

Sept. 1, 1953

T. H. HEATH
PUSH BUTTON AUTOMOBILE ENGINE
IGNITION AND STARTER SYSTEM

2,650,989

Filed May 1, 1952

2 Sheets-Sheet 1

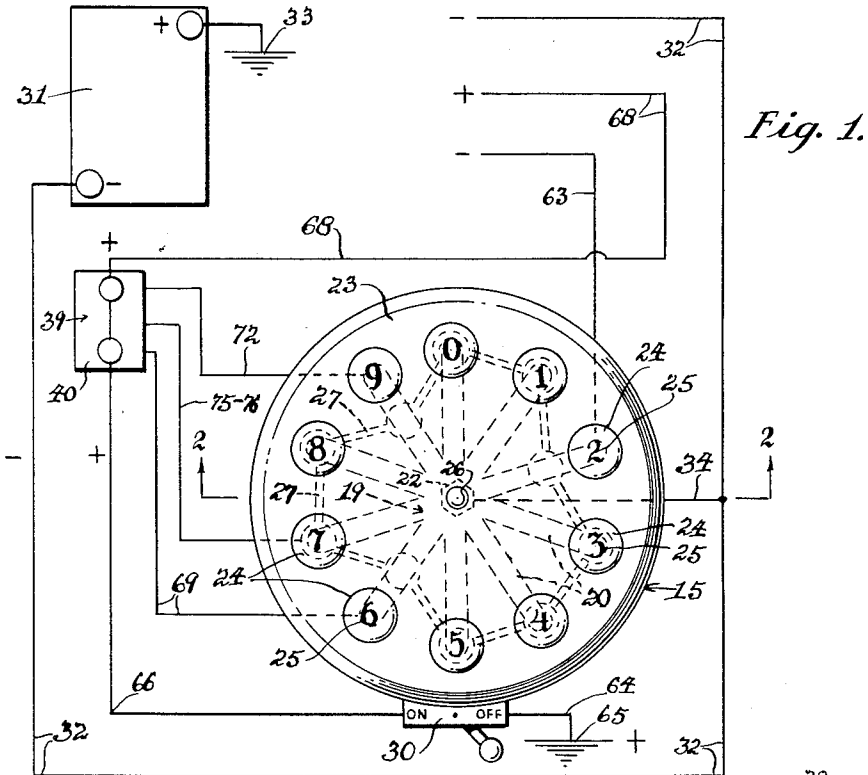


Fig. 1.

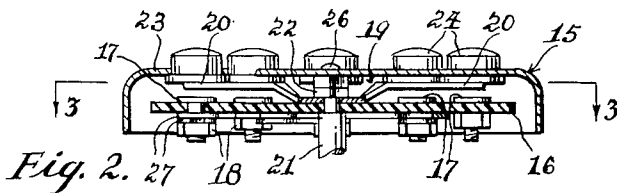


Fig. 2.

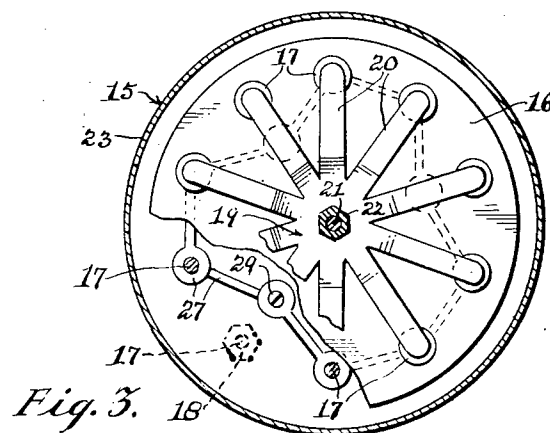


Fig. 3.

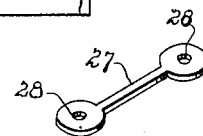


Fig. 5.

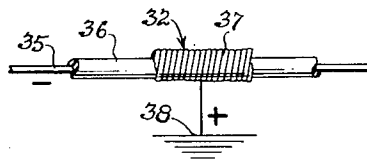


Fig. 4.

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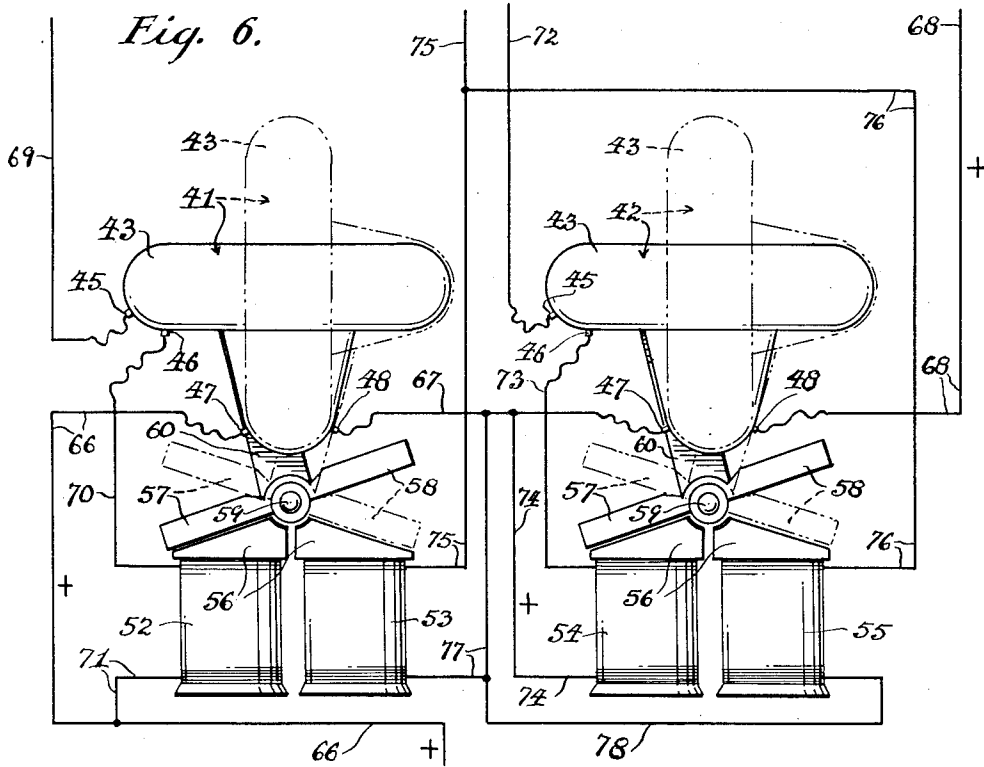


Fig. 8.

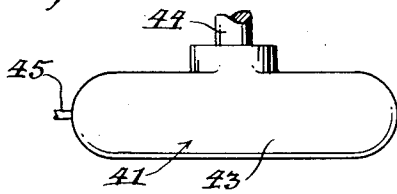


Fig. 7.

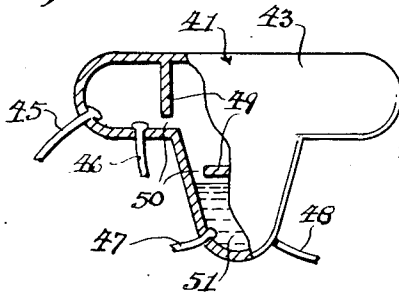


Fig. 9.

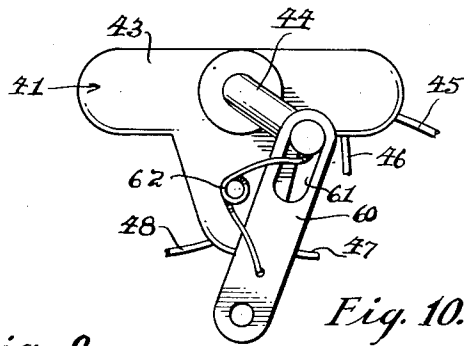
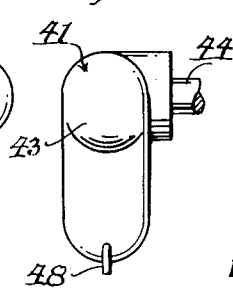


Fig. 10.

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2,650,989

PUSH BUTTON AUTOMOBILE ENGINE
IGNITION AND STARTER SYSTEM

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Application May 1, 1952, Serial No. 285,508

5 Claims. (Cl. 307—10)

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My invention relates to a new and useful push button automobile engine ignition and starter system and has for one of its objects to provide a combination of electrical elements to be semi-automatically actuated in a preselected sequence to complete a prearranged ignition circuit and a complementary starter circuit.

Another object of the present invention is to produce a push button automobile engine ignition and starter system comprised of a dial having ten push button circuit closers numbered one to nine and zero, in combination with an electromagnetic selector unit capable of completing an ignition and a complementary starter motor upon pressing a preselected combination of three of the push button circuit closers.

Another object of this invention is to provide, in a device of the character mentioned, ten differently indexed button circuit closers capable of producing a selective total of seven hundred twenty different three-button combinations. Preferably the buttons are numbered from one to nine and zero, inclusive, and the different three-button combinations are produced without using any double or triple combinations such as 331, 455, 545 or 666, etc.

Another object of the invention is to provide an arrangement of circuits and also a particular arrangement of button circuit closers whereby certain preselected buttons must be actuated in a predetermined sequence to close an ignition circuit and a complementary starter motor circuit, and the operation of other button circuit closers will not close said circuits or will completely open or neutralize said circuits if either is partially or wholly closed, thereby nullifying any highly improbable progress an unauthorized person may have made towards solving the combination by experimentation.

Another object of the invention is to provide a control or master switch in the main circuit whereby authorized persons, such as garage attendants, to operate the automobile without knowledge of the combination necessary to close the ignition circuit and partially complete the starter motor circuit.

A further object of this invention is to provide means for readily, quickly and easily changing the preselected combination of circuit closing buttons required for closing the circuits whereby use of the automobile by an unauthorized person may be frustrated even though such person may have surreptitiously learned of the former combination.

A still further object of this invention is to

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produce a coaxial armored conductor to hinder tampering with the installation or to short one of the circuits, due to attempted tampering, whereby operation of the automobile will be prevented.

With the above and other objects in view this invention consists of the details of construction and combination of elements hereinafter set forth and then designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same I will describe the construction thereof in detail referring by numerals to the accompanying drawings forming a part hereof, in which:

Fig. 1 is a face view of the push button dial and showing, diagrammatically, the circuits, the selector unit and a battery as the source of electricity.

Fig. 2 is a section of the dial and multiple switch taken on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2 with a portion of the contact supporting panel broken away.

Fig. 4 is a fragmentary side view of the coaxial armored conductor.

Fig. 5 is a perspective view of one of the circuit forming links.

Fig. 6 is a schematic view of the elements of the selector unit and the electrical circuits.

Fig. 7 is a broken sectional front elevation of one of the mercury electrical circuit makers and breakers in the electro-magnet selector unit.

Fig. 8 is a top plan view thereof.

Fig. 9 is an end view of the same.

Fig. 10 is a rear view of Fig. 7 showing the connection with the partly broken away arm or lever of a twin armature.

In carrying out my invention as herein embodied 15 represents the push button dial, including a panel 16 of insulating material having a plurality of stationary contacts 17 mounted thereon, preferably ten in number and equally spaced apart in a circle. For purposes of illustration said stationary contacts 17 each comprises a large headed screw having the shank projected through the panel 16 with the head resting on the obverse face of said panel and a nut 12 screwed on the shank for cooperation with the reverse face of the panel 16.

On the obverse face of the panel 16 also is mounted the hub of the multiple spring contactor 19 including a plurality of resilient fingers 20 in a different plane to that of the hub of said contactor. The fingers 20 are equal in number

to the stationary contacts 17 and overlie the latter normally in spaced relation thereto but capable of being individually flexed into engagement with their respective stationary contacts.

The panel 16 with its contacts 17 and the multiple spring contactor 19 are mounted on a suitable support 21 and are held in place by appropriate means 22, such as one or more nuts. The aforementioned parts are enclosed by a cover 23 in which are mounted a plurality of push buttons 24, equal in number to the contacts 17 and the fingers 20 of the resilient contactor 19. Said push buttons 24 are arranged in juxtaposition to the fingers 20 for cooperation therewith to flex said fingers and cause them to engage their respective contacts 17 as the push buttons are individually forced inwardly against the action of the fingers. Each push button has an indicating mark 25 thereon, preferably a numeral, and since I have shown the group of buttons and their associated groups of circuit closing elements as being ten in number the indicating marks are depicted as the numerals one to nine, inclusive, and zero. The cover 25 is detachably connected with the support 21 by a removable fastening means 26.

Certain of the contacts 17 are connected in series by means of links 27 of electric conductive material which are of proper length to bridge a gap between two adjacent contacts and each link has a hole 28 at each end for registration with the shanks of adjacent contacts or with the shank of one contact and a screw 29, Fig. 3, which may fasten together the contiguous ends of two links, when said attached ends have been disconnected from a common contact 17, for a purpose to be presently described.

The push button dial 15 is mounted in any suitable locality within an automobile, as on the steering wheel post, and has a master snap switch 30, Fig. 1, connected thereto and interposed in one of the controlling circuits of the electro-magnetic selector unit.

A source of electricity 31, such as the battery of an automobile, has one pole thereof, as the negative pole, connected by a conductor 32 with one side of the ignition system (not shown) of the automobile engine and thence to the other pole of the battery, as through a suitable ground, said other or positive pole of the battery being illustrated as grounded at 33.

The resilient multiple switch 19 is connected by a branch conductor 34 with the conductor 32. The conductors 32 and 34, in particular, are of the coaxial armored type, specifically illustrated in Fig. 4, wherein the electric conducting wire 35 is covered with an insulating jacket 36 and the latter surrounded by a coiled spring steel armor 37 which is also electrically connected in the ignition circuit as represented by the ground 38.

The electro-magnetic selector unit 39, Fig. 1, includes a suitable casing or housing 40 in which are located two tiltable mercury circuit makers and breakers 41 and 42 which can be identical in construction wherefore the description of one will suffice for a complete understanding of the structure and operation of both.

Each mercury circuit maker and breaker includes a hollow bulbous body 43 mounted on a crank 44 suitably journaled in the housing 40 whereby the rotation of said crank will oscillate or tilt the body 43.

At a suitable location in the body is one pair of complementary spaced terminals 45 and 46

which project outside of the body for connection with proper conductors. Also mounted in the body at a location, a considerable distance from the first pair of terminals, is mounted a second pair of complementary spaced terminals 47 and 48 which likewise project outside of the body for connection with proper other conductors. The body of each mercury circuit maker and breaker has, if desirable one or more baffles 49, Fig. 7, to provide one or more restricted passageways 50 for the flow of a quantity of mercury 51 in the body 43 from one location to another or from one pair to the other pair of terminals during the tilting actions of the circuit makers and breakers.

A pair of individual electro-magnets 52 and 53, Fig. 6, is associated with the mercury circuit maker and breaker 41 and similarly another pair of individual electro-magnets 54 and 55 is associated with or mounted in cooperative relation to the other circuit maker and breaker 42.

The pole pieces 56 of the individual electro-magnets are appropriately shaped for coaction with the twin oscillating armatures each comprised of oppositely projecting armature leaves 57 and 58, one on each side of an armature pivot 59. Each twin oscillating armature has an arm or lever 60 as a unitary part thereof and said arm or lever has a longitudinal slot 61, Fig. 10, for registration with the outer free end of the crank 44 whereby the oscillation of a twin armature will impart a similar or alternate tilting motion to the respective associated mercury circuit maker and breaker. To retain the armature structure and its respective circuit maker and breaker in either of the extreme tilted positions and assist in swinging them past the center during oscillation, a spring 62 has one end attached to the crank and the other end to the arm or lever to urge the crank outwardly within the slot 61 with relation to said arm or lever.

It is desirable that a three button combination be utilized for completing the ignition circuit and the complementary starter motor circuit in order to obtain seven hundred twenty combinations utilizing any preselected three buttons in each combination. Therefore, as an illustrative example, I have shown, Figs. 1 and 3, the links 27 disconnected from the contacts 17 associated with the buttons indexed "2," "6" and "9" and the ends of adjacent links which are disconnected from said contacts as being attached to each other by the fastening devices 29. This leaves all seven of the other contacts 17 connected in series by the links.

A conductor 63 leads from the contact 17 associated with button "2" to one side of the starter motor (not shown) and a feed conductor 64 leads from one side of the battery as through the ground 65 to one side of the master switch 30 and from the other side of said master switch leads a conductor 66, Figs. 1 and 6, to the terminal 47 of circuit maker and breaker 41 as an element of the electro-magnetic selector unit 39. From the companion terminal 48 leads a conductor 67, Fig. 6 to the terminal 47 of the circuit maker and breaker 42 while from the companion terminal 48 of said circuit maker and breaker 42 leads a conductor 68, Figs. 1 and 6 to the other sides of both the ignition system and the starter motor, said conductor constituting to common line to both said ignition system and starter motor.

Assuming that the contact 17 associated with the button indexed "6" is one of those to be used

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then a conductor 69 leads from such contact to the terminal 45 and from the companion terminal 46 leads a conductor 70, Fig. 6, to one pole of the electromagnet 52 while from the other pole thereof leads a conductor 71 to the conductor 66 in which the master switch 30 is interposed. Where the other contact to be used is the one associated with button indexed "9," a conductor 72 leads from said contact to the terminal 45 of the second circuit maker and breaker 42 and from the companion terminal 46 of said second circuit maker and breaker 42 leads a conductor 73 to one pole of the electro-magnet 54 while from the other pole of said magnet 54 leads a conductor 74 to the conductor 67.

The dial circuit including the other seven contacts 17 comprised of said other seven contacts and their connecting links 27 is in communication with one pole of each of the electro-magnets 53, 55 through a conductor 75 and a branch conductor 76, respectively. For purposes of illustration, the connection at the dial is shown as leading from the contact 17 associated with the button indexed "7." The other pole of each of the electro-magnets 53, 55 is connected by a conductor 77 and a branch conductor 78 with conductor 67 which is common to both circuit makers and breakers 41, 42.

The illustrated apparatus is shown as set to operate upon the actuation of the buttons indexed "6," "9" and "2" in that order. When the parts are in neutral positions the master switch 30 is open or in the "off" position and the circuit makers and breakers 41, 42 are in the dotted line positions so that the mercury 51 is bridging the gap between the terminals 45, 46 in both circuit makers and breakers 41, 42.

To complete the ignition and starter motor circuits, the button indexed "6" is pressed first which will complete a circuit from the positive side of the battery 31 via the grounds 33 and 65, conductor 64, master switch 30, conductors 66 and 71, electro-magnet 52, conductor 70, the terminals 46, 45 and the mercury of the circuit maker and breaker 41, conductor 69, the contact 17 associated with the button indexed "6," the resilient multiple fingered contactor 19 and the conductors 34 and 32 to the negative side of the battery. This will energize the magnet 52 and attract the armature 57 to move the latter from the dotted line position, Fig. 6, to the full line position to tilt the circuit maker and breaker 41 and cause the mercury to flow away from the terminals 45, 46 and to the terminals 47, 48 of said circuit maker and breaker 41.

The opening of the last above described magnet circuit will deenergize the magnet 52 to prevent the same from burning out and simultaneously partially close the ignition circuit from the positive side of the battery 31 via the grounds 33, 65, conductors 64, master switch 30, conductor 66, terminals 47, 48 and the mercury of circuit maker and breaker 41 and conductor 67 to the terminal 47 of the circuit maker and breaker 42.

By subsequently pressing the button indexed "9" a magnet circuit can be completed from the positive side of the battery 31 via the grounds 33, 65, conductor 64, the master switch 30, conductor 66, terminals 47, 48 and the mercury of circuit maker and breaker 41, conductors 67, 74, the magnet 54, conductor 73, the terminals 46, 45 and the mercury of circuit maker and breaker 42, conductor 72, the contact 17 associated with the button indexed "9," the multiple fingered resilient contactor 19 and conductors 34, 32 to the

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negative side of the battery 31. This will energize the magnet 54 and attract the armature 57 associated with said magnet 54 to move the latter from the dotted line position to the full line position and tilt the circuit maker and breaker 42 to cause the mercury to flow away from the terminals 45, 46 and to the terminals 47, 48 of said circuit maker and breaker 42.

The opening of the circuit through the magnet 54 will deenergize the same to prevent it being burned out and will complete the ignition circuit, and partially close the starter motor circuit, from the conductor 67, Fig. 6, previously conditioned for carrying the electric current, through the terminals 47, 48 and the mercury of the circuit maker and breaker 42, through conductor 68 to the positive side of the ignition system and through the latter to the conductor 32 back to the negative side of the battery 31.

The ignition circuit now being in condition for supplying current to the ignition system the engine may be operated. The closing of the positive side of the ignition circuit necessarily closed the same side of the starter motor circuit because it is common to both. By pressing the button indexed "2" said starter motor circuit will be completed from the positive side of the starter motor through the same to the negative side thereof and thence via conductor 63, the contact 17 associated with the button indexed "2," the multiple fingered contactor 19 and conductors 34, 32 back to the battery. Upon completion of the last mentioned circuit the engine will be turned over by the starter to start said engine. The button indexed "2" is held down as long as necessary or desirable for operating the starter and may be pressed as often as necessary without again touching the other buttons of the combination until such time as the circuits may be broken or neutralized.

Whenever the automobile is parked in a public garage or parking lot the attendant may be shown which button to use for operating the starter and the master switch 30 turned off. This will open the ignition circuit and stop the engine. Thereafter, the engine may be started when desired by merely turning on the master switch and pressing the starter button which, in the example above described, is the button indexed "2."

When parking at night or on the street, for instance, any button other than those indexed "6," "9" and "2" is pressed which will open the circuits or neutralize the entire system. Assuming that the button indexed "5" is pressed then a circuit is completed through the contact 17 associated with said button indexed "5," the multiple fingered contactor 19, the conductors 34 and 32, the battery 31, the grounds 33 and 65, conductor 64, master switch 30, conductor 66, the terminals 47, 48 and the mercury of circuit maker and breaker 41, conductors 67, 77 and 78, magnets 53 and 55, conductors 75, 76 to some one of the contacts 17, such as the one associated with the button indexed "7," the links 27, to the contact 17 associated with the button indexed "5." This will energize both magnets 53, 55 and attract their respective armatures 58 to tilt the circuit makers and breakers to open the ignition and starter motor circuits and condition the magnet circuits of the magnets 52, 54 for future operation as above outlined.

It will now be apparent that the three indexed button combination to which the dial is set must be operated in the exact sequence of the setting or the system will not function. When any one

of the indexed buttons not used in the combination is pressed, purposely or accidentally, the circuits are opened and the engine will be stopped, if running, or prevented from being started. If one or two of the correct buttons are actuated and incorrect second or third ones pressed, the apparatus will not function and the actuation of an incorrect second or third button will immediately neutralize the system circuits. Therefore, any highly improbable progress an unauthorized person may have made in solving the combination by experimenting with the buttons without the consent of the owner will be nullified.

The dial can be set to operate on any one of seven hundred twenty, three-button combinations if ten buttons are employed in the dial and without using any one button more than once in the combination setting. The three-button combination can be readily changed by merely disconnecting cooperating links 27 from any one, two or three of the contacts 17 and fastening the disconnected ends together by a screw 29, Fig. 3, and replacing any previously disconnected links on their respective contacts 17.

Should anyone try to tamper with the installation by attempting to cut an armored conductor, the armor should thwart such an attempt but if successful in cutting through the armor, the tool will cause a short circuit through the armor 37 and conductor wire 35 which would neutralize the circuits in the selector unit 39 located in some rather inaccessible place in the automobile.

Of course I do not wish to be limited to the exact details of construction herein shown and described as these may be varied within the scope of the appended claims without departing from the spirit of my invention.

Having described my invention what I claim as new and useful is:

1. The combination with an engine furnishing the motive power of a self-propelled vehicle and having an electric starter operatively connected therewith, of controlling means comprising an electro-magnetic circuit maker and breaker to partially complete an ignition circuit, a second electro-magnetic circuit maker and breaker to finally close the ignition circuit and partially complete the starter circuit, a push button switch to finally close said starter circuit, and means whereby the operation of the controlling means may be predetermined.

2. The combination with an engine forming the motive power of a self-propelled vehicle and having an electric starter operatively connected therewith, of a multiple fingered contactor actuated by individual push buttons and coacting with a similar number of contacts, said contactor being connected to one side of a source of electricity, a selector unit comprising a primary electro-magnetically operated circuit maker and breaker in circuit with a preselected one of said contacts and one side of the ignition system of the engine, a secondary electro-magnetically operated circuit maker and breaker in circuit with another preselected one of said contacts and the other side of the ignition system as well as one side of the electric starter, means connecting a third preselected contact with the other side of the electric starter whereby upon actuation of the buttons associated with the preselected contacts in sequence the ignition and the starter circuits will be closed, and means to connect all other contacts in circuit with electro-magnetic means whereby the aforesaid ignition

and starter circuits will be opened upon actuation of any one of the push buttons associated with said other contacts exclusive of the three preselected ones.

3. The structure according to claim 2 wherein the means to connect all other contacts comprises a plurality of individual electric conductive links of a length to bridge the spaces between adjacent contacts and detachably connected to said contacts whereby preselected links may be disconnected from their respective contacts and the unattached ends of said links fastened together.

4. The combination with an engine forming the motive power of a self propelled vehicle and having an electric starter operatively connected therewith, of a source of electricity having one pole connected by a conductor with one side of the ignition system of the engine, a selector unit comprising primary and secondary circuit makers and breakers each including a tiltably mounted hollow body having two pairs of separated terminals and a quantity of mercury therein for alternately bridging each pair of terminals as the body is oscillated and further provided with opposed armatures, a pair of electro-magnets for circuit maker and breaker, one pair of terminals of each circuit maker and breaker being connected in series with the other side of the engine ignition system, and one side of the electric starter, the other pair of terminals in each circuit maker and breaker being electrically connected to an individual one of each pair of electro-magnets, and controlling means connected with the other pole of the source of electricity to preselectively control the magnet circuits which pass through the circuit makers and breakers in sequence to tilt said circuit makers and breakers in a direction to close the engine ignition circuit and subsequently controlling the electric starter circuit.

5. The structure according to claim 4 wherein the controlling means consists of ten contacts, two preselected ones of said contact being interposed in the circuits of magnets which actuate the circuit makers and breakers to partially close the ignition circuit and one side of the starter circuit and a third preselected one of said contacts being interposed in the other side of the starter circuit, a contactor having ten resilient fingers cooperating with said contacts and normally out of engagement with said contacts, said contactor being interposed in the other side of the ignition circuit whereby when preselected fingers of the contactor are moved into engagement with the preselected contacts in proper sequence the ignition and starter circuits will be closed, means to temporarily connect all other contacts together, other magnets for actuating the circuit makers and breakers to open the ignition and starter circuits, said other magnets and said other contacts being interposed in a circuit including a part of one side of the ignition circuit whereby when any one of said other contacts is engaged by its respective finger of the contactor the circuit makers and breakers will be actuated to open the ignition and starter circuits, and ten push buttons, each cooperating with one of the contactor fingers for moving the latter into engagement with their respective contacts, each push button being differently indexed whereby the combination of preselected contacts can be readily ascertained.

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No references cited.