opened to deenergize the solenoid 47 and the levers 18 and 53 being returned to normal positions with the lower end of the lever arm 18 engaging the next successive face 16 of the wheel 14.

It will be apparent that the solenoids 47 are all in parallel circuits which, in turn, are in series with the master switch 100, and if the latter switch is open, none of the solenoids 47 can be energized. The switch 100 is opened when the doors are to be locked. The operator need only momentarily depress a button 72 (Figures 3 and 4) to lock the car, regardless of whether he remains in the vehicle or is leaving it. Operation of the push button 72 of either front door will close the associated switch 110 (Figure 3) whereupon the current will flow from source 102 through wires 104 and 103, locking solenoid 91, wire 107 (assuming switch 150 to be closed) and through the proper branch wire 105, thence through the closed switch arm 119 and back to the source through grounds 112 and 103. Energization of the locking solenoid 91 obviously swings the lever 95 and the switch 100 opens.

Under such conditions, no circuit can be completed to any solenoid 47 upon operation of an outside door handle 32. If an attempt is made to open a door by turning a handle 32, the swinging of the crank arm 35 (Figures 1 or 2) will move the plate 25 downwardly and release the switch button 53 to close the switch arm in the associated switch 51. However, the solenoid 47 will not be energized and the bell crank lever 48 will remain in its normal position. The lever arm 39 (or 39') will pinch against the plate 25 by engaging the shoulder 38, and accordingly the bell crank lever 19 cannot be swung sufficiently to release the wheel 14. Accordingly the door cannot be opened.
When the operator desires to reenter the vehicle, he will insert the key in the door lock (not shown) and will rotate the key to turn the shaft 73 in the direction of the arrow in Figure 1. The cam 74 will engage the lever arm 75 to turn the bell crank lever 76 in a clockwise direction in Figure 1. Two operations will be performed under such conditions. The pin 81a, engaging the link 80, will swing the right hand end of this lever downwardly to transmit downward movement to the link 48 and swing the bell crank lever 40 to the unlocking position in exactly the same manner as if the solenoid 47 were energized. In addition, the lever 78, engaging the switch arm 82, will swing the switch arm 117 (Figure 3) to closed position.

Under the conditions referred to current will flow from the source 102, through wires 164 and 106, unlocking solenoid 92, wire 115, through the proper wire 33 and through the operated switch arm 117 and back to the source through contacts 116 and grounds 84 and 103. The solenoid 92 will be energized to swing the lever 95 in a clockwise direction to close the switch 100. Accordingly all of the switch parts 47 will again be conditioned for normal operation. The over-center spring 98 obviously holds the lever 95 in either of its positions, thus rendering it unnecessary to maintain either solenoid 91 or 92 energized, a mere instantaneous energization of either such solenoid being all that is necessary to set the master switch 100 in either position.

The system having been thus placed in unlocked condition, the operator may open either door by the previously described operation of an outside door handle 32. As previously stated, an unlocking operation of the door key manually swings the lever 40 to its unlocking position. This operation is of importance only if the battery has become ‘dead’ during the driver’s absence. Ordinarily, the driver can turn the key to an unlocking position, and then reverse the unlocking operation of the door key manually, thus on the next operation of the outside door handle 32, the doors will be opened in the usual manner. If the battery is ‘dead,’ the operator nevertheless can enter the vehicle merely by holding the key in an unlocking position to manually hold the lever arm 30 out of position beneath the shoulder 38, whereupon the door handle 32 may be turned to release the wheel 14 for the purpose stated.

It will be apparent that under normal conditions with the doors unlocked, the operator may stop the vehicle and leave the vehicle by operation of either inside front door handle 65. This operation will be carried out regardless of whether the master switch is in locked or unlocked position.

By turning an inside front door handle 65 to rotate the shaft 64 (Figure 1) in the direction of the arrow, the crank 61 will pull the link 59 to swing the lever plate 55 in a counter-clockwise direction; as viewed in Figure 1. The projection 81b will swing the lever arm 21 downwardly in exactly the same manner as this operation is performed by the lip 37 upon an operation of an outside door handle. The projection 57 and lip 37 are operable wholly independently of each other as means for effecting an unlatching swinging movement of the associated bell crank lever 19.

Assuming that the driver desires to lock himself or herself in the vehicle against unlawful entrance thereinto, for example by a so-called ‘red light’ bandit, the operator need only depress the push button 12 to accomplish the locking operation previously described, and under such conditions the vehicle cannot be entered without the possession and operation of a door key.

However, the mechanism is operative for preventing the driver from locking the car from the inside and then leaving the vehicle with the doors inadvertently locked. Assuming that the push button 12 has been operated by the driver to open the master switch 100 and the driver with the parts so conditioned stops the vehicle and leaves it, he will open the door adjacent the driver’s seat by the operation of the adjacent indoor handle 65, as described. This operation sent only moves the lever 78 in a downward direction, and the swinging of the lever plate 55 for effecting this operation causes the pin 81 to effect downward movement of the link 79. Whenever an inside door handle is operated, therefore, the lever 78 will be operated in exactly the same manner as by a key-operated turning movement of the shaft 73. The lever 78 will operate the associated switch 83 to close the switch arm 117 thereof and thus energize the unlocking solenoid 92 in the manner described, to close the master switch 100. Thus, if the car doors are locked with the driver inside, the above conventional operation of an inside front door handle when the driver leaves the vehicle will restore the normal condition of all of the parts of the mechanism, thus preventing an inadvertent locking of the doors. The slot 30 is provided in the link 79 to permit free downward movement of the link 79 by the lever 78 when the latter is operated by the key-controlled shaft 73, as will be obvious.

The foregoing operation, so far as it concerns the circuits for the front door push buttons 72, assumes the switch 152 (Figure 3) to be closed. This switch and its operating means prevents the operator from inadvertently locking the car with the key in the ignition switch. When the ignition key 156 is turned on, the pin 164 (Figure 5) will be arranged in the bottom of the groove 170, thus permitting the biasing spring 153 to hold the switch 152 closed. When the ignition switch key is turned off and the key is removed, the pin 164 will occupy the same lower position. Under either of the conditions referred to the switch 152 will be closed, and energization of the locking solenoid 81 will be solely under the control of the push buttons 72. With the key 156 in the ignition switch turned off, the pin 164 will be in an elevated position to open the switch 152 and thus prevent the closing of either push button circuit, and consequently the closing of a circuit through the locking solenoid 81. Accordingly the operator cannot turn off the ignition, leave the key in position and lock the car.

The principal feature of the present combination of elements is primarily intended to insure the safety of children riding in the rear compartment of a four-door sedan. As is well known, children riding in the rear of a sedan may open one of the rear doors, and many children have been injured and killed in such way. This is a source of particular danger in motor vehicles in which the rear doors swing out from the forward ends thereof, as is well known.

The toggle switch 180 is located at a point convenient to the operator and may be opened or closed at the election of the operator for the reasons to be described. Normally, the toggle switch 180 will be closed as shown in Figure 3. It is essential that the circuit in which the toggle switch 180 is arranged be subject to energization solely by
one of the rear inside door handle switches 87 when the car is at rest. Accordingly the circuit including the switches 10, 15 and 196 and associated elements are employed.

The governor switch 17 is closed as shown in Figure 3 when the car is at rest. With the toggle switch 180 closed, a person in the rear compartment of a four-door sedan can then open either rear door from the inside by operation of one of the rear inside door handles 88. The turning of such handle in a clockwise direction as viewed in Figure 2 releases the associated switch 175 for movement to closed position. Under such circumstances, current will flow from the battery 192 through wires 194 and 195, through switch arm 196 and contact 193, through wire 197 and the toggle switch 180, thence through one of the wires 178 and the operated switch 176, and through wire 29, the associated solenoid 47 and back to the source through grounds 48 and 123.

The foregoing operation of one of the inside rear door handles energizes the solenoid 47 of the associated lock and swings the corresponding ball catch lever 49 in the same manner as is done when one of the outside door handles is operated in the manner previously described. Referring to Figure 2 it will be apparent that this operation releases the lever 56 for turning movement in a counter-clockwise direction to unlatch the door. It will be apparent that no such releasing of the lever 56 of either front door latch mechanism is necessary since such lever is freely movable at all times without energization of the solenoid 47 associated therewith. Only the rear inside door handles operate their associated solenoids 47, and this operation is provided so that the rear doors can be locked from the inside, when desired.

The operation just described with relation to the opening of one of the rear doors from the inside assumes that the ignition key is not in operative position and not turned on. Under such conditions, the toggle switch circuit is completed across contact 183 and switch arm 184. A different operation takes place with the vehicle standing still with the engine running. Under such conditions, the ignition switch 196 (which may be an accessory control switch governed by the ignition switch) will be closed and current will flow through wires 194 and 195 to contact 197, through switch arm 196 and wires 195 and 199 to the solenoid 95 and thence back to the source through grounds 191 and 192. Under such conditions the solenoid 95 will be energized and its armature 92 will move the switch 195 to disconnect the switch arm 194 from the contact 183 and connect the latter to the switch arm 186.

Under such conditions, current through the toggle switch circuit will flow through wires 194 and 195, switch 196, wire 195, governor switch 188, contact 187, switch arm 186 and contact 183, and thence through the remainder of the toggle switch circuit through wire 179 in the manner previously described.

Under either of the previously described two conditions, therefore, either inside rear door handle is operable to energize its associated solenoid 47 to release the corresponding door latch mechanism to permit one of the rear doors to be opened. The alternative circuits for the toggle switch as described above are provided so that the toggle switch circuit may be energized by either inside door handle whenever the vehicle is at rest, regardless of whether the engine is running or has been turned off. In other words, under either of such two conditions it is desirable to maintain the toggle switch circuit closed up to the inside door handle switches 87.

It will be apparent that whenever the engine is running, energization of either rear door solenoid 47 is dependent upon the positioning of the governor switch in closed position. When the vehicle is started and reaches a predetermined relatively low speed, for example ten miles per hour, the governor switch will be opened and will remain open until deceleration of the vehicle again reaches such predetermined speed. Therefore, whenever the vehicle is running at a speed above the predetermined speed referred to, the toggle switch circuit for either rear door cannot be closed by operation of the inside door handle thereof. Either switch 87 can be closed, but the circuit for the associated solenoid 47 will be broken at the governor switch 188.

As stated, the rear door latches cannot be opened except by energizing the associated solenoids 47. Accordingly when the vehicle is in motion and traveling above a predetermined relatively low speed, no one in the rear seat can open either rear door. This is a highly important safety feature, as will be obvious. A very large percentage of two-door sedans are sold to people who customarily carry small children in the back seat and they prefer two-door sedans since children in the back seat cannot readily gain access to the inside door handles of the two doors. The present invention renders it wholly practicable to carry children in the back seat of a four-door sedan, and they are carried in perfect safety so far as opening the rear doors is concerned without any thought on the part of the operator. The operation described is wholly automatic and the operator need not concern himself in any manner with children riding in the back of a four-door sedan.

All present four-door sedans, of course, are provided with individual door locks, and in some types of such locks opening of the rear doors cannot be accomplished by operation of the inside handles. However, children have access to the locking means and after having observed the operation of such means can readily unlock and then open one of the rear doors. The present construction, not only positively prevents accidents from occurring in the manner described but requires no attention whatever on the part of the operator.

The toggle switch 188 is provided so that the operator can prevent the rear doors from being opened under any circumstances. For example, an operator may desire to leave his vehicle for a few minutes with small children in the back of the car without locking the front doors, and under such conditions, the operator may open the toggle switch 188, thus preventing the closing of the circuit for either rear door solenoid by operation of the associated inside door handle.

The present construction not only provides complete safety for children traveling in the back seat of a four-door sedan, but it also renders it practicable for people who customarily carry children in motor vehicles to purchase four-door sedans instead of two-door sedans. Four-door sedans are purchased by people who greatly prefer four-door sedans but do not buy them because of the factor of danger of carrying children in the rear seats.

We claim:

1. In a door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising a first
handle at one side of the door, a locking device biased to a normal position in which said first handle is inoperative for moving said latch, means operable upon initial operation of said first handle for moving said locking member out of said normal position in order to render said first handle operative for releasing said latch, a second handle for said latch at the opposite side of said door, operating means for transmitting movement of said second handle to said latch to open it, and means operative under predetermined conditions for rendering said operating means ineffective by said second handle for opening the latch.

2. In a door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising a first handle at one side of the door, a locking device biased to a normal position in which said first handle is inoperative for moving said latch, means operable upon initial operation of said first handle for moving said locking member out of said normal position to render said first handle operative for releasing movement of said second handle for said latch at the opposite side of said door, normally inoperative operating means between said second handle and said latch, control means associated with said operating means for determining the operativeness of said operating means, and means for operating control means for rendering said operating means ineffective for operating the latch upon movement of said second handle.

3. In a locking mechanism for a vehicle door wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle, an inside door handle, normally inoperative operating connections between said inside door handle and the latch for releasing the latter upon operation of said inside door handle, a control device for said operating connections, and means responsive to movement of the vehicle above a predetermined speed for controlling the operation of said control device to render the latter ineffective for preventing said operating connections from transmitting movement from said inside door handle to the latch.

4. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle, an inside door handle, operating connections between said inside door handle and the latch to effect a releasing movement of the latch upon operation of said inside door handle, a member biased to an operative position controlling said operating connections to prevent the latter from transmitting latch-releasing movement from said inside door handle to the latch, means operative upon initial movement of said inside door handle for moving said member to a second position in which said operating connections are free to transmit further movement of said inside door handle to said latch to release it, and means responsive to movement of the vehicle for preventing operation of said last-named means whereby said member remains in its said biased position.

6. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle, an inside door handle, operating connections between said inside door handle and the latch to effect a releasing movement of the latch upon operation of said inside door handle, a member biased to an operative position controlling said operating connections to prevent the latter from transmitting latch-releasing movement from said inside door handle to the latch, means operative upon initial movement of said inside door handle for moving said member to a second position in which said operating connections are free to transmit further movement of said inside door handle to said latch to release it, and means responsive to movement of the vehicle for preventing operation of said last-named means whereby said member remains in its said biased position.

7. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle, an inside door handle, operating connections between said inside door handle and the latch to effect a releasing movement of the latch upon operation of said inside door handle, a member biased to an operative position controlling said operating connections to prevent the latter from transmitting latch-releasing movement from said inside door handle to the latch, a solenoid energizable for moving said member to a second position in which said operating connections are free to transmit movement from said inside door handle to the latch to release it, a circuit for said solenoid including a switch movable to closed position upon initial movement of said inside door handle, means responsive to movement of the vehicle for preventing said switch from closing said circuit whereby said member remains in its said biased position.

8. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle, an inside door handle, operating connections between said inside door handle and the latch to effect a releasing movement of the latch upon operation of said inside door handle, a member biased to an operative position rendering said handle ineffective for releasing the latch, means operative upon initial movement of either door handle for moving said locking member to a second position in which such handle is effective for releasing the latch, control means for preventing movement of said locking member to said second position upon op-
eration of the outside door handle, and independently operable means for preventing movement of said locking member to said second position upon movement of said inside door handle.

10. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an inside door handle and an outside door handle, a locking member biased to a normal position rendering either door handle ineffective for releasing the latch, an electromagnetic device energizable for moving said locking member out of said normal position to render either door handle operable for releasing said latch, circuit means for said electro-magnetic device including a switch operable by initial movement of the outside door handle to energize said electro-magnetic device, means for preventing the closing of said circuit means to render the outside door handle ineffective for releasing the latch, a second circuit means for said electro-magnetic device including a switch operable by the inside door handle to energize said electromagnetic device and render the inside door handle operable for releasing the latch, and means responsive to movement of the vehicle for preventing energization of said electromagnetic device by the closing of said last-named switch.

11. In a vehicle door locking mechanism wherein the door is provided with a latch, and means for operating the latch to release it comprising an outside door handle and an inside door handle, a locking member biased to a normal position rendering either door handle ineffective for releasing the latch, an electromagnetic device energizable for moving said locking member out of said normal position to render either door handle operable for releasing said latch, circuit means for said electromagnetic device including a switch operable by initial movement of the outside door handle to energize said electromagnetic device, means for preventing the closing of said circuit means to render the outside door handle ineffective for releasing the latch, a second circuit means for said electromagnetic device including a switch operable by the inside door handle to energize said electromagnetic device and render the inside door handle operable for releasing the latch, means responsive to movement of the vehicle for preventing energization of said electromagnetic device by the closing of said last-named switch, and a manually operable switch in said second circuit means whereby, when said manually operable switch is open, the inside door handle is ineffective for releasing said latch.

12. In a vehicle door locking mechanism wherein the door is provided with a latch and means for operating the latch comprising an inside door handle, normally inoperative means for transmitting movement from said door handle to said latch for releasing it, control means operable upon initial movement of the door handle for rendering said normally inoperative means effective for releasing the latch upon further movement of the door handle, and means responsive to motion of the vehicle for rendering said control means inoperative for affecting said normally inoperative means.

13. In a vehicle door locking mechanism wherein the door is provided with a latch and means for operating the latch to release it comprising an inside door handle, normally inoperative means for transmitting movement from said door handle to said latch for releasing it, control means operable upon initial movement of the door handle for rendering said normally inoperative means effective for releasing the latch upon further movement of the door handle, means responsive to motion of the vehicle for rendering said control means inoperative for affecting said normally inoperative means, and manual means for rendering said control means ineffective under any conditions for controlling said normally inoperative means, to prevent said motion transmitting means from opening said latch upon operation of said door handle.

14. In a vehicle door locking mechanism wherein the door is provided with a latch, and an inside door handle for operating the latch, normally inoperative motion transmitting means connected between the door handle and the latch, means comprising a solenoid energizable upon initial movement of the door handle for rendering said motion transmitting means operable for opening the latch upon further movement of the door handle, and means responsive to motion of the vehicle above a predetermined speed for preventing energization of said solenoid.

15. In a vehicle door locking mechanism wherein the door is provided with a latch, and an inside door handle for operating the latch, normally inoperative motion transmitting means connected between the door handle and the latch, means comprising a solenoid energizable upon initial movement of the door handle for rendering said motion transmitting means operable for opening the latch upon further movement of the door handle, means responsive to motion of the vehicle above a predetermined speed for preventing energization of said solenoid, and manual means operable for preventing said motion responsive means from rendering said solenoid energizable under any conditions.

JEANNOT G. INGRES.
DAVID T. AYERS, Jr.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,988,889</td>
<td>Landry</td>
<td>Mar. 20, 1935</td>
</tr>
<tr>
<td>2,055,750</td>
<td>Vincent</td>
<td>Oct. 6, 1936</td>
</tr>
<tr>
<td>2,085,881</td>
<td>Preston</td>
<td>Oct. 5, 1937</td>
</tr>
<tr>
<td>2,189,748</td>
<td>Wilson</td>
<td>Feb. 6, 1940</td>
</tr>
<tr>
<td>2,276,019</td>
<td>Ching</td>
<td>Mar. 10, 1942</td>
</tr>
<tr>
<td>2,540,424</td>
<td>Ott</td>
<td>Feb. 1, 1944</td>
</tr>
</tbody>
</table>