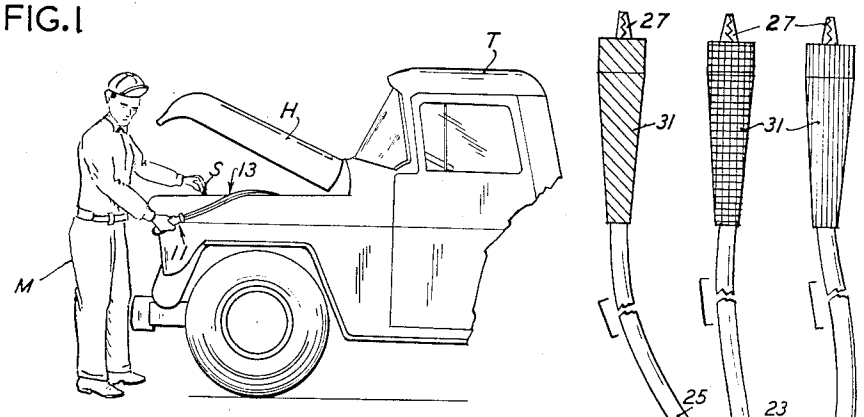
Oct. 13, 1959 H. H. HICKMAN 2,908,827

AUXILIARY ENGINE CONTROL DEVICE

Filed June 14, 1957

FIG.1



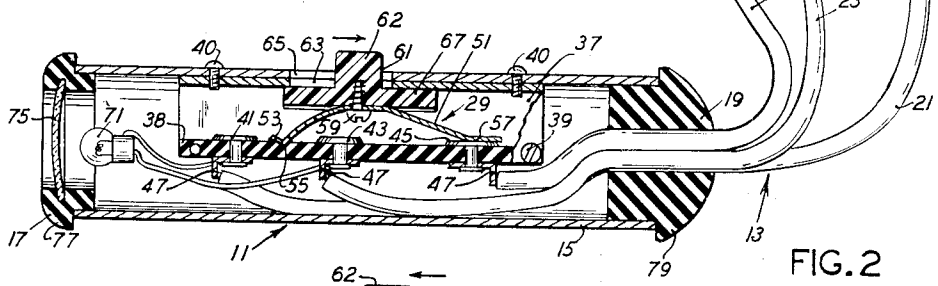


FIG.2

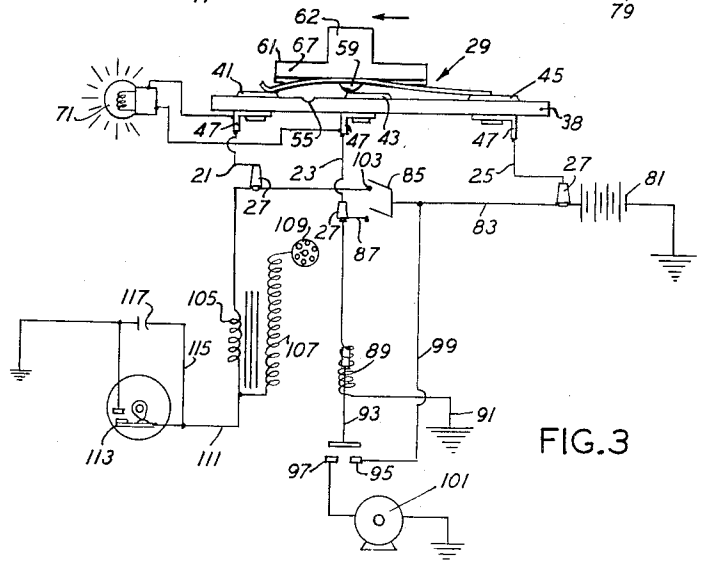


FIG.3

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AUXILIARY ENGINE CONTROL DEVICE

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6 Claims. (Cl. 307—10)

This invention relates to and has for its object the provision of an auxiliary device for controlling the operation of an internal combustion engine, and particularly to a portable device which may be connected in the engine circuit to by-pass the dashboard switches and permit an automobile mechanic to start and stop or otherwise control the operation of the engine while standing beside or working on the engine.

A further object of the invention is to provide such a device in which the control unit of the device is of a size and shape to be held in one hand and operated thereby without the assistance of the other hand.

Another object of the invention is to provide such a device equipped with a lamp to indicate when the ignition circuit is energized.

A further object of the invention is to provide such a device which may be connected to the ignition and starter circuits in a manner permitting the starting motor to be energized to turn the engine over with or without the ignition circuit on.

Still a further object of the invention is to provide a device of the type under consideration having a control unit which may be operated in a manner to maintain the starter circuit energized without requiring continued depression of a switch button, so that both hands of the operator are free for working on the engine.

A further object of the invention is to provide a device of the character under consideration which may be used as a test lamp to test for broken circuits for a wide variety of purposes. A further object of the invention is to provide such a device which may be connected in the electrical circuit of the automobile to enable brief energization of specialized circuits, such as the horn circuit.

A further object of the invention is to provide a device of the character under consideration which may be used for a wide variety of purposes in testing and checking the electrical circuit of an automobile and also may be used as a flashlight when desired.

Various other objects of the present invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

Fig. 1 is a somewhat diagrammatic view showing a device of the invention in the environment in which it will normally be employed:

Fig. 2 is an enlarged view of the control device showing the control unit in longitudinal section;

Fig. 3 is a view of part of an engine circuit showing in schematic form the device of the present invention connected in the circuit.

Referring to Fig. 1, the automobile mechanic M is shown at the front end of a truck which has the hood H raised to facilitate work on the engine. The automobile mechanic M is shown in the process of testing the engine with the aid of a device of the present invention. In one hand, the mechanic holds the control unit **11** of such device, the device including a lead assembly **13** extending

from the control unit to the electrical circuits of the engine.

Referring to Fig. 2, the unit **11** includes a tubular housing **15** closed at its opposite ends by elastomer inserts **17** and **19**. The lead assembly **13** includes three leads **21**, **23** and **25** which extend through a central hole in the insert **19**. The free or exposed ends of the leads are provided with clips **27** partially surrounded by flexible shields **31** which are of different colors for purposes of identification of the leads. The left-hand or opposite ends of the leads **21**, **23** and **25** are connected to switch means, generally indicated by the reference numeral **29**, in a manner to be explained presently.

The switch means **29** includes a case of rectangular cross section comprising a channel-shaped piece **37** and a strip of insulation **38** which is secured between the free margins of the channel-shaped piece by screws **39**. The channel-shaped piece is fastened by screws **40** to the housing **15**. The strip of insulation is provided with three spaced fixed contacts **41**, **43** and **45** having depending terminal lugs **47**. The inner ends of the leads **21**, **23** and **25** are connected to the terminal lugs of the fixed contacts **41**, **43** and **45**, respectively.

The switch means **29** has a movable switch member including a movable contact **51** having a leading portion **53** fitting in a notch **55** formed in the insulating strip **38** and a trailing portion **57** which slidably engages the fixed contact **45**. The movable contact **51** is in the form of a spring leaf and thus the leading and trailing portions of the movable contact yieldingly press against the strip **38** and the contact **45**, respectively.

The movable contact **51** is connected by a screw **59** or other suitable metallic securing means to a button **61**, of inverted T-shape. The button has a finger engaging portion **62** projecting through registering slots **63** and **65** formed in back of the channel-shaped piece **37** and in the tubular housing **15**, respectively. The button also includes a base portion **67** which, in the position shown, will not pass through the slots **63** and **65** and which is yieldingly pressed by the movable contact **51** against the underside of the back of the channel piece **37**, as is clearly shown in Fig. 2.

A lamp **71** is connected between the terminals **47** of the fixed contacts **41** and **43**. The lamp is positioned next to a lens **75** which fits within a suitable groove formed in the elastomer insert **17**. As clearly shown in Fig. 2, the insert **17** has a radical flange **77** which projects outwardly beyond the confines of the tubular housing **15**, and the insert **19** has a similar flange **79** so that the control unit may be placed on a metal surface without danger of scratching the same.

Fig. 3 illustrates the control unit connected in one desired way into the electrical circuit of an automobile. The particular circuit shown is intended to illustrate one conventional form of ignition and starter circuit and is not intended to limit the invention. As shown, the circuit includes a battery **81** having its negative side grounded and its positive side connected by a conductor **83** to a double pole single throw switch **85**, which is conventionally located on the dashboard of the vehicle and is of the key-operated type. One pole of the switch is connected by a conductor **87** to one terminal of the operating coil **89** of a solenoid switch in the starter circuit, the other terminal of the coil being connected to ground at **91**. The movable element **93** of the solenoid switch will engage spaced contacts **95** and **97** when the coil **89** is energized. Contact **95** is connected by a conductor **99** and the conductor **83** to the positive side of a battery **81**, whereas contact **97** is connected to the starter motor **101**. The other pole of switch **85** is connected by a conductor **103** to the primary coil **105** of an ignition coil having a secondary coil **107** connected to

the distributor head **109**. The ignition coil primary is conventionally connected by a conductor **111** to one side of the breaker points **113** of the distributor. A conductor **115** connects a condenser **117** in parallel with the points.

As shown in Fig. 3, the lead **25** has its clip connected to conductor **83** at any suitable place, such as a terminal box or the like. For convenience, the clip is shown attached directly to the conductor. The clip of the lead **23** is shown attached to the conductor **87** and the clip of the lead **21** is shown attached to the conductor **103**.

In use, with the control unit connected as shown, the engine may be turned over with the switch in the Fig. 2 "off" position by simply depressing the switch button **61** to bring the screw **59** into engagement with the fixed contact **43**. This will serve to energize the solenoid coil **89** to complete the circuit through the contacts **95** and **97** and thus cause the starter motor **101** to turn over the engine.

It is apparent by comparing the Fig. 2 and Fig. 3 positions of the button **61** and of the movable contact **51**, that the trailing end of the movable contact **57** never leaves the fixed contact **45** and the head of screw **59** is always disposed in a position above fixed contact **43**.

It is normally desired not only to have the engine turn over, but also to start. To accomplish this the switch button **61** is shoved to the left to the Fig. 3 "on" position. This serves to energize the lamp **71** and also the ignition system. Thus, when the button **61** is subsequently depressed to bring the screwhead of screw **59** into engagement with fixed contact **43**, the engine will be turned over with the ignition system energized to start the engine.

When the switch button **61** is depressed in the Fig. 2 position of the button, the ignition circuit will be connected to the fixed contact **43** through the lamp **71**. However, the resistance of the lamp is of a magnitude to prevent the development of an operative voltage drop across the ignition circuit. Thus the engine will not fire until the button is moved to its Fig. 3 position, in which position the battery is connected directly to the ignition circuit through the fixed contact **41**. Furthermore, when the button is moved to its Fig. 3 position, without being depressed, the starter circuit is connected to the battery through the lamp **71**. However, the lamp resistance will prevent the operation of the solenoid **89** until the button is depressed to by-pass the lamp circuit.

While the above-described use of the invention is the principal use, the device has many other uses. For instance, not infrequently the automobile mechanic would like both hands free and would like to have the engine turning over without the ignition on. To do this, he will attach the clip of the lead **21** to the conductor **87** and the clip of the lead **25** to the conductor **83** and then shove the button **61** from the left to right to dispose the leading portion of the movable contact **51** in engagement with the fixed contact **41**. This will energize the starting motor, and the mechanic may simply place the control unit on any convenient portion of the vehicle leaving both hands free for work on the engine.

The device of the present invention may be used as a test lamp to determine the location of a broken circuit. To do this, the clips of the leads **21** and **23** are connected across the doubtful circuit, and assuming that a source of energy is supplied to the circuit, the lamp bulb **71** will be lighted if the circuit is unbroken, or will remain deenergized if the circuit is broken.

Not infrequently, it is desired to test certain electrical components with only short periods of energization. This is desirable in the case of testing a horn. To make this test, the clip of the lead **25** is connected to the battery as shown, and the clip of the lead **23** is connected to the horn. The switch button **61** may be depressed to briefly energize the horn as desired. With this arrangement the horn may be conveniently tuned or otherwise adjusted without long blasts from the horn.

Obviously, the device may also be used as a flashlight and for all types of tests to test heater indicators, gas gauges and the like. Also, the device may be used to test the generators of various cars by either supplying current to the field of the generator, in which case either of the leads **21** and **23** may be employed, or to ground the field in which case either of such leads may be employed.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited other than by the provisions of the following claims.

I claim:

1. A portable, hand supported and operated, remote control device for controlling the operation of the internal combustion engine of a vehicle, comprising a housing having a portion of a size to be held in the hand, at least three flexible leads extending from said housing and having connecting means on the free ends thereof facilitating detachable connection of said leads to parts of said engine circuit, said leads being of a length sufficient to enable a mechanic to position himself at the side of a vehicle next to the engine with said flexible leads connected to the engine circuits, one lead being connected to the vehicle battery, a second lead being connected in the starter circuit of the engine between the dashboard switch and the starter solenoid, and a third lead being connected in the ignition circuit between the dashboard ignition switch and the ignition circuit transformer, and switch means carried by said housing having a single exposed operating button movable in two different directions under the control of the thumb or a finger of the hand holding the housing without changing the grip on the housing, a fixed contact in said housing for each lead, said button carrying a contactor having a part in constant engagement with the fixed contact of said one lead, said contactor being engageable with the fixed contact of said second lead when moved in one direction while remaining in engagement with the fixed contact of said one lead to turn the engine over without starting the engine, said contactor being engageable with the fixed contact of said third lead when moved in a second direction and also being capable of being simultaneously moved in said one direction while remaining in engagement with fixed contact of said first lead to enable said engine to be started.

2. A device as set forth in claim 1 in which there are means for automatically returning said contactor to a nonengaging position with respect to the fixed contact of said second lead whenever pressure on said button which has moved said contactor in said one direction is released thereby permitting intermittent turning over of said engine without starting the same by intermittently applying pressure to said button in said one direction.

3. A device as set forth in claim 2 in which there are means for releasably holding said button in its position with the contactor simultaneously engaging the fixed contacts of the first and third leads so that the engine will continue to run without pressure on the button permitting the operator to lay the housing down on a part of the vehicle and use both hands in operating on the running engine.

4. A portable, hand supported and operated, remote control device for controlling the operation of the internal combustion engine of a vehicle, comprising a housing having a portion of a size to be held in the hand, at least three flexible leads extending from said housing and having connecting means on the free ends thereof facilitating detachable connection of said leads to parts of the engine circuit, said leads being of a length sufficient to enable a mechanic to position himself at the side of a vehicle next to the engine with said flexible leads connected to

the engine circuits, one lead being connected to the vehicle battery, a second lead being connected in the starter circuit of the engine between the dashboard switch and the starter solenoid, and a third lead being connected in the ignition circuit between the dashboard ignition switch and the ignition circuit transformer, and switch means in said housing having a single operating button that is exposed through the wall of said housing for engagement by the thumb or a finger of the hand holding the housing to leave the other hand free for work on said engine, means mounting the button for movement longitudinally of the housing from a first to a second position and also mounting the button for depressing movement generally radially of said housing, a fixed contact for each lead associated with said button, said button carrying a contactor having a part in engagement with the fixed contact of said one lead in both the first and second positions of said button, said contactor having a part engageable with the fixed contact of said second lead when said button is depressed in both positions of said button, said contactor having a part engageable with the fixed contact of said third lead only in the second position of said button.

5. A portable, hand supported and operated, remote control device for controlling the operation of the internal combustion engine of a vehicle, comprising a housing having a portion of a size to be held in the hand, at least three flexible leads extending from said housing and having connecting means on the free ends thereof facilitating detachable connection of said leads to parts of the engine circuit, said leads being of a length sufficient to enable a mechanic to position himself at the side of a vehicle next to the engine with said flexible leads connected to the engine circuits, one lead being connected to the vehicle battery, a second lead being connected in the starter circuit of the engine between the dashboard switch and the starter solenoid, and a third lead being connected in the ignition circuit between the dashboard ignition switch and the ignition circuit transformer, and switch means in sad housing having a single operating button that is exposed through the wall of said housing for engagement by the thumb or a finger of the hand holding the housing to leave the other hand free for work on said engine, means mounting the button for movement longitudinally of the housing from a first to a second position and also mounting the button for depressing movement generally radially of said housing, said switch means including parts making contact between said one lead and said second lead in the depressed condition of said button and between said one lead and said third lead in the second position of said button so that said engine may be turned over without starting the engine or may be started, as suits the desires of the operator.

6. A portable, hand supported and operated, remote control device for controlling the operation of the internal combustion engine of a vehicle, comprising a housing having a portion of a size to be held in the hand, at least three flexible conductors extending from said housing and having connecting means on the free ends thereof facilitating detachable connection of said conductors to parts of the engine circuit, said conductors being separate from one another at the location of said connecting means and at least a substantial distance therefrom to facilitate connection of said connecting means to separate parts of the engine circuit, said conductors being of a length sufficient to enable a mechanic to position himself at the side of a vehicle next to the engine with said flexible conductors connected to the engine circuit, one conductor being connected to the engine circuit in energy receiving relation to the vehicle battery, a second conductor being connected in the starter circuit of the engine in spaced relation to the dashboard switch and in a location to cause the starter motor to turn over when said second conductor is supplied with electrical energy, and a third conductor being connected in the ignition circuit in spaced relation to the dashboard ignition switch to supply electrical energy to the spark plugs of the engine when said third conductor is supplied with electrical energy, and switch means carried by said housing and having a single operating button that is exposed through the wall of said housing for engagement by the thumb or finger of the hand holding the housing to leave the other hand free for work on said engine, means mounting the button for movement longitudinally of the housing from a first to a second position and also mounting the button for depressing movement generally radially of said housing, said switch means including parts making contact between said one conductor and said second conductor in the depressed condition of said button and between said one conductor and said third conductor in the second position of said button so that said engine may be turned over without starting the engine or may be started, as suits the desires of the operator.

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