July 4, 1944. H. R. ANNIS 2,352,679

ILLUMINATION CONTROL MEANS

Filed July 7, 1942 2 Sheets-Sheet 1

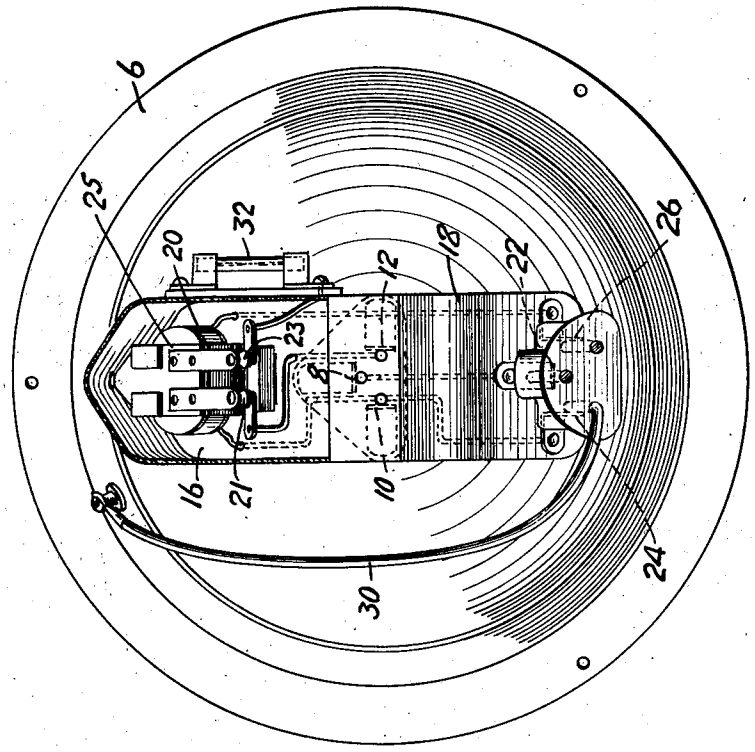


FIG. 2.

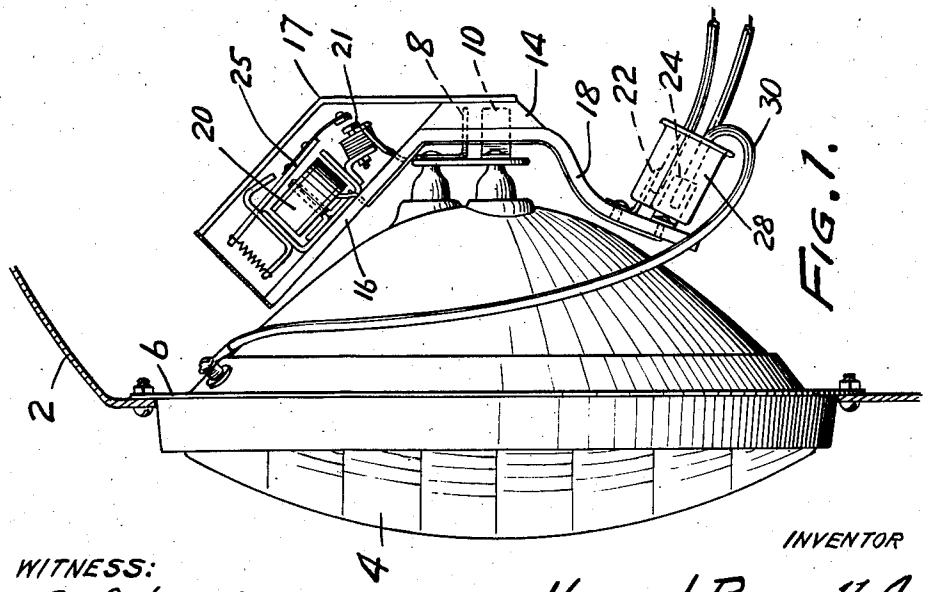


FIG. 1.

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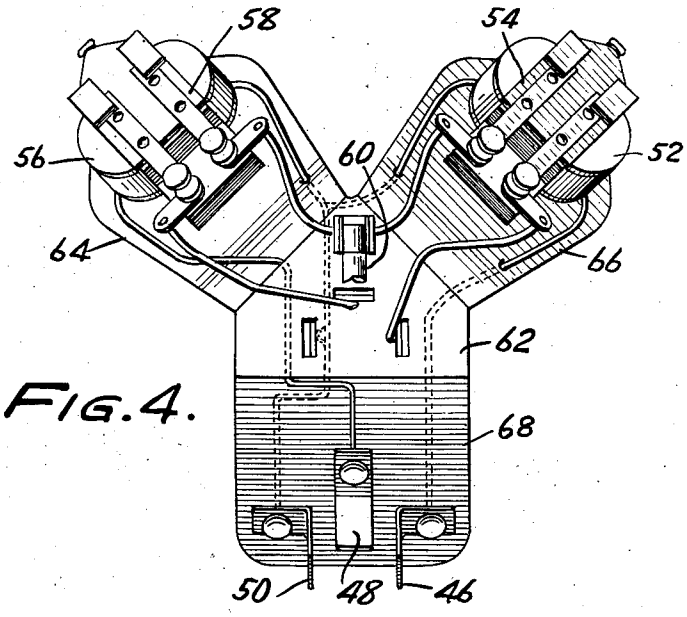


FIG. 4.

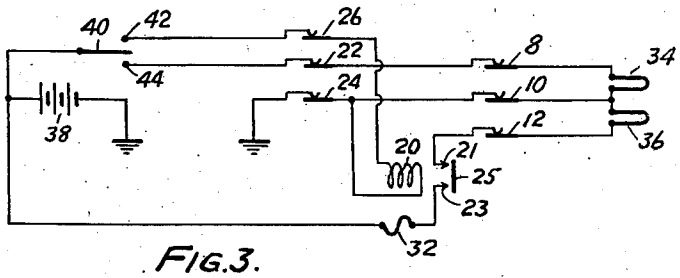


FIG. 3.

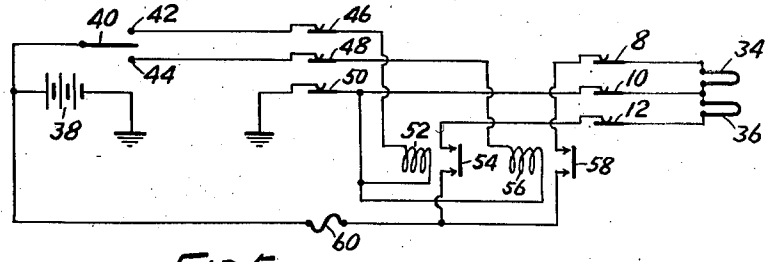


FIG. 5.

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UNITED STATES PATENT OFFICE

2,352,679

ILLUMINATION CONTROL MEANS

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Application July 7, 1942, Serial No. 450,040

7 Claims. (Cl. 315—322)

This invention relates to illumination control means and has particular reference to lamp relays adapted to be associated with such lamps as the headlamps of motor vehicles.

Present day headlamp filaments draw very heavy currents for their rated operation from a source of relatively low voltage comprising, for example, the usual combination of a storage battery and charging generator. Since these headlamps are located in the front of the vehicle, the battery, in some location such as under the rear of the hood or under a seat or floor boards, and the control switch on the instrument panel or elsewhere accessible to the operator, the total length of electrical wiring involved provides in the filament circuit a resistance which, though small in value, provides an RI drop which reduces the voltage at the filament to an amount quite appreciably less than the voltage of the supply. The candle power of a lamp falls off very rapidly with decrease of the filament voltage, and as a consequence, the ordinary connections, even disregarding resistance at the switch contacts, result in an appreciable dimming of the filaments below their normal intensity, with a waste of electrical energy in the incidental resistances in the way of dissipated heat. Additionally, the resistance at the switch provides an RI drop still further reducing the voltage. Generally speaking, it is not feasible to correct this condition by providing sufficiently massive contact elements at the switch and by providing connecting cable of sufficiently large gage.

As a consequence of this condition, it is common to provide lamp relays at positions closely adjacent the lamps, which relays are of such type that they may be energized with relatively low currents, while their armatures close massive contacts directly between heavy connections to the battery and to the lamp filament. Generally speaking, the connection from the battery to the relay is the longest one, but if a suitable relay is provided, only a single connecting cable is necessitated through the major or the entire distance involved to provide current to all four of the usual headlamp filaments. This cable may be very heavy, since there is not involved any question of threading a plurality of cables to a suitable switching means in the vicinity of the driver. The connecting wires for the energization of the relays may be of quite small gage suitable to carry the small currents involved.

The disadvantage of an arrangement of the type just described is that its installation generally involves the mechanical operation of drilling and tapping holes in suitable portions of the vehicle frame to carry the relays, while additionally the original wiring connections must be disturbed and new ones made.

The broad object of the present invention may be stated to be the provision of such a headlamp relay arrangement the installation of which is extremely easy, particularly when the headlamps are of the so-called "sealed beam" type in which the bulb is normally secured in position about its periphery and presents rearwardly extending prongs of quite rigid construction adapted to be engaged by a connector which is normally supported thereby. In accordance with the invention, a relay assembly is provided which may be mounted directly upon the prongs which serve not only for electrical connections, but, through their rigidity, as substantial and adequate supports for the relay assembly. Additionally, the relay assembly carries prongs which may be engaged by the connector theretofore engaging the prongs of the lamp, there being provided in this fashion suitable control connections. For the completion of the installation, the sole additional matter to be provided is a heavy cable to run directly from the battery to each of the relay assemblies.

The general object of the invention, and other objects, particularly relating to details, will become apparent from the following description, read in conjunction with the accompanying drawings, in which:

Figure 1 is a vertical sectional view showing a headlamp and relay assembly in side elevation;

Figure 2 is a rear elevation of the same, partially in section, to show the interior of the relay assembly;

Figure 3 is a wiring diagram of the modification of Figures 1 and 2;

Figure 4 is a rear elevation of a modified form of relay assembly; and

Figure 5 is a wiring diagram showing the connections involved in the assembly of Figure 4.

Referring first to Figures 1 and 2 and the wiring diagram of Figure 3, there is illustrated at 2 one of the fenders of an automobile in which there is mounted a headlamp 4 of the sealed beam variety by the use of an annular ring arrangement indicated at 6. Headlamps of this type are provided with relatively rigid prongs, indicated at 8, 10 and 12. Headlamps of this type are generally provided with two filaments commonly designated as producing bright and dim beams, though quite generally these two filaments are identical and the dimness or bright-

ness involved is merely that apparent to someone approached by the vehicle depending upon which of the beams is directed upwardly and which is directed downwardly, the downwardly directed beam being designated the dim one. For the purpose of the present matter, however, it may be considered that the terms "dim" and "bright" may apply either to the apparent effects or to the relative candle powers involved. In the case of the dim beam, generally used for city driving, the intensity is not particularly important, and a reduction of its candle power due to resistance of connections is not serious, so that in the case of the dim beam, the association therewith of a relay may be dispensed with. In the case of the bright beam, however, a relay is desirable, and in the modification of Figures 1, 2 and 3, the relay is arranged for the control of the bright beam only. It will be understood, of course, that each of the headlamps has its individual relay.

The relay assembly for each lamp comprises a base which may be molded as a unit or built up of various sections of a plastic insulating material, which may be opaque or transparent, depending upon whether it is desirable to see the action of the relay during testing without dismantling. The specific way in which this base is built up is immaterial and subject to large variation, and consequently, it need not be described in any detail. It may be stated, however, that it comprises a central portion 14, and, desirably, two portions 16 and 18 extending adjacent the reflector portion of the lamp to conserve space. The central portion 14 is provided with a plurality of spring contacts designed to fit upon and engage the prongs 8, 10 and 12. These are of conventional connector type and are indicated as spring contacts in the wiring diagram of Figure 3. A relay is carried by the extension 16 of the base, and is indicated at 20, being provided with an armature 25 adapted to be attracted upon energization of the relay to close contacts at 21 and 23, respectively. The portion 18 of the base is provided with a set of prongs, indicated at 22, 24 and 26, and having the same geometrical form as the assembly of prongs 8, 10 and 12. These last named prongs are adapted to be engaged by the conventional connector 28, which, if the relay was not used, would engage the prongs 8, 10 and 12 to effect the proper connections to the switching means. One of the spring contacts within the connector 28 is grounded in conventional fashion by a wire 30, which may be electrically connected to the mounting of the lamp.

As will be seen from Figure 2, the base of the assembly carries various permanent wire connections between the prongs, relay armature, contact points and sockets. The physical arrangement of these is, of course, subject to wide variation, but the electrical configuration may be best made clear by reference to Figure 3.

A source of current is conventionalized in Figure 3 as a battery 38, though it will be understood that this consists in the usual fashion of a combination of battery and charging generator. One pole of this battery is grounded. The other pole is connected to the switch 40, manually operable by a driver, between two contact points 42 and 44, the former representing control of the bright filaments and the latter of the dim filaments. As indicated above, this assembly need not be disturbed if the change is made from a conventional arrangement to one involving the relay. The spring contact sockets in the connector 28 are joined, respectively, to the points 42, 44 and ground, as illustrated.

The dim filament is indicated at 34 and the bright filament at 36. Prong 10 is the ground prong of the lamp, while 8 is connected to the dim filament and 12 to the bright one. The spring sockets carried by the base engage these prongs as indicated in the figure, wherein there are also indicated the connections to the relay 20 and the contact points 21 and 23 adapted to be bridged by the armature. The contact point 23 is connected directly to the ungrounded side of the source 38 by a heavy cable with the interposition of a suitable fuse, indicated at 32 and conventionally carried on the relay assembly as indicated in Figure 2.

It will be evident that if the switch 40 makes contact at 42, the relay 20 will be energized and the circuit closed through the bright filament 36, there being in this circuit only the massive relay contacts, the heavy cable from the battery and the fuse 32. If the switch 40 is thrown to the position 44, however, the dim filament is energized, the current flowing in conventional fashion except for its passage between 22 and 8 through a wire carried by the base. The arrangement is essentially duplicated for the other headlamp, there being either independent heavy cables running from the battery or a single cable connected to branches at the front of the vehicle in the vicinity of the headlamps.

The same fundamental matters may be involved in the control of current through both filaments by relays. Figure 4 illustrates a dual relay assembly for this purpose which is wired up as indicated in Figure 5. In the case of Figure 4, the prongs 46, 48 and 50 correspond to the prongs 26, 22 and 24, of Figure 3. Two relays 52 and 56 are provided with respective armatures 54 and 58. These are mounted on a base consisting of a central portion 62, a pair of wings 64 and 66 carrying the relays and an extension 68 carrying the prongs 46, 48 and 50. The central portion 62 is provided with sockets adapted to receive the prongs on the lamp. A fuse 60 may be mounted on the base, being connected between the relay contact points and the cable to the source.

The operation of the modification will be quite evident from Figure 5, in which the assembly of Figure 4 is shown substituted for the assembly of Figures 1 and 2 in the same general circuit as that previously described. It will be evident that in this case the switch energizes the relays selectively.

It will be evident that in accordance with the invention, the specific embodiments thereof may be of various forms. For example, if the headlamps are of a different type, the relay mounting base may be made to correspond, so that if, for example, sockets are provided on the headlamps to receive prongs extending from a connector normally used, the relay bases would be provided with prongs to complete the electrical circuits and to serve for mechanical support. It will be evident, furthermore, that the wiring arrangements may be substantially changed without departing from the scope of the invention.

What I claim and desire to protect by Letters Patent is:

1. In combination, a lamp of the type arranged to be supported by means engaging its circumference and provided with substantially rigid prongs electrically connected to at least

one filament thereof, a connector of a type adapted to engage said prongs to provide an electrical connection therewith, and a relay assembly, said relay assembly comprising a base, a relay having an electromagnet and circuit closing means engageable upon energization of the electromagnet, contact elements carried by the base and engageable with said prongs to support said assembly thereon, and prongs carried by said base and engageable by said connector, and electrical connections between the aforesaid parts of the assembly so that the relay may be energized by current flowing between said connector and at least one of said prongs carried by the base, and the lamp filament may be energized upon operation of the relay through current flowing between at least one of the contact elements carried by the base and the corresponding prong of the lamp.

2. In combination, a lamp of the type arranged to be supported by means engaging its circumference and provided with at least one substantially rigid prong electrically connected to at least one filament thereof, a connector of a type adapted to engage said prong to provide an electrical connection therewith, and a relay assembly, said relay assembly comprising a base, a relay having an electromagnet and circuit closing means engageable upon energization of the electromagnet, at least one contact element carried by the base and engageable with said prong to support said assembly thereon, and at least one prong carried by said base and engageable by said connector, and electrical connections between the aforesaid parts of the assembly so that the relay may be energized by current flowing between said connector and said prong carried by the base, and the lamp filament may be energized upon operation of the relay through current flowing between at least one of the contact elements carried by the base and said prong of the lamp.

3. In combination, a lamp of the type arranged to be supported by means engaging its circumference and provided with at least one connector element electrically connected to a filament thereof, a connector of a type adapted to engage said connector element to provide an electrical connection therewith, and a relay assembly, said relay assembly comprising a base, a relay having an electromagnet and circuit closing means engageable upon energization of the electromagnet, at least one connector element carried by the base and engageable with the connector element of the lamp to support said assembly thereon, at least one connector member carried by said base and engageable by said connector, and electrical connections between the aforesaid parts of the assembly so that the relay may be energized by current flowing between said connector and said connector member carried by the base, and the lamp filament may be energized upon operation of the relay through current flowing between said connector elements.

4. A relay assembly designed for association with a lamp of the type provided with at least one connector element electrically connected to a filament thereof and arranged to be supported by means engaging its circumference, comprising a base, a relay carried by said base and comprising an electromagnet and circuit closing means engageable upon energization of the electromagnet, and at least one connector element carried by the base, connected to said circuit closing means, and engageable with the connector element of the lamp to support said assembly thereon.

5. A relay assembly designed for association with a lamp of the type provided with at least one prong electrically connected to a filament thereof and arranged to be supported by means engaging its circumference, comprising a base, a relay carried by said base and comprising an electromagnet and circuit closing means engageable upon energization of the electromagnet, and at least one connector element carried by the base, connected to said circuit closing means, and engageable with the prong of the lamp to support said assembly thereon.

6. A relay assembly designed for association with a lamp of the type provided with at least one connector element electrically connected to a filament thereof and arranged to be supported by means engaging its circumference, comprising a base, a relay carried by said base and comprising an electromagnet and circuit closing means engageable upon energization of the electromagnet, at least one connector element carried by the base, connected to said circuit closing means, and engageable with the connector element of the lamp to support said assembly thereon, and a connector member on the base electrically joined to the electromagnet and through which said electromagnet may be energized.

7. A relay assembly designed for association with a lamp of the type provided with at least one prong electrically connected to a filament thereof and arranged to be supported by means engaging its circumference, comprising a base, a relay carried by said base and comprising an electromagnet and circuit closing means engageable upon energization of the electromagnet, at least one connector element carried by the base, connected to said circuit closing means, and engageable with the prong of the lamp to support said assembly thereon, and a prong on the base electrically joined to the electromagnet and through which said electromagnet may be energized.

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