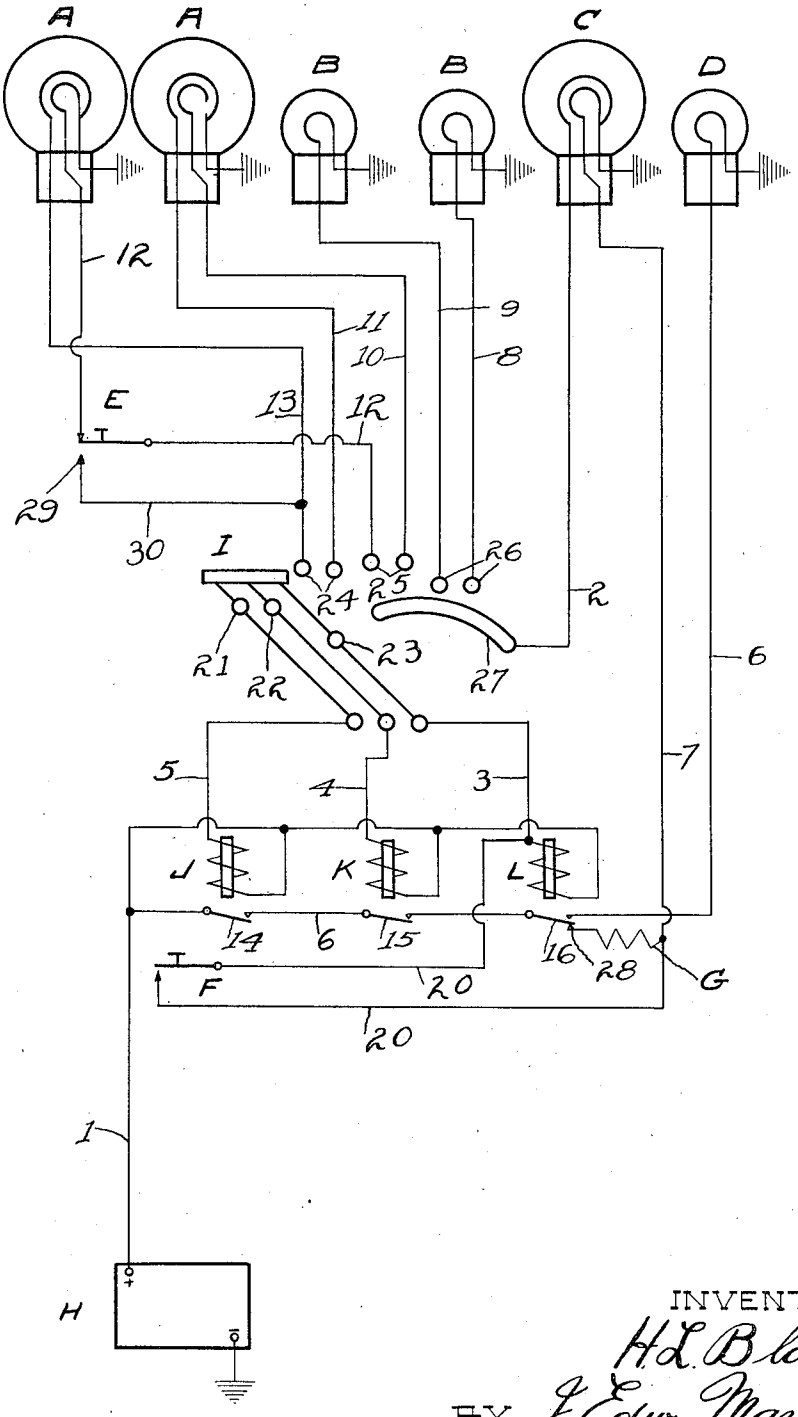
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APPARATUS FOR INDICATING AN OPERATIVE CONDITION OF VEHICLE LIGHTS

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APPARATUS FOR INDICATING AN OPERATIVE CONDITION OF VEHICLE LIGHTS

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This invention relates more particularly to the lighting systems of motor vehicles in which two or more sets of lights are employed, some of which are arranged in pairs of which both lights must be lit at the same time when conditions require lights to be used, and my object is to provide means whereby an indication is given when any running lights switched on for use at any given time are actually in operation.

A further object is to obtain indications of the operative condition of two pairs of headlights and a tail light using no more than three electromagnets each with a single winding.

A further object is to provide means whereby when a running light used as a tail light is extinguished, the circuit of another light is closed to replace that extinguished.

A further object is, when the replacement light is a signal light generally known as a "stop light", to provide means whereby the luminosity of the light is greater when used to signal than when merely serving as a tail light.

I attain my object by means of the constructions hereinafter described and illustrated in the accompanying diagram which shows a complete lighting system constructed in accordance with my invention.

In the drawing A^A, B^B, C, D are electric light bulbs of the type in which their circuits are completed by ground connections. The lights B^B and D are of the single filament type, the lights BB being intended for parking lights and the light D as an indicator light.

The lights AA are of the double filament type used for headlights, one filament being for the "bright" light and the other for "dim".

The light C is a double filament light, one filament being for use as a signal or stop light and the other as a tail light. It will be understood, of course, that separate lights might be used instead of lights with double filaments.

Referring to the diagram, the battery H is shown as grounded at one side. From the other side of the battery extends a conductor 1 which is connected in parallel to one end of the coil of each of the electromagnets J. K. L.

The other ends of the coils are connected by the conductors 5, 4 and 3 with the contacts 21, 22 and 23 of the movable part of a switch I. The switch is provided with pairs of fixed contacts 24, 25 and 26 adapted to be contacted in pairs by the contacts 21 and 22. Conductors 8 and 9 lead from the contacts 26 to the filaments of the lights BB, conductors 10 and 12 lead from the contacts 25 to similar filaments of the lights AA, and conductors 11 and 13 lead from the contacts 24 to the other filaments of the lights AA.

The switch I is provided with an elongated fixed contact 27 from which a conductor 2 leads to the tail light filament of the light C. When the movable contacts 21, 22 of the switch I are engaged with any pair of fixed contacts 24, 25, 26 the contact 23 is engaged with the contact 27.

Under such conditions it will be seen that, if the lights and connections are all in good condition, circuits will be completed through all the electromagnets J. K. L. which magnets are used to control the indicator signal provided by the light D. The filament of this light is connected by the conductor 6 with the battery preferably by tapping it into the conductor 1.

The electromagnets J. K. L. are provided with the armatures 14, 15 and 16 forming switch members adapted to open and close the indicator circuit 6. When the magnets are energized the circuit is closed and the indicator light D lights up and remains alight as long as all the lamps in series in the coils of their respective magnets remain lit, but as soon as any one of such lights fails the circuit of the corresponding electromagnet is broken and its armature drops breaking the indicator circuit so that the indicator light promptly goes out.

To cause the stop light filament of the light C to take the place of the tail light filament, I provide the following means. The conductor 7 extends from the filament to a back stop 28 engageable by the armature 16 when the electromagnet L is de-energized by the failure of the tail light. If the other running lights in use are in working condition and the switches 14 and 15 therefore closed the circuit of the stop light is completed through the indicator circuit 6 and the conductor 1 to which it is connected. Preferably a resistance G is included in the conductor 7 to cut down the normal brilliancy of the stop light when thus used as a tail light.

To increase its brilliancy to enable it to function as a signal or stop light, I position the stop light switch F in a conductor 20 which taps the conductor 3 adjacent the electromagnet L and the conductor 7 between the resistance G and the stop light filament. Thus, when the switch F is closed, the resistance G is shunted and the stop light filament increases in brilliancy to give the desired signal. At the same time the electromagnet L is energized and closes the indicator circuit, thus notifying the driver that his stop light is functioning properly. When no running lights are in use and the stop light switch F is

closed the stop light circuit is from ground, through the stop light filament, the conductors 7 and 20, the closed switch F, the coil of the electromagnet L, and the conductor 1 to the battery H.

Thus, if the stop light is functioning as a tail light, it is merely necessary to close the switch F to get an indication that the stop light so continues to function, but this indication can only be given as long as the switches 14 and 15 are closed, that is if the headlights in use are properly functioning. It follows that, if the indicator light, which has been illuminated, goes out, the driver can tell by closing the switch F whether it is a headlight or tail light which has gone. If the indicator light remains out it is a headlight which is gone. If the indicator light again lights up it is the tail light which has gone.

While it forms no part of my invention, I show a dimming switch E in the conductor 12 which is normally closed. A back contact 29 is provided for this switch connected by the conductor 30 to the conductor 13.

When the contacts 21, 22 of the switch I are engaged with the contacts 25 the bright filaments of the headlights are illuminated, assuming the switch E is in its closed position as shown. If however the switch is depressed the circuit of the bright filament of the near headlight is broken and the circuit of the dim filament closed at the switch instead.

It is necessary to observe that the electromagnets must be wound so that they are responsive to the current flowing through lights of the lowest candle power employed.

What I claim as my invention is:

1. In a vehicle signal system the combination of a running light; a circuit therefor; an electromagnet in said circuit; a signal light; a signal light circuit normally open; a switch therein controllable by the electromagnet to close the signal light circuit when the electromagnet is deenergized and thus substitute the signal light for the running light; an indicator light; an indicator light circuit; a switch in said indicator circuit controllable by the electromagnet to close the indicator circuit when the magnet is energized and the running light circuit is operative; a resistance in the circuit of the signal light to dim its maximum luminosity; a shunt circuit connected with the signal light circuit adapted, when closed, to by-pass the resistance and the switch in the indicator circuit; and a switch in the shunt circuit adapted to open and close said circuit.

2. In a vehicle signal system the combination of a running light; a signal light; an indicator light; a battery, one side of each light and the battery being grounded; a conductor leading from the running light to the battery; an electromagnet having its coil in series in said conductor; a switch in said conductor between the running light and coil; a conductor leading from the signal light and tapping the first mentioned conductor between the coil and the running light at a point whence the path to the battery is permanently closed; a switch in the last mentioned conductor; a conductor leading from the indicator light and tapping the first mentioned conductor between the coil and the battery at a point whence the path to the battery is permanently closed; a switch in the last mentioned conductor controllable by the electromagnet to close a circuit through said conductor and light the indicator light when the electromagnet is energized; a back contact for said switch; and a conductor leading from said back contact to the conductor which leads from the signal light to light the latter when failure of the running light has broken the circuit through the coil of the electromagnet.

3. A vehicle signal system according to claim 2 in which a resistance is included in the conductor leading from the back contact of the switch to the conductor leading from the signal light.

4. In a vehicle signal system the combination of a running light; a circuit therefor normally closed; a signal light; a circuit therefor normally open and including a resistance; means whereby the opening of the running light circuit closes the signal light circuit to cause the signal light to replace the running light; a by-pass circuit tapping the signal light circuit between the resistance and the light; and a switch in said circuit manually operable, to close the circuit and thus by-pass the resistance to increase the brilliance of the signal light to give a signal.

5. In a vehicle signal system the combination of a pair of running lights; an indicator light; a battery, one side of each light and the battery being grounded; a pair of electromagnets each having a single coil; means for connecting the coils of said electromagnets in series with the pair of lights and with the battery; an indicator circuit connected with the battery and the indicator light and including a pair of switches adapted to be closed by the electromagnets when the latter are energized; a single running light; a signal light, one side of each light being grounded; an electromagnet having its coil in series with the single running light and battery when the pair of running lights is so connected; a normally open circuit for the signal light; means whereby the de-energizing of the last mentioned electromagnet closes the circuit of the signal light; a shunt circuit connected to the circuit of the signal light between the last mentioned means and the light and connected with the circuit of the last mentioned electromagnet to form a connection with the battery through the coil of the said electromagnet; and a manually operable switch in said shunt circuit.

6. In a vehicle signal system the combination of a running light; a circuit therefor; an electromagnet in said circuit; a signal light; a signal light circuit normally open; a switch therein controllable by the electromagnet to close the signal light circuit when the electromagnet is deenergized and thus substitute the signal light for the running light; an indicator light; an indicator light circuit; the switch aforesaid being controllable by the electromagnet to close the indicator circuit when the magnet is energized and the running light circuit is operative; a shunt circuit connecting the signal light circuit and the coil of the electromagnet by-passing the switch in the indicator circuit and adapted when closed to energize the electromagnet and thus close the indicator circuit while maintaining the signal light circuit closed; and a switch in said shunt circuit adapted to open and close said circuit.

7. In a vehicle signal system the combination of a running light; a circuit therefor; an electromagnet in said circuit; a signal light; a signal light circuit normally open; a switch therein controllable by the electromagnet to close the signal light circuit when the electromagnet is deenergized and thus substitute the signal light for the running light; an indicator light; an indicator light circuit; the switch aforesaid being control-

lable by the electromagnet to close the indicator circuit when the magnet is energized and the running light circuit is operative; a resistance in the circuit of the signal light to dim its maximum luminosity; a shunt circuit connecting the signal light circuit and the coil of the electromagnet by-passing the resistance and the switch in the indicator circuit and adapted when closed to by-pass the resistance and to energize the electromagnet and thus close the indicator circuit while maintaining the signal light circuit closed; and a switch in said shunt circuit adapted to open and close said circuit.

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