June 8, 1937. E. MICHEL 2,082,806

ELECTRIC CONTROL LOCK

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Fig. 1.

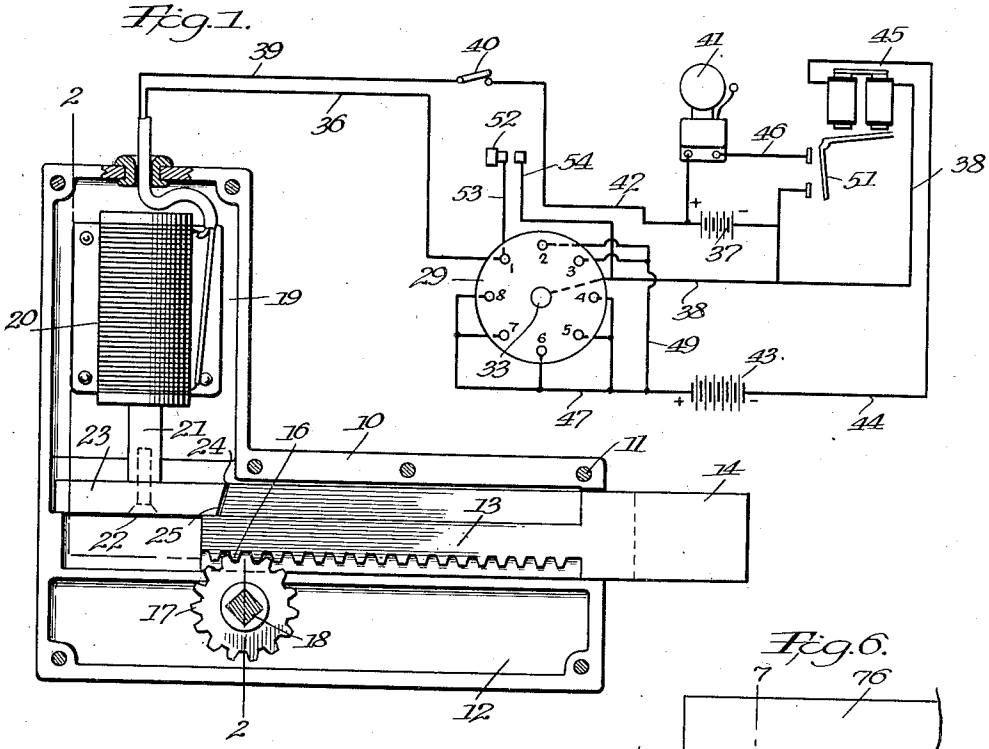


Fig. 6.

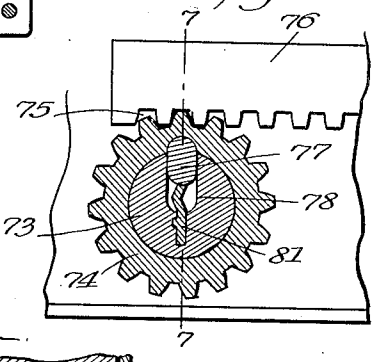
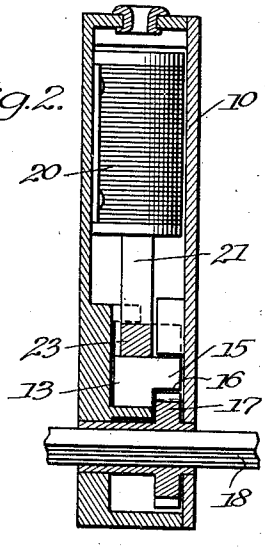


Fig. 2.



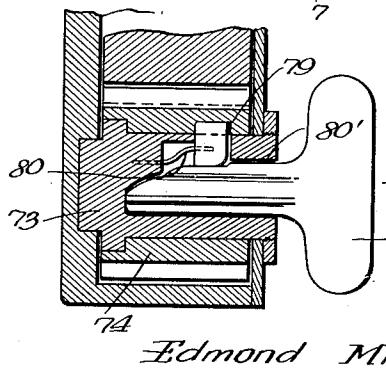


Fig. 7.

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ELECTRIC CONTROL LOCK

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Fig. 3.

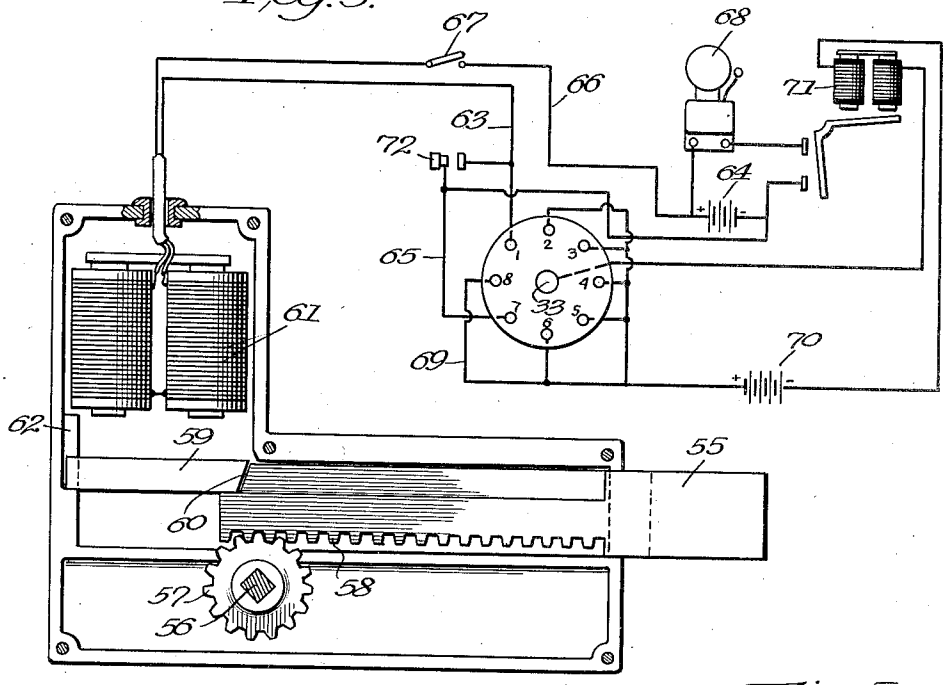


Fig. 12.

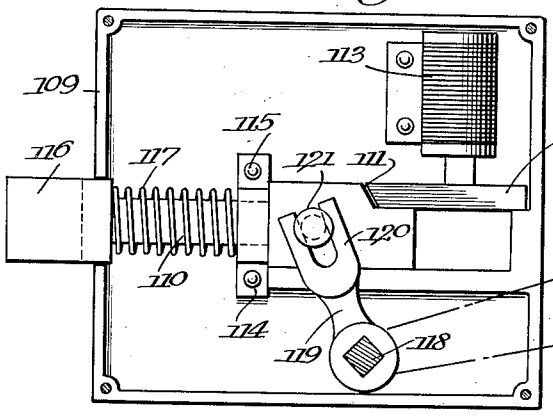
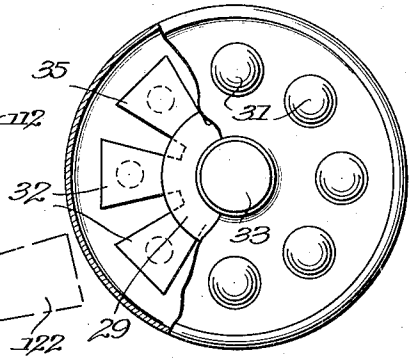


Fig. 5.



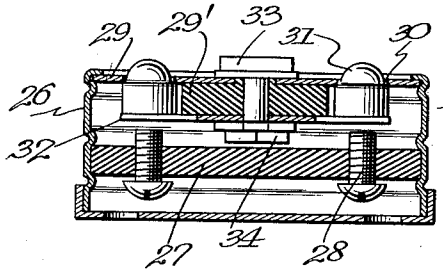


Fig. 4.

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ELECTRIC CONTROL LOCK

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Fig. 8.

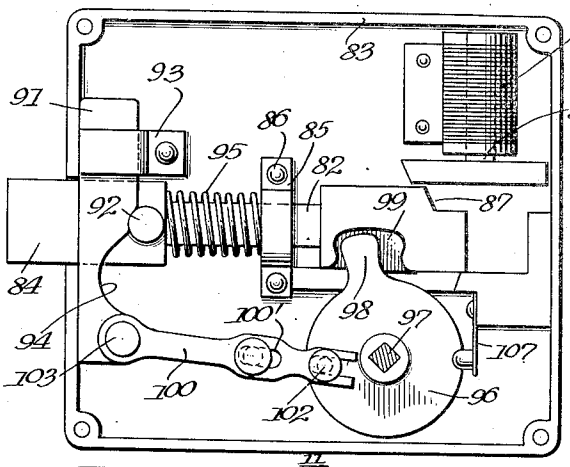
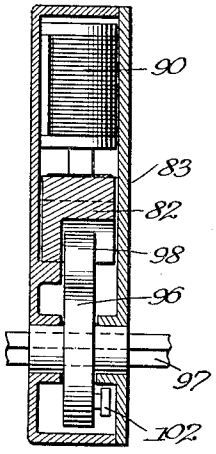


Fig. 11.



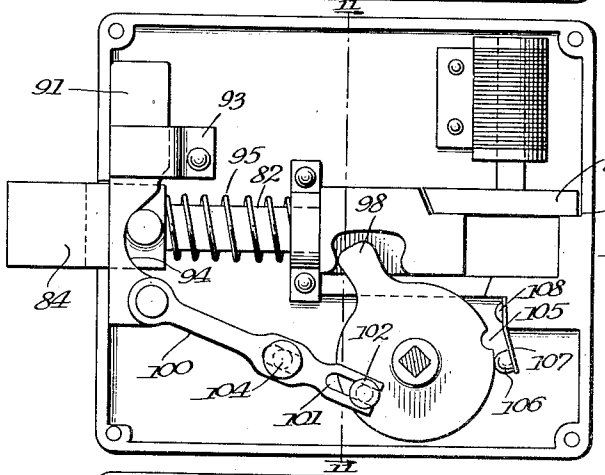
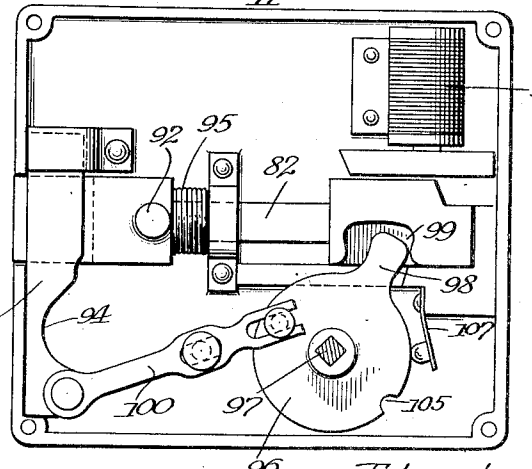


Fig. 9.

Fig. 10.



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Patented June 8, 1937 2,082,806

UNITED STATES PATENT OFFICE

2,082,806

ELECTRIC CONTROL LOCK

Edmond Michel, New Orleans, La., assignor to Larmloc Corporation, New Orleans, La., a corporation of Louisiana

Application September 16, 1935, Serial No. 40,844

11 Claims. (Cl. 70—283)

The present invention relates to an improved electric control lock for use in securing or fastening doors, safes, vaults and other closures, entrance to which is ordinarily prevented by a lock.

An important object of the invention is to provide a simple, compact, efficient and economical electric control lock which when in its closed or locked position, can only be opened upon the establishing of a predetermined electric circuit and in which electric means may be provided to give an audible or visual signal when an attempt is made to open the lock by any unauthorized person.

A further object comprehends the provision of a permutation electric lock in which a magnetic controlled obstructing member is arranged to be moved into the path of the lock when the magnet is de-energized, to maintain the lock in its closed position and which, upon the energizing of the magnet, is displaced or moved out of the path of the lock to permit free movement of the latter.

Another object consists in associating with the magnet means controlling the lock releasing instrumentalities, a switch device which is operable only by the closing of a certain predetermined circuit so that the lock is non-retractable except by persons who know the circuit that must be closed to effect the energizing of the electro-magnet to displace the obstructing member from the path of the lock, thus providing means for positively maintaining the lock closed which dispenses with the use of a key or other mechanical means for permitting the opening of the lock.

A further object consists in providing an electric control jimmy-proof lock having a retractable bolt arranged to be maintained in its closed or locked position by an obstructing member operable by an electro-magnet, and associating with the bolt, means normally to prevent the locking of the bolt when the obstructing member is displaced or moved out of its locked position, and thus permit the operation of the bolt while maintaining the obstructing member inoperative.

A still further object comprehends the provision of an improved contact mechanism arranged to be operatively associated with the circuit controlling the electromagnet, said contact mechanism including a plurality of push buttons, which have associated therewith a flexible movable contact provided with arms each arranged to be moved into engagement with an adjacent fixed contact to establish an electric circuit to either energize the magnet that operates the bolt releasing instrumentalities or an alarm device which gives a signal when the lock is being tampered with by any unauthorized parties.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the accompanying claims and drawings.

Referring to the drawings in which are shown several preferred embodiments the invention may assume,

Figure 1 is a side view of a lock made in accordance with the invention showing the casing in section and a diagram of a single contact combination for actuating the magnet or the alarm device.

Figure 2 is a sectional view taken substantially along the line 2—2 of Figure 1.

Figure 3 is a view similar to Figure 1, showing a modified form of the invention.

Figure 4 is a sectional detail view of the panel push button structure.

Figure 5 is a plan of Figure 4 with parts cut away for clearness of illustration.

Figure 6 is a sectional detail of a modified form of lock mechanism.

Figure 7 is a sectional view taken substantially along the line 7—7 of Figure 6.

Figure 8 is a sectional view of a modified form of the invention showing the retaining bolt in its normal closed position and the obstructing member released.

Figure 9 is a view similar to Figure 8, showing the obstructing member moved into the path of the bolt to maintain the latter in its locked or closed position.

Figure 10 is a view similar to Figure 8 with the bolt in its retracted or opened position.

Figure 11 is a sectional view taken substantially along the line 11—11 of Figure 9.

Figure 12 is a vertical sectional view of a further modified form of the invention.

Referring to the drawings in which like numerals indicate like parts in the several views, 10 designates a lock casing arranged to be set in a recess in the door or other closure with which the lock is associated, by the screws or bolts 11. The casing is preferably formed with a horizontally disposed portion 12 in which is slidably mounted a reciprocating bolt or locking member 13 having a latched outer end portion 14 arranged to be received in a keeper carried by a jamb against which the door closes. The

inner end portion of the bolt is reduced or cut away as at 15 (Figure 2) to provide a gear rack 16 which meshes with a spur gear 17 non-rotatably secured to an operating spindle or shaft 18. The shaft 18 extends through the casing 10 and the door and has connected to each end thereof, a knob or a handle for actuating the gear 17 which in turn reciprocates the bolt 13 to move the latter into its opened and closed positions. The inner end of the casing 10 has an upwardly projecting portion 19 in which is mounted electric magnet means such as a solenoid 20 which carries a reciprocating plunger or core 21 to which is connected by the screw 22, an obstructing member or wedge 23 arranged when the bolt 13 is in its outermost or closed position to fit within a recess 24 formed between the inner wall of the casing and the adjacent shoulder 25 of the bolt in the manner as shown in Figure 1.

The magnetic means 20 is energized to raise or displace the obstructing member 23 out of the path of the bolt 13 to permit the free axial movement of the latter, through an electric contact device, which may include a panel or casing 26 (Figure 4) arranged to be connected near the door or other closure with which the locking device is associated so as to be conveniently operable to effect release of the bolt when the latter is in its locked position. Within the panel 26 is a web 27 of insulated material which carries a series of fixed contacts 28. A cover or face plate 29 closes the outer end of the panel 26 and is provided with a plurality of openings 30 which register with the fixed contacts 28 and slidably carry the push buttons 31. A metallic plate or disc 32 is secured to the under side of the cover 29 by a bolt 33 and nut 34. Between the plates 29 and 32 is preferably located a fibre washer 29'. The plate 32 is preferably formed with a series of spaced radially disposed flexible arms 35 which correspond in number to the number of fixed contacts and are arranged to be interposed between and in alignment with adjacent contacts 28 and push buttons 31 to constitute movable contacts for establishing predetermined circuits with their adjacent fixed contacts. The plate 32 is of flat, flexible metal so that when each of the arms 35 is displaced by a push button to be brought into engagement with the fixed contact 28, it will, upon the release of the push button, return to its normal horizontal position and thus will not be detrimentally affected by constant usage. As shown, the panel 26 is provided adjacent its periphery with circumferentially disposed contacts numbered 1 to 8. The retaining bolt 33 constitutes a centrally disposed fixed contact which also acts adjustably to secure the movable contacts 32 in position so that the plate 29 and its associated parts may be turned to change the locating of the movable contacts relative to the fixed contacts as desired. In other words under constant usage the particular push button connection selected to close the circuit so as to permit the reciprocation of the locking bolt, may be discernible under careful observation due to signs of wear, lack of dust, finger marks or the like and thus enable an unauthorized person to operate the lock without knowledge or consent of the proper parties. In order to eliminate such a possibility as this, the plate 29 loosely fits in the groove formed in the casing 26 so as to be rotatably mounted therein. As the push buttons 31 and plate 32 are rigidly connected to the plate 29 by the bolt 33 it will be seen that upon the turning of the plate 29, the push buttons and the plate 32 may be moved to register with other of the fixed contacts 28 and thus insure against the condition of the plate 29 revealing the push buttons necessary to be actuated in order to effect a release of the locking bolt. For the purpose of illustration, there is shown in Figure 1, a single button contact circuit for energizing the magnet 20. Accordingly, the contact 1 has been selected as constituting a part of the electrical circuit for energizing the magnet 20 and is connected to the magnet through the wire 36. The centrally disposed fixed contact 33 which forms a part of this circuit is connected to the negative pole of battery 37 through wire 38. The positive pole of the battery 37 is connected to the magnet 20 through the wire 39 to complete the circuit. A switch 40 may be provided in the circuit for controlling the flow of current to the magnet. Thus, it will be seen that when the switch 40 is closed and the push button 1 is depressed to move the arm 35 adjacent thereto into engagement with the fixed contact 28, a circuit will be closed to energize the magnet 20 which in turn attracts the obstructing member 23 to move the latter out of the path of the locking bolt 13. When the obstructing member 23 is displaced, the shaft 18, upon being rotated in a counter-clockwise direction, causes the bolt 13 to be moved inwardly to release the lock and permit the opening of the door or other closure member. Conversely, when the magnet is de-energized, and the bolt 13 is in its outermost position, the obstructing member 23 will fall by gravity to fit within the recess 24 to maintain the bolt locked until the magnet is again energized to withdraw the obstructing member from the path of the bolt. It will be noted that the bottom of the recess 24 constitutes a supporting surface for receiving the freely movable member 23 when the bolt is closed and the magnet is deenergized. In order to give an alarm when some unauthorized party attempts to tamper with the lock, there is preferably provided a signalling device which may be either audible or visual as desired. As shown, the signal includes an electric bell 41, connected to the positive pole of battery 37. The negative pole of battery 43 is connected to the electric magnet 45 through the wire 44. The positive pole of battery 43 is connected to each of the contacts 2, 3, 4, 5, 6, 7, and 8 by the wire 47, and the contact 33 is connected through wire 38 to the electric magnet 45. Relay 51 when energized closes the gap between the negative pole of battery 37 and electric bell 41 through wire 46. Assuming that the push button 3 is depressed, it will be seen that immediately a circuit is established through the wire 49 with the positive pole of the battery 43 while the fixed contact 33 connects through the wire 38 with the relay 45, which in turn is connected to the negative pole of the battery through the wire 44, thus causing the arm 51 of the relay to engage the contacts to complete the circuit through the wire 46 to the bell 41.

Similarly, should any of the other push buttons be depressed, they will in turn complete the same circuit to actuate the bell 41. Thus it will be seen that any one not familiar with the particular combination will immediately betray his presence when he attempts to open the lock.

Whenever desired, the combination may be changed by disconnecting contact 1 from the magnet 20 and connecting any of the other contacts thereto so that all the contacts not connected to the magnet 20 may be connected to

energize the alarm or signal device. The facing of the push buttons 31 may, if desired, be coated with a luminous material so that it will be visible in the dark. As the plate 29 and the arms 32 are normally flat and lie in the same horizontal plane, it will be seen that when the arms are distorted by the push buttons 31 they will, upon release of the downward pressure, return to their initial position. Consequently, their resiliency or efficiency will not be impaired by constant usage as is the case of curved spring contacts which soon lose their preformed shape and resiliency.

As shown, the panel 26 is arranged to be connected to the outside of the door to permit entry into the room or compartment when the proper push button is actuated. In order to permit the release of the bolt 13 from the inside of the room or premises, a contact 52 may be provided, which has one of its poles directly connected through the wire 53 to the contact 1 and its other pole connected through the wire 54 with the fixed contact 33 to energize the magnet 26 in substantially the same manner as would take place if the contact 1 were depressed. The contact 52, it will be observed, is arranged to be in the circuit of the particular push button selected to close the magnetic circuit and is only necessary where the lock is used on a door as when the door is locked and must be opened by parties inside the room. When the lock is used on safes, vaults, prison cells and the like, the contact 52 may be dispensed with. The switch 40 may be located either within or outside the premises to connect or disconnect the source of electric energy from either the electromagnet 26 or the alarm 41. Thus, after all the occupants of the premises have retired, the inside switch 40 may be disconnected and further secure the premises against intruders since it is impossible to operate the magnet 26 when the current is shut off. The switch 40 may also be concealed somewhere outside the premises to disconnect either one or both of the circuits to the magnet and the alarm. It will be seen that the switch control is particularly useful in isolated localities or industrial plants where it is desired to control from a remote point, the operation of the lock. The panel 26 and its associated parts are very compact and may be accessibly located to effect the convenient operation of the lock. Moreover, as the circuits for actuating the magnet 26 and the signalling device 41 are readily interchangeable, the predetermined push buttons necessary to close the magnetic circuit may be rearranged periodically when desired. Manifestly, the number of contacts in a panel can be increased or decreased and more than one panel can be associated with the electro-magnet for actuating the bolt so as to increase the combination or for dual control. If desired, the panel 26 may be located in any convenient position away from the lock.

In Figure 3, a two-button combination is shown for energizing the electro-magnet. In this figure, the locking bolt 55 is manually actuated by the turning of a shaft 56 which is operatively connected through the spur gear 57 and rack 58 to the bolt. An obstructing member in the form of a wedge 59 is arranged when the bolt is in its outermost or closed position, to fit within a recess 60 formed between the inner wall of the casing and the adjacent opposed inner end of the bolt 55. As shown, the obstructing member 59 is positioned within the recess 60 to prevent bolt 55 from being moved inwardly. When the magnet 61 is energized the obstructing member 59 is withdrawn from the recess and is guided in its upward movement by spaced parallel guides 62. In this two-button combination, the push buttons 1 and 7 have been chosen to complete the circuit to the magnet 61, and it will be seen that when these two buttons are simultaneously depressed, the contact 1 is directly connected to the magnet through the wire 63 while the contact 7 is connected to the negative pole of the battery 64 through the wire 65. Contact 33 is connected to both of contacts 1 and 7, and closes the negative circuit between the magnet 61 and the battery 64. The positive pole of the battery 64 is connected by the wire 66 to the magnet 61. A switch 67 may be provided in the circuit for controlling the flow of current to the magnet. The remaining contacts 2, 3, 4, 5, 6 and 8 establish a separate circuit with the signalling device 68 through the wire connection 69, battery 70 and relay 71 in substantially the same manner as in the single combination shown in Figure 1, with the exception that contact 7 is not connected to the positive pole of battery 70 as are the contacts 2, 3, 4, 5, 6 and 8.

A push button contact 72 may be provided in the electromagnet circuit so as to be operable within the room or at a remote point to energize the magnet to permit the withdrawal of the obstructing member and the manual operation of the bolt or retaining member 55. As there are 56 different two button combinations in an eight push button panel, the chances of guessing the combination on the first try is very remote and practically impossible.

Instead of providing manual means, such as the shaft 18 shown in Figure 1 for actuating the locking bolt when the obstructing member is displaced by the magnet, an inside lock may be provided to insure further protection against unauthorized persons tampering with the lock. As shown in Figures 6 and 7, a key lock mechanism is employed instead of a knob or handle and preferably comprises a cylindrical shaft 73 positioned within the spur gear 74 so that normally the gear is freely revoluble on the shaft. The teeth of the gear 74 mesh with the teeth 75 of the locking bolt 76. In order to operatively connect the cylinder 73 with the gear 74 to effect axial movement of the lock 76 when the obstructing member is displaced, there is preferably provided a locking means in the form of a radially movable lug 77 which fits within a complementary recess 78 in the cylinder 73 and is arranged to be moved radially outward into a recess 79 formed in the wall of the gear 74. A spring 80 normally tends to maintain the locking lug 77 wholly within the opening 78 to permit the free rotation of the gear 74 on the member 73. The member 73 is locked to the gear 74 through the instrumentality of a key 81 arranged to fit in a key hole 80' in the member 73 so as to engage the lug 77 and move the latter radially into the opening 79 to provide a positive connection between the member 73 and the gear 74 in the manner as shown in Figure 7. Upon the turning of the key, either in a clockwise or counterclockwise direction, the gear 74 actuates the bolt 76 to move the same into its opened or closed position. Manifestly, the opening 80' for receiving the key 81 may be of varying sizes and configurations to insure the lock being opened only by those authorized to do so.

In the modified forms of the invention shown

in Figures 8, 9, 10 and 11, there is disclosed an electric control lock, particularly adaptable for use with automobile doors and the like. As shown, the locking bolt 82 is slidably mounted within a suitable casing 83 and has its outer end 84 shaped to engage a keeper in the door jamb. A supporting guide 85 connected to the casing as at 86 acts to maintain the bolt in proper alignment with the door jamb to effect a proper closure of the door. The inner end of the bolt has a reduced shoulder portion 87 which coacts with the adjacent wall of the casing 83 to provide a recess for receiving the obstructing member 88 when the bolt is in its outermost or locked position. The obstructing member 88 is connected to a reciprocating plunger 89 operable by the solenoid 90 which in turn may be suitably connected to either a single button contact as shown in Figure 1 or a double button contact as disclosed in Figure 3 to cause the energizing of the solenoid upon the depression of certain predetermined contacts and the energizing of an alarm device when any of the other contacts are depressed.

In order to prevent the locking of the bolt 82 by the obstructing member 88 during the normal operation of the lock, means are provided for maintaining the obstructing member 88 in such a position that it cannot be moved into the recess 87 until the bolt is manually actuated to bring the recess in alignment with the obstructing member. This means also permits the free manual operation of the bolt so that the same may be temporarily retained in its locked position without requiring the energizing of the electro-magnet 90 to displace the obstructing member. This is effected by positioning a vertically movable block 91 between the outer end wall of the casing and a roller or stud 92 carried by the bolt. A guide 93 may be provided for maintaining the block 91 in proper position during its vertical movement. The inner surface of the block has a cam portion 94 which is arranged to engage the roller 92 so as to vary or control the outward movement of the bolt 82 depending upon the location of the bolt 91 relative thereto. A coil spring 95 confined between the latched end portion 84 of the bolt and the guide 85, acts to urge the bolt outwardly. A revoluble disc member 96 non-rotatably secured to the operating shaft 97, has a radial arm or lug 98 which fits within a recess 99 in the bolt 82 so as to impart a rectilinear movement to the bolt when the shaft 97 is rotated. A link 100 has an elongated slot 101 at one end which is slidably connected at 102 to the disc 96 and is pivoted at its opposite extremity as at 103 to the block 91. The intermediate portion of the link 100 is loosely connected through an elongated slot 100' to a fixed pivot 104 to impart a vertical movement to the block 91 when the disc 96 is rotated. A notch 105 in the periphery of the disc 96 is arranged to receive a projection or lug 106 carried by a spring 107 secured as at 108 to the casing so as to temporarily retain the disc and its associated parts in a fixed position when the disc is moved to bring the recess in registration with the projection 106.

As shown in Figure 9, the bolt 82 is moved to its outermost or locked position and the obstructing member 88 is positioned within the recess 87 to prevent the inward movement of the bolt. Upon the solenoid 90 being energized, the wedge 88 is moved out of the path of the bolt so that the latter may be manually operated by turning a handle or knob secured to the shaft 97. Assuming that the disc 96 is rotated in a clockwise direction, the bolt 82 will be moved by the lug 98 inwardly against the tension of the spring 95 so as to assume the position as shown in Figure 10. Upon the solenoid 90 being de-energized the obstructing member 88 will rest against the upper surface of the bolt 82 so that the parts assume the unlocked position as shown in Figure 10. During this movement, the block 91 is moved downwardly by the link 100 so that upon release of the knob on the shaft 97, the spring 95 will act to move the bolt 82 outwardly, thus causing the disc 96 to rotate in a counterclockwise direction until the projection 106 engages the notch 105 which temporarily arrests the further outward movement of the bolt. The block 91 is simultaneously actuated by the disc 96, so that its cam surface 94 is positioned to coact with the projection 106 to limit the compressive action of the spring 95 to return the bolt 82 to its extreme closed position. The parts are then in the position as shown in Figure 8, which is the normal position the bolt 82 assumes when the solenoid 90 is de-energized and it is desired to operate the lock without danger of the recesses 87 being moved into registration with the obstructing member 88 which would prevent the inward movement of the bolt. When the bolt 82 is in this position, it will be seen that if the door is opened and it is desired to close the same, the outer end 84 of the bolt, when it engages the door jamb will be moved inwardly until it reaches the aperture in the door frame or striker plate whereupon the spring 95 acts to push the bolt forwardly to lock the door without causing the obstructing member 88 to fall within the recess 87. Thus, the door can be opened or closed without energizing the electro-magnet in the same manner as an ordinary spring latch and is retained in its closed position by the engagement of the projection 106 with the notch 105. When it is desired to lock the door so that the obstructing member 88 will prevent its opening, it is only necessary to rotate the disc 96 in a counter-clockwise direction which causes the release of the projection 106 with the notch 105 and the bolt 82 is moved forwardly sufficiently to clear the path of the obstructing member 88 which then falls by gravity into the recess 87. Conversely, when it is desired to effect manual operation of the bolt, after the magnet 90 has withdrawn the obstructing member 88 out of the recess 87, the shaft 97 is rotated in a clockwise direction until the projection 106 engages the notch 105 so as to temporarily retain the bolt closed without necessitating the energizing of the solenoid. It will be seen the slight turning movement required to actuate the disc 96 to lock the bolt in its extreme closed position, improves the efficiency of the device since not infrequently, when the lock is applied to the door of a motor vehicle, the driver either neglects or forgets to lock the door. By reason of my improved lock structure, when the driver closes the car door from inside by slamming it, it is readily opened again without use of the electro-magnet. If desired, however, a single button switch or a double button switch, such as shown in the Figures 1 and 3, may be provided inside the car to release the electro-magnet in substantially the same manner as the auxiliary switches 52 and 72 previously described. Due to limited action of the spring 95, effected by the block 91, the bolt is provided with a double acting locking

device which is operable either by the electromagnet or when the magnet is inoperative. The locking mechanism shown in Figures 8, 9, 10 and 11 is arranged to be connected to a contact circuit and an alarm circuit substantially in the manner as the locks previously described.

The block 91 and yieldable projection 106 constitute two different means which are simultaneously operable to limit the full compressive action of the spring 95 to prevent the bolt from being moved to its extreme outermost or closed position and thus preclude the possibility of the recess 87 being brought into registration with the obstructing member 88. While the use of both of these means insures a more positive control, manifestly either one could be dispensed with without materially affecting the efficiency of the locking device.

In the modified form of the invention disclosed in Figure 12, the means for limiting the full compressive action of the spring urging the bolt to its outermost position is dispensed with. As shown, the casing 109 has mounted therein a reciprocating locking bolt 110, the inner end of which is provided with a shoulder 111 which coacts with the inner wall of the casing to form a recess for receiving the obstructing member 112 which is raised from the recess by the energizing of the solenoids 113 in a manner similar to the means employed for energizing the electromagnetic means 20 and 61 previously described. A bracket 114 secured as at 115 to the casing acts as a guide for the bolt. The bolt 110 supports between its outer end 116 and the bracket 114 a compression spring 117 which normally urges the bolt to its locked or closed position. When the bolt is in this position and the solenoid 113 is de-energized the obstructing member 112 falls within the recess 111 to prevent the inward movement of the bolt. An operating shaft 118 has secured thereto an arm 119 which is formed with a bifurcated end 120 that loosely receives the stud 121 which extends laterally from the bolt. A handle 122 is secured to the shaft 118 to cause the actuation of the arm 119 which, in turn, moves the bolt inwardly against the action of the spring 117. It will be observed that this form of the invention is quite similar to that disclosed in Figure 1 and distinguishes therefrom in that the spring 117 acts to normally maintain the bolt closed and the handle 122 is utilized to move the bolt to its opened position, while in Figure 1 the operating shaft 18 may be actuated to move the bolt to its opened and closed positions. It will be observed that when the parts are in the position as shown, the door will be positively locked and securely closed and can only be opened by energizing the magnet 113 to withdraw the obstructing member out of the path of the bolt.

In all forms of the invention, it will be noted that the inner end of the bolt coacts with the inner wall of the casing to provide a recess for receiving the obstructing member so as to maintain the bolt in its outer or locked position. By reason of this novel arrangement of parts, means are provided when the bolt is in its locked position for preventing the unauthorized actuation of the bolt either by rotating the handle or knob or by means of a jimmy or other similar tool.

It is to be understood that the several forms of the invention shown are merely illustrative of preferred embodiments and that such changes may be made without departing from the spirit of the invention as fall within the purview of one skilled in the art and the scope of the appended claims.

I claim:—

1. A lock of the class described including a reciprocating bolt, yieldable means for urging said bolt outwardly, means to move said bolt axially to its opened and closed positions, means for limiting the outward movement of the bolt, an obstructing member for preventing inward movement of the bolt when the latter is in its outermost position, means to render said obstructing member normally inoperative to permit the uninterrupted axial movement of the bolt, and means for maintaining the bolt in locked positions when the obstructing member is inoperative to permit the actuation of the bolt without causing the operation of the obstructing member.

2. A lock of the class described including a casing, a reciprocating bolt mounted within the casing, an obstructing member arranged to be moved into the path of the bolt to lock the latter in its outermost position, said bolt having a projection thereon adjacent the outer end of the casing, a vertically movable block between the casing and the projection to limit the outward movement of the bolt, yieldable means for urging the bolt to its closed position, a rotatable member operatively connected to the bolt for actuating the same, and means operatively connecting the rotatable member to said block whereby upon the actuation of said rotatable member to simultaneously move the bolt axially and the block vertically while maintaining the obstructing member inoperative.

3. A lock of the class described including a casing, a reciprocating bolt mounted within the casing, an obstructing member arranged to be moved into the path of the bolt to lock the latter in its outermost position, said bolt having a projection thereon adjacent the outer end of the casing, a vertically movable block between the casing and the projection to limit the outward movement of the bolt, yieldable means for urging the bolt to its closed position, a rotatable member operatively connected to the bolt for actuating the same, means operatively connecting the rotatable member to said block whereby upon the actuation of said rotatable member to simultaneously move the bolt axially and the block vertically while maintaining the obstructing member inoperative, and means for moving the block to permit the bolt to be moved to its extreme outermost position.

4. A lock of the class described including a casing, an axially movable locking bolt mounted within the casing, the inner end of the bolt coacting with the adjacent wall of the casing to provide a recess, an obstructing member arranged to fit within the recess when the bolt is in its outermost position to prevent inward movement of the same, an electric magnet for moving the obstructing member out of the recess to permit the actuation of the bolt, means for energizing the magnet, means when the magnet is de-energized to render the obstructing member normally inoperative to permit the free operation of the bolt without causing the obstructing member to enter the recess, said means including a revoluble member operatively connected to the bolt to impart axial movement thereto, and a yieldable stop, said revoluble member having a recess arranged when the bolt is in its closed

position to engage said stop to limit the further rotative movement of the bolt.

5. A lock of the class described including a casing, an axially movable locking bolt mounted within the casing, the inner end of the bolt coacting with the adjacent wall of the casing to provide a recess, an obstructing member arranged to fit within the recess when the bolt is in its outermost position to prevent inward movement of the same, an electric magnet for moving the obstructing member out of the recess to permit the actuation of the bolt, means for energizing the magnet, means when the magnet is de-energized to render the obstructing member normally inoperative to permit the free operation of the bolt without causing the obstructing member to enter the recess, said means including a revoluble member operatively connected to the bolt to impart axial movement thereto, a vertically movable block to limit the outward movement of the bolt, and means operatively connecting the revoluble member to the block whereby upon the actuation of the revoluble member to move simultaneously the bolt and block while maintaining the obstructing member inoperative.

6. A lock of the class described including a casing, an axially movable locking bolt mounted within the casing, the inner end of the bolt coacting with the adjacent wall of the casing to provide a recess, an obstructing member arranged to fit within the recess when the bolt is in its outermost position to prevent inward movement of the same, an electric magnet for moving the obstructing member out of the recess to permit the actuation of the bolt, means for energizing the magnet, means when the magnet is de-energized to render the obstructing member normally inoperative to permit the free operation of the bolt without causing the obstructing member to enter the recess, said means including a revoluble member operatively connected to the bolt to impart axial movement thereto, said bolt having a lateral projection, a vertically movable block between the casing and said projection, said block having a cam surface engaging said projection to vary the outward movement of the bolt in accordance with the engagement of the projection with said cam surface, and means operatively connecting the block to the revoluble member whereby upon the actuation of the revoluble member to move simultaneously the bolt and the block while rendering the obstructing member inoperative.

7. A lock of the class described including a casing, an axially movable locking bolt mounted within the casing, the inner end of the bolt coacting with the adjacent wall of the casing to provide a recess, an obstructing member arranged to fit within the recess when the bolt is in its outermost position to prevent inward movement of the same, an electric magnet for moving the obstructing member out of the recess to permit the actuation of the bolt, means for energizing the magnet, means when the magnet is de-energized to render the obstructing member normally inoperative to permit the free operation of the bolt without causing the obstructing member to enter the recess, said means including a revoluble member operatively connected to the bolt to impart axial movement thereto, said bolt having a lateral projection, a vertically movable block between the casing and said projection, said block having a cam surface engaging said projection to vary the outward movement of the bolt in accordance with the engagement of the projection with said cam surface, means operatively connecting the block to the revoluble member whereby upon the actuation of the revoluble member to move simultaneously the bolt and the block while rendering the obstructing member inoperative, and means associated with the revoluble member and coacting with the block for limiting the outward movement of the bolt when the obstructing member is displaced from its recess.

8. A lock of the class described including a casing, an axially movable locking bolt mounted within the casing, the inner end of the bolt coacting with the adjacent wall of the casing to provide a recess, an obstructing member arranged to fit within the recess when the bolt is in its outermost position to prevent inward movement of the same, an electric magnet for moving the obstructing member out of the recess to permit the actuation of the bolt, means for energizing the magnet, means when the magnet is de-energized to render the obstructing member normally inoperative to permit the free operation of the bolt without causing the obstructing member to enter the recess, said means including a revoluble member operatively connected to the bolt to impart axial movement thereto, said bolt having a lateral projection, a vertically movable block between the casing and said projection, said block having a cam surface engaging said projection to vary the outward movement of the bolt in accordance with the engagement of the projection with said cam surface, and means operatively connecting the block to the revoluble member whereby upon the actuation of the revoluble member to move simultaneously the bolt and the block while rendering the obstructing member inoperative, said revoluble member being operable to move the bolt to its outermost position to permit the obstructing member to engage said recess.

9. An electric lock of the class described including a casing having a reciprocating locking bolt mounted therein, said bolt having an axially disposed end portion projecting from the casing to constitute a head, the inner end of the bolt having a cut-away portion forming a shoulder arranged to coact with the adjacent inner wall of the casing to provide a recess having a bottom supporting surface, yieldable means carried by the bolt between the head and the inner end thereof for normally urging the bolt outwardly, a freely movable obstructive member arranged to fit into the recess and be supported by said surface and to engage said shoulder when the bolt is in its outermost position, electro-magnetic means operatively associated with the obstructive member, said obstructive member when the magnetic means is de-energized and the bolt is in its outermost position being disposed within said recess to prevent the inward movement of the bolt, means for energizing the electro-magnetic means to move the obstructive member out of the path of the bolt to permit the free axial movement of the latter, and means when the bolt is in its outermost position and the obstructive member is out of the path thereof, for moving the bolt inwardly against the action of said yieldable means.

10. An electric jimmy-resistant keyless lock of the class described including a casing having a reciprocating locking bolt mounted therein, the inner end of the bolt provided with means coacting with a shelf portion on the adjacent wall of the casing to provide a seat, a freely movable

obstructing member arranged to fall by gravity into said seat to maintain the bolt in its locked position and being in contact with the adjacent wall in its lower position whereby any axial pressure applied to the head of the bolt will be transmitted through the member directly on the wall of the casing so as to render the bolt jimmy-resistant, means for urging said bolt normally outwardly to its closed position, and means for actuating the obstructing member to permit the axial movement of the bolt.

11. An electric jimmy-resistant keyless lock of the class described including a casing having a reciprocating locking bolt mounted therein, means on the inner end of the bolt co-acting with the adjacent wall of the casing to provide a seat, a freely movable obstructive member adapted to engage said seat and be disposed substantially in axial alignment with the inner end of the bolt when the latter is in its outermost position to prevent the inward movement of the bolt, said obstructive member having a plunger, a solenoid for actuating the obstructive member, said plunger being slidable in the solenoid so as to be guided thereby, said obstructive member arranged to maintain the bolt in its locked position and in contact with the adjacent wall of the casing when in its lower position whereby any axial pressure applied to the bolt will be transmitted through the member directly on the wall of the casing so as to render the bolt jimmy-resistant, and means for actuating the obstructing member to permit the axial movement of the bolt.

EDMOND MICHEL.