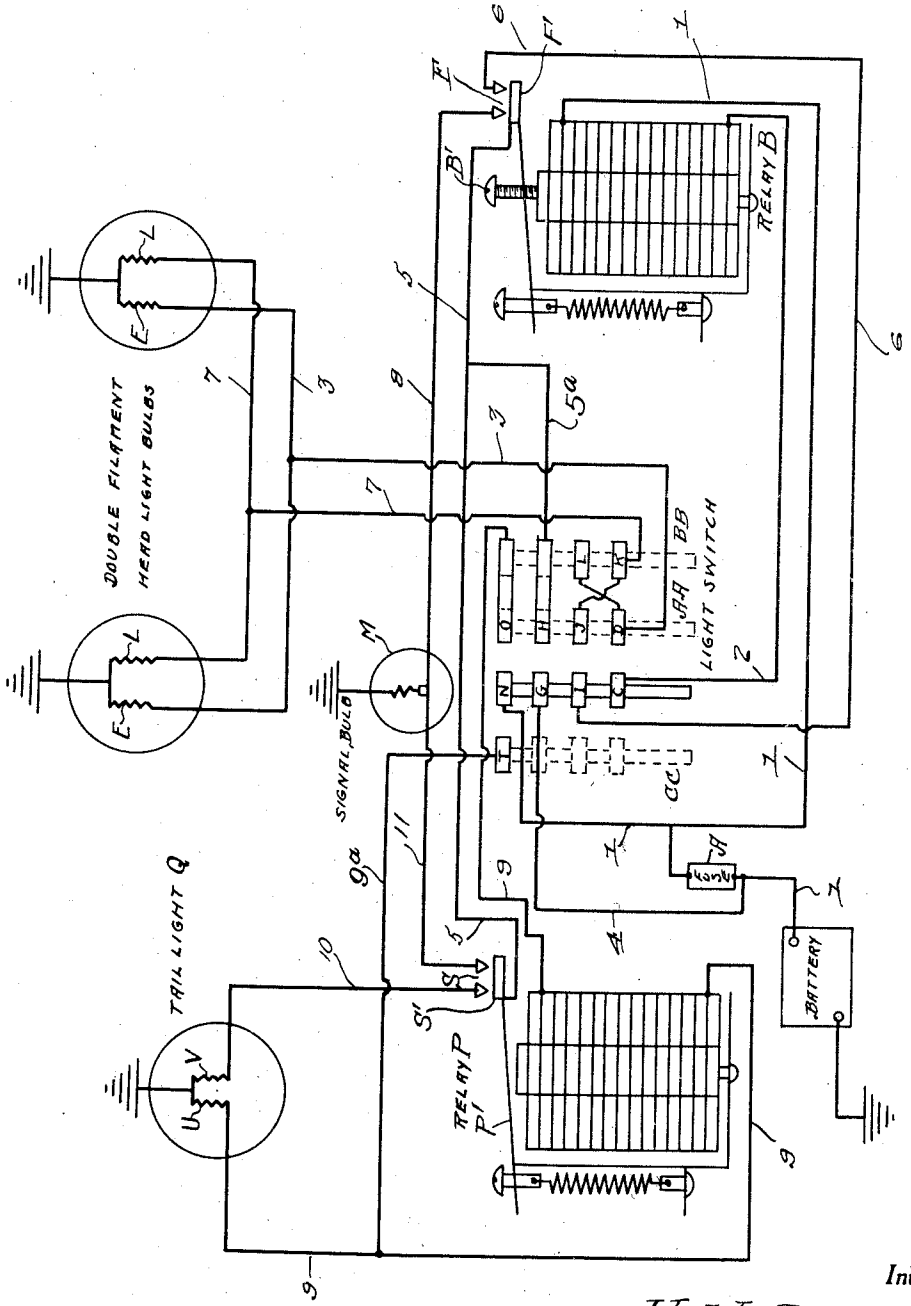
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LIGHTING SYSTEM CONTROL

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LIGHTING SYSTEM CONTROL

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My invention relates purely to electrical lighting systems, and particularly to motor vehicle lighting systems of the conventional type, and an important object of my invention is to provide means in such a lighting system which when set, will automatically operate certain portions of the lighting system upon the failure of other portions, and at the same time give warning of the existence of a defective condition in the lighting system.

It is also an important object of my invention to incorporate in a system of the class described involving head lamps having double filaments and a tail lamp or lamps having double filaments, means for controlling the head lamps and the tail lamp, so that upon the failure of either filament in either one or both of the head lamps or in either one or both of the tail-lamps, an automatic change-over will be effected from the bright to the dim filaments of the head lamps or vice versa, the tail lamp or lamps being kept practically continuously illuminated except in case of the failure of both filaments thereof.

It is also an important object of my invention to provide signal means in a system of the type described for automatically apprising the operator of the occurrence of a changeover, whether conditioned by the failure of a filament or by the "blowing" of a fuse incorporated in the lamp circuits.

It is also an important object of my invention to provide control means in a system of the type described which is very simple and inexpensive to construct, and which can be easily and cheaply installed, and which is not subject to become out of order easily, and is constructed and arranged according to the best modern standards of efficiency and capability of being produced in quantity.

Other objects and advantages of my invention will be apparent from a reading of the following description in connection with the drawing, wherein for purposes of illustration I have shown a preferred embodiment of my invention. It will be understood that the drawing shows only one form of wiring system, other systems being capable of being adapted for reception of the arrangement of the invention, and the arrangement of the invention being readily adapted to other lighting systems.

In the drawing the single view is a diagrammatic representation of the embodiment showing the manner of its incorporation in one conventional form of automobile lighting system.

The light switch designated in the drawing will preferably be mounted upon the steering wheel post of the vehicle so as to be capable of being readily and accurately operated by the operator, several suitable forms of which will readily occur to those skilled in the art, and any suitable kind of relays may be utilized which are of simple and positive acting type. Those shown are equipped with springs to positively move the armatures. It will be understood that both the head lamps and the tail lamp are of the double filament type, so that the change-over may be made from one filament to the other by the automatic action of the relays as one of the filaments burns out or becomes in some other manner disabled. It is believed that a suitable construction and arrangement of the parts shown in the drawing is evident, and that the coordination and operation thereof will be evident from the following.

Any suitable form of light switch may be utilized which comprises a single contact T, and aligned and spaced from this a double length contact O, and laterally spaced from this another double length contact H, and laterally spaced from the contact H, two laterally spaced pairs of aligned contacts J, X, and D, K, respectively. The switch arm carries contacting element N for engaging either contact T or contact O when in an "on" position, contacting element G for engaging only contact H, contacting element I for engaging either contact J or contact X, and contacting element C for engaging either contact D or contact K.

As shown contacts J and K are connected together, as are contacts D and X. Contact D is connected by conductor 3 to the E filaments of two or more double filament head lamp bulbs, and the remaining filaments L of these bulbs are connected by conductor 7 to the contact K. The contact T is connected by a conductor 9a to the conductor 9 which has one end connected to the filament U of the tail lamp bulb Q and its remaining end connected to one side of the magnet coil of the relay P. The remaining side of the said magnet coil is connected by a continuation of the conductor 9 to the double length switch contact O.

The contacting element N of the switch arm is connected by one of two branches of a conductor 1, through a fuse A, to one side of the battery. The remaining branch of the conductor 1 connects with one side of the magnet coil of the relay B, whose remaining side is connected by conductor 2 to the contacting element C of the switch arm. The contacting element G is connected by

a conductor 4 to the portion of the conductor 1 which is between the battery and the fuse A.

The contacting element 1 of the switch arm is connected by a conductor 6 to one of a pair of relay contacts F of the relay B.

The remaining one of the relay contacts F of the relay B is connected by the conductor 8 to the signal bulb M. One of the pair of relay contacts S belonging to the relay P is connected to bulb M by conductor 11. The remaining one of the relay contacts S is connected by a conductor 10 to the filament V of the tail lamp bulb Q with the filament U of which the conductor 9 has already been described as connected.

The only conductor remaining undescribed is conductor 5 and its single branch 5a. The conductor 5 connects the relay armature contacting element F' of relay B with the relay armature contacting element S' of relay P, while its branch 5a connects the conductor 5 to the double length light switch contact H.

It is to be noted that any arrangement of switch equivalent to that shown and described above is contemplated by the invention.

The relay B includes the spring tensioned armature which carries the relay contacting element F' in closing and opening relation to the relay contacts F. The conventional arrangement of screw B' which is threaded in the armature to engage the magnet and is utilized to adjust the spacing of the armature away from the magnet of the relay so that the armature will be held in the attracted position only when both of the head lamp bulb filaments and the wires leading thereto are intact. In such a case a larger amount of magnetic flux is produced in the magnet than is the case when only one of these filaments or wires or none of them is intact. In the latter case insufficient magnetic flux obtains in the said magnet to retain the armature in the attracted position and the armature is moved by its spring to the relay contact closing position, which action effects the transfer of energization from the faulty filament to the remaining intact filament.

The relay P has a similar spring tensioned armature P', which, however is not provided with an adjusting screw such as the screw B' used for adjusting the sensitivity of the relay B.

As shown in the drawing in full lines the switch arm occupies an "off" or neutral position. When the switch arm is moved to the dotted line position designated A—A is contacting elements N, G, I, C engage switch contacts O, H, J, D, respectively. With the head lamp filaments E intact this brings about a flow of current from the grounded battery through the conductor 4, through contacting element G and contact H, through conductor 5a, and conductor 5 to the armature contacting element F' of the relay B and the armature contacting element S' of the relay P. Current from the battery also flows through the fuse A to both branches of conductor 1. Through one of these branches the current flows through contacting element N and contact O to one side of the magnet coil of the relay P, and the remaining branch carries the current to one side of the magnet coil of the relay B. The current flows from the remaining side of the magnet coil of relay B through switch arm contacting element C, switch contact D, and conductor 3 to the E filaments of the head lamp bulbs thence to the ground as indicated. The current which makes the E filaments light sufficiently energizes the magnets of the relays to retain their armatures in the attracted positions in which the armature contacting elements F' and S' are disengaged from their pairs of contacts F and S, respectively.

However, as soon as one or both of the E filaments or the wires leading thereto become inoperative or burn out, the energization of the magnet of relay B will be reduced to such an extent that sufficient magnetic flux no longer obtains to hold the armature B' in its attracted position, and the spring tensioning the armature B' snaps the armature into engagement with the pair of relay contacts F and bridges the same. The effect of the bridging of the relay contacts F is to establish a circuit through the conductor 6, through contacting element 1, and contacts J and K, through conductor 7 to the filaments L, L and back to the battery through the ground. The remaining side of the battery is connected into this circuit to energize the filaments L, L through conductor branch 5a and the conductor 5. With the relay contacts S bridged, which may occur at the time the relay contacts F become bridged, the battery feed line 5 energizes also the changed over filament of the tail lamp bulb Q.

With the switch arm in the dotted line position designated BB, the functioning of the circuit is substantially as described above except that the functioning starts with the incapacitating of the head lamp filaments L, L instead of with the head lamp filaments E, E.

When the U filament of tail-lamp bulb Q or the wires leading thereto become inoperative or burn out, the magnet of relay P becomes deenergized and its armature is permitted to bridge the relay contacts S, which establishes a circuit through switch contact element G and contact H, through conductor 5a, through conductor 5, through relay contacts S and through conductor 10 to the intact filament V of the tail-lamp, thereby lighting the same. The relays P and B work independently of each other.

With the switch arm in the dotted line position or parking position designated C, C the flow of current from the battery is directly through switch arm contact element N, and contact T, conductor 5a, and conductor 9 to one of the filaments of the tail lamp bulb, and through the ground and back to the battery again.

Current from the battery flows through the magnet coils of the relays only in positions A, A and B, B of the switch arm.

As soon as either of the relay contacts F or S become bridged as a result of the burning out of a tail or head lamp filament or their feed wires and a corresponding action of one or both of the relays, the conductor 8 between which and the ground the warning bulb M is located, is connected to the battery feed line 5 so as to energize the warning bulb M and apprise the operator of the automobile of the occurrence of the change-over.

It will be observed that because of the arrangement of the head lamp relay B to retain its armature in the attracted position only when current is flowing normally through a filament in each of the two head lamps, the operator knows that whether the bright or the dim filaments are in use he has both head lamps burning when the lights are on; since in the event the filament in only one head lamp burns out, there will not be sufficient current to retain the armature of relay B in the attracted position, and a change-over must take place.

If the fuse A should "blow" while the switch

arm is in either the A, A or B, B position, current flow to the relay B would, of course, cease. By this deenergization of relay B its armature is released from its attracted position so that its contacting element F' bridges relay contacts F and the warning light M is thereby energized and indicates the presence of trouble, and a changeover is effected.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto, and any change or changes may be made in material and structure and arrangement of parts, within the spirit of the invention and the scope of the subjoined claims.

What is claimed is:—

1. In a control for an automobile lighting system consisting of a pair of head lamp bulbs each containing a first filament and a second filament, a source of electrical energy connectible to either the first or the second set of filaments of said pair of head lamp bulbs and normally connected to one of the sets of flaments, a head lamp relay interpolated between the first and second set of filaments of the head lamp bulbs and said source of electrical energy, said relay having means operable upon the failure of one of the filaments of one set of head lamp bulb filaments to disconnect such set and connect the remaining set to the source of electrical energy, said means being arranged to have an initial position electrically conditioned upon soundness of both of the filaments of a set, and to have a different position conditioned upon the failure of one of the last mentioned filaments.

2. In a control for an automobile lighting system consisting of a pair of head lamp bulbs each containing a first filament and a second filament, a source of electrical energy connectible to either the first or the second set of filaments of said pair of head lamp bulbs, a head lamp relay interpolated between the first and second set of filaments of the head lamp bulbs and said source of electrical energy and having means operable upon the failure of one or both of the filaments of one set of head lamp bulb filaments to deenergize such set and energize the remaining set, said means being arranged to have an initial position electrically conditioned upon soundness of both of the filaments of a set, and to have a different position conditioned upon the failure of one or both of the last mentioned filaments, a tail lamp bulb containing a first filament and a second filament, a tail lamp relay interposed between said source of electrical energy and connected to said head lamp relay and having means operable to deenergize one of the tail lamp bulb filaments and energize the remaining tail lamp bulb filament either upon failure of one or both of the head lamp bulb filaments or upon failure of one of the tail lamp bulb filaments.

3. In a control for an automobile lighting system consisting of a pair of head lamp bulbs each containing a first filament and a second filament, a source of electrical energy connectible to either the first or the second set of filaments of said pair of head lamp bulbs, a head lamp relay interpolated between the first and second set of filaments of the head lamp bulbs and said source of electrical energy, and having means operable upon the failure of one or both of the filaments of one set of head lamp bulb filaments to deenergize such set and energize the remaining set, said means being arranged to have an initial position electrically conditioned upon soundness of both of the filaments of a set, and to have a different position conditioned upon the failure of one or both of the last mentioned filaments, fuse means interpolated between said source of electrical energy and said sets of head lamp bulbs and head lamp relay and adapted upon "blowing" to deenergize the active set of head lamp bulbs and said head lamp relay by causing the head lamp relay means to assume said different position and energize the remaining set of head lamp bulb filaments.

4. In a control for an automobile lighting system consisting of a pair of head lamp bulbs each containing a first filament and a second filament, a source of electrical energy connectible to either the first or the second set of filaments of said pair of head lamp bulbs, a head lamp relay interpolated between the first and second set of filaments of the head lamp bulbs and said source of electrical energy and having means operable upon the failure of one or both of the filaments of one set of head lamp bulb filaments to deenergize such set and energize the remaining set, said means being arranged to have an initial position electrically conditioned upon soundness of both of the filaments of a set, and to have a different position conditioned upon the failure of one or both of the last mentioned filaments, a tail lamp bulb containing a first filament and a second filament, a tail lamp relay interpolated between said source of electrical energy and connected to said head lamp relay and having means operable to deenergize one of the tail lamp bulb filaments and energize the remaining tail lamp bulb filament either upon failure of one or both of the head lamp bulb filaments or upon failure of one of the tail lamp bulb filaments, electrical signal means energized by either the first or second mentioned relay means in the said different position thereof.

5. In a control for an automobile lighting system consisting of a pair of head lamp bulbs each containing a first filament and a second filament, a source of electrical energy connectible to either the first or the second set of filaments of said pair of head lamp bulbs, a head lamp relay interposed between the first and second set of filaments of the head lamp bulbs and said source of electrical energy, said relay having means operable upon the failure of one of the filaments of one set of head lamp bulb filaments to disconnect such set and connect the remaining set, said means being arranged to have an initial position electrically conditioned upon soundness of both of the filaments of a set, and to have a different position conditioned upon the failure of one of the last mentioned filaments, adjusting means for said means operable to adjust the responsiveness of said means whereby a sound condition of only one of the filaments of a set will be inadequate to hold said means in said initial position and a sound condition of both of the filaments of a set will be necessary to hold said means in said initial position.

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