

J. E. ERICKSON.  
 AUTOMOBILE LOCK AND BURGLAR ALARM.  
 APPLICATION FILED JAN. 9, 1918.

1,324,499.

Patented Dec. 9, 1919.

2 SHEETS—SHEET 1.

Fig. 1

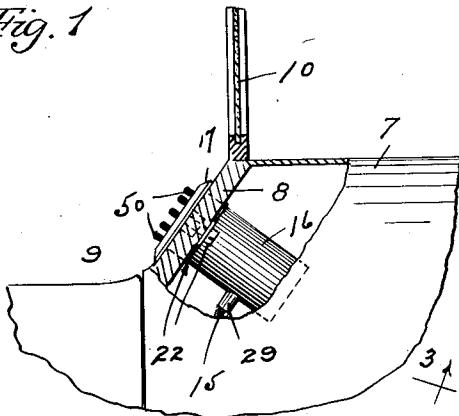


Fig. 2

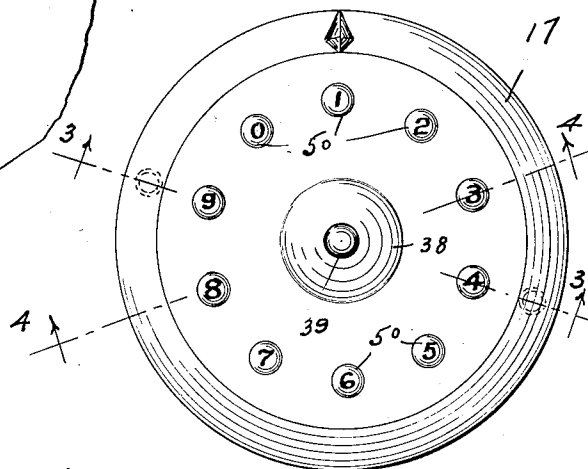
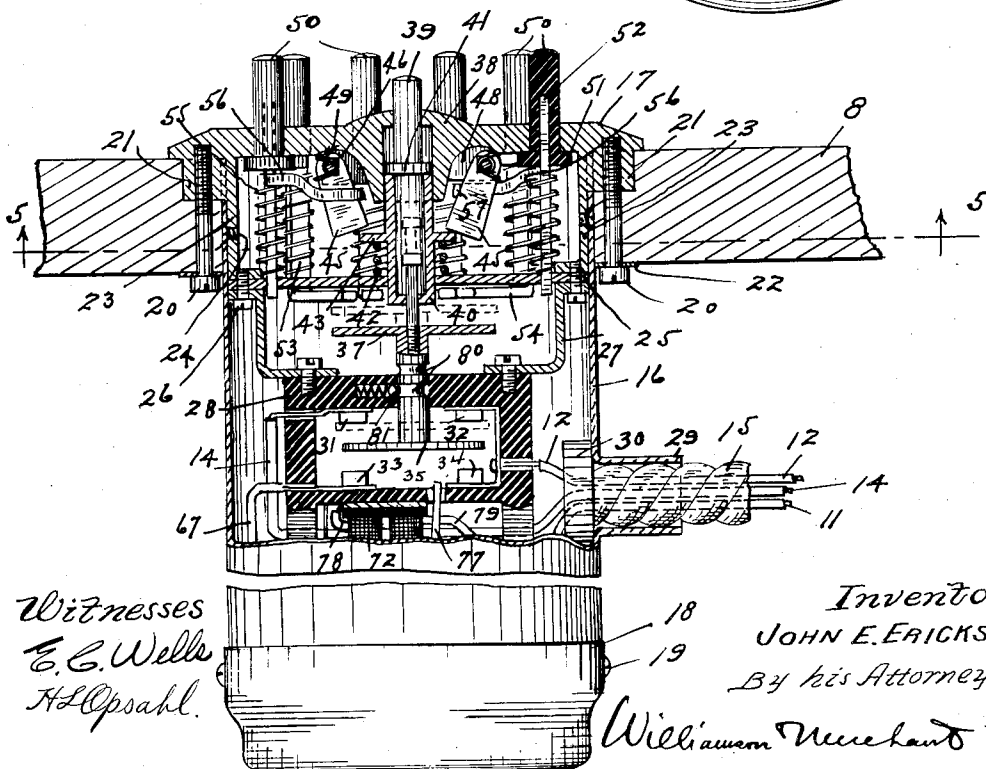


Fig. 3



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2 SHEETS—SHEET 2.

*Fig. 4*

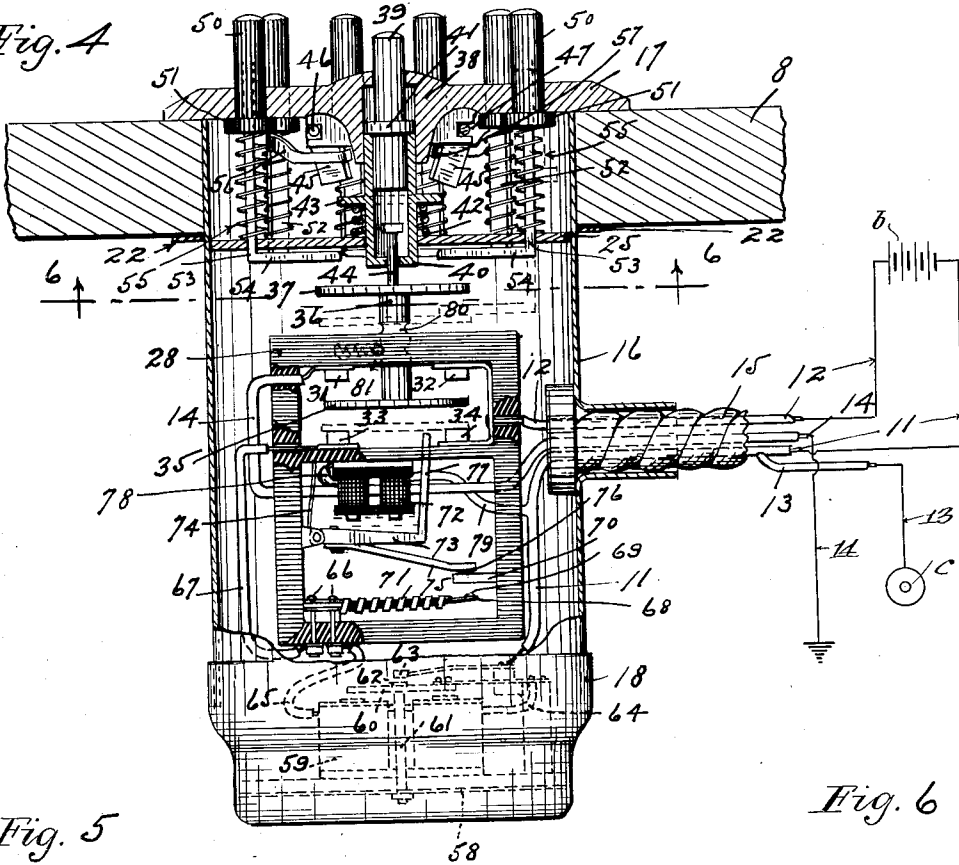
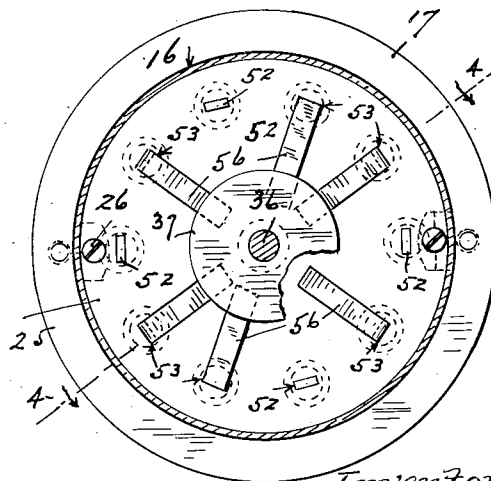


Fig. 6



Williamson Merchants

# UNITED STATES PATENT OFFICE.

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AUTOMOBILE LOCK AND BURGLAR-ALARM.

1,324,499.

Specification of Letters Patent.

Patented Dec. 9, 1919.

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*To all whom it may concern:*

Be it known that I, JOHN E. ERICKSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Automobile Locks and Burglar-Alarms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an automobile lock and burglar alarm; and, to this end, it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings,

Figure 1 is a fragmentary view, partly in side elevation and partly in longitudinal vertical section of an automobile having the invention interposed in its ignition system and mounted on the dash;

Fig. 2 is a face view of the lock removed from the dash;

Fig. 3 is a view principally in section taken on the line 3—3 of Figs. 2 and 5, and also illustrating a portion of the dash;

Fig. 4 is a view corresponding to Fig. 3, but taken on the line 4—4 of Figs. 2 and 6 and also diagrammatically illustrating additional elements;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 3; and

Fig. 6 is a transverse section taken on the line 6—6 of Fig. 4.

The numerals 7, 8, 9 and 10 indicate, respectively, the hood, dash, fore door and wind shield of an automobile having the invention interposed in its ignition system and applied to the dash 8. In respect to the ignition system, wires 11 and 12 of a normally open battery circuit lead from a battery *b*. A branch wire 13 extends from the lead wire 11 to the distributor *c* and a wire 14 is grounded on the engine. To prevent the wires 11 to 14, inclusive, from being cut or otherwise tampered with, the same are placed in a flexible steel conduit 15.

The invention comprises four distinct units, to wit: a switch mechanism, a combination lock, a burglar alarm, and an auto-

matic timed release for the burglar alarm. These four units are contained within a cylindrical casing 16, having its upper end closed by a face or top plate 17 and its lower end closed by a cap 18 that is telescoped thereon and detachably secured thereto by screws 19. The upper end of the casing 16 is mounted in a bore in the dash 8 and the diameter of the face plate 17 is somewhat larger than the diameter of the casing, so as to overlap the dash at a point surrounding said bore.

A pair of screws 20 detachably secure the face plate 17 to the dash 8 by being passed through bores in said dash from the back thereof and having screw-threaded engagement with two diametrically opposite lugs 21, integrally formed with the inner surface of said face plate. The upper end of the casing 16 is notched to receive the lugs 21, and thereby properly positions the face plate 17 on the casing 16. A large washer 22 is interposed between the heads of the screws 20 and the dash 8 and is provided with bores, through which the bodies of said screws project.

Integrally formed with the lugs 21, is a pair of arm extensions 23, which project into the casing 16 and are detachably secured thereto, at diametrically opposite points, by a pair of screws 24. Obviously, these screws 24 detachably connect the casing 16 to the face plate 17, which, in turn, is secured to the dash 8 from the back thereof by the screws 20. The inner ends of the arm extensions 23 are bent laterally toward each other and support a transverse partition plate 25, which is detachably secured thereto by screws 26.

Z-shaped brackets 27, secured to the partition plate 25 by the screws 26, suspend a frame 28, of fiber or other suitable insulating material, within the casing 16 and out of contact therewith. One end of the conduit 15 is extended into the casing 16 through a sleeve 29 attached thereto, and provided with a head 30 of such size as to engage the inner wall of the casing as a stop to prevent said conduit from being separated therefrom.

Referring now to the switch mechanism, there is secured within the frame 28, upper and lower pairs of switch contacts 31—32 and 33—34. The ground wire 14 is connected to the switch contact 31 and the lead

wire 12 is electrically connected to the two contacts 32 and 34. Interposed between the two pairs of contacts 31—32 and 33—34, is a switch 35, in the form of a disk, having an upwardly projecting stem 36 mounted for axial sliding movement in a seat formed in the top member of the frame 28. On the upper end of the stem 36, is an annular flange 37 which extends parallel to the switch 35, the purpose of which will presently appear.

At the axis of the face plate 17, is a hub 38 in the contracted outer end of which is mounted an ignition key 39, the inner end of which is mounted in a tubular switch-actuating plunger 40. This key 39 is provided, at its intermediate portion, with a collar 41, which rests upon the outer end of the plunger 40, and, when said plunger is projected, engages the contracted outer end of the hub 38 as a stop to prevent said key from being withdrawn from its seat. A coiled spring 42, encircling the plunger 40, is compressed between an annular lock flange 43 on said plunger and the partition 26 and is under tension to move said plunger and the key 39 into a projected position.

The switch 35 and the plunger 40 are connected, with freedom for a limited axial movement, with respect to each other, by a headed pin 44, in the form of a screw, having threaded engagement with the stem 36 and slidably working in the contracted inner end of said plunger with its head projecting therein. When the key 39 is pressed inward against the tension of the spring 42, the plunger 40 engages the stem 36 and moves the switch 35 out of a circuit-closing position with the contacts 31—32, as shown by broken lines in Fig. 3, to a neutral or intermediate position, as shown by full lines in Figs. 3 and 4. Upon releasing the key 39, the compressed spring 42 will move said key and plunger 40 into a projected position. During this projecting movement of the key and plunger, the head of the pin 44 is engaged by the contracted inner end of said plunger and moves the switch 35 from an intermediate position into a circuit-closing position with the contacts 31—32.

The lock, previously referred to, is designed to hold the plunger 40 in a retracted position against the action of the spring 42 to project said plunger and thereby move the switch 35 from a neutral position into a circuit-closing position with the contacts 31—32. As shown, this lock comprises four lock pawls 45 pivoted on a split ring 46, with freedom for radial swinging movement, with respect to the plunger 40. This split ring 46 is mounted in an annular channel 47 formed in the inner end of the hub 38 and transversely intersecting this channel is a multiplicity of, as shown ten, radi-

ally extended seats 48, in any four of which the lock pawls 45 may be interchangeably seated. Springs 49, acting upon the pawls 45, tend to swing the same toward the plunger 40 and in the path of movement of the lock flange 43.

It is highly important to note that the lock pawls 45 are of varying lengths, so that when the plunger 40 is in its extreme retracted position only the longest thereof engages the lock flange 43. To release the locked plunger 40 so that the spring 42 may move the switch 35 from an intermediate position into a circuit-closing position with the contacts 31—32, it is, of course, necessary to know the combination, in order that the lock pawls 45 may be successively released, in respect to their lengths. Steps of movement are imparted to the plunger 40 by the spring 42 as said plunger is first released by the movement of the engaging lock pawl into an inoperative position and then intercepted by the next longest lock pawl.

These steps of movement of the plunger 40 do not, in any way, effect the switch 35, for the reason that said plunger has a limited axial movement on the pin 44. When the last or shortest lock pawl 45 has been moved out of engagement with the lock flange 43, the spring 42 imparts the final projecting movement to the plunger 40. During this movement, the plunger 40 engages the head of the pin 44 and moves the switch 35 from an intermediate position to a circuit-closing position with the contacts 31—32.

Circumferentially spaced around the ignition key 39, is a multiplicity of, as shown ten, intermingled main and auxiliary keys 50, numbered 0 to 9, inclusive, and interchangeably mounted for axial sliding movement in seats or bores formed in the face plate 17 on the same radial lines with the seats 48. Collars 51, on the inner ends of the keys 50, engage the inner surface of the face plate 17, when said keys are pulled out, to prevent their being completely withdrawn from the seats therefor. Secured to the inner end of each main key 50, which are positioned opposite the lock pawls 45, are flat bars 52 and secured to the other or auxiliary keys are flat bars 53. The inner ends of these bars 52 and 53 are mounted in seats formed in the partition plate 25, and the extreme inner ends of the bars 53 are bent laterally inward to form radially projecting fingers 54, the free ends of which overlie the flange 37. Coiled springs 55, encircling the bars 52 and 53, are compressed between the partition plate 25 and the inner ends of the keys 50 and normally hold said keys projected.

The bars 52 and 53 are detachably and interchangeably secured to the keys 50 by

mounting their outer ends in seats formed in the inner ends of said keys. Rigidly secured to each bar 52, is a laterally projecting arm 56, having at its free end a cam finger 57 arranged to engage the inner edges of the lock pawls 45, which are normally held in oblique position by the springs 49. An inward movement of the main keys 50 will cause the cam fingers 57 to move over the inner oblique edges of the lock pawls 45 and cam the same out of the path of movement of the lock flange 43. If the main key, which operates the longest lock pawl 45, is depressed against the tension of its spring 55, the spring 42 will impart a step of movement to the plunger 40 and, when said key is released, will be projected by the compressed spring 55, but said lock pawl 45 will be held in an inoperative position by the lock flange 43, for the reason that during this step of movement of the plunger 40, said lock flange has been moved past the free end of said lock pawl, while held in an inoperative position by its key. If another of said main keys is depressed, the respective lock pawl will be moved into an inoperative position, but, as soon as released, will immediately be returned to an operative position by its spring 49, for the reason that said lock pawl is of such length as to be out of engagement with the lock flange 43 and will swing clear thereof.

The combination for releasing the lock pawls, as shown in the drawings, is 4—7—2—9. It will thus be seen that to release the ignition key, in order to start the engine, a person must know the combination and the keys numbered 4—7—2—9 must be depressed in succession.

The alarm shown is of well known construction and briefly comprises a diaphragm 58, magnets 59, a vibrating armature 60, arranged for operation upon an adjustable rod 61 carried by the diaphragm, and contacts 62 and 63 carried, the former by the armature 60 and the latter by the alarm-supporting frame. The alarm is diagrammatically shown by means of broken lines and is carried by the cap 18, so that it may be readily applied to or removed from the casing 16. The lead wire 11 from the battery is electrically connected to the contact 63 and the magnets are also connected, one with the other, and one thereof is connected to the frame by a short wire 64, while the other thereof is connected by a wire 65 to one of two binding posts 66 on the frame 28. The other of said binding posts 66 is electrically connected to the contact 33 by a wire 67. The two binding posts 66 are also electrically connected, as will presently appear.

In case any one of the auxiliary keys 50 is depressed, the finger 54 thereof will engage the flange 37, and thereby move the switch 35 from an intermediate position into

a circuit-closing position with the contacts 33—34, thus completing the alarm or auxiliary circuit. With the switch 35 in engagement with the contacts 33—34, the alarm will be continuously sounded, until released by a person knowing the combination of the lock, or automatically released, after a predetermined interval of time, by the automatic alarm release, previously referred to.

The automatic alarm release comprises a thermally-actuated member 68 secured to the frame 28 by the binding screws 66 and electrically connects the same. This member 68 has, at its free end, a contact 69 normally out of engagement with a fixed contact 70 on the frame 28. The member 68 is made of two metals of such properties that one thereof will expand faster than the other thereof, and thereby bend and twist the member 68, when subjected to heat, and carry its contact 69 into electrical engagement with the contact 70. As a means for heating the members 68, I provide a heating element 71 wound thereon and electrically connected to the binding screws 66, which, as previously stated, are in the alarm or auxiliary circuit. Coöperating with the member 68, are magnets 72, electrically connected and secured to the frame 28 below the switch 35, and an armature 73 pivoted to the frame 28. A spring 74 normally holds the armature 73 out of engagement with the coils 72 and secured to said armature is a flat spring 75, having a contact 76 resting upon the contact 70.

On the free end of the armature 73, is a long upwardly projecting finger 77, that is just out of engagement with the switch 35, when in engagement with the contacts 33—34. One of the magnets 72 is electrically connected to the armature 73 by a wire 78 and the other thereof is electrically connected with the battery lead wire 11 by a branch wire 79. Normally, the circuit through the wire 79, magnet 72, wire 78, armature 73, spring 75 and contacts 76 and 70 is broken, but as soon as the member 68 is heated sufficiently to carry its contact 69 into engagement with the contact 70, the circuit is complete through the magnets 72 and, when energized, will lift the armature 73, and thereby carry the finger 77 into a position to lift the switch 35 from the contacts 33—34, and thereby break the alarm or auxiliary circuit. With the alarm circuit broken, the member 68 will cool, and return to normal position with its contact out of engagement with the contact 70. By varying the distance between the contacts 69 and 70, the length of time the alarm will sound may be varied, at will. If desired, a screw may be provided for adjusting the contact 69, with respect to the contact 70.

To yieldingly hold the switch 35, either

in an intermediate position or in engagement with the contacts 33—34, there is formed in the stem 36 two annular grooves 80 arranged to be engaged by a spring-pressed friction ball 81 mounted in the frame 28.

From the above description, it is evident that by interchanging the lock pawls 45, the combination of the lock may be varied, at will, and by shifting said pawls in the seats 48, their positions may be varied, at will, with respect to each other and with respect to the auxiliary keys 50. In case some one, unfamiliar with the combination, should depress one of the auxiliary keys 50, the finger 54 thereof will engage the flange 37, as previously described, and move the switch into engagement with the contacts 33—34 and complete the auxiliary circuit, thereby causing the alarm to be sounded, until the circuit is again broken by the thermally-actuated device.

With the above described invention incorporated in an electric circuit in connection with a normally open switch therefor, and more particularly in the ignition system of an internal combustion engine for propelling a vehicle, it is impossible to stop the motor without locking the switch when moved from a circuit-closing position to an open position, thereby making it necessary to know the lock combination before the motor can again be started. It will thus be seen that each time the motor is stopped, the vehicle is automatically locked.

What I claim is:—

1. A normally open circuit-closing switch, yielding means tending to hold said switch in a closed position, progressively releasable stop elements normally intercepting the closing movement of said switch, a multiplicity of combination keys which when operated in a predetermined order permit said switch to move step by step to a circuit-closing position, contacts adapted to be engaged by movement of said switch from the normal open position in a direction reverse to its first noted circuit-closing position, and a multiplicity of other keys intermingled with the first noted keys and operative on said switch to move the same into a position to engage said contacts.

2. Main contacts and auxiliary contacts, a movable switch member normally held in an intermediate position but movable in one direction to engage said main contacts and in another direction to engage said auxiliary contacts, a switch-actuating plunger under tension to move in a direction to cause said movable switch member to engage said main contacts, said movable switch member having normally such play in respect to said plunger as to permit it to be moved to engage said auxiliary contacts, a plurality of stop pawls normally in position to suc-

sively intercept the switch-closing movement of said plunger, a multiplicity of main keys which when operated in a predetermined order release said pawls from said plunger in their respective order, thereby permitting a step by step movement of said plunger required to move said movable switch member into position to engage said main contacts, and a multiplicity of auxiliary keys intermingled with said main keys and operative on said movable switch member to move the same into position to engage said auxiliary contacts.

3. Main contacts and auxiliary contacts, a movable switch member normally held in an intermediate position but movable in one direction to engage said main contacts and in another direction to engage said auxiliary contacts, a switch-actuating plunger under tension to move in a direction to cause said movable switch member to engage said main contacts, said movable switch member having normally such play in respect to said plunger as to permit it to be moved to engage said auxiliary contacts, a plurality of stop pawls of varying lengths normally in position to successively intercept the switch-closing movement of said plunger, a multiplicity of main keys which when operated in a predetermined order release said pawls from said plunger in the order of their respective lengths, thereby permitting a step by step movement of said plunger required to move said movable switch member into position to engage said main contacts, and a multiplicity of auxiliary keys intermingled with said main keys and operative on said movable switch member to move the same into position to engage said auxiliary contacts.

4. A normally open circuit-closing switch, yielding means tending to hold said switch in a closed position, interchangeable lock pawls of varying lengths normally and successively intercepting the closing movement of said switch, a multiplicity of keys for actuating said lock pawls and when operated in a predetermined order permit said switch to move step by step to a circuit-closing position, contacts adapted to be engaged by movement of said switch from the normal open position in a direction reverse to its first noted circuit-closing position, and a multiplicity of other keys intermingled and interchangeable with the first noted keys and operative on said switch to move the same into a position to engage said contacts.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN E. ERICKSON.

Witnesses:

CLARA DEMAREST,  
HARRY D. KILGORE.