March 25, 1952 R. GOLDEN 2,590,606

ELECTRICAL CONTROL CIRCUIT

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Fig. 1.

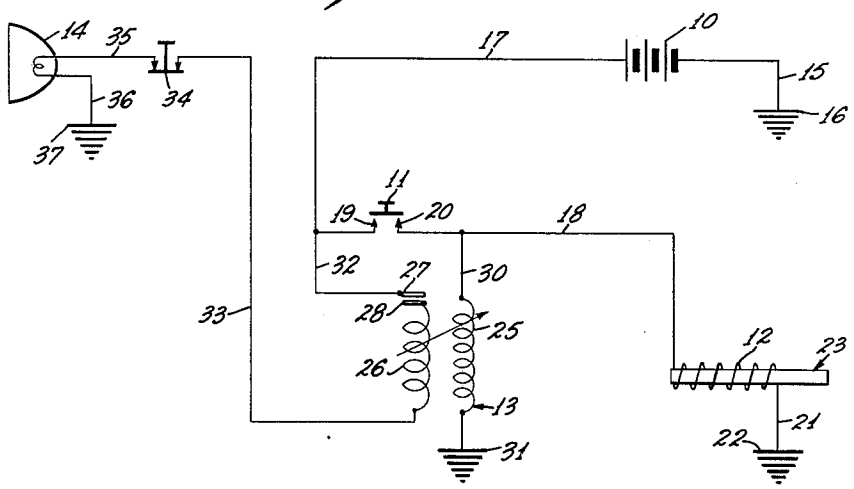
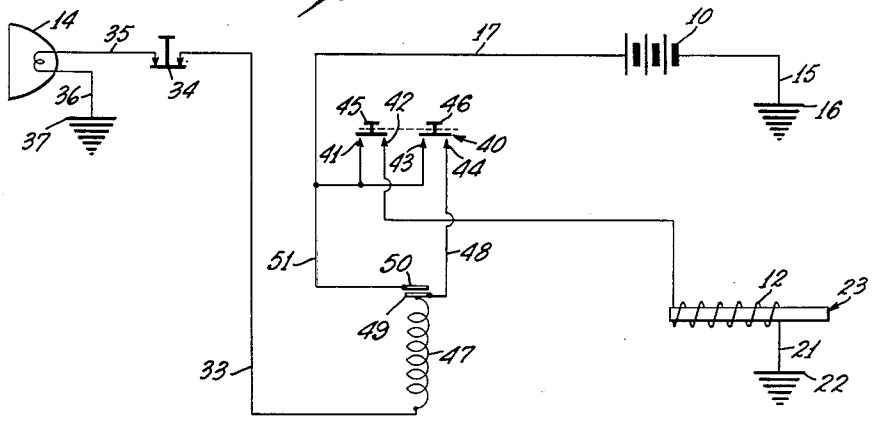


Fig. 2.



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ELECTRICAL CONTROL CIRCUIT

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My invention relates to an electrical control circuit. It was first conceived in connection with, and finds its most beneficial use on police motorcycles. It will become apparent to those skilled in the art that the circuit can also be used on police patrol cars, fire equipment, ambulances and other emergency vehicles operating both sirens and red signal lights.

Police motorcycles are uniformly equipped with an emergency siren and a red spotlight. The siren is pivotally mounted adjacent the rear wheel and is so actuated that a pulley or spindle is caused to contact the surface of the rear wheel, thereby causing the siren to rotate and emit its warning signal.

So far as applicant is aware, the motorcycles have been equipped with a lever adapted to be operated by the heel of the left foot of the rider. Such control means is satisfactory except where the rider is first starting or is endeavoring to shift the gears of the motorcycle. The clutch for releasing the gear train between the motor and the rear wheel is also operated by the left foot. When a motorcycle officer starts up after a traffic violator or in pursuit of an emergency, it becomes necessary in order to safeguard his own life to start the siren immediately. He has, therefore, been compelled to operate both the clutch and the siren control with one foot, a task which is physically impossible.

Under such circumstances, the police officer has been compelled to forego the protection of the siren while starting up into a lane of traffic or else start in such a jerky manner that loss of control of the motorcycle frequently results. An object of my invention is to provide an electrical control system whereby the siren can be engaged against the rear wheel to act as a warning signal immediately upon starting, but which leaves the left foot free to operate the clutch in the proper manner.

It is also necessary by law upon starting after an emergency or a traffic violator to, simultaneously with operating the siren, turn on a red warning spotlight, which said spotlight must remain lighted during the entire course of the emergency travel or pursuit. It is a further object of my invention to provide an electrical control system having one operating switch button, which is adapted to cause the siren to engage the rear wheel intermittently or while the button is depressed and to cause the warning spotlight to be energized and remain energized during the entire period of travel, whether the siren is operating continuously or not.

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It is a further object of my invention to place a one-button control in a position on the handlebars of a motorcycle or at a readily accessible position to be operated by the thumb or hand of the operator, so that the fullest measure of control, both as to clutching and starting, is obtained.

Other and further objects and advantages of my invention will become apparent from the drawings and the specifications relative thereto.

In the drawings:

Figure 1 is a schematic electrical diagram of my control circuit.

Figure 2 is a modification of the diagram shown in Figure 1.

As seen in Figure 1, the circuit comprises essentially a source of electrical energy, such as a battery 10, a control switch 11, a siren-operating solenoid 12, a control or holding relay, designated generally 13, and a spotlight 14.

The source of electrical energy or battery 10 is grounded by conductor 15 at 16. The battery 10 is also connected with the solenoid 12 by the conductors 17 and 18 in series with the control button 11.

The control button 11 is illustrated as a normally open switch or push button having contacts 19 and 20.

The solenoid 12 is also grounded by conductor 21 at 22.

An armature, designated generally 23, is connected to a siren (not shown) which is pivotally mounted adjacent the rear wheel of a motorcycle, so that upon depression of the control button 11, a circuit is completed from the source of electrical energy 10 through the conductor 17, contact points 19 and 20, conductor 18, solenoid coil 12 and ground 22. Upon energization thereof, the armature 23 is pulled inwardly to the center of the coil, thereby causing a pivoting motion of the siren so that its pulley or spindle will contact the rear wheels.

Thus it will be seen that immediately upon starting the motorcycle, the operator's left foot is free to operate the clutch in a proper manner, and by using the thumb of the left hand, the operator may depress the button 11 and start rotation of the siren.

Whereas, I have illustrated the solenoid 12 as having an armature 23 adapted to pivot the siren, it is clear that the solenoid 12 can be used to operate breaker points for energizing an electrically driven siren such as is used on police patrol cars, ambulances and other emergency vehicles.

The relay 13 is comprised of a coil 25, a second coil 26 and a set of breaker points 27 and 28.

The coil 25 is a comparatively high-resistance coil wound about a magnetic core and is connected by means of conductors 30 to the return side of the switch button 11 and is grounded at 31 so that upon closing the switch 11, the coil 25 will be energized, thereby magnetizing the magnetic core.

The coil 25, which is of high resistance, is known as a starter coil. The coil 26 is known as a holding coil and is wound about the same magnetic core, thereby forming a low-resistance magnetic coil.

The breaker point 27 is connected by means of conductor 32 to the hot or battery side of the control button 11. The contact point 28 is connected to one end of the holding coil 26. The other end of the holding coil 26 is connected to the spotlight 14 by means of conductor 33 through a normally closed switch 34 and conductor 35. The spotlight 14 is also grounded by conductor 36 at 37.

The contact point 27 is carried by a magnetic armature so that upon energization of the starter coil 25, the contact points 27 and 28 will complete an electrical circuit between the battery 10, conductor 17, conductor 32, contact points 27, 28, coil 26, conductor 33, switch 34, conductor 35 and the spotlight 14. The current passing through the coil 26 to the spotlight 14 will be sufficient to continue energizing the core of the holding relay 13, thereby holding the contacts 27 and 28 in closed relation.

Upon starting into a lane of traffic after an emergency or a traffic violator, a motorcycle officer need only depress the button 11 to close the contact across the points 19 and 20. This will immediately cause the siren to contact the rear wheel of the motorcycle and start emitting its warning signal. This will also magnetize the core of the relay 13 which causes closing of the points 27 and 28, thereby lighting the spotlight 14. Upon releasing the button 11, the spotlight 14 remains lighted because of the holding coil 26. This permits the operator to operate the siren intermittently which is far more effective than a continuous signal. At the end of the emergency run when the motorcycle has been stopped, the operator can depress the button 34 which is normally spring-closed, thereby breaking the circuit to the spotlight 14 and allowing the contact points 27 and 28 to separate.

Referring to Figure 2, I illustrate a modified circuit for accomplishing the same result. The principal modification lies in the control button which is designated generally 40 and comprises contact points 41 and 42, and 43 and 44, adapted to be closed by busbars 45 and 46, respectively. It will be readily apparent that the busbars 45 and 46 are operatively connected in such a manner that depressing a control button will complete the contact across both said contact points. However, the busbars 45 and 46 are electrically insulated from each other.

Similar numerals in Figure 2 represent parts which are similar to those shown in Figure 1.

The siren-control solenoid 12 is energized by means of the conductor 17, contact points 41 and 42 through busbars 45, conductor 18, conductor 21 and ground 22, so that depression of the control button will cause a pivotal movement of the siren as was described in connection with Figure 1.

A relay coil 47 is connected to the spotlight 14 by means of conductor 33, switch 34 and conductor 35. The coil 47 is connected with the battery by means of conductor 17, contact points 43 and 44 through busbar 36 and a conductor 48. A pair of contact points 49 and 50 are associated with the coil 47. The contact 49 is electrically connected thereto, so that upon energization of the coil 47, the contact point 50, which is mounted on an armature, completes the connection across the points 49 and 50 and is connected to a battery by means of conductor 51 and conductor 17.

Thus it will be seen that upon depression of the control button and the busbars 45 and 46, the solenoid 12 will be energized, thereby causing operation of the siren, and the coil 47 will be energized, thereby closing the contacts 49 and 50 and completing the circuit between the battery and the spotlight. The same current which feeds the spotlight 14 travels through the coil 47, thereby acting as a holding relay.

Releasing of the control button will not affect the operation of the spotlight 14 because of the holding relay 47, but will permit intermittent operation of the siren as desired.

Again, as in the case of Figure 1, in order to extinguish the spotlight, the switch 34 is opened, thereby breaking the circuit and releasing the contacts 49 and 50.

What I consider the essence of my invention is an electrical control system for use in connection with emergency vehicles having a solenoid adapted to control an auditory warning signal and a relay adapted to control a visual warning signal, said auditory warning signal solenoid adapted to be operated intermittently by a normally open switch, said visual warning signal adapted to be operated continuously by means of a relay circuit having a starter coil and a holding coil.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electrical circuit comprising a source of electrical energy, normally open switching means electrically connected with said source of electrical energy, an operating solenoid connected with said switching means, an electrical relay having a starter coil and a holding coil, breaker points in series between said source of electrical energy and said holding coil, said starting coil being connected with said source of electrical energy through said switching means and adapted upon energization thereof to cause closing of said breaker points, an electrically responsive device connected with said holding coil, said breaker points being also responsive to the current flowing through said holding coil, second switching means being normally closed and in series between said holding coil and said electrically responsive device and adapted to interrupt the flow of current therethrough, thereby releasing said breaker points from said holding coil.

2. An electrical circuit comprising a source of electrical energy, normally open switching means having a plurality of sets of contact points, a first electrical load connected with one set of said

contact points, a holding relay connected with another of said sets of contact points, a second electrical load connected to be energized through said holding coil, and switching means responsive to said holding coil adapted upon energization of said coil to connect said coil directly with said source of electrical energy.

3. An electric circuit comprising a source of electrical energy, normally open switching means having a plurality of sets of contact points responsive to a single manual control, a first electrical load connected with one set of said contact points, a holding relay connected with another of said sets of contact points, a second electrical load connected to be energized through said holding coil, and switching means responsive to said holding coil adapted upon energization of said coil to connect said coil directly with said source of electrical energy.

4. An electrical control circuit comprising a source of electrical energy, normally open manually operable switching means in series therewith, a first and second control circuit adapted to be connected to said source of energy by said normally open switching means, said first circuit comprising an electromagnet adapted to control a solenoid armature, said second circuit comprising a holding coil, a normally closed manually operable switching means and an electrically responsive device in series, and switching means responsive to said holding coil being adapted to connect said second control circuit with said source of electrical energy in shunt relation with said first-mentioned manually operable switching means.

5. An electrical control circuit comprising a source of electrical energy; normally open switch means having at least three terminals, the first connected to said source of energy and the second and third adapted to be connected to independent, energizable circuits, both of said circuits being energized through said switch means simultaneously upon actuation thereof; a first electrical load connected to said second terminal and constituting the first of said energizable circuits; a second electrical load, a normally closed switch, and a relay coil, connected in series and to said third terminal and constituting the second of said energizable circuits; and relay contacts, biased to open position, closed upon energization of said relay coil, and connected in shunt across said switch means, thereby maintaining said relay and second load energized after opening of said switch means, whereby said first load is energized only when said switch means is held closed, while said second load is energized continuously after initial closing of said switch means and until opening of said normally closed switch.

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