

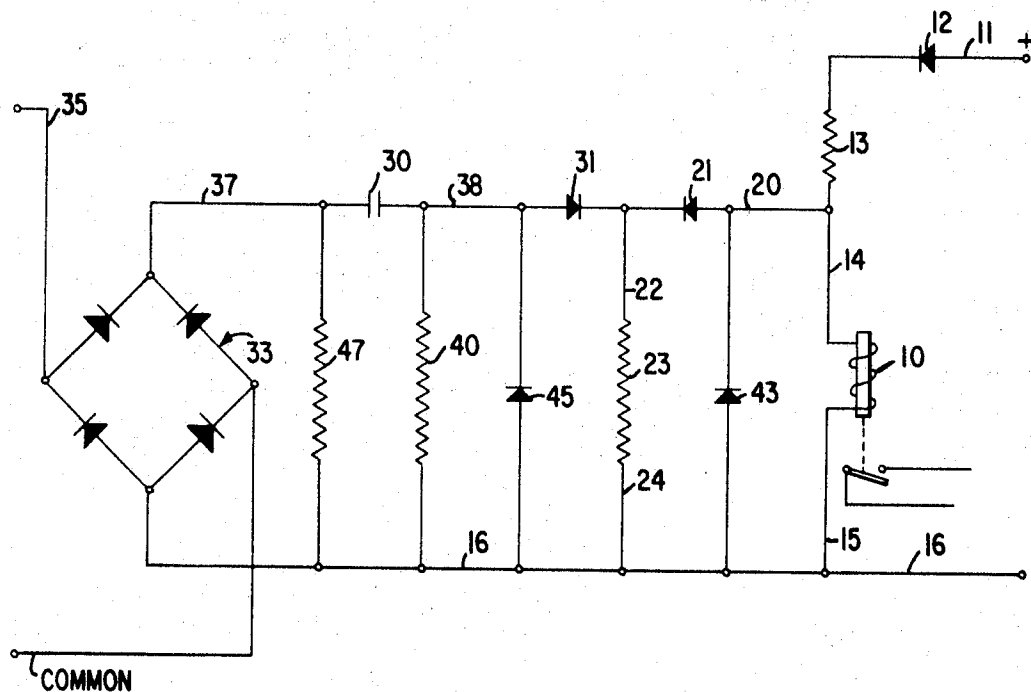
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R. F. CURTIS

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TRAFFIC SIGNAL SYSTEM

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INVENTOR.

RICHARD F. CURTIS.

BY

D. Emmet Thompson

ATTORNEY.

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3,434,016

TRAFFIC SIGNAL SYSTEM

Richard F. Curtis, Liverpool, N.Y., assignor to Crouse-Hinds Company, Syracuse, N.Y., a corporation of New York

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5 Claims

ABSTRACT OF THE DISCLOSURE

A system for switching traffic signals from the traffic signal controller to a flasher containing a relay in parallel with a shunting circuit comprised of a resistor and diode in series. Normally, the effect of the resistor is to hold the current in the relay below the pull in but above the hold in current value. The resistor is, however, effectively removed from the shunting circuit when a control pulse passes through a control circuit capacitor and second diode rendering the first diode non-conductive. With the resistor thus rendered ineffective, the relay receives pull in current.

This invention relates to a system for switching traffic signals at a highway intersection from the traffic signal controller to a flasher. In many installations, it is desirable, during a certain period of the day, to transfer traffic signals at a highway intersection from the cyclic controller to a flasher to effect an intermittent flashing display of certain signal indications, as the caution, or stop, signals.

In transferring from the cyclic controller to the flasher, it is preferable to do so at the beginning of the display of the green, or go, signal to one of the streets of the intersection, preferably at the beginning of the display of the go signal to the main street. With this arrangement, the transfer to the flashing display is less confusing to vehicle operators. This transfer, at present, is effected by providing the cyclic controller with a cam actuated contact operatively paired with the main street go indication, the contact being operable in conjunction with energization of a circuit from headquarters to pull in a relay effecting the switching of the signals from the cyclic controller to the flasher.

The invention has as an object a compact solid state system which may be fabricated in the form of a small module which may be conveniently connected in the traffic signaling system, as by jack mounting and accordingly, adapted to be used in conjunction with any conventional cyclic controller.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing which is a schematic diagram of the system embodying my invention.

10 designates the coil of a relay which, when energized, is effective to disconnect the cyclic controller from the signals, and to connect the flasher thereto. The relay coil 10 is connected in a circuit energized from headquarters, or the master station. Line 11 indicates the positive side of the circuit. The circuit extends through a diode 12, resistor 13, wire 14, relay coil 10, wire 15, to the common side 16. The relay coil 10 is fabricated to have a pull-in current of predetermined value, and a drop-out current of lower value than the pull-in value. For example, the pull-in current value may be three milliamperes, and the drop-out value may be .5 of a milliamperes.

There is a branch circuit connected in shunt with the relay coil. This circuit consists of wire 20 connected to the bottom of resistor 13, diode 21, wire 22, resistor 23, wire 24, to the common 16. The cathode of the diode 21

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is connected to the top of the resistor 23. In other words, the diode 21 is arranged to conduct with current flowing from wire 14, to the resistor 23. The value of the resistor 23 in the shunt circuit is such as to maintain the current value in the relay coil 10 below the pull-in value, but above the drop-out current value of the coil. Accordingly, when power is applied from the master station to wire 11, the relay will not pull in. Means is provided for rendering the diode 21 non-conductive so the branch shunting circuit becomes ineffective upon which event, the current flow through the relay coil 10 rises above the pull-in value, and the relay is pulled in to effect substitution of the flasher for the cyclic controller.

The diode 21 is rendered ineffective by applying a plus pulse to the cathode of diode 21. To effect this operation, a DC controller circuit is provided which includes a capacitor 30 connected in the plus side of the control circuit and in series with a second diode 31. The cathode of the diode 31 is connected to the cathode of diode 21 and to the top of the resistor 23. Accordingly, when the control circuit is initially energized, a pulse is transmitted from the capacitor 30, through the diode 31, to the cathode of diode 21, and the voltage in the control circuit is equal to the voltage appearing on line 11. Accordingly, the diode 21 is blocked, removing the effectiveness of the shunt circuit to effect pull-in of the relay 10, as will be apparent.

The DC control circuit is provided by a full wave rectifier 33, one side of the input of which is connected by wire 35 to the cyclic controller to be energized contemporaneously with energization of one of the controller output signal circuits as, for example, the go signal indication to the main street at the intersection. The positive side 37 of the output of the rectifier is connected to the capacitor 30 and by wire 38 to the anode of diode 31, the capacitor 30 serving to produce a pulse through the diode 31 to the cathode of the diode 21, which pulse is of sufficient duration to permit relay 10 to pull in. A resistor 47 is connected across the control circuit to provide a discharge for the capacitor 30.

It will be observed that with this arrangement, the shunting circuit to relay coil 10 is rendered ineffective only upon the initial energization of the control circuit. Accordingly, regardless of when voltage is applied to the line 11 from the master station, the relay 10 will pull in only upon the initial energization of the control circuit which, as previously stated, is coincident with the initial energization of the main street go signal. If the line 11 is energized subsequent to the display of the main street go signal, the relay 10 will not pull in because the pulse through capacitor 30 will be dissipated through the resistor 40. Full wave rectification for the control circuit is preferred inasmuch as the controllers at the various intersections of the traffic signaling system pick up power locally at the intersection, and the local power supply may be out of phase with the power supply at the master station providing the DC power to line 11.

A diode 43 may be connected in parallel with the relay coil and the shunting circuit to make certain that the plus supply from line 11 is fed through the diode 21 to the shunting circuit. In like manner, an additional diode 45 may be connected across the control circuit to make certain the pulse through capacitor 30 is directed through the diode 31 to block diode 21. A filtering resistor 40 may be connected across the output of the rectifier following the capacitor 30.

The components disclosed in the circuitry can be assembled on a very small module printed board for convenient adaptation to any cyclic controller now in operation.

What I claim is:

1. A system for switching traffic signals from a con-

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troller to a flasher including a relay normally connecting the controller to the signals and, when energized, disconnecting the controller and connecting the flasher to the signals, said relay having a pull in current of predetermined value, and a drop out current of lower value than said pull in current value, the coil of said relay being connected in a DC circuit energized from a master station, a branch circuit shunting said relay coil, said shunt circuit including a diode connected in series with a resistor, said resistor having a value to hold the current in said relay coil below the pull in current value, but above the drop out current value of said relay coil, and means operable only upon initial energization of one signal circuit output from said controller to render said diode non-conductive.

2. A system for switching traffic signals from a controller to a flasher including a relay normally connecting the controller to the signals and, when energized, disconnecting the controller and connecting the flasher to the signals, said relay having a pull in current of predetermined value and a drop out current of lower value than said pull in current value, the coil of said relay being connected in a DC circuit energized from a master station, a branch circuit shunting said relay coil, said shunt circuit including a first diode connected in series with a resistor, with the cathode of said diode connected to the resistor, said resistor having a value to hold the current in said relay coil below the pull in current value but above the drop out current value of said relay coil, a DC control circuit energized by one signal circuit output from said controller, said control circuit including a capacitor connected in series with a second diode, the

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cathode of said second diode being connected to the junction between said first diode and said resistor, whereby upon initial energization of said one signal circuit, the pulse through said capacitor is effective to render said first diode non-conductive.

3. A system according to claim 2, including a circuit connected in parallel with said relay coil, said circuit including a third diode having the cathode thereof connected to the anode of said first diode.

4. A system as set forth in claim 2, including a circuit connected in parallel with said resistor and including a fourth diode, the cathode of said fourth diode being connected to the anode of said second diode.

5. A system according to claim 2, including a resistor connected across said control circuit intermediate said capacitor and said second diode, said resistor having a value to effect discharge of said capacitor subsequent to the transmission of the pulse to said first diode.

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JOHN F. COUCH, *Primary Examiner*.

DENNIS J. HARNISH, *Assistant Examiner*.

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