Dec. 7, 1926. **1,609,646**

S. F. FOCHT

APPARATUS FOR CONTROLLING CIRCUITS

Filed August 28, 1924 2 Sheets-Sheet 1

FIG. 1.

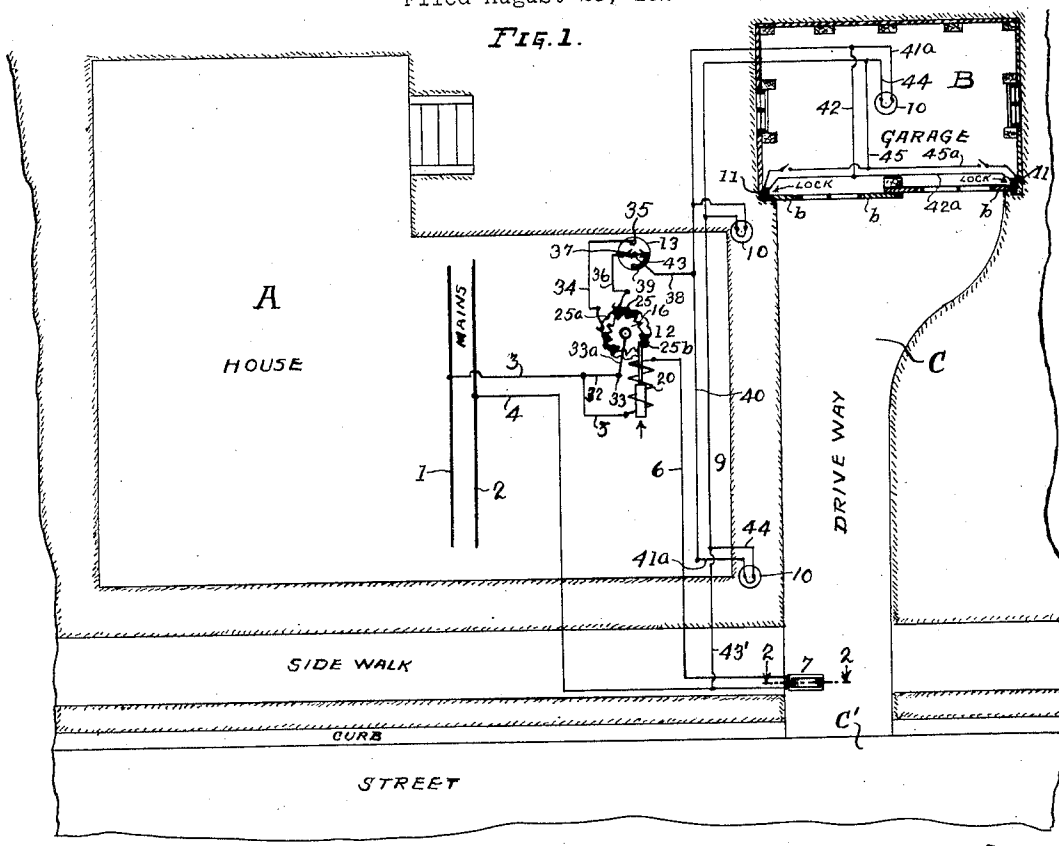


FIG. 2.

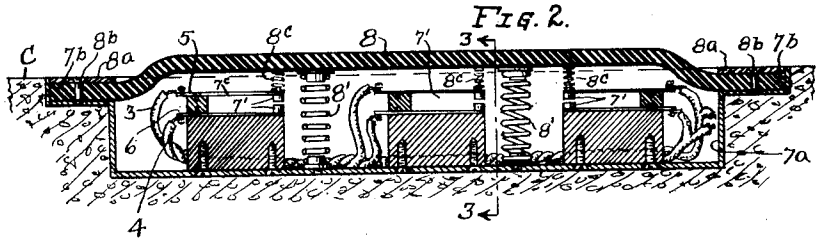


FIG. 3.

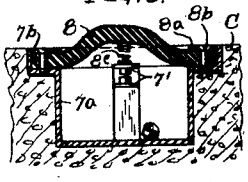
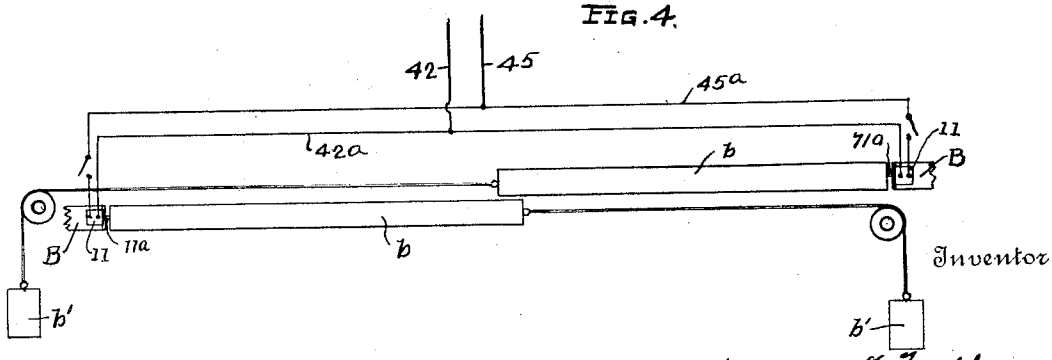


FIG. 4.



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Fig. 5.

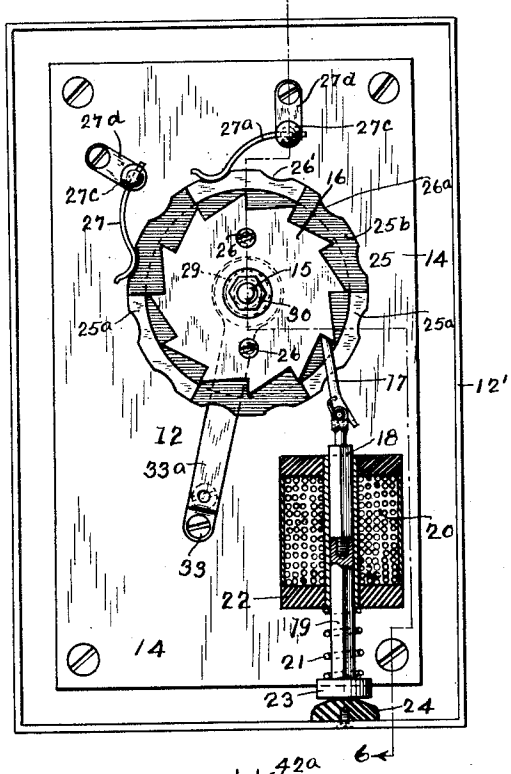


Fig. 6

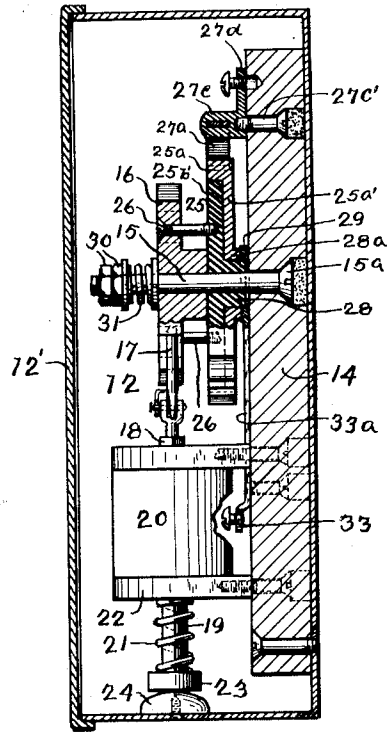


Fig. 7

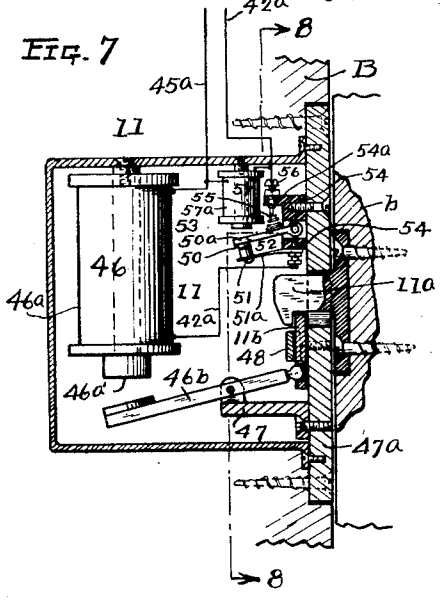
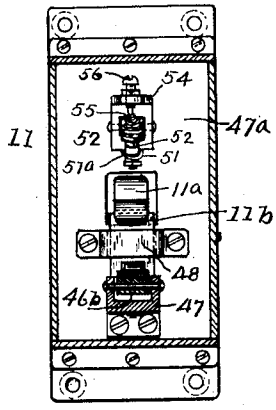


Fig. 8.



Inventor

Stephen F. Focht

By Jos. Pitts

Attorney

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UNITED STATES PATENT OFFICE.

STEPHEN F. FOCHT, OF CLEVELAND, OHIO.

APPARATUS FOR CONTROLLING CIRCUITS.

Application filed August 28, 1924. Serial No. 734,675.

This invention relates to apparatus for controlling an electric circuit or circuits adapted to throw on and off one or more lights and also actuate a locking mechanism, if desired.

The object of the invention is to provide an improved apparatus of this character of relatively simple construction and capable of ready installation.

Other objects of the invention will be apparent to those skilled in the art to which my invention relates from the following description taken in connection with the accompanying drawings, wherein—

Fig. 1 is a diagrammatic view of apparatus and electric circuits embodying my invention shown applied for use in connection with a dwelling and a garage and drive-way therefor, the latter being shown in plan.

Fig. 2 is a section, enlarged, on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary view showing diagrammatically the garage doors and the locking mechanisms and circuits therefor.

Fig. 5 is plan view, partly in section, of the switch mechanism.

Fig. 6 is a section on the line 6—6 of Fig. 5.

Fig. 7 is a sectional view of one of the locking mechanisms.

Fig. 8 is a section on the line 8—8 of Fig. 7.

I have shown my invention for use in connection with a dwelling, indicated at A, having a garage B and a drive-way C leading therefrom, the purpose being to first light the garage B and also the driveway C, if desired, and to release or unlock the garage door or doors, then to put out the several lights automatically when the vehicle is driven out, then to light the several lights automatically when the vehicle re-enters the driveway and finally to put the lights out and lock the door or doors.

1, 2, indicate the current supply mains leading into the house A and serving as the source of current supply. 3, 4, indicate leads connected to the mains 1, 2, respectively, and the terminals 5, 6, of a switch 7. The switch 7 is disposed in the drive-way 3 in the path of the wheels of the vehicle to be stored in the garage B so as to be operated by the wheels as they pass thereover to close the circuit through the leads 3, 4, as will be later set forth. The switch 7 may be mounted in a casing 7^a, which may be counter-sunk in the drive-way C at any suitable point, preferably near the end that merges into the street C'. To insure operation of the switch 7, I prefer to provide the elongated casing 7^a and to dispose it transversely of the drive-way, and to mount in the casing a plurality of switches 7 having their respective terminals connected in parallel. By this arrangement danger of the wheels missing and failing to operate the switch is avoided. The casing 7^a may be closed at its upper or open end by a flexible member 8, fitting along its side and end edges into lateral chambers 7^b and secured therein by strips 8^a and screws 8^b; the construction being preferably of a character to make the casing water-tight. 8' indicates a plurality of compression springs interposed between the bottom of the casing 7^a and flexible member 8 and serving normally to hold the latter elevated out of engagement with the switch elements 7'. The switch elements are normally separated to maintain the circuit open, the upper elements being mounted on a resilient arm 7^c. 8^c indicates a coiled spring disposed on the upper switch element to form a cushion to avoid undue strains on the switch contacts when the vehicle wheels pass thereover.

9 indicates a supplemental circuit in which is connected the lamp or lamps 10 to be lighted and one or more door locking and releasing mechanisms 11 to be controlled, a switching mechanism 12 and a switch 13, preferably of the three-way type.

The lamps 10 are placed at various positions, two being shown along the drive-way C and one in the garage B, but a greater or lesser number may be employed. The garage B is shown as capable of storing two vehicles for which reason I prefer to provide two doors b, b, particularly as either one may be slid into overlapping relation with respect to the other to effect the opening thereof. Each door is preferably connected with a weight b', which tends to move the door to its open position. Each door b' is provided with a locking element 11^a which engages and disengages a latch 11^b operated by the lock and releasing mechanism 11 as will be later set forth.

Of the switch mechanism 12, 14 indicates a base mounted at some convenient place

preferably within the house A. 15 indicates a shaft projecting from the base 14 and preferably comprising a screw the head 15^a of which is counter-sunk in the under face of the base 14 (see Fig. 6). 16 indicates a ratchet which is loosely mounted on the shaft 15 and engaged by a pawl 17, the latter being pivoted on the outer end of a thrust member 18 which is connected at its inner end to the outer end of a core 19 mounted within a solenoid winding 20 so that when the winding is energized the core will be moved and it in turn, operating through the thrust member 18, will effect the movement of the pawl and ratchet wheel, thereby rotating the latter one step. The core 19 and thrust member 18 are preferably of polygonal shape in cross section and slidably fit a correspondingly shaped sleeve within the winding 20 so that they will not rotate therein and move the pawl 17 out of its operative relation to the teeth of the wheel 16. 21 indicates a spring preferably coiled around the core and interposed between the outer end of the winding 20 or an end plate 22 thereon and a head or cap 23 mounted on the outer end of the core 19, the purpose of the spring 21 being to move the core 19 outwardly, when the winding is de-energized, to retract the pawl 17 into position for its next operation. 24 indicates a cushion serving as a stop for the core 19 when moving outwardly. The switch mechanism 12 is mounted in a casing 12′ and the stop 24 is preferably mounted on one end wall thereof. The solenoid winding 20 is interposed in the lead 3, so that each time the switch 7 is operated the ratchet wheel is moved the distance of one tooth. Since both the front and rear wheels of the vehicle pass over the switch 7 it is closed twice each time a vehicle passes in and out of the drive-way C and the ratchet wheel is thus operated twice or the distance of one tooth two times. 25 indicates a switch element loosely mounted on the shaft 15, but rigidly connected to the ratchet wheel 16 by a plurality of screws 26 so as to be rotated thereby. The periphery of the switch element 25 is formed with notches 26′, corresponding in number to the number of teeth on the wheel 16. 27, 27^a, indicate spring fingers or brushes arranged to ride on the periphery of the switch element 25 and seat in the notches 26′ formed therein. The fingers or brushes 27, 27^a, are each supported by a standard 27^c fixed to the base 14 by a screw $27^{c'}$ and provided with a terminal 27^d to which reference will later be made. The switch element 25 comprises a plurality of sections of conducting material 25^a and insulating material 25^b alternately arranged so that a circuit may be closed alternately through the fingers 27, 27^a. Due to the fact that the circuit through the leads 3, 4, is closed twice and the ratchet wheel 16 is moved a corresponding number of times each time the vehicle goes out or enters the drive-way C, each section 25^a, 25^b, is wide enough to provide for two notches 26′ and the ends of fingers 27, 27^a, are spaced to seat in corresponding notches of two sections 25^a, 25^b, so that at any position of the switch element 25 both fingers cannot simultaneously engage one conducting section 25^a or two thereof or an insulating section 25^b or two of said sections. In constructing the switch element 25, I provide its body portion with a plate of insulating material $25^{b'}$ having a hub 28 and a plate of suitable conducting material $25^{a'}$ that is connected to the conducting sections 25^a to permit the circuit to be completed therefrom to a collar 28^a which in turn bears against a ring 29 preferably interposed between the switch element 25 and base 14. The hub 28 may extend through the collar 28^a and partially into the ring 29 and thus serve to insulate both from the shaft 15. 30 indicates nuts engaging the outer end of the shaft 15 and serving to hold the switch element 25 and ratchet wheel 16 on the shaft. I prefer to interpose between the nuts 30 and the wheel 16″ a comression spring 31, the function of which is to yieldingly hold the collar 28^a in engagement with the ring 29, and thus to insure electrical contact therewith.

The supplemental circuits for the switch mechanism 12, three-way switch 13, lamps 10 and locking and release mechanisms may now be described, as follows: 32 indicates a lead connected at one end to the lead 3 between its connection with the main 1 and the solenoid winding 20 and at its opposite end to a terminal 33, which in turn is electrically connected by a strip 33^a with the ring 29. 34 indicates a lead extending from the terminal 27^d for the finger 27 to the switch contact 35 of the three-way switch 13. 36 indicates a lead extending from the terminal 27^d for the finger 27^a to the switch contact 37 of the three-way switch 13. 38 is a lead extending from the other contact 39 of the three-way switch 13 to a wire 40 which is connected to each of the lamps 10 by wires 41, 41^a, and to each of the locking and release mechanisms 11 by a branch wire 42, 42^a. 13 indicates a switch device for connecting the contact 39 with either of the contacts 37, 35, such device being preferably mounted to rotate so that it may be oscillated from either position to the other. The other side of the circuit for the lamps 10 and locking and release mechanism 11 comprise a wire 43′ connected to the lead 4 and branch wires 44 to each of the lamps 10 and branch wires 45, 45^a, to the locking and releasing mechanisms 11.

According to the position of the elements

as shown in Fig. 1, the lamps 10 are out and the garage doors *b* are locked, since the switch device 13 is positioned across the contacts 39, 37, and the latter is connected to the finger (27^a) that is engaging an insulating section 25^b on the switch element 25. If now it is desired to drive a vehicle (not shown) out of the garage B the switch device 13 is rotated to connect the contacts 39, 35, which completes the supplemental circuit 9 through the finger 27, section 25^a to the lead 3 and the wire 38, 40, 43 to the lead 4; hence, the lamps 11 will be lighted, the locking and release mechanisms 11 released and the door *b* will slide open under the influence of the weights *b'*. As the front and rear wheels at one side of the vehicle pass over the switch 7, the circuit through the leads 3, 4, will be closed twice and energize the solenoid winding 20 each time. As a result of this operation, the ratchet wheel 16 will be operated the distance of two teeth, thereby moving the switch element to bring that insulating section 25^b that was below the finger 27^a to the position below the finger 27, thereby breaking the circuit (putting out the lamps 10) and positioning the next conducting section 25^a below the finger 27^a. When the vehicle returns it first passes over the switch 7, operating it twice again, thereby operating the ratchet wheel 16 as before and moving the conducting section 25^a that is below the finger 27^a to the position below the finger 27, which completes the circuit 9 and lights the lamps 10. Upon driving the vehicle into the garage B, closing the doors *b*, and entering the house A, the switch device 13 is operated to open the circuit 9 and thus put out the lights.

From the foregoing description, it will be seen that when the circuit 9 is closed, the locking and release mechanisms 11 are released to permit opening of the doors *b*; hence when the vehicle enters the driveway C and automatically closes the circuit 9 provision must be made for locking the doors when the circuit to the lamps is closed or holding them in closed position until the circuit 9 is opened, it being desirable to have the doors move to open position by the action of a weight or equivalent means upon the closing of the circuit 9 by operation of the three-way switch 13. For this reason I have provided a novel construction of locking and release mechanism 11 which will now be described, only one of such mechanisms being referred to since both are similar in construction. Of this mechanism, 46 indicates a main electro-magnet having the ends of its winding 46^a connected to the wires 45^a, 42^a, and its armature 46^b fulcrumed on a support 47, mounted on a base 47^a. One end of the armature 46^b is arranged to be acted upon by the winding 46^a, or its core $46^{a'}$, when the winding is energized by the closing of the circuit 9; the other end of the armature 46^b is operatively connected to the latch 11^b and operates to slide it out of engagement with the keeper 11^a when the armature is operated by the winding 46^a. The latch 11^b is guided in its movements to engage and disengage the keeper 11^a by a strap 48, suitably secured to the base 47^a. The outer end of the armature is arranged to slightly overbalance the weight of the latch 11^b so that it may normally hold the latch in locking position; the latch and electro-magnet 46 being arranged so that the armature may rock on a horizontal fulcrum. 50, 51, indicate the contacts of a switch 52 interposed in the wire 42^a and serving to open and close the circuit therethrough, in the manner later to be set forth. The contact 50 is carried by an arm 50^a that is pivotally mounted on a block 54 of insulating material, to insulate it from the contact 51 carried by an arm 51^a also preferably supported by the block 54. The arm 50^a is preferably connected through a compression spring 55 and a terminal 56 to that section of the wire 42^a connected to the wire 42. As shown, the terminal 56 is carried by a lug extending laterally from the block 54, so that such lug may form an abutment 54^a for the spring 55, whereby the latter may swing the arm 50^a about its pivot and normally hold the contacts 50, 51, in engagement to complete the circuit through the winding 46^a. The arm 50 forms an armature for a supplemental electro-magnet 57, the winding 57^a of which is connected to the wires 42^a, 45^a, between their connections with the winding 46^a and terminal 56 and the wires 42, 45. In operation, upon the closing of the circuit 9 in the manner already described, the current will flow through both windings 46^a, 57^a, and effect an operation of the armatures 46^b, 50^a, respectively, but due to the interpositioning of the spring 55 between the abutment 54^a and the armature 50^a the movement of the latter will be retarded relative to the movement of the armature 46^b. As a result, the electro-magnet 46 will first operate to release the latch 11^b from the keeper 11^a, following which the electro-magnet 57 will break the circuit through the contacts 50, 51, thus allowing the latch 11^b to return to its keeper engaging or locking position. Accordingly, if the door *b* is closed, the latch 11^b will ride the free edge of the keeper 11^a (such edge being inclined for this purpose) and finally seat itself below the projecting element of the keeper. It will therefore be seen that when the vehicle enters the garage, notwithstanding the fact that the lamps 10 are lighted by the operation of the switch 7, the latch 11^b is free to engage the keeper and hence the doors *b* may be closed and locked, and when the switch 13 is operated to open the circuit 9, as above set forth, it will de-

energize the winding 57ª of the supplemental electro-magnet 57 and thus permit closing of the switch 52.

To those skilled in the art to which my invention relates many changes in construction and widely differing embodiments and applications of my invention will suggest themselves without departing from the spirit and scope thereof. My disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In apparatus of the class described, the combination of a main circuit, a switch therefor, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch element having alternate non-conducting and conducting sections, the latter being connected to said supplemental circuit, a pair of fingers each arranged to be connected to said supplemental circuit and positioned to engage a non-conducting section and a conducting section, means controlled by the closing of said main circuit to move said switch element to reverse the engagement of said fingers with said sections, and a switch device in said supplemental circuit for closing the circuit through one of said fingers at will.

2. In apparatus of the class described, the combination of a main circuit, a switch therefor, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch element having alternate non-conducting and conducting sections, the latter being connected to said supplemental circuit, a pair of fingers connected to said supplemental circuit positioned to engage a non-conducting section and a conducting section, means, including a pawl and ratchet mechanism, controlled by the closing of said main circuit to move said switch element to reverse the engagement of said fingers and said sections, and a switch device in said supplemental circuit for closing the circuit through one of said fingers at will.

3. In apparatus of the class described, the combination of a main circuit, a switch therefor, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a pair of switching means, a pair of leads between the respective contacts of said switching means to permit closing of the supplemental circuit through one of said leads when either of said switching means is operated, and means controlled by the closing of said main circuit to move one of said switching means.

4. In apparatus of the class described, the combination with a drive-way for a vehicle, of a main circuit having a switch disposed in said drive-way for the wheels of the vehicle to pass over, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch mechanism in said supplemental circuit, a solenoid having its winding connected in said main circuit, whereby it is energized each time the main circuit is closed, and means actuated by said solenoid to operate said switch mechanism to open and close said supplemental circuit.

5. In apparatus of the class described, the combination with a drive-way for a vehicle, of a main circuit having a switch disposed in said drive-way for the wheels of the vehicle to pass over, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch mechanism in said supplemental circuit, a solenoid having its winding connected in said main circuit whereby it is energized each time the main circuit is closed, and step by step means actuated by said solenoid to operate said switch mechanism to open and close said supplemental circuit.

6. In apparatus of the class described, the combination with a drive-way for a vehicle, of a main circuit having a switch disposed in said drive-way for the wheels of the vehicle to pass over, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch mechanism in said supplemental circuit, a solenoid having its winding connected in said main circuit whereby it is energized each time the main circuit is closed, and a pawl and ratchet wheel actuated by said solenoid and connected with said switch mechanism to open and close said supplemental circuit.

7. In apparatus of the class described, the combination with a drive-way for a vehicle, of a main circuit having a switch disposed in said drive-way for the wheels of the vehicle to pass over, a supplemental circuit, a device in said supplemental circuit arranged to be operated when said circuit is closed, a switch mechanism in said supplemental circuit, a solenoid having its winding connected in said main circuit whereby it is energized each time the main circuit is closed, means actuated by said solenoid to operate said switch mechanism to open and close said supplemental circuit, and a separate switch in said supplemental circuit for opening or closing the circuit.

8. In apparatus of the class described, the combination of a main circuit, a switch therefor, a supplemental circuit, a switch mechanism for closing said supplemental circuit, means controlled by the closing of said main circuit to operate said switch mechanism, a switch device in said supplemental circuit for closing the circuit at will, and a locking and release mechanism in said

supplemental circuit arranged to be operated when the circuit is closed, said mechanism comprising an electromagnet and means for breaking the circuit through said electro-magnet following the energizing of its winding.

9. In apparatus of the class described, the combination of a main circuit, a switch therefor, a solenoid interposed in said main circuit, a supplemental circuit, a pair of switching means in said supplemental circuit arranged to close the circuit when either is operated, a locking element, a pair of electro-magnets operated by the closing of said supplemental circuit, the armature of one thereof being connected to said locking element, and means between said electro-magnets for breaking the circuit through the magnet that operates said element.

In testimony whereof, I have hereunto subscribed my name.

STEPHEN F. FOCHT.