

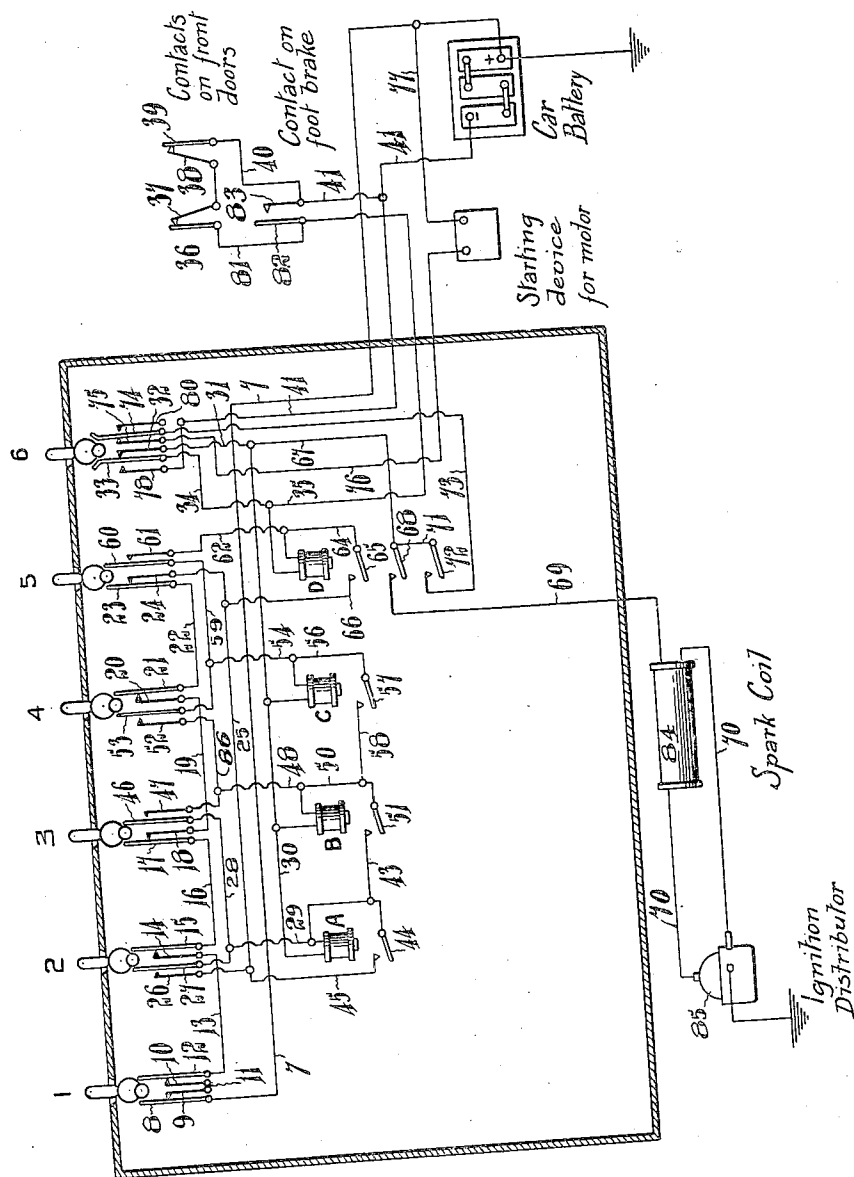
Sept. 25, 1934.

H. L. BLACK

1,974,944

25, 1934. H. L. BLACK
LOCKING SYSTEM FOR AUTOMOBILE IGNITION AND STARTING SYSTEMS

Filed Feb. 27, 1933



INVENTOR
H. L. Black
BY J. Edw. Maybee
ATTY

UNITED STATES PATENT OFFICE

1,974,944

LOCKING SYSTEM FOR AUTOMOBILE
IGNITION AND STARTING SYSTEMS

Harry L. Black, Toronto, Ontario, Canada

Application February 27, 1933, Serial No. 653,816

5 Claims. (Cl. 175—320)

This invention relates to systems for automatically locking the ignition and starter circuits of an automobile by the operation of a door or other part when the driver or a passenger leaves the vehicle, and my object is to devise a system of this type which will be substantially all electrical in its nature save for certain mechanical switches, in which means are provided whereby the driver may at will prevent the automatic locking of said circuits, in which means are provided whereby the closing of the said circuit or circuits is effected by operating a plurality of switches in a predetermined order and in predetermined directions, in which, when the switch combination is set, the system may be conditioned so that the door may be opened and closed without upsetting the control combination, and which may be conditioned to open the starter circuit, while the ignition circuit remains closed when it is necessary to start the car by hand.

I attain my object by providing a control system adapted to open and close the ignition circuit, and preferably also the starter circuit as is in accordance with modern practice.

This control system includes a plurality of relay-operated switches which are adapted to be progressively closed by the operation of a plurality of manually operable switches or keys in a predetermined order and direction. When the operation is completed all the relays are energized and the ignition circuit closed.

The control system, however, includes a switch which is opened when a given car door is opened and, when the control system is thus de-energized, the relays are de-energized and the ignition circuit remains open until the switch combination is reset.

Included in the control system is a switch which may be closed by the driver to by-pass the door operated switch and thus hold the control system energized as long as he desires, thus enabling a passenger to open the door and leave the car without opening the control system and de-energizing the last relay.

The control system also includes a manually operable switch movable to either of three positions.

When this control switch is in either of two positions, the control system after closing remains closed even though the door switch be open, but in one of said positions the ignition circuit is broken and in the other the starter circuit. In an intermediate position the circuits are under the control of the door switch.

The invention is hereinafter more specifically

described and is illustrated in the accompanying diagram which shows the parts in the position they assume when all the circuits are open.

Referring to the drawing the car battery is grounded as usual, and also the distributor 85, which is included as usual in the circuit 70 of the spark coil 84. The spark coil is connected with the negative terminal of the battery by the conductor 69, switch 68, conductors 67 and 31, contacts 32 and 33, conductors 34, 35, 81, contacts 36 and 37, contacts 38 and 39, and conductors 40 and 41.

The contacts 36, 37 and 38, 39 are included in door switches so that, when either door is opened, the ignition circuit is broken.

The starting device (which may be of any known type) is connected with the positive side of the car battery by the conductor 77 and with the negative side by the conductor 76, contacts 75, 74, conductor 73, switch 72, conductors 71, 67 to a junction with the conductor 31 of the spark coil or ignition circuit.

The starter circuit is thus also broken when the ignition circuit is opened by the door switches. It is also evident that both the ignition circuit and the starter circuit may be opened by separating the contacts 32, 33 and that the starter circuit only is broken by separating the contacts 74, 75.

The control system includes a series of relays A, B, C, D adapted to actuate the switches 44, 51, 57 and 65.

The last relay in the series actuates also the switches 68 and 72 hereinbefore referred to. If the relay D be energized, then the ignition circuit and starter circuit will be closed unless opened at other contacts as hereinbefore referred to.

The energizing of the relay D is dependent on the progressive energizing of the relays A, B and C.

The energizing of the relays is effected by manual control switches 2, 3, 4 and 5 and the arrangement is such that, when these switches are momentarily closed in the proper order, the relays A, B, C, D are progressively energized and remain energized until either of the door switches is opened or the control system otherwise broken as hereinafter described.

As it is sometimes desired to take the control away from the door switches when the driver remains in the car, I provide the contacts 82, 83, which, when closed, serve to by-pass the door switches. Preferably these contacts will be asso-

ciated with the foot brake so that they are closed when the foot brake is on.

In addition to the switches 2, 3, 4 and 5 I show an extra switch 1, which is normally closed, but which, when opened, breaks the relay circuits and adds to the difficulty of setting the combination by trial and error.

The relays are progressively energized as follows: The keys or switches 1 to 5 are of the well known two-way non-locking type provided with spring contacts while the switch 6 is of the three way type holding in either of three positions as is evidenced by the fact that the contacts 33 and 74 have their outer ends, which are engaged by the key, bent outwardly at an angle.

When starting to set the combination the door contacts will be closed and the switches 1 to 6 in the positions shown in Fig. 1.

Now move the switch 2 to engage the contacts 27, 26. Current from the battery then flows through the conductor 7 to the switch 1, through the contacts 8, 9, conductor 11, contacts 10, 12, conductor 13, contacts 14, 15 of the switch 2, conductor 16, contacts 17, 18 of switch 3, conductor 19, contacts 20, 21 of switch 4, conductor 22, contacts 23, 24 of switch 5, conductor 25, contacts 26, 27 of the switch 2, conductor 29, through relay A, conductor 30, conductor 31, contacts 32, 33, conductors 34, 35 and thence through the door contacts to the negative side of the battery. The energizing of the relay A closes the switch 44, so that, if the switch 2 be released, the relay is still connected with the positive side of the battery through the conductor 45, switch 44, conductor 42, conductor 25 and its connections, and therefore the switch 44 remains closed.

The conductor 28 connects the contact 46 of switch 3 with the contact 27 of switch 2 and with the conductor 29.

If now the switch 3 is moved to close the contacts 46, 47, the current flowing to the relay A also passes through the conductor 28, contacts 46, 47, conductor 48, relay B and conductor 30 which forms part of the return to the battery, as hereinbefore described. The energizing of the relay B thus effected closes the switch 51, so that, if the switch 3 be now released and the relay circuit broken at the switch, the circuit will remain closed through the conductors 42, 43, switch 51 and conductor 50.

If now the switch 4 is moved to close the contacts 52, 53, the current flowing through the relays A and B also passes through the conductor 86, contacts 52, 53, conductor 54 and relay C to conductor 30 forming part of the return to the battery.

The energizing of the relay C thus effected closes the switch 57, so that, if the switch 4 be now released and the relay circuit broken at the switch, the circuit will remain closed through the conductors 50, 58, switch 57 and conductor 56.

If now the switch 5 is moved to close the contacts 60, 61, the current flowing through the relays A, B and C also passes through the conductor 59, contacts 60, 61, conductor 62, and relay D to conductors 34 and 35.

The energizing of the relay D thus effected closes the switch 65 so that if the switch 5 be now released, and the relay circuit broken at the switch, the circuit will remain closed through the conductors 25, 66, switch 65, conductor 64, and relay D to conductor 35 which is connected with the negative side of the battery through parts hereinbefore described.

The switches 68 and 72 in the ignition and starter circuits, hereinbefore described, are also closed by the energization of the relay D so that these circuits become energized from the battery.

If now either of the door switches is opened, the return circuit from the control system to the battery is opened and all the relays become de-energized so that the switches 44, 51, 57, 65, 68 and 72 open. The ignition and starter circuit are thus both opened.

Then if the door switch is again closed these circuits remain open since the switches 68 and 72 are open and cannot be closed until the switches 2, 3, 4 and 5 are again operated in the proper order.

To prevent the ignition and starter circuits being broken when the door was opened, the driver merely puts his foot on the brake pedal and closes the by-pass switch contacts 82 and 83 as hereinbefore described.

As it is desirable that the car may, on occasion, be operated and the ignition and starter circuits opened or closed while the relay D remains energized and the switches 68 and 72 remain closed, I provide the switch 6 to which reference has previously been made.

When the switch 6 is in the position shown in Fig. 1, the relays are de-energized immediately a door switch is opened.

If, however, the door switches are closed, the ignition circuit may be broken by operating the switch 6 to separate the contact 33 from the contact 32 and engage it with the contact 78.

The relay D, however, remains energized since the current from the battery will flow from the conductor 25, through the conductor 66, switch 65, conductor 64, relay D, conductor 34, contacts 33, 78 and conductor 41 to the battery. With the switch 6 in this position the door switches may be opened without opening the switch 65 of the control system, but the ignition circuit is broken at the contacts 32 and 33.

If the switch 6 be operated to separate the contact 74 from the contact 75 and engage it with the contact 80, the starter circuit is broken at the contacts 74, 75, but the relay D remains energized and the ignition circuit therefore closed, since the current from the battery will flow from the conductor 25, through the conductor 66, switch 65, conductor 34, contacts 33, 32, conductors 67, 71, contact 72, conductor 73, contacts 74, 80 and conductor 41 to the negative side of the battery. With the switch 6 in this position the door switches may be opened without opening the switch 65 of the control system.

From the above description it will be seen that I have devised a locking system for automobile operating circuits which will attain the objects of my invention as set forth in the specification. It is also obvious that many changes may be made in the details of construction without departing from the spirit of my invention.

What I claim as my invention is:

1. In a motor vehicle, the combination with an electric operating circuit of an electric control system including a series of relays; independent manual switches controlling the energization of the respective relays; means whereby when the switches are actuated in a predetermined order, they effect the progressive energization of the relays; a switch in the operating circuit closable by the energization of the last relay in the series; means included in the control system for breaking the relay circuits independent of the opera-

tion of the relay switches; and manual control means in the control system for maintaining, at will, the energization of the last relay of the series when the circuits of the other relays have been broken by the operation of the last mentioned means.

2. In a motor vehicle, the combination with two electric operating circuits of an electric control system including a series of relays; independent manual switches controlling the energizing of the respective relays; means whereby, when the switches are actuated in a predetermined order, they effect the progressive energization of the relays; a switch in each operating circuit closable by the energizing of the last relay in the series; and manually controllable means in the control system for breaking either one or the other of the operating circuits while maintaining the energization of the last relay of the series.

3. In a motor vehicle, the combination with two electric operating circuits of an electric control system including a series of relays; independent manual switches controlling the energizing of the respective relays; means whereby, when the switches are actuated in a predetermined order, they effect the progressive energization of the relays; a switch in each operating circuit closable by the energizing of the last relay in the series; means included in the control system for breaking the relay circuits independent of the operation of the relay switches; and manually controllable means in the control system for breaking either one or the other of the operating circuits while

maintaining the energization of the last relay of the series and adapted, when in an intermediate position, to break the circuit of the last relay.

4. In a motor vehicle, the combination with an electric operating circuit of an electric control system including a series of relays; independent manual switches resiliently held in an open position; means whereby, when the switches are closed in a predetermined order the relays are progressively energized; means whereby each relay as energized closes its own circuit and thus permits its switch to return to the open position; and a switch in the operating circuit closable by the energization of the last relay in the series, the relays having a common return for the energizing current; and a switch included in the return for breaking said return.

5. In a motor vehicle, the combination with an electric operating circuit of an electric control system including a series of relays; independent manual switches resiliently held in an open position; means whereby, when the switches are closed in a predetermined order the relays are progressively energized; means whereby each relay as energized closes its own circuit and thus permits its switch to return to the open position; a switch in the operating circuit closable by the energization of the last relay in the series, the relays having a common return for the energizing current; a switch included in the return for breaking said return; and means for by-passing the said switch.

HARRY L. BLACK.