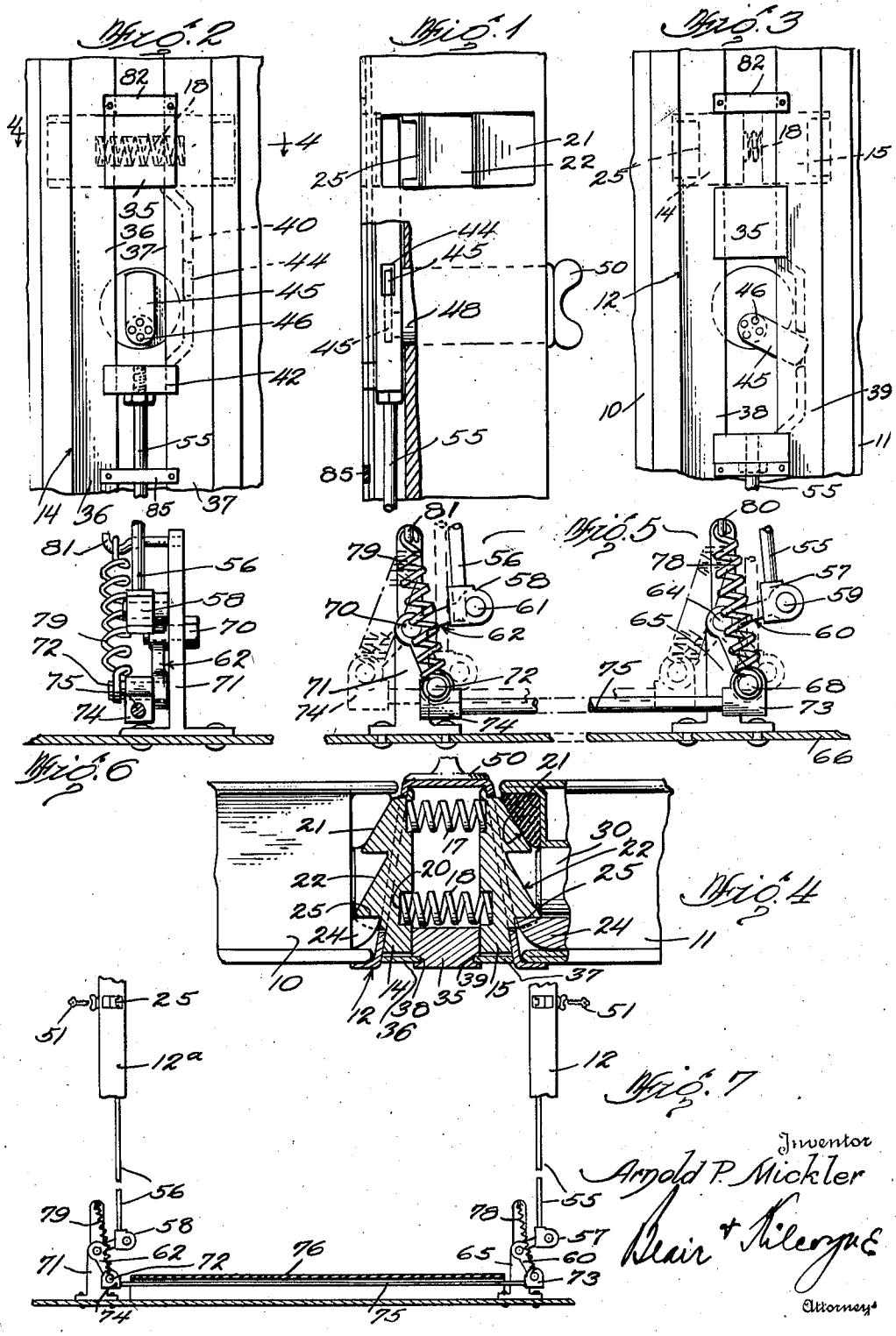
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LOCKING MECHANISM FOR VEHICLE DOORS

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Inventor
Arnold P. Mickler
Blair & Kilergue
Attorneys

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LOCKING MECHANISM FOR VEHICLE DOORS

Arnold P. Mickler, Orlando, Fla.

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This invention relates to improvements in locking mechanism for vehicle doors and with regard to its more specific aspects to mechanism for simultaneously locking and/or unlocking the several doors of a vehicle (automobile, truck, etc.), and which is operable from either side of the vehicle, regardless of the side from which the previous locking or unlocking was effected.

Among the objects of the present invention may be noted the provision of an improved locking mechanism by which the several doors of a vehicle may be simultaneously locked from either side of the vehicle and by which the vehicle doors may thereupon be simultaneously unlocked from either the same side as that from which the previous locking was effected or from the opposite side of the vehicle; the provision of a locking mechanism of the stated character which, when operated to simultaneously lock all of the vehicle doors, renders the door handle and/or door unlatching means operated thereby, with which each door is conventionally provided, inoperative to effect unlocking or unlatching of any one or all of the doors until the positive and authorized unlocking as permitted by the mechanism is effected, and which thus its capable of maintaining the vehicle doors locked, regardless of door-window position; and the provision of a locking mechanism for vehicle doors which is characterized by simplicity in construction, which is rugged and durable in use, and which is capable of accomplishing the above desirable results in effective and efficient manner.

Other objects will be in part obvious and in part hereinafter pointed out in connection with the following analysis of this invention wherein is illustrated an embodiment of the invention in detail.

In the drawing:

Fig. 1 is a front to rear elevation of a portion of a door post between front and rear doors at the right side of a vehicle, and which illustrates the preferred arrangement and relation of lock cylinder and striker plate of the present invention and being broken away to illustrate in side elevation the striker plate dogging mechanism actuable by the turnable lock cylinder, it being understood that the door post between the front and rear doors at the left side of the vehicle carries similar parts although arranged in reverse or left-hand position;

Fig. 2 is a view looking into the door post channel and contained locking assembly, which illustrates the striker plate dogging mechanism in its up or door-locking position.

Fig. 3 is a view similar to Fig. 2 which illustrates the striker plate dogging mechanism in its down or unlocking position, to which it has been actuated by partial clockwise rotation of the lock cylinder;

Fig. 4 is a section taken generally along line 4—4 of Fig. 2;

Fig. 5 is a front to rear broken away elevation of the bell crank assemblies by which locking and/or unlocking movement is transmitted from one side of the vehicle to the other;

Fig. 6 is a side elevation of one of the bell crank assemblies;

Fig. 7 is a generalized view indicating schematically the manner in which locking and/or unlocking may be effected from either side of the vehicle to which the mechanism is applied.

In the drawing, the locking mechanism of the present invention has been shown for purposes of illustration as arranged to lock and unlock the doors of vehicles such as automobiles having four doors, that is, front and rear doors on each side thereof. The relation of front and rear door and intermediate door post is partially indicated generally in Fig. 4 wherein 10 indicates the front door and 11 the rear door at the right side of the vehicle, said doors closing against a door post channel 12 of generally conventional construction. Fig. 4 may further be representative of the relation of front and rear door and intermediate door post at the left side of the vehicle by considering door 11 as the front door and door 10 as the rear door.

As will be hereinafter described, the invention contemplates the provision of locking assemblies, one for each side of the vehicle for locking and for unlocking the door or doors on that side, the locking assemblies being so interconnected as by a linkage system that actuation of either assembly to locking and/or unlocking position results in like actuation of the other assembly. By such arrangement one of the primary objects of the invention is achieved, namely, that of simultaneously locking and/or unlocking the doors of the vehicle to which the mechanism is applied from either side thereof and regardless of the side from which the previous locking or unlocking operation was effected.

With this preliminary explanation of the invention in mind, reference is had to Figs. 1–4, wherein the righthand locking assembly is illustrated in detail. Mounted in the post channel 12 and at a level corresponding to that of the conventional striker plate and latch bolt of known vehicle door construction is the pair of opposed

striker plates 14, 15, having a floating mounting in the post and being urged away from each other by outer and inner compression springs 17, 18, the ends of which are seated in spring seats 20 formed in the adjacent faces of the striker plates as indicated. The relatively outer faces of the striker plates, which extend through suitable openings in door post channel, are preferably stepped as at 21, 22 and the steps thereof are adapted to be succesively engaged by a stationary striker 24 as carried by each door 10, 11 Thus as either of the doors swings to closing position, its striker 24 successively rides over the steps 21, 22 of the engaged striker plate, relative inward movement thereof being permitted by the springs 17, 18, until the striker finally engages behind and interlocks with shoulder 25 of the striker plate step 22. In this position of the parts, the door is latched in closed position, with springs 17, 18 maintaining the striker plate in its latching relation with the door striker as illustrated.

According to the present invention each of the vehicle doors is provided with a handle operated unlatching mechanism of the character employing a pusher bolt 30 which has a normal retracted position as indicated in Fig. 4; said bolt being movable out of the door frame to engage against an associated striker plate upon turning of the door handle to its unlatching position. By manipulation of the door handle as aforesaid and referring to the pusher bolt 30 of door 11 in Fig. 4, pusher 30 is actuated towards the left and against the striker plate 15, thus to actuate the latter to its retracted position against the action of springs 17, 18. In this retracted position, the door striker 24 clears the steps 21, 22 of the striker plate, and the door 11 may be swung to its open position, with compression springs 17 and 18 thereafter returning the striker plate 15 to its normal position in readiness for the next latching operation.

The locking assembly associated with the striker plates 14, 15 is of the character as, in locking position, to prevent retracting movement of the striker plates or either of them, thus to render ineffective the unlatching means as described. To this end a striker plate dogging block 35 is provided which by reference to Figs. 2 and 3 is movable into a high position in which the block 35 functions to dog the striker plates 14, 15 in their normal or out position, thus to prevent any retracting movement of the plates, the dogging block being movable to a low position, in which latter the block provides no obstruction to the retracting movement of the striker plates as is required for unlatching.

The dogging block 35 may take the form of a rectangular block mounted for vertical movement in vertically arranged guide pieces 36, 37 carried by the door post channel 12 in the manner illustrated. The block operates in the space between the guide pieces and is provided on its side faces with grooves or ways 38, 39 in which the facing side edges of the guide pieces extend.

Secured to the block 35 is a strap 40 which extends downwardly a substantial distance and which is bowed laterally as shown, the lower end thereof being secured in a slide block 42 also mounted by the guide pieces 36, 37 and partaking of any vertical movement imparted the block 35.

Intermediate its ends the strap 40 which operates in the post channel space is provided with an opening 44 adapted to receive the free end of an arm 45 whose other end is secured as by screws 46 to the relatively rear end of a rotatable lock cylinder 48, which extends into the post channel. The front end of the cylinder has a wing handle 50 projecting exteriorly of the channel for convenient operation.

With the dogging block 35 in its up or locking position, as shown in Figs. 2 and 4, the block functions to prevent any relatively inward or retracting movement of either or both of the striker plates 14, 15. Hence, assuming the doors 10 and 11 to have been latched closed and the block 35 thereupon actuated to its up position, the pusher bolts 30 are wholly ineffective as movement thereof out of the door to their unlatching position is prevented by the block 35 and interposed striker plate.

Unlocking is effected by lowering the block 35 from its striker plate obstructing position to its low position indicated in Fig. 3. This block lowering movement is effected in simple manner as by imparting clockwise rotation to lock cylinder 48 through its operating handle 50. Such rotation effects clockwise rotation of arm 45, during which the free end of said arm moves into opening 44 of the strap 40 and by its rotation cams the strap downwardly to the position indicated in Fig. 3, and hence actuates the dogging block 35 out of its striker plate dogging position to its low position as indicated in Fig. 3. In such position striker plates 14, 15 are maintained in their relatively outward position only by the compression springs 17, 18 and accordingly the door handle associated with either or both of the doors 10 and 11 may be operated to actuate its bolt 30 against an associated striker plate, thus to retract the latter and unlatch the door or doors.

Clockwise rotation of the lock cylinder 48 beyond the point at which its arm 45 is shown in Fig. 3 results in disconnection of the arm from the strap 40. By giving the lock cylinder a full 360° turn, the arm is returned to its initial position as indicated in Fig. 2. While no details of the lock cylinder are here given as such forms no part of the present invention, it will be understood that the lock cylinder is preferably of the character requiring insertion of a key 51 in a slot extending through the wing handle 50 and cylinder for rotation of the latter and further requiring a full 360° cylinder rotation prior to removal of the key.

To effect a locking operation, the key 51 is inserted in the handle and cylinder slot and the cylinder turned in reverse or counterclockwise direction. During such cylinder rotation, the free end of arm 45 engages in opening 44 of the strap 40 and cams the latter upwardly. Hence block 35 is moved upwardly to its Fig. 2 position in which it prevents movement of the striker plates to retracted position. Upon completing the full 360° cylinder rotation, the key 51 can be withdrawn and the doors are positively locked against unlatching.

Reference has been made to the foregoing to the provision of a locking assembly as aforesaid on both the right and left sides of the vehicles, each assembly functioning to lock all the doors on its side of the vehicle. It will be understood therefor that a locking assembly as described will also be installed in the door post on the left or driver's side of the vehicle, and that the left side locking assembly, is similar to the right side assembly as described, differing therefrom only in that it operates the door or doors opening into the left side of the vehicle. It is further contemplated that the same key will operate both

right and left side locking assemblies, so that a key which has effected locking of all doors from one side of the vehicle may be inserted in the locking assembly at the opposite side, thus to unlock all doors from the latter side.

Considering now the means for actuating both locking assemblies from either side of the vehicle, such may include a linkage system comprising a vertically disposed rod **55** secured at its upper end to the slide block **42** of the right hand locking mechanism and operating in the right side door post channel **12**, and a similarly arranged rod **56** secured to the slide block of the left side post channel **12***a* (Fig. 7). The lower ends of the rods **55**, **56** (Fig. 5) are connected respectively into the knuckles **57**, **58**. The knuckle **57** turns on a bearing pin **59** extending from the relatively upper arm of a right side bell crank **60**, and the knuckle **58** turns on a bearing pin **61** of a similarly arranged left side bell crank **62**.

Bell crank **60** is mounted to turn on the axis of a pin **64** carried by a stand **65** bolted or otherwise secured to the vehicle floor **66**. The other arm of the bell crank carries a bearing pin **68**. In similar manner, the left hand bell crank **62** is mounted to turn on the axis of a pin **70** carried by a stand **71** also secured to the vehicle floor, the lower arm of said bell crank carrying a bearing pin **72** similar to pin **68**. Said pins **68** and **72** provide mounts for opposed knuckles **73**, **74**, into which are secured the ends of a transverse thrust rod **75**, which extends from side to side of the vehicle, preferably under the front or driver's seat, and which may be housed in a protective channel **76**.

The bell cranks **60**, **62** are each movable from the full line position to the dotted line position as indicated in Fig. 5, being maintained in the position to which they are actuated by the over-center springs **78**, **79**, of which spring **78** extends between a stand hook **80** and the projecting end of bearing pin **68**. In similar manner spring **79** associated with the left hand bell crank **62** operates between a stand hook **81** and the end of the bearing pin **72**.

By the above described linkage system, actuation of either of the locking assemblies to locking and/or unlocking position results in like actuation of the other locking assembly. Thus, if it is assumed that the right hand locking assembly has been actuated to unlocking position (Fig. 3), lowering movement of block **35** results in like movement of the slide block **42** and hence axial down movement of rod **55**. This latter movement turns bell crank **60** in clockwise direction, similar movement being imparted the left hand bell crank **62** by thrust rod **75**. As the latter bell crank moves clockwise, it effects lowering of rod **56** and hence of the slide block and dogging block of the left hand locking assembly. Accordingly, all doors have now been unlocked from the right side of the vehicle, it being understood that the same unlocking operation could have been initiated from the left side and effected.

Assuming that subsequent locking of all doors from the left or driver's side of the vehicle is desired, the locking assembly at that side is actuated to locking position resulting in raising of the block **35** to its locking position, the rod **56** being raised thereby. Bell crank **62** is thereby turned clockwise (Fig. 5) to its full line position, similar movement being imparted bell crank **60** by thrust rod **75** which moves block **35** into its locking position. Obviously, this simultaneous actuation of both left and right side locking assemblies to locking position could have been initiated and effected from the right side of the vehicle, rather than from the left side as described.

It will be appreciated from the foregoing that the over-center springs **78**, **79** function to maintain the bell cranks and hence the dogging blocks **35** in the position to which they have been actuated. In order further to limit movement of the blocks beyond that necessary, there is provided suitable means such as a positive stop piece **82** secured across guides **36**, **37** just above the high position of each block **35**, thus to limit the upward movement thereof. Stop means to limit the downward throw of the dogging block assembly may also be provided in the nature of a stop **85** spanning the guides **36**, **37** at a point below the slide block **42** and defining the lower position of said block and hence the limit of the dogging block movement.

While the locking mechanism of the present invention has been described in the foregoing as applied to a four-door vehicle, that is, a vehicle having two doors on each side thereof, it is of course applicable to two-door vehicles of the character having one door on each side without substantial change. Thus, according to one manner of applying this locking mechanism on two-door vehicles, a dummy striker plate is substituted for one of the striker plates **14**, **15** of each latching assembly so that springs **17**, **18** hold the operative striker plate of each assembly in its normal latching position. Obviously, the latching assemblies, instead of being mounted in the posts between front and rear doors, as when the mechanism is applied to the four-door vehicle, may, in the case of the two-door vehicle having doors hinging on rear edges, be installed in the door front-frame; or, in the case of two-door vehicles in which the doors hinge along their front edge, the latching assemblies may with equal facility be mounted in the door rear-frames. In this connection it will be understood that the lever system interconnecting the latching assemblies can be installed so as to operate under the front seat or just to the rear thereof when the mechanism is applied to vehicles of either the four-door type, or to vehicles of the two-door type in which the locking assemblies are mounted in the door rear-frames. Where the latching assemblies are mounted in the door front-frames, as required in a two-door vehicle having doors which hinge on their rear edges, the interconnecting leverage system can be installed under the dash to operate in effective manner.

In addition to the practical advantages provided by the mechanism of the present invention in its ability to lock and/or unlock all doors of a vehicle from a position at either side thereof, the locking mechanism as described has added advantage in that it can be locked only from the outside and by the use of a key, and is accordingly wholly independent of window position. Thus, when locking has been effected from one side or the other of the vehicle, retracting movement of the striker plates **14**, **15** of the locking assemblies at both sides of the car is positively prevented from either the inside or the outside of the vehicle, the door unlatching means being ineffective because the pusher bolts **30** thereof cannot be actuated to their unlatching position. Hence, the locking mechanism of the present invention operates effectively regardless of whether the vehicle door windows are raised

or lowered. This latter feature is of notable advantage when it is desired to lock the vehicle doors and leave the door windows open for ventilating purposes.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A vehicle door locking mechanism comprising, in combination, latching mechanism including a part fixedly carried by the door, a member carried by the door post adapted for interlocking engagement with said door part, means mounting said member for movement from a door part interlocking position to a retracted position, door carried means normally operative to actuate said member to retracted position, thereby to unlatch the door, and door locking means including a member mounted for vertical movement within the door post from an inoperative to an operative position in which it renders said door carried means ineffective to actuate the member as aforesaid.

2. A vehicle door locking mechanism comprising, in combination, latching means for each of the vehicle doors, each including a striker plate adapted to coact with a fixed door part, means normally urging said striker to its latching position but providing for movement thereof to an unlatching position, door carried means normally operative to actuate the striker plate of its latching means to unlatching position, and locking means on each of the opposite sides of the vehicle each including a single, vertically reciprocable member movable from an inoperative to an operative position in which it renders all said door carried means on its side of the vehicle ineffective to actuate the striker plates associated therewith to unlatching position, and operating connections between the reciprocating members on the two sides of the vehicle providing for actuation of both said members to operative position upon actuation of either.

3. A vehicle door locking mechanism comprising, in combination, latching means for each of the vehicle doors, each including a striker plate adapted to coact with a fixed door part, means normally urging said striker to its latching position but providing for movement thereof to an unlatching position, door carried means normally operative to actuate the striker plate of its latching means to unlatching position, locking means on each of the opposite sides of the vehicle, each including a single, vertically reciprocable member movable into position in which it renders all said door carried means on its side of the vehicle ineffective to actuate the striker plates associated therewith to unlatching position, and means for actuating both said vertically reciprocable members in unison and from either side of the vehicle.

ARNOLD P. MICKLER.