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MOTOR VEHICLE LOCK

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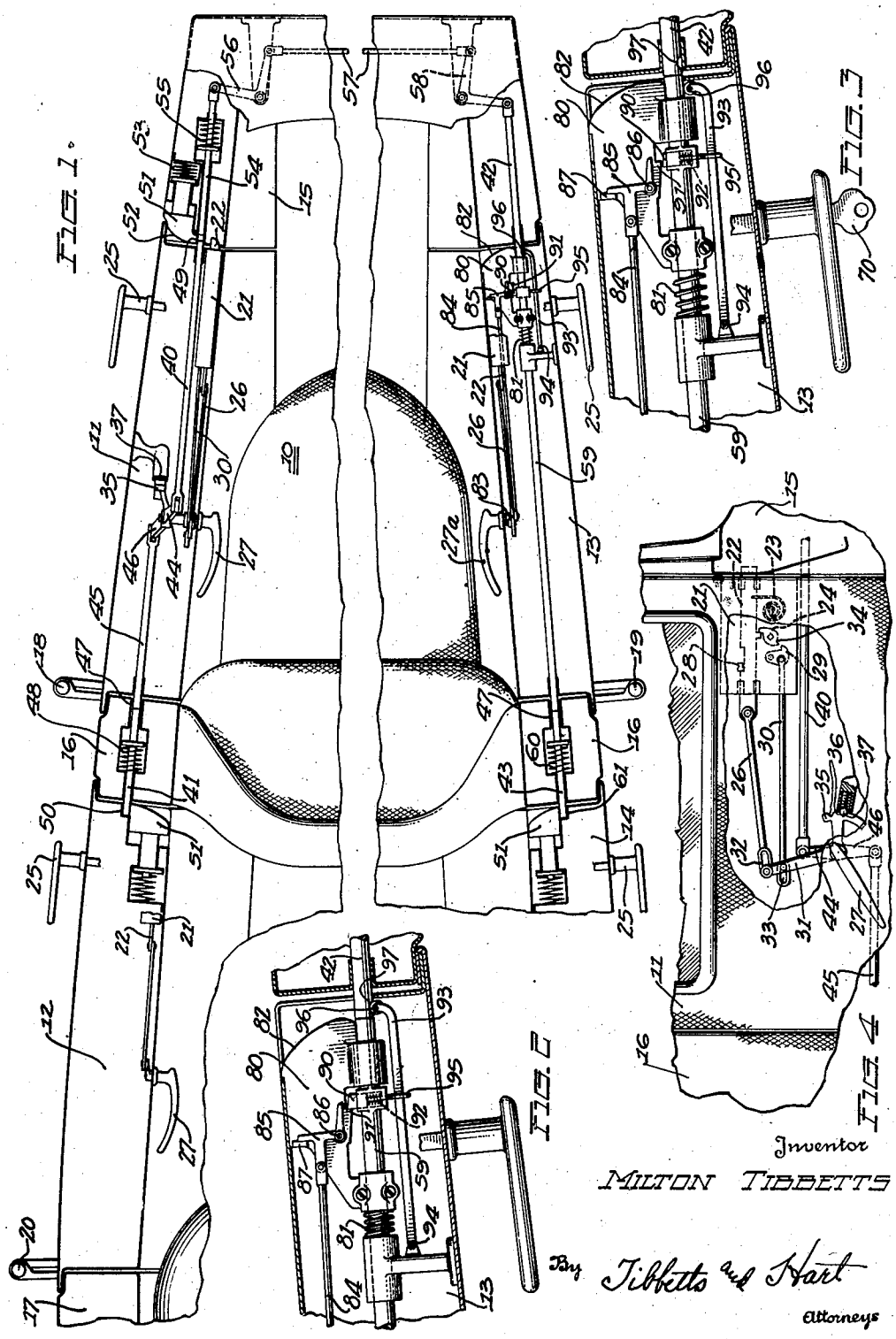


FIG. 1.

FIG. 3

FIG. 2

FIG. 4

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MOTOR VEHICLE LOCK

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This invention relates to motor vehicles and more particularly to locking mechanism for locking and unlocking the doors of such vehicles.

This invention is particularly applicable to the sedan type of vehicle in which there are four doors, two on one side and two on the other, but some of its features are applicable to vehicles having only two doors.

In the conventional locking mechanism for automobiles there is a latch mechanism for each door and a handle on the outside for operating the latch mechanism to release the door so that it may be swung open, and a handle on the inside for the same purpose.

Usually there is a device on the inside for locking each door against opening from the outside and then there is a key mechanism usually for the right front door only, for key locking that door from the ouside. The device for locking the door on the inside is usually operated by the inside handle by moving that handle in the reverse direction from that in which it is moved to release the door catch.

With this conventional construction, when it is desired to lock the vehicle from the inside against intrusion from the outside, it is necessary to move each of the four inside locking devices and it is difficult to do this from the driver's seat particularly when the car is in motion. Also, such locking of the rear doors does not prevent those doors from being opened from the inside and hence the rear doors are not secured against opening by children who may be alone in the rear compartment or against accidental release by the handle being caught on the clothing. It is desirable, therefore, that on some occasions the rear doors should be locked against opening from either the outside or from the rear compartment inside.

With the above described conventional construction, when it is desired to leave the vehicle with all of the doors locked, it is necessary to lock three of them from the inside and then close the right front door from the outside and key lock it. It is so much trouble that many car owners leave their doors unlocked and it is much easier for the thief to steal the car because he can work quietly at the ignition lock from the inside of the car.

It is an object of the present invention to provide door locking and unlocking mechanism that will overcome the disadvantages above described.

It is another object of the invention that by a single device all of the doors of the vehicle may be locked against outside intrusion and, in the four door type of vehicle, the rear doors may be locked against opening from the inside by door handles of those doors.

Another object of the invention is to provide a single locking device for a plurality of doors of a vehicle with provision for opening one of the doors from the inside and closing it without disturbing the locking mechanism except that the door so opened and closed will be released from the locking mechanism to thereby prevent one from accidentally locking himself outside of the vehicle. After the door is so closed it will be locked by the key locking mechanism on the outside.

Another object of the invention is to provide a locking mechanism for a plurality of doors of the vehicle so arranged that one of the doors may be opened from the inside and when so opened its adjoining door may also be opened, but as soon as the first door is closed the said adjoining door will be again locked. The closed door may then be key locked from the outside. Thus in a four door vehicle a single device locks all four doors and after thus locking the doors the operator of the vehicle may open the right front door and with that door opened the right rear door may also be opened to permit other passengers to alight. The right rear door may then be closed and as soon as the right front door is closed, with the master locking mechanism in locked position as above stated, the right rear door will again be locked. The right front door may then be locked with the key and all four doors will be locked against outside opening except with the key.

Another object of the invention is to provide locking means whereby two doors on opposite sides of a center body post may be locked by a device on one of the doors even though one of these doors is pivoted to the post itself.

Another object of the invention is to provide a locking means for a plurality of the doors of a vehicle such that when the multiple lock device is moved to locking position one of these doors may be opened from the inside and again closed, which opening and closing releases the lock of that door, and then when the device is moved to the reverse position the multiple locks will be restored to unlocked position and the lock release mechanism to non-releasing position, so that the multiple lock device may again be operated to lock all of the plurality of doors.

Other objects of the invention will appear from the following description taken in connec-

tion with the drawing, which forms a part of this specification, and in which:

Fig. 1 is a somewhat diagrammatic plan view or horizontal section through the sides of a motor vehicle body embodying the invention, parts being broken away to illustrate the lock mechanism;

Fig. 2 is an enlarged view of lock mechanism shown on the right front door of the vehicle shown in Fig. 1;

Fig. 3 is a view similar to Fig. 2 with the parts in unlocked position, and

Fig. 4 is an inside elevation of a portion of the left front door and adjacent parts of the vehicle shown in Fig. 1, with parts broken away to show the lock mechanism under the upholstery.

Referring to the drawing, the vehicle body 10 shown in Fig. 1 has its front toward the right so that the door 11 is the left front door and the door 12 is the left rear door. Doors 13 and 14 are the right front and right rear respectively. The thickness and dimensions of these doors and other parts of the vehicle are not intended to be accurate and are shown diagrammatically to some extent so that the lock mechanism thereof may be illustrated more clearly.

The front part of the vehicle body usually referred to as the cowl is indicated at 15 and between each pair of doors is a post 16 forming parts of the skeleton or frame of the body. The rear quarter of the body is shown at 17.

The two front doors are hinged or pivoted at 18 and 19 respectively to their respective posts 16, and the left rear door is hinged or pivoted to the body portion 17 as at 20.

Each of the doors is provided with a conventional latch member, one of which is shown diagrammatically at 21 on the left front door. A portion of one of these is shown on the left rear door. This latch mechanism is shown in elevation in Fig. 4 and it comprises a latch bolt 22 operated by a spring 23, a releasing lever 24 operated by a handle 25 on the outside of the door, and a release rod 26 for remote control by a handle 27. A stop 28 limits the movement of the bolt 22. There is also a pivoted dog 29 connected by a link 30 to the same arm 31 to which the link 26 is connected. There is a pin and slot connection 32 for the link 26 and a similar pin and slot 33 for the link 30.

From this description of the conventional lock mechanism it will be seen that the bolt 22 is spring held in its latching position from which position it may be moved by the outside handle 25 to unlatch the door, or from which position it may be moved by the inside handle 27 to unlatch the door. This unlatching movement of the handle 27 is downwardly in Fig. 4, or counterclockwise about its pivot. However, if the handle 27 is moved upwardly or clockwise, in Fig. 4, the dog 29 will be moved behind the lug 34 on the lever 24 and the latter will be prevented from turning and consequently the bolt 22 cannot be turned by the outside handle 25 to unlatched position. However, the bolt 22 may still be moved to unlatched position by downward movement of the handle 27 as such movement will withdraw the bolt 22 without turning the lever 24. The same movement, however, withdraws the dog 29 and thereby releases the lever 24. On the shaft of the handle 27 is a segment 35 having notches 36, and a spring pressed ball or detent 37 operates in these notches to yieldingly retain the handle 27 in either its neutral position or in its locked position. It is not to be retained in its unlatched position, the spring 23 returning it to neutral position.

Such or similar locking mechanism may be arranged on all four of the doors of the vehicle through the inside locking part of this mechanism may, if desired, be omitted in view of the additional inside locking mechanism about to be described.

Lock means for each of the doors is provided in the form of a sliding bolt for each of them. Thus there is a sliding bolt 40 for the left front door, a sliding bolt 41 for the left rear door, a sliding bolt 42 for the right front door and a sliding bolt 43 for the right rear door. The bolt 40 is connected to an arm 44 on the shaft of the inside door handle 27 and there is a push rod 45 connected to an arm 46 on the opposite side of said shaft. The rear end of the push rod 45 is adapted to extend into an opening 47 in the post 16 and contact with the end of the lock bolt 41, which latter bolt is spring pressed to its unlocked position by a spring 48. By moving the handle 27 from the position shown in Fig. 4 to the position in which it is shown in Fig. 1 the lock bolt bolt 40 is moved so that its forward end enters a recess 49 in the cowl portion of the body, thereby locking the left front door against opening from the outside, and the push rod 45 acting against the forward end of the lock bolt 41 moves the rear end of that bolt into a recess 50 in the door 12 so that that door is also locked against opening from the outside. This rear door 12 is also locked against opening from the inside so far as its inside handle 27 is concerned, and it can be unlocked only by movement of the handle 27 of the left front door.

The outside edge of the slot 49 is formed by a spring pressed plunger 51 so that the door may be closed with the locking bolt 40 in its locked position, the plunger 51 being beveled as at 52 and retracting from the end of the lock bolt 40 as the door closes. The spring 53 pushes the plunger back into locking position when the door is completely closed. There is a similar plunger 51 forming the outer wall of the recess 50 in the left rear door 12. It will be seen that the opening 47 is somewhat larger than the rear end of the push rod 45 which operates in it. This is for the purpose of permitting that rod to be withdrawn on an arc about the axis of the hinge 18 as the door is opened. This opening of the left front door with the parts in locking position would, of course, permit retraction of the lock bolt 41 and thereby unlock the rear door 12 but as soon as the front door is again closed the lock bolt 41 will be again moved to its locking position.

As the lock bolt 40 is moved to its locking position as above described, it contacts with and moves a push rod 54 spring pressed toward the rear by a spring 55, which rod 54 is connected to a bell crank lever 56. A rod 57 connects with bell crank lever 56 to a similar bell crank lever 58 on the other side of the vehicle and the other arm of lever 58 is connected to the lock bolt 42 above referred to. By this movement the lock bolt 42 is moved to the locking position in which it is shown in Fig. 1 simultaneously with the movement of the lock bolt 40 into its locking position as when the inside handle 27 is moved as described above.

Rearward movement of the lock bolt 42 causes a similar movement of a push rod 59 mounted in the right front door 13 and the rear end of this push rod 59 extends into an opening 47 in the

right hand body post 16 and in contact with the front end of lock bolt 43 which is also spring pressed forwardly by a spring 60 similar to bolt 41. Thus the lock bolt 43 is moved into a socket 61 in the right rear door 14, thus locking that door against opening from either the inside or the outside as with the door 12. There is a plunger 51 forming the inner wall of the recess 61 as is the case with the door 12.

In this construction also it will be seen that the opening 47 is slightly larger than the rear end of the push rod 59 so that this rod may move on an arc as the door 13 is swung open. Likewise the lock bolt 43 will be retracted when the door 13 is opened but it will be moved to its locked position again when that door is closed, this on the assumption that the multiple lock mechanism is in its locked position.

From the above it will be seen that upward movement of the handle or device 27 on the inside of the left front door will simultaneously lock all of the four doors of the vehicle, this movement of the handle causing the lock bolt 41 to move rearwardly into locking position, the lock bolt 40 moving forwardly into locking position, the lock bolt 42 moving rearwardly to its locking position and the lock bolt 43 moving rearwardly to its locking position. Reverse movement of the handle 27 will positively withdraw the lock bolt 40 and the other three lock bolts will then be withdrawn by the springs connected with them, the spring 55 withdrawing the bolt 42, the spring 48 withdrawing the bolt 41, and the spring 60 withdrawing the bolt 43.

For the purpose of locking the vehicle body securely from the outside, provision is made for releasing one of the doors, preferably the right front door, from its lock bolt without disturbing the remainder of the locking mechanism, so that the occupant of the vehicle may thereby open this door, step out of the vehicle, and then close the door. But it is desirable that this action shall not leave that door locked against outside opening because in that event the owner of the vehicle might accidentally lock himself out by thoughtlessly leaving his key in the ignition lock. So it is desirable that when this right front door is thus opened and closed it may be in unlocked position but all of the other doors must be left in locked position. Thus the right front door may be locked with the usual key mechanism as by the key 70 shown in Fig. 3. The details of this key locking mechanism are not shown but they may be of any desired construction.

The mechanism that thus permits the right front door to be opened and closed to an unlocked position is shown particularly in Figs. 1, 2 and 3. A plunger 80 mounted to slide on the rod 59 and spring pressed towards the right by a spring 81, forms the inner wall of the recess into which the lock bolt 42 extends when it is moved into locking position in the front face of the door 13. This plunger is beveled as at 82 so that the end of the bolt 42 may push it back in case the door happens to be open when the lock bolt 42 is moved to locking position.

The plunger 80 may also be positively retracted as by connecting it to an arm 83 on the inside door handle 27a of the right front door 13. This connection may be made through a rod 84, the forward end of which is connected to a bell crank lever 85 pivoted on the plunger 80 as at 86. A stop 87 limits the movement of the lever 85 in one direction so that a pull on the rod 84 will withdraw the plunger 80 to a releasing position so that the door 13 may be opened in spite of the lock bolt 42 being in locking position. The plunger 80 is shown in its releasing position in Fig. 2.

The handle 27a of this right front door 13 is, of course, the handle by which the door is opened from the inside and it has the same connection 26 to the conventional latch mechanism so that in order to open the door the operator moves the handle 27a downwardly and withdraws the latch 22 and opens the door. As this is done the rod 84 also withdraws the plunger 80 so that the door may be opened past the lock bolt 42.

For the purpose of retaining the plunger 80 in its releasing position there is a pawl 90 mounted on the rod 59, which pawl catches back of a lip 91 on the plunger 80 and thereby retains the plunger so long as the locking bolt 42 is in its locking position. A spring 92 presses the pawl 90 inwardly and it may be withdrawn by a lever 93 pivoted at 94 and extending through an opening in an extension 95 on the pawl. The forward end of the lever 93 has a roller 96 which co-operates with a depression 97 adjacent the forward end of the lock bolt 42. Thus when the end of the lever 93 is in the depression 97 the pawl 90 is spring pressed inwardly to catch and hold the plunger 80.

The plunger 80 may be manually released by reversing the movement of the handle 27a since this reverse movement rocks the lever 85 and pushes the pawl 90 downwardly and thereby releases the plunger 80 and permits the latter to slide into the locking position in which it is shown in Figs. 1 and 3.

The plunger 80 may also be released at the same time all of the doors are unlocked since this unlocking movement withdraws the lock bolt 42. This movement of the lock bolt pushes the lever 93 out of the depression 97 and this withdraws the pawl 90 from the lip 91 and releases the plunger 80. In other words, the unlocking movement of the multiple lock handle 27 on the left front door restores all of the parts to their original position, that is, the four locking bolts to their unlocked positions and the plunger 80 to its non-releasing position. This means that if after the four doors have been locked by the multiple locking device and the front door is then opened and closed from the inside, thus leaving the right front door unlocked, all of the doors can again be locked by moving the handle 27 in the unlocking direction (counter-clockwise in Fig. 4) and then moving it to locking position again, thus unlocking the three doors, releasing the plunger 80, and then locking all four doors again.

Or if the passenger on the right front seat desires to lock the right front door when the other three doors are locked and the right front door is not locked, that passenger may lock the right front door by moving the handle 27a to its locking position, thus releasing the plunger 80 so that the latter assumes its non-releasing position.

While I have herein described in some detail a specific embodiment of my invention, which I deem to be new and advantageous and may specifically claim, I do not desire it to be understood that my invention is limited to the exact details of the construction, as it will be apparent that changes may be made therein without departing from the spirit or scope of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an automobile having two doors, the combination of lock means for each door, a device having connections for simultaneously operating the lock means of both said doors to lock said doors against opening from the outside, a device operable from the inside of the vehicle for releasing one of said doors from its lock means without disturbing the lock means of the other door, means for releasing the lock means of said other door as the first door is moved to open position, the lock means of said other door returning to locked position as said first door returns to closed position, and means for retaining in releasing position the releasing device of the first door when such door is opened and closed.

2. In an automobile having a door, the combination of lock means for said door, a device for moving said lock means to and from locked position, said door being locked against opening from outside when said lock means is in locked position, a device operable from the inside of the vehicle for releasing the door from said lock means when the latter is in locked position, and means to move said releasing means to releasing position and retaining it there when the door is closed with the lock means in locked position and the releasing means in non-releasing position.

3. In an automobile having two front doors and two rear doors, the combination of lock means for each door, a device for simultaneously operating the lock means of all of said doors to lock the front doors against opening from the outside and to lock the rear doors against opening from both the outside and the inside except by operation of said device, and inside operable means independent of said device for releasing one of the front doors.

4. In an automobile having a body with a door opening therein, and a door for said opening, the combination of a locking bolt extending from the body into the door, a plunger mounted in the door and co-operating with said bolt to retain the door in locked position, means for withdrawing said plunger so that the door may be opened without disturbing said locking bolt, and means for automatically retaining said plunger in its released position, said withdrawing means being adapted to actuate said retaining means to release said plunger.

5. The combination with a door and its co-operating jamb, of locking means for the door comprising a bolt extending from the jamb into the door, a device in the door co-operating with said bolt to retain the door in locked position, means for withdrawing said device and retaining it in withdrawn position so that the door is released from the bolt, and means for returning said device to non-releasing position as the bolt is withdrawn.

6. In combination with an automobile having a door, manually controlled lock means for the door, retractable means carried by said door urged to normally engage said lock means for preventing opening of the door, independent manually controlled means movable in one direction to retract said retractable means to a position rendering said lock means ineffective, automatic means for retaining said retractable means in its retracted position, said controlled means actuating said automatic means to release said retracted means when the controlled means is moved in a direction opposite to said first direction.

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