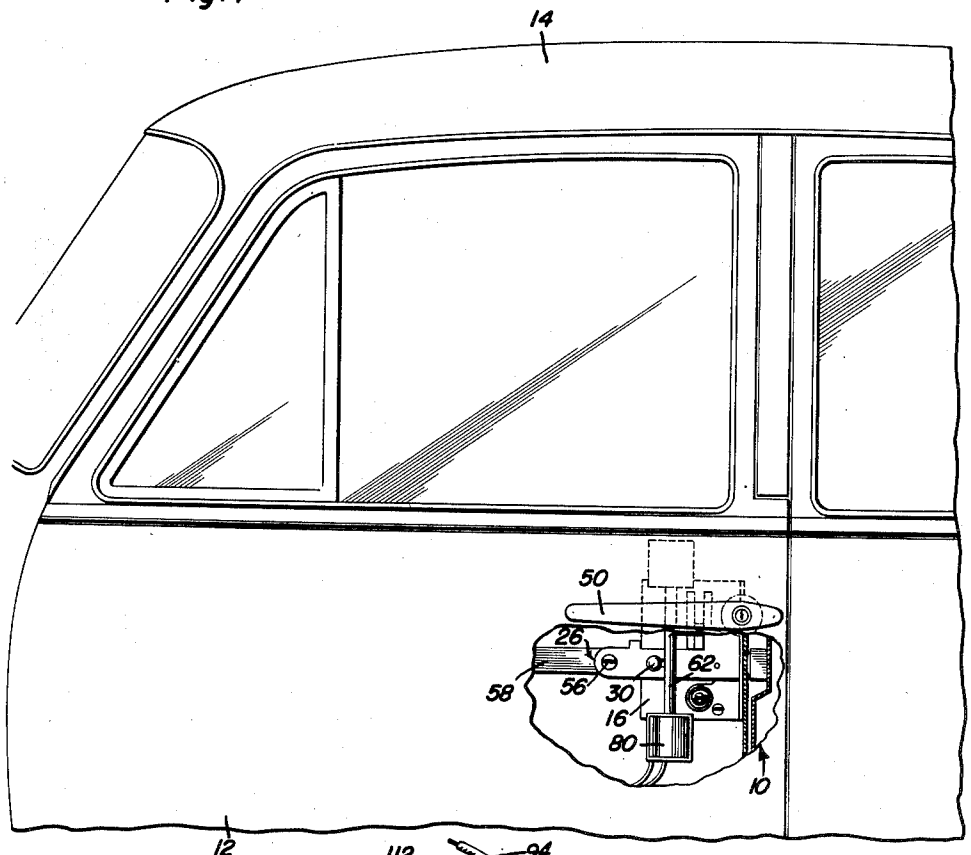
Sept. 22, 1953 W. PINDERHUGHES 2,653,045

ELECTRIC DOOR LOCK

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Fig. 1



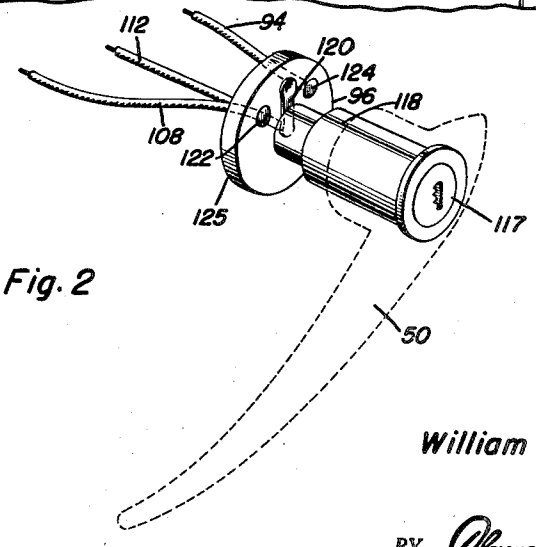


Fig. 2

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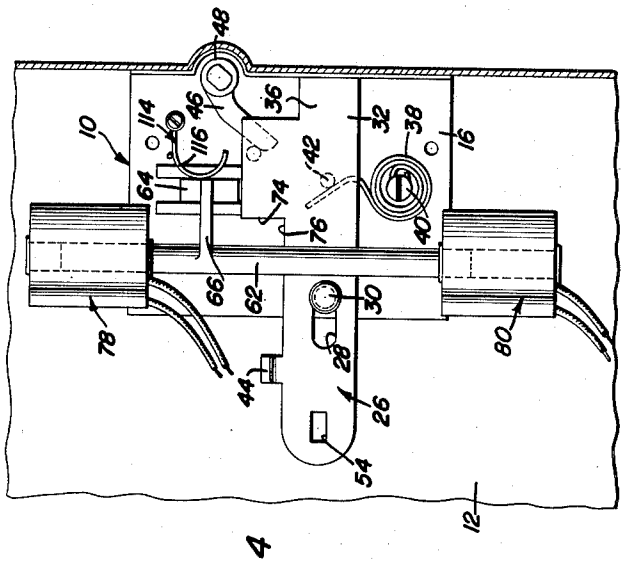


Fig. 4

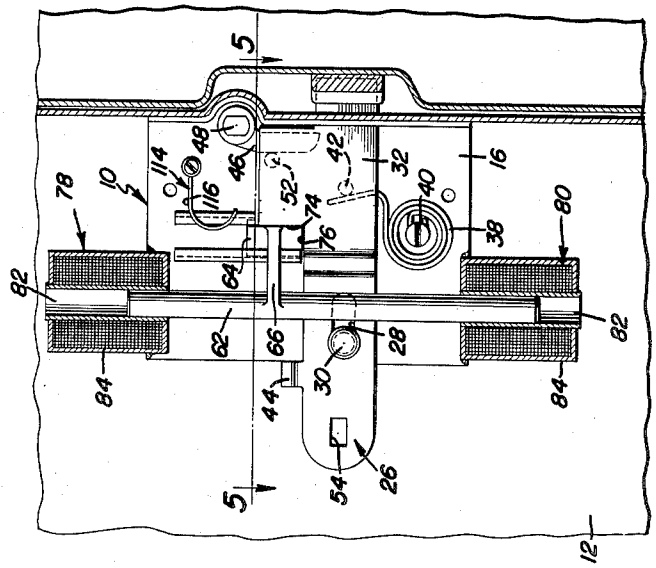


Fig. 3

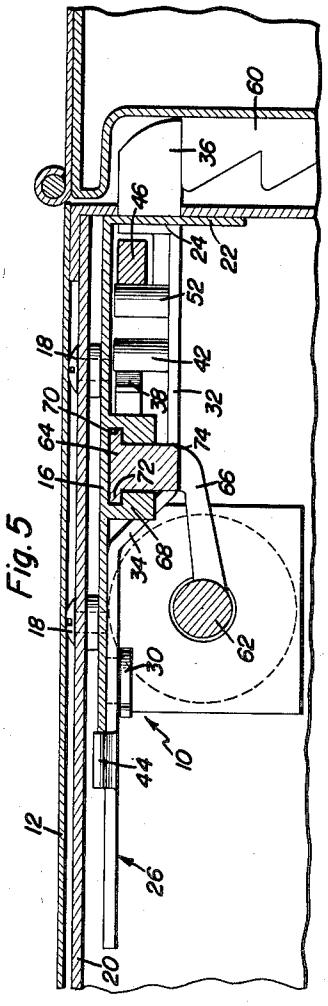


Fig. 5

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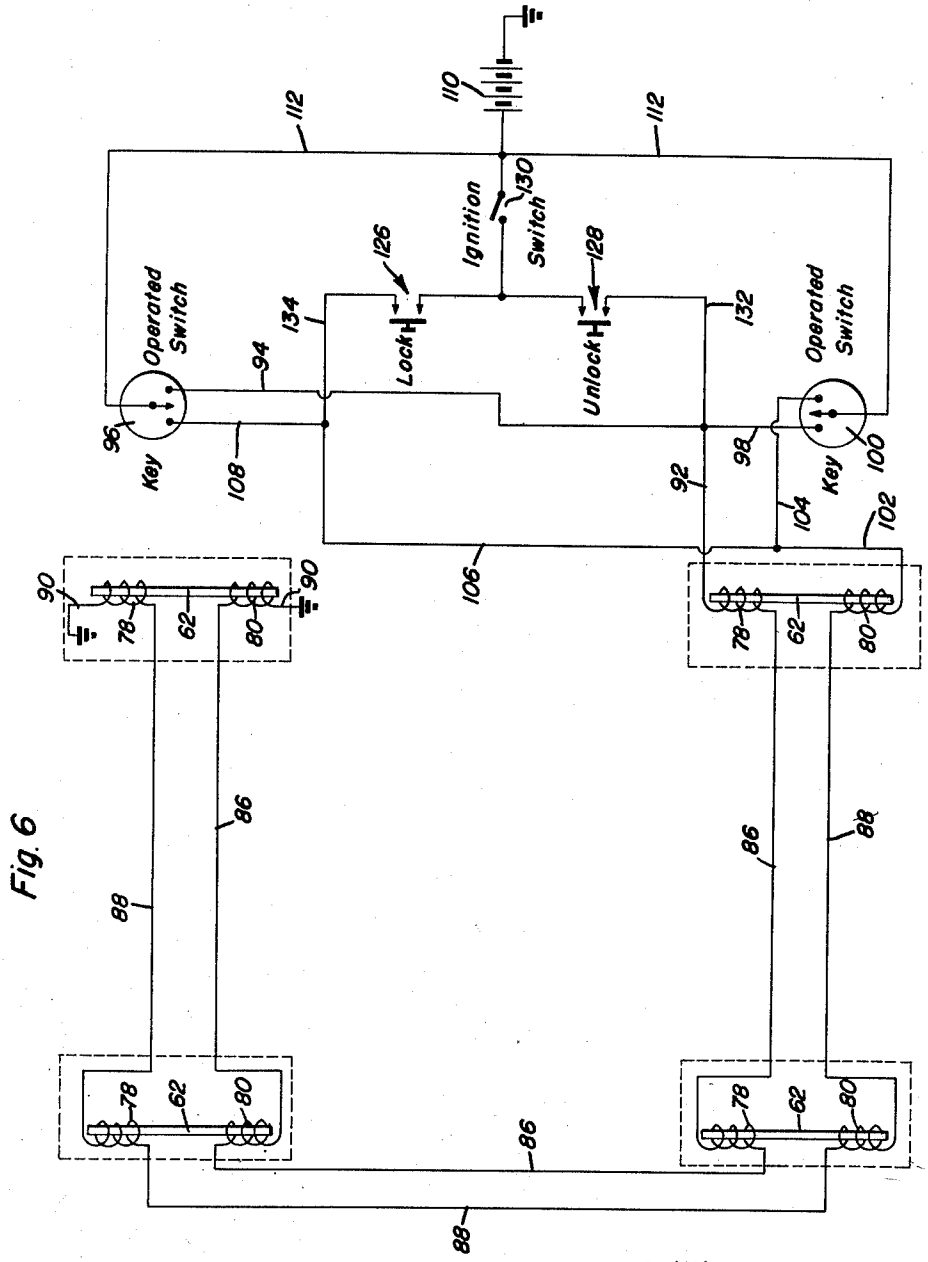


Fig. 6

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UNITED STATES PATENT OFFICE

2,653,045

ELECTRIC DOOR LOCK

William Pinderhughes, Baltimore, Md.

Application April 25, 1950, Serial No. 157,959

3 Claims. (Cl. 292—169)

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This invention comprises novel and useful improvements in door locking devices, and more particularly pertains to an electromagnetically operated door lock.

An important object of this invention is to provide an electromagnetically operated door locking device in which a plurality of locks may be simultaneously locked and unlocked by a single key actuated switch.

Another object is to provide a door locking device in which all of the doors may be locked and unlocked from a point remote from the doors.

A further object of this invention is to provide a door locking device in accordance with the foregoing objects, which door lock is of simple construction, yet which cannot be forced into an unlocked position.

An important feature of this invention resides in the provision of a horizontally reciprocating bolt, and a vertically reciprocating latch, and means for selectively reciprocating said latch into and out of its bolt engaging position.

Another feature of this invention resides in the provision of a door lock, in accordance with the foregoing feature, in which door lock the latch is urged and retained in its bolt engaging position by the force of gravity.

These, together with various ancillary objects and features, are attained by this device, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a fragmentary side elevational view of a vehicle, parts of the door being broken away to show the door locking device mounted thereon;

Figure 2 is a perspective elevational view of a key actuated single pole double throw switch which is adapted to be mounted in the door handle;

Figure 3 is a fragmentary vertical sectional view of the door locking mechanism;

Figure 4 is a fragmentary side elevational view of the door locking mechanism, the bolt being shown in its released position;

Figure 5 is a fragmentary horizontal sectional view taken substantially on the plane 5—5 of Figure 3; and

Figure 6 is a schematic wiring diagram of a circuit in which the electromagnetically operated door locking mechanism may conveniently be utilized.

Referring now more specifically to the accompanying drawings wherein like numerals designate similar parts throughout the various views, it will be seen that there is provided a door locking mechanism indicated generally by the numeral 10 which is adapted to be mounted upon the door 12 of a vehicle 14 or the like.

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The door locking mechanism 10 consists generally of a backing plate 16 which is mounted, as by fasteners 18 upon a door reinforcing member 20 or the like. The backing plate 16 is provided with an angulated portion 22 adjacent one end thereof, which angulated portion has a bore 24 extending therethrough.

A bolt 26 is provided with a longitudinally extending slot 28 therein, a headed pin 30 extending through the slot and being secured to the backing plate 16 to horizontally movably support the bolt. The forward portion 32 of the bolt 26 is angularly offset as at 34 so that the forward portion of the bolt 26 is parallel to, and laterally spaced from the backing plate 16. A head 36 is secured to the forward end portion 32, and extends through the aperture 24 in the angulated portion 22 of the backing plate 16.

A suitable torsion spring 38, or the like, is secured to the backing plate 16 by means of a fastener 40, and engages a pin 42 on the bolt 26 to urge the latter into its latched position. A stop member 44 may be conveniently formed integrally with the bolt 26, and is adapted to engage the backing plate 16 to limit forward movement of the bolt 26.

The bolt 26 may be reciprocated into its unlatched position by means of a cam member 46 which is keyed or otherwise secured to the shaft 48 of the door handle 50, the cam member 46 engaging the pin 52 when the handle is rotated about its shaft. The other end of the bolt 26 is suitably apertured as at 54 for reception of a fastener 56 by means of which the bolt may be connected to a link 58 which is operatively connected to the inner door actuating handle.

It is believed readily apparent that when the door 12 is closed, the head 36 of the bolt 26 engages the keeper 60 on the frame of the vehicle, the spring 38 urging the bolt 26 into its keeper engaging position.

The latching mechanism for the bolt 26 consists generally of an actuator rod 62 to which the latch member 64 is connected, as by an arm 66. The latch member 64 is slidably and guidably mounted upon the backing plate 16 for movement transverse the direction of movement of the bolt 26, by means of a pair of laterally spaced guides 68 having registering longitudinally extending recesses 70 on the inner surfaces thereof. These guides, for reasons which will later become apparent as the following description

proceeds, are preferably located on the backing plate adjacent the forward laterally spaced portion 32 of the bolt 26. The latch member 64 is provided with laterally extending keys 72 which are received in the complementarily formed recesses 70. The bolt 26 is provided with a vertically extending shoulder 74 which abuts against the latch member 64 when the latter is in its bolt engaging position. It is also intended that the latch member 64 rest upon, and be supported by the upper edge 76 of the bolt 26, when the latch member is in its bolt engaging position.

The actuator rod 62 is slidably received in the upper and lower, vertical aligned solenoids 78 and 80 respectively. The solenoids 78 are preferably provided with a bearing forming core member 82 which is of a material of relatively low permeability, and an outer casing 84, formed of a material of relatively high permeability, in order to decrease the reluctance of the coil.

In order that a plurality of doors may be locked by means of a single switch, each of the upper coils 78 are connected in series with each other, as by means of conductors 88. Similarly, each of the lower coils 80 are electrically connected in series with each other by means of conductors 86. The free ends of the series connected upper and lower end coils 78 and 80 respectively are electrically grounded on the body of the vehicle as by conductors 90. The last coil of the series of upper coils is connected by means of a conductor 92 and conductor 94 to one terminal of a key operated single pole double throw switch 96, the same coil being connected by means of conductors 92 and 98 to one terminal of a second key operated switch 100. The end of the series connected lower coils 80 is connected by means of the conductors 102 and 104 to a second terminal of the second single pole double throw switch 100, and by means of a conductor 102, 106 and 108 to the second terminal of the key operated switch 96. A suitable grounded source of power 110 is electrically connected by conductors 112 to the center switch terminal of the switches 96 and 100.

It is intended that the direction of the windings of the solenoid, and the electrical connections thereto be such that when either the switch 96 or 100 is moved to energize either the upper or lower set of solenoids, that each of the actuating rods 62 will be moved in the same direction. Thus, it will be seen that there is provided a key operated switch which electromagnetically urges the actuating rod 62 into either its lower bolt engaging position, or into its upper bolt releasing position. In order to retain the actuating rod 62, and consequently the latch member 64 in its upper bolt releasing position, there may conveniently be provided a latch member locking means 114 which may, as best shown in Figures 3 and 4 of the drawings, consist of a resilient arcuate member 116 which is secured to the backing plate 16 and which detachably engages the side of the latch member 64 when the latter is in its upper bolt releasing position.

A suitable form of key actuated switch is best shown in Figure 2 of the drawings, wherein a conventional locking mechanism 117 is mounted in a housing 118 and is operatively connected to a contact arm 120, the contact arm being movable with the key mechanism into contact with either of the terminals 122 or 124 dependent upon the direction in which the key turns the locking mechanism. The electrically insulating block 125 upon which the contact terminals are mounted is preferably attached to the handle 50 by means of the housing 118 for movement with the handle.

It is also intended that the doors may be locked from the interior of the car, by means of one or more switches which are remotely positioned from the doors, so that a taxicab driver or the like may prevent egress of passengers without paying their fares, or that private motorists may prevent unauthorized opening of the doors by children and the like. For this purpose there may be provided a lock switch 126 and an unlock switch 128 which may conveniently be mounted upon the dashboard of a vehicle or the like. However, in order to prevent a person from breaking into the locked car and pressing the unlock button to open the doors, the lock and unlock switches 126 and 128 are electrically connected through the ignition switch 130 to the source of power 110. The unlock switch 128 is electrically connected as by conductor 132 and conductor 94 to one terminal of the key operated switch 96, and the lock switch is electrically connected by conductors 134 and conductor 108 to the other terminal of the key operated switch 96.

An alternative electrical circuit may be provided in which the upper and lower solenoids 78 and 80 respectively of each of the doors are electrically connected to each other in series and in such a manner that current flowing in one direction through the coils will produce a force in the same direction, each of the sets of coils for each of the doors being electrically connected in series in such a manner that current flowing in one direction through all of the coils will force the corresponding actuating rod 62 to each be urged in the same direction as the other. The terminals of the series connected coils can then be connected to a suitable reversing switch which is electrically connected to a source of power. In this manner, upon moving the reversing switch in one direction current will flow through both the upper and lower coils of each of the doors at the same time, and produce the combined force of both the upper and lower solenoids on the actuating rod 62.

Further, it is believed apparent that it is within the scope of this invention to provide an electromagnetically operated bolt, in lieu of the mechanically actuated cam member 46 and connecting rod 58. It is believed apparent that it would merely be necessary to provide a horizontally disposed solenoid which is operatively connected to the bolts 26 suitable switch means being provided in the circuit which electrically connects the bolt actuating solenoids to any source of power.

From the foregoing, it is thought that the operation and construction of the device will be readily understood, and further discussion is believed to be unnecessary. However, since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not intended to limit the invention to that shown and described, but all suitable modifications may be resorted to falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A door locking mechanism comprising a support plate, a longitudinally movable door bolt, held by said support plate for longitudinal

reciprocating movement, said door bolt being provided with a projecting ear, the end face of which forms a transverse abutment, means for actuating said door bolt, two aligned solenoids above and below the door bolt, their common axis being at right angles to the direction of movement of the door bolt, a slidable actuator rod, with ends each cooperating with and operated by one of said solenoids, a latch member carried by said rod and projecting from the same, with end faces extending transversely with respect to the direction of movement of the door bolt, a guide means guiding the transversely extending end faces of the latch member, said guide means being held on the support plate between the latter and the door bolt, the latch member projecting from said guide means and the projecting face being adapted to cooperate with the transverse abutment of the projecting ear of the door bolt, means for energizing alternatively the one or the other solenoid, thus moving the latch member within the guide member and its projecting transverse abutment face into and out of engagement with the abutment on the ear of the door bolt.

2. In a door locking mechanism having a mounting plate, a latch bar slidably mounted on said plate, a spring biasing said latch bar in one direction and manually operable means for retracting said bar in opposition to said spring, a lock comprising a rod slidably mounted transverse to said latch bar, electromagnetic means operative to reciprocate said rod, an arm rigidly mounted on said rod intermediate the ends thereof, a T-slot guide arranged in lateral extending relation to said latch bar, a latch member rigidly secured on said arm and slidably received in said T-slot, a lateral projection on said latch bar, said rod being operable to move said latch member

into and out of the path of travel of said projection.

3. In a door locking mechanism having a mounting plate, a latch bar slidably mounted on said plate, a spring biasing said latch bar in one direction and manually operable means for retracting said bar in opposition to said spring, a lock comprising a rod slidably mounted transverse to said latch bar, electromagnetic means operative to reciprocate said rod, an arm rigidly mounted on said rod intermediate the ends thereof, a T-slot guide arranged in lateral extending relation to said latch bar, a latch member rigidly secured on said arm and slidably received in said T-slot, a lateral projection on said latch bar, said rod being operable to move said latch member into and out of the path of travel of said projection, a resilient member mounted adjacent said T-slot, said resilient member frictionally engaging said latch member when out of the path of travel of said projection.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
805,437	Baisch	Nov. 28, 1905
914,670	Pfleghar	Mar. 9, 1909
1,554,839	Brown	Sept. 22, 1925
1,992,729	Weller	Feb. 26, 1935
2,028,852	Vincent	Jan. 28, 1936
2,061,978	Pentka	Nov. 24, 1936
2,082,806	Michel	June 8, 1937

FOREIGN PATENTS

Number	Country	Date
8,060	Great Britain	June 7, 1915
308,285	Italy	May 31, 1933
491,024	Great Britain	Aug. 25, 1938