

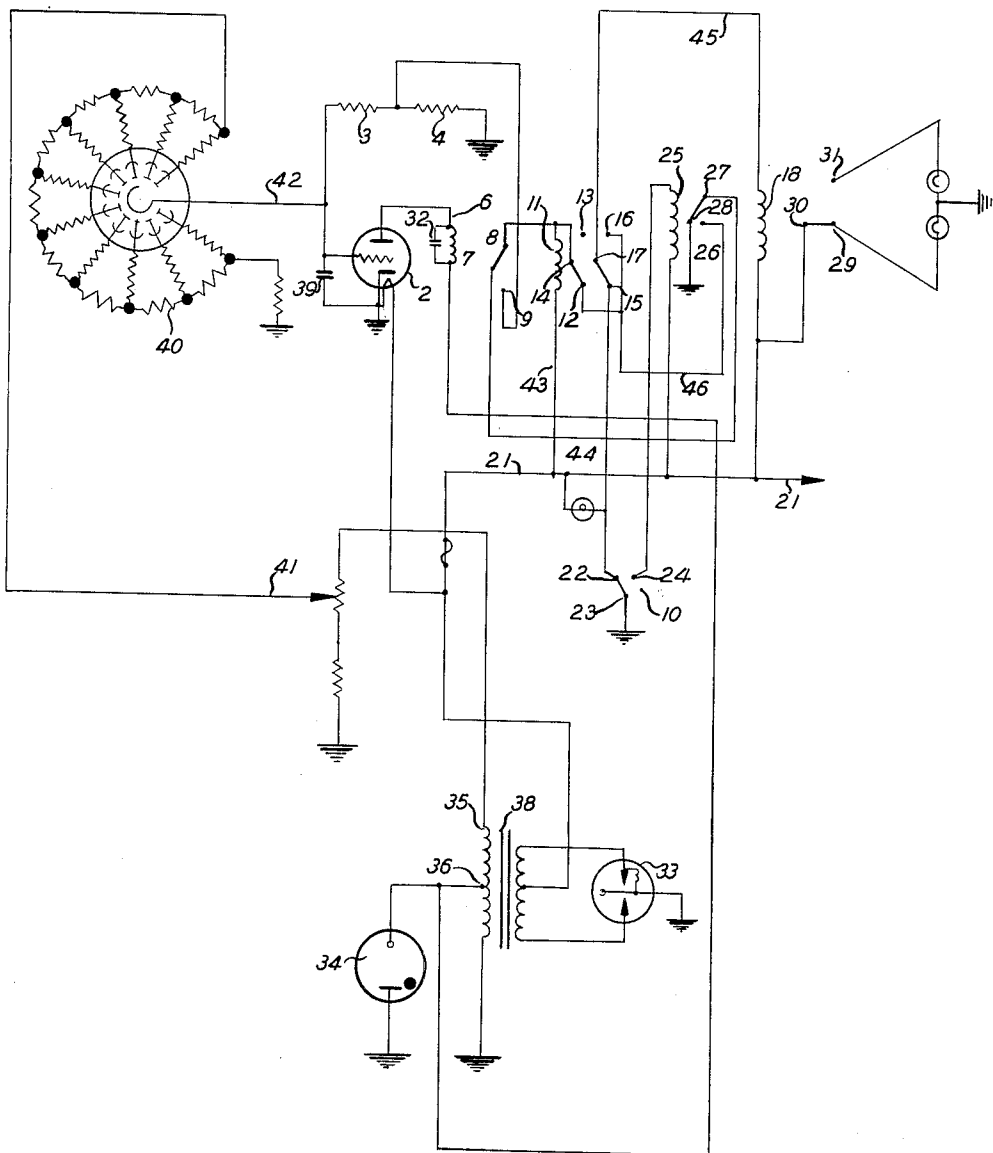
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HEADLIGHT DIMMER

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HEADLIGHT DIMMER

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1 Claim. (Cl. 315—83)

This invention is concerned with the automotive illumination field and more specifically with an apparatus for automatically dimming automotive headlights upon the approach of a vehicle from the opposite direction and the automatic restoration of the bright or upper beam when such approaching vehicle has passed. This invention is also designed to provide a system whereby the operator may at any time override or reverse the action of the automatic system and when desired return control to the automatic system by means of only one switch which may conveniently be the same foot switch with which the public has become familiar for the control of headlights. This system is also designed to incorporate a time delay to prevent the actuation of the dimming device by such stray light as strokes of lightning or miscellaneous highway lighting.

The gist of the invention is readily understood by reference to the figure of drawing which is an electrical diagram of the divers circuits involved. In the drawing the electrical energy to actuate the entire system is derived from conductor 21 which is connected to the battery through and controlled by the headlight switch. Conductor 21 in turn energizes conventional vibrator 33 which supplies the primary of transformer 38. The secondary of transformer 38 is tapped at 36 to give an alternating potential of about 160 volts. This potential is limited by voltage regulator 34. An OA2 tube would be suitable for this purpose. The secondary of transformer 38 is also tapped at 35 to give an alternating potential of about 750 volts.

This 750 volt potential from tap 35 of transformer 38 is led through a sensitivity control 41 which may be an ordinary potentiometer and hence to photomultiplier tube 40. Similarly, the 160 volt alternating current potential from tap 36 of transformer 38 is led to the plate of control tube 2 (a 6C4 for example) through the armature circuit of pilot relay 6 which armature circuit is shunted by condenser 32 having a capacity of about 10 microfarads. The output of photomultiplier 40 is led to ground through resistors 3 and 4 and is also fed to the grid of control tube 2 which is shunted to ground by condenser 39 which has a capacity of 20 thousandths of a microfarad. Resistor 3 has a value of 6 megohms and resistor 4 a value of 4 megohms.

Photomultiplier tube 40 is physically arranged so that it receives the light from the headlight beam of an on-coming vehicle. It is characteristic of this type of photomultiplier cell arranged in this circuit that the output signal received on conductor 42 will become more negative when the photomultiplier tube is excited by incident light. As the negative signal is received on conductor 42 and impressed upon the grid of control tube 2 this control tube becomes less conducting and permits pilot relay 6 to assume the deenergized position. In the deenergized position there is no connection between contact points 7 and 9 and connection is established between contact points 7 and 8. Conductor 43 is connected to conductor 21 and energizes the coil of memory relay 11

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through contact points 7 and 8 of pilot relay 6. Contact point 7 of pilot relay 6 is connected to contact point 27 on lock relay 25 for a purpose which will become apparent as the description proceeds. When memory relay 11 is energized through contact points 7 and 8 when pilot relay 6 is de-energized, connection is made between contact points 14 and 12 and 17 and 15 and broken between contact point 14 and 13 and between contact point 17 and 16.

The operator is given control of the system through foot dimmer switch 10 by means of which the operator is able to connect contact point 23 to contact point 22 to provide automatic operation or to contact point 24 to override the automatic operation. It will be observed that contact point 23 is at all times solidly grounded.

The actual control of the headlight beam is through slave relay 18 which is provided with contact points 29, 30 and 31. When contact point 30 is connected to contact point 29 the low beam is energized. Similarly, connection between contact point 30 and contact point 31 energizes the high or bright beam. Lock relay 25 which is energized from conductor 21 through contact point 24 of foot dimmer switch 10 is shown in the de-energized position in which position contact point 28 is connected to contact point 27 and contact point 28 is disconnected from contact point 26. Contact point 28 is at all times solidly grounded.

Assuming light falling upon photomultiplier 40, a strong negative bias will be placed upon control tube 2 which will deenergize the armature of pilot relay 6 which will in turn connect contact points 7 to 8 as shown in the drawing. This will permit the energization of memory relay 11 through conductor 43 and conductor 44 to contact point 27, contact point 28, and hence to ground. This assumes, of course, that foot dimmer switch 10 is in the automatic position as shown and hence lock relay 25 is in the de-energized position as shown because of the interruption to the armature circuit at contact point 24. In this state of affairs the armature of slave relay 18 is energized through conductor 45 terminating in contact point 17 of memory relay 11 from which the circuit is grounded through contact point 15 of memory relay 11 and contact points 22 and 23 of foot dimmer switch 10. Under these circumstances if the operator desires to energize the high beam rather than the low beam pressure upon foot dimmer switch 10 will disconnect contact point 23 from point 22 and connect it to contact point 24. This will energize the armature of lock relay 25 and connect contact point 28 to contact point 26 and disconnect contact point 28 from contact point 27. This will interrupt the armature circuit of slave relay 18 at contact 22 for lack of a ground. At the same time memory relay 11 will be held in the energized position through contact points 12 and 14 and conductor 46 which will permit the grounding of this memory relay 11 armature circuit at contact point 26 instead of at 27.

A study of this circuit will indicate to one skilled in the art the action of this circuit under the circumstances when no incident light is exciting photomultiplier tube 40 and the action when the operator overrides the automatic circuit under these circumstances.

The action of the circuit established by the energizing of pilot relay 6, that is the grounding of the conductor 42 through conductor 44 and contact point 28, serves to shunt out resistor 4 and to alter the sensitivity of the photomultiplier circuit to render it less sensitive.

I claim as my invention:

A headlight control device comprising a photo electric device, a control tube, a double throw, single pole pilot relay, a memory relay comprising a double-throw single-pole section and a further single-pole section which is connected to the armature when the relay coil is en-

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energized, a double throw, single pole lock relay, a double-throw single-pole slave relay and a manually controllable double-throw single-pole switch, the output of the photoelectric device being applied to the grid of the control tube to decrease the plate current in the control tube when the photoelectric device is exposed to light, the armature of the pilot relay being operated by the plate current of the control tube, said armature being connected to the pole of the lock relay which is contacted by the lock relay armature when the lock relay coil is deenergized, the pole of the pilot relay contacted by the armature when the pilot relay coil is deenergized being connected to the side of armature of the memory relay which has only one throw, and to a source of energy through the coil of the memory relay, the stationary contact on the single contact side of the memory relay being connected to the contact on the double-throw section of the memory relay which is connected to the armature of the memory relay when the memory relay coil is deenergized and being connected also to the pole of the lock relay which is contacted by the armature of the lock relay when the lock relay coil is energized, the contact on the double-throw side of the memory relay which

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is connected to the armature when the memory relay coil is energized being connected to the pole of the manually operable switch which is grounded when the switch is in the automatic position, the coil of the lock relay being connected to a source of energy and the pole of the manually operable switch which is grounded when the manually operable switch is in the operator controlled position, the coil of the slave relay being connected to a source of energy and the armature of the double-throw side of the memory relay, the armature of the slave relay being connected to a source of energy, the pole of the slave relay in contact with the armature when the slave relay coil is deenergized being connected to the bright portion of the headlights and the other pole of the slave relay being connected with the dim portion of the headlights.

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