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3,453,591 7/1969 Perez..... 307/10 AT X
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[54] **THEFT-DETERRENT IGNITION SYSTEM**
17 Claims, 1 Drawing Fig.

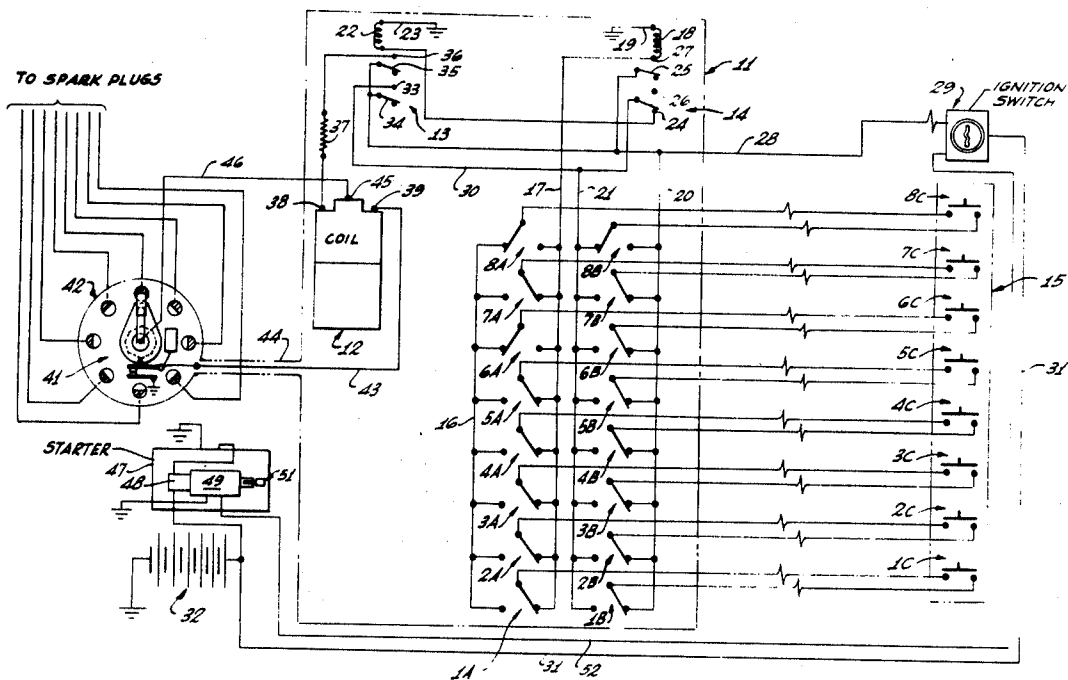
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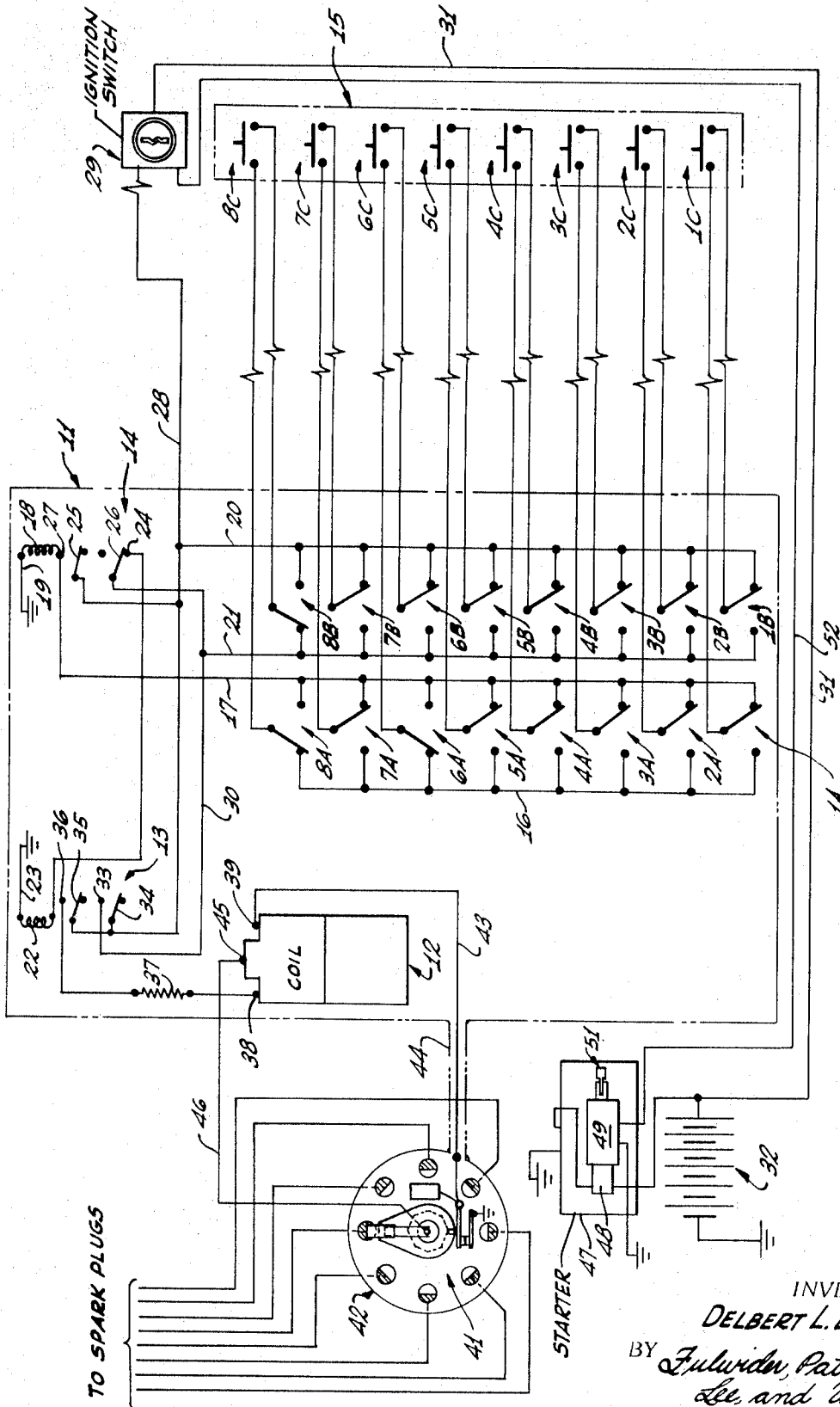
[56] **References Cited**

UNITED STATES PATENTS

2,657,317 10/1953 Herrell..... 307/10 AT

ABSTRACT: A theft-deterrent ignition system for automotive vehicles in which the ignition coil and pairs of coding switches are locked in an enclosing box with run and lockout relays, and in which the ignition coil is connected to the distributor through armor covering. The coding switches are interconnected through momentary contact switches which are grouped together in the vehicle to be readily accessible to the driver. The setting of the coding switches determines which of the momentary contact switches must be simultaneously closed to secure closing of the run relay and energization of the ignition system. Closing of a momentary contact switch other than a coded one closes the lockout relay and prevents closing of the run relay.





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THEFT-DETERRENT IGNITION SYSTEM

BACKGROUND OF THE INVENTION

1. This invention is in the field of theft prevention for automotive vehicles.

2. Theft of automotive vehicles has become a very serious problem and reliance on a simple ignition lock and key futile, since the electrical circuit can be readily jumpered to provide ignition to the engine. While the absolute prevention of theft is practically impossible, the present invention provides means making theft very difficult by using a coding system requiring the simultaneous closing of coded momentary contact switches to complete and maintain the ignition system for the engine.

Coded ignition systems have been known in the past, but for various reasons have not been successful. One is shown in the U.S. Pat. to Heath, No. 2,650,989, granted Sept. 1, 1953. This patent discloses a coded ignition system in which pushbuttons must be operated in sequence to complete the ignition circuit, but it has many disadvantages in the use of complicated and undesirable relays, readily defeatable coding elements, and special devices which complicate the structure and circuitry of the device.

The coding and theft-deterrent system of the present invention uses standard electric switches and relays for both coding and circuit closing and mounts the essential elements of the system within a locked box so that change in coding, jumpering and other means defeating the system are made very difficult.

SUMMARY OF THE INVENTION

In the system of the present invention, pairs of standard single-pole, double-throw electrical switches are used to provide a code of a pair of circuits which must be closed to provide ignition for the vehicle engine. A pair of relays, a run relay for completing the ignition circuit and a lockout relay preventing closing of the run relay, are provided and wired so that closing of other than the coded circuits closes the lockout relay to prevent closing of the run relay. The relays and the coding switches are, together with the ignition coil, mounted in a locked steel box to which access is difficult, absent a key or lock combination. The connection between the coil and the distributor is made through an armor sleeve or the like to make the connection of a substitute coil difficult. The coding switches are interconnected by momentary contact switches, for example, of the pushbutton type, which are located near the driver of the vehicle for ready access. The coding switches determine which of the momentary contact switches must be simultaneously closed to close the run relay. Closing of any other momentary contact switch will close the lockout relay to prevent closing of the run relay. The lockout relay may thereafter be opened only by opening the circuit through the ignition switch.

It is the object of this invention to establish coding circuits for an automotive ignition system by employing standard switching elements and relays throughout and enclosing defeatable elements in a locked box preventing access thereto.

Another object of the invention includes the armoring of the connection between a locked ignition coil and the distributor of an automotive engine to make the connection of a substitute coil difficult.

A general object of the invention is the provision of a simple, effective and inexpensive coding system for the ignition circuit of an automotive vehicle to provide theft-deterrence therefor.

Other objects and features of the invention will be apparent from the detailed description and the attached drawing.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE of the drawing diagrammatically illustrates the theft-deterrent automotive ignition system of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The theft-deterrent ignition system of the present invention employs a locked box, indicated in broken lines at 11, which is preferably of steel and having a cover with a good lock. This box is preferably located under the hood of the automotive vehicle and encloses an ignition coil 12, a run relay 13, a lockout relay 14, and paired single-pole, double-throw coding switches of any desired number, of which eight pairs are illustrated, 1A-1B, through 8A-8B. The movable contacts of each pair of the coding switches are adapted to be connected to momentary contact switches, desirably of the pushbutton type, numbered in correspondence with the pair of coding switches which they interconnect, from 1C through 8C. The momentary contact pushbuttons 1C-8C are preferably mounted on a common panel or the like 15 which may be mounted near the driver's station in the vehicle, for example mounted from the dashboard adjacent the steering column.

One of the stationary contacts of the switches 1A-8A are connected together by a common line 16. The other stationary contacts of the switches 1A-8A are connected together by a line 17 which is connected to one side of the operating coil 18 of the lockout relay 14, the other side of this coil being grounded at 19. One of the stationary contacts of each of the switches 1B-8B are connected together by a line 21 and to a line 30 which interconnects a movable contact 26 of the lockout relay 14 and a stationary contact 33 of the run relay 13. A stationary contact 24 of the lockout relay 14, normally closed by contact 26, is connected to operating coil 22 of the run relay 13, the other side of the coil being grounded at 23. The other stationary contacts of the switches 1B-8B are connected together by a line 20 and to line 28.

Lockout relay 14 has movable contacts 25 cooperating with a stationary contact 27 to form a holding circuit for coil 18 to a line 28 which is energized through ignition switch 29 and a line 31 by a battery 32.

The run relay 13 has a first movable contact 34 connected to line 28 and cooperating with stationary contact 33. The run relay 13 has a second movable contact 35 also connected to the line 28. The movable contact 35 cooperates with a stationary contact 36 which is connected through a limiting and voltage dropping resistor 37 to an input terminal 38 on the ignition coil 12. The other input terminal 39 for the ignition coil is connected by a line 43 to ground through the points 41 of a distributor 42. The line 43 passes through a steel tube or sleeve 44 which is interlocked at one end to the locked box 11 and at its opposite end to the base of the distributor 42 to prevent ready access to the line 43 and therefore to inhibit wiring a substitute coil into the ignition circuit. The output terminal 45 of the coil 12 is connected in conventional manner by a line 46 to the distributor rotor.

A starter 47 is connected to the battery 32 through a starter relay 48 operated by a solenoid 49 which also operates conventional clutch control linkage 51. The solenoid 49 is energized by a line 52 through a starting switch which may either be a separate switch or a part of the ignition switch 29, the latter being illustrated.

With the locked box 11 opened, the coding switches 1A-1B through 8A-8B may be readily manually manipulated to establish any two of the momentary contact switches 1C-8C for simultaneous operation to complete the ignition circuit. To effect this connection, one pair of coding switches is moved to the left, as viewed in the drawing FIGURE, and the left one only of the other pair of coding switches is moved to the left. As illustrated in the drawing the coding is in a 6, 8 combination wherein both switches 8A and 8B have been moved to the left and switch 6A only moved to the left, thereby establishing momentary contacts 6C and 8C for simultaneous closing to complete the ignition circuit. Closing of any other of the momentary contact switches will close the lockout relay 14 to prevent closing of the run relay 13, as will now be described.

With the coding set as shown in the drawing and the ignition switch 29 closed to connect line 28 through line 31 to the battery 32, if the correct combination of momentary contact switches 6C and 8C are closed at the same time, a circuit is established from line 28 through line 20, switch 6B, switch 6C, switch 6A to line 16 and thence through switch 8A, switch 8C and switch 8B to line 21 which energizes the operating coil 22 of the run relay 13 through the normally closed contacts 26, 24 of the lockout relay 14, the run relay 13 thereby closes to energize the terminal 38 of coil 12 from line 28 through movable contact 35 and stationary contact 36. A holding circuit for the run relay 13 is closed from line 28 through movable contact 26 and stationary contact 24 of the relay 14. The engine may now be started by closing the starter switch and the ignition circuit described is maintained as long as the ignition switch remains closed.

If, instead of the simultaneous closing of switches 6C and 8C, one of the other momentary contact switches were closed, for example, switch 5C, a circuit would be established from line 28 through line 20, switch 5B, switch 5C, and switch 5A, to line 17, which energizes the operating coil 18 of the lockout relay 14. This relay then closes and establishes a holding circuit for itself from line 28 through movable contact 25 and stationary contact 27. Closing of relay 14 opens the normally closed connection between movable contact 26 and stationary contact 24, thereby opening the circuit to the operating coil 22 of the run relay 13, and preventing closing of the run relay while lockout relay 14 remains closed.

Should the correct combination of 6C and 8C be thereafter closed while the lockout relay 14 is closed, nothing happens, since the circuit to the operating coil 22 is broken at contacts 26, 24 on the lockout relay 14. This prevents easy sampling for the set code as the ignition switch must be opened to open the lockout relay.

It will therefore be seen that the theft-deterrent system of the present invention encloses the operating relays, the coding switches and the ignition coil within a locked box to prevent defeat of the system and unauthorized change of the ignition code. Likewise, the wire 43 connecting the distributor points to the ignition coil is armored to inhibit the wiring in of a substitute coil.

The coding switches and the momentary contact switches are standard, off-the-shelf items coding to any two momentary contact switches is readily changed by authorized access to the locked box and simple movement of the coding switches. Closing of any but the coded momentary contact switches closes the lockout relay which prevents energization of the run relay for the ignition system and the lockout relay may be opened only by opening of the circuit through the ignition switch; thus easy determination of the code by manipulation of the momentary contact switches is prevented.

While a certain preferred embodiment of the invention has been specifically illustrated and described, it will be understood that the invention is not limited thereto as many variations will be apparent to those skilled in the art.

I claim:

1. A theft-deterrent ignition system comprising:
 - a plurality of pairs of electric switches for establishing a circuit code;
 - a plurality of momentary contact switches;
 - means interconnecting the switches of each pair of coding switches through one of said momentary contact switches;
 - an ignition coil;
 - a running relay;
 - a power source;
 - means connecting said ignition coil with said power source through said running relay; and
 - means for energizing the operating coil of said running relay through two coded pairs of said coding switches and the two momentary contact switches interconnecting them.
2. The ignition system defined in claim 1 in which said coding switches, ignition coil and running relay are enclosed within a box locked to prevent access thereto.

3. The ignition system defined in claim 1 including:

a lockout relay having normally closed contacts through which the operating coil of said running relay is energized; and

means for energizing the operating coil of said lockout relay by the closing of a momentary contact switch other than those connected to the coded pairs of coding switches.

4. The ignition system defined in claim 1 including:

said coding switches being of the single-pole, double-throw type;

means interconnecting the movable contacts of each pair of coding switches through one of said momentary contact switches;

means connecting one of the stationary contacts of the first of each pair of coding switches together;

means connecting one of the stationary contacts of the second of each pair of coding switches together and to said power source; and

means connecting the other stationary contact of the second of each pair of coding switches together and to the operating coil of said running relay,

whereby movement of the movable contacts of a first pair of coding switches to engage said one stationary contact of the first switch and the other stationary contact of the second switch and movement of the movable contact of the first switch of a second pair of coding switches to engage said one stationary contact of said first switch establishes said first and second pairs as the coding switches whose momentary contact switches must be simultaneously closed to complete the circuit to the operating coil of the running switch.

5. The ignition system defined in claim 4 including:

a lockout relay having an operating coil;

normally closed contacts on said lockout relay through which the operating coil of said running relay is energized; and

other stationary contacts on the first switch of each pair of coding switches connected together and to the energizing coil of said lockout relay, whereby

closing of a momentary contact switch other than the coded ones energizes the operating coil of the lockout relay to open its normally closed contacts and prevent energization of the coil of said running relay.

6. The ignition system defined in claim 5 including:

means providing a holding circuit for the operating coil of said lockout relay; and

said holding circuit being opened to drop out the locking relay by opening the ignition circuit.

7. The ignition system defined in claim 2 including:

a distributor;

a conductor connecting said ignition coil to the points on said distributor; and

a protective sheath between said locked box and said distributor preventing access to said conductor to inhibit the wiring into the ignition circuit of a substitute coil.

8. The ignition system defined in claim 1 including:

means providing a holding circuit for the operating coil of said running relay whereby said ignition coil remains energized when said momentary contact switches are released.

9. The ignition system defined in claim 3 in which said coding switches are each a single-pole, double-throw switch, and said momentary contact switches are pushbutton switches;

means connecting the movable contacts of each pair of coding switches together through one of said pushbutton switches;

means connecting together one of the stationary contacts of the first of each pair of coding switches;

means connecting the second stationary contacts of the first of each pair of coding switches together and to the operating coil of the lockout relay;

means connecting one of the stationary contacts of the second of each pair of coding switches together and to the operating coil of the running relay through normally closed contacts of the lockout relay;

an ignition switch; and

means connecting the second stationary contacts of the second of each pair of coding switches together and to the power source through said ignition switch.

10. The ignition system defined in claim 9 in which:

said coding switches establish an ignition code for two push-button switches which must be simultaneously closed to complete the circuit to the operating coil of the running relay by moving both of the movable contacts of one pair of thereby coded coding switches to engage one of the stationary contacts of that pair and by moving only the movable contact of the first of the second pair of thereby coded coding switches to engage said one contact of said first switch of said second pair.

11. The ignition system defined in claim 10 in which

closing of a momentary contact pushbutton switch other than those interconnecting the coded pairs of coding switches closes the circuit to the operating coil of said lockout relay to open the normally closed contacts thereof through which the operating coil of the running relay is fed; and

means providing a holding circuit for the operating coil of said lockout relay to prevent energization thereafter of the operating coil of said running relay.

12. The ignition system defined in claim 7 including:

said coding switches being of the single-pole double-throw type;

means interconnecting the movable contacts of each pair of coding switches through one of said momentary contact switches;

means connecting one of the stationary contacts of the first of each pair of coding switches together;

means connecting one of the stationary contacts of the second of each pair of coding switches together and to said power source; and

means connecting the other stationary contact of the second of each pair of coding switches together and to the operating coil of said running relay,

whereby movement of the movable contacts of a first pair of coding switches to engage said one stationary contact of the first switch and the other stationary contact of the second switch and movement of the movable contact of the first switch of a second pair of coding switches to engage said one stationary contact of said first switch establishes said first and second pairs of the coding switches whose momentary contact switches must be simultaneously closed to complete the circuit to the operating coil of the running switch.

13. The ignition system defined in claim 12 including:

a lockout relay having an operating coil; normally closed contacts on said lockout relay through which the operating coil of said running relay is energized; and

other stationary contacts on the first switch of each pair of coding switches connected together and to the energizing coil of said lockout relay, whereby

closing of a momentary contact switch other than the coded ones energizes the operating coil of the lockout relay to open its normally closed contacts and prevent energization of the coil of said running relay.

14. The ignition system defined in claim 13 including:

means providing a holding circuit for the operating coil of said lockout relay; and

said holding circuit being opened to drop out the locking relay by opening the ignition circuit.

15. The ignition system defined in claim 7 including:

a lockout relay having normally closed contacts through which the operating coil of said running relay is energized;

means for energizing the operating coil of said lockout relay by the closing of a momentary contact switch other than those connected to the coded pairs of coding switches;

said coding switches are each a single-pole, double-throw switch, and said momentary contact switches are push-button switches;

means connecting the movable contacts of each pair of coding switches together through one of said pushbutton switches;

means connecting together one of the stationary contacts of the first of each pair of coding switches;

means connecting the second stationary contacts of the first of each pair of coding switches together and to the operating coil of the lockout relay;

means connecting one of the stationary contacts of the second of each pair of coding switches together and to the operating coil of the running relay through normally closed contacts of the lockout relay;

an ignition switch; and

means connecting the second stationary contacts of the second of each pair of coding switches together and to the power source through said ignition switch.

16. The ignition system defined in claim 15 in which:

said coding switches establish an ignition code for two push-button switches which must be simultaneously closed to complete the circuit to the operating coil of the running relay by moving both of the movable contacts of one pair of thereby coded coding switches to engage one of the stationary contacts of that pair and by moving only the movable contact of the first of the second pair of thereby coded coding switches to engage said one contact of said first switch of said second pair.

17. The ignition system defined in claim 16 in which:

closing of a momentary contact pushbutton switch other than those interconnecting the coded pairs of coding switches closes the circuit to the operating coil of said lockout relay to open the normally closed contacts thereof through which the operating coil of the running relay is fed; and

means providing a holding circuit for the operating coil of said lockout relay to prevent energization thereafter of the operating coil of said running relay.

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