

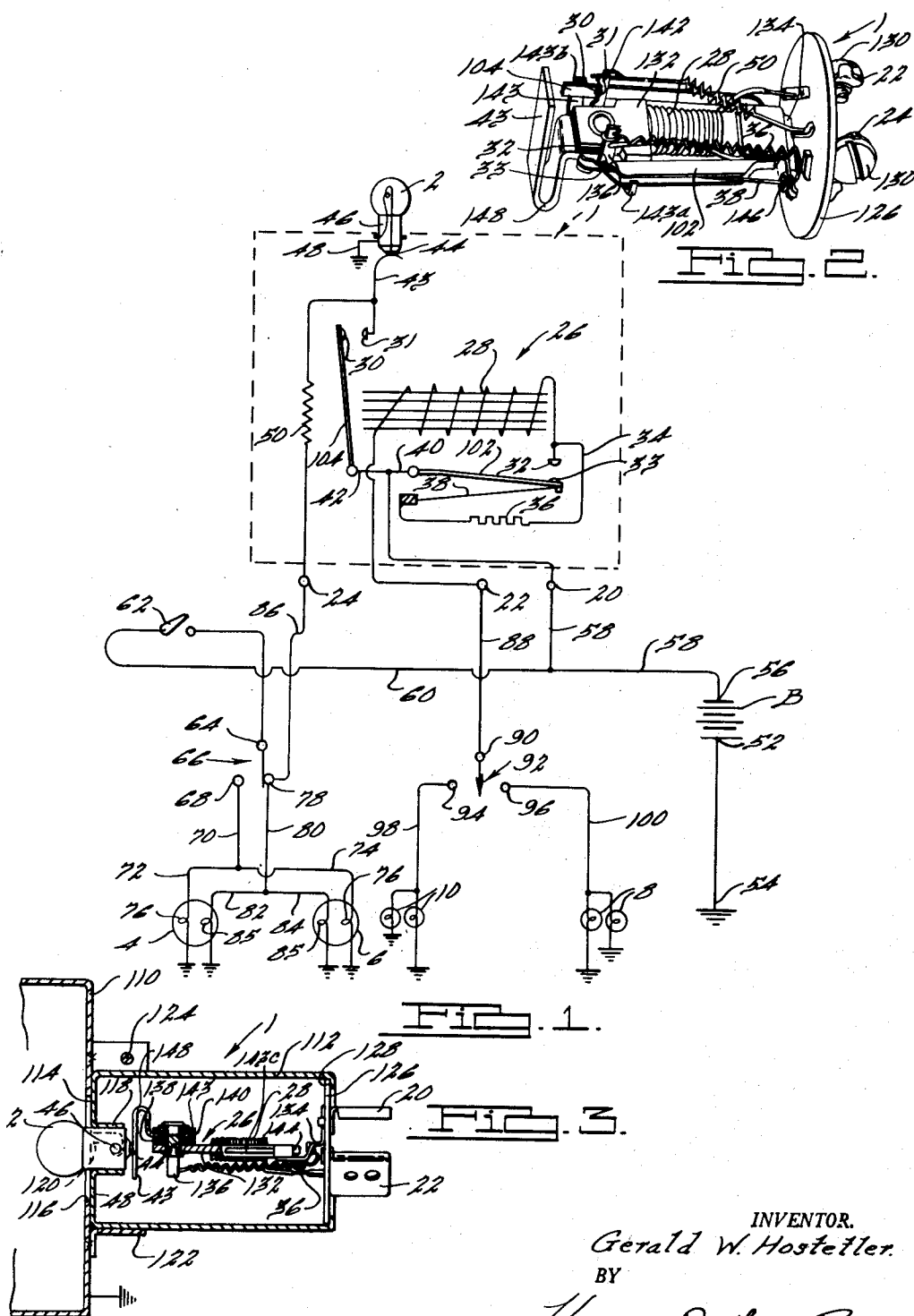
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ELECTRICAL INDICATING MEANS

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## ELECTRICAL INDICATING MEANS

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This invention relates generally to electrical indicating means and is particularly adapted among other uses as a headlight beam and turn indicator for motor vehicles.

An object of this invention is to provide a new and improved mechanism of the character described.

Another object of this invention is to provide a common indicator for indicating both the connection of the headlight filaments and the operation of the turn signals of the motor vehicle.

Another object of this invention is to provide such a device in which the single indicator is an electric bulb.

Another object of the invention is to provide such a device in which the bulb is intermittently flashed at full brilliance for indicating operation of the turn signals and which is continuously illuminated at a lesser brilliance for indicating a high beam condition of the vehicle head lamp.

Other objects will be apparent from the specification, the appended claims and the drawings in which drawings,

Figure 1 is a diagrammatic representation of a unitized beam and turn pilot indicator embodying the invention;

Fig. 2 is a perspective view of the indicating apparatus with certain of the parts removed; and Fig. 3 is a sectional view of the apparatus of Fig. 2 mounted on a panel.

Referring to the drawings by characters of reference, the numeral 1 indicates generally an indicating apparatus having a single indicating lamp 2 for indicating which of the filaments in the headlight lamps 4 and 6 are energized and also for indicating when one of the sets 8 or 10 of the turn signal lamps are illuminated.

In general the apparatus 1 is arranged to illuminate the bulb 2 at reduced brilliance when the headlights are burning on high beam and are flashed from reduced to full brilliance when one of the turn signal sets is energized at the same time as the high beam headlights. If a turn signal set is energized with the headlights off or at low beam the bulb 2 flashes from off to full brilliance. In this manner a lamp or bulb 2 may be utilized which is flashed at sufficient intensity or brilliance during the daylight hours to be easily seen by the motor vehicle operator and which during the hours in which headlights are used at high beam may be continually burned at a reduced intensity such that it will be easily visible to the operator but will not emit sufficient light to interfere with his vision of the road. Furthermore the use of two intensities of illumination will enable the lamp 2 to indicate that the

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turn signals are energized even with the head lamp energized for high beam operation.

The apparatus 1 is provided with three terminals 20, 22 and 24, and is further provided with a relay 26 having an energizing winding 28 and normally open sets of contacts 30—31 and 32—33. The contact 32 is directly connected to one end of the winding 28, the other end of which winding is connected to the terminal 22. A conductor 34 is connected between the contact 32 and a current limiting resistor 36. The other end of the resistor 36 is connected through a hot wire resistor 38 to the contact 33. This last mentioned contact 33 is connected by means of conductor 40 to the terminal 20. A conductor 42 connects the terminal 20 with the contact 30. The contact 31 is connected to conductor 43 which is in electrical contact with one of the terminals 44 of the pilot light bulb 2. The other terminal 46 of the bulb 2 is connected to ground as at 48. The contact 31 is also connected to one terminal of a voltage reducing resistor 50, the other terminal of which is connected to the terminal 24. A suitable source of electrical energy such as storage battery B is provided and as is usual in automotive practice, one terminal 52 thereof is grounded as at 54. It will be apparent that as far as this invention is concerned it is immaterial whether it is the positive or negative terminal of the battery B which is grounded. As shown the positive terminal is grounded. The other terminal 56 of the battery B is connected by means of conductor 58 to the terminal 20 and by means of branch conductor 60 through the usual on-off head lamp switch 62 to common terminal 64 of a usual high beam-low beam headlight switch 66 common to modern motor cars. The low beam terminal 68 of the switch 66 is connected by means of conductor 70 and branch conductors 72 and 74 to the low beam filament 76 of each of the headlights 4 and 6 and therethrough to ground. The high beam contact 78 of the switch 66 is connected through conductor 80 and branch conductors 82 and 84 to the high beam filament 85 of the headlights 4 and 6 and therethrough to ground. The high beam contact 78 is also connected by means of conductor 86 to the terminal 24.

The terminal 22 is connected by means of conductor 88 to the common terminal 90 of the usual turn signal switch 92 having a right-hand turn contact 94 and a left-hand turn contact 96. The right-hand contact 94 is connected by means of conductor 98 through one terminal of each of the two right-hand turn signal bulbs 10, the other terminals of which are connected to ground,

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The left-hand contact 96 of the switch 92 is connected by means of conductor 100 to one side of each of the filaments of the left-hand turned signal lights 8 and therethrough to ground. It is believed that the remainder of description of parts may best be understood by a reference to the operation thereof which is as follows.

During normal operation of the motor vehicle, the light 2 is de-energized but is energized at a low intensity illumination upon closure of the head lamp switch 62 assuming that the high-beam low-beam switch 66 is set for high-beam energization of the headlights 4 and 6, as shown. Under such condition, a circuit will be completed between the terminals 52 and 56 as follows: From the terminal 56, through the conductors 58 and 60, the switch 62, the switch 66, conductors 80, 82 and 84, lamps 4 and 6 to ground, back through ground to the terminal 52. At the same time a circuit will be completed including the above traced circuit to the high-beam terminal 78 of the switch 66 and then through the conductor 86, past terminal 24, through the resistance 50, conductor 43, terminal 44, the filament of lamp 2, terminal 46 to ground 48 and back to the grounded terminal 52 thereby energizing the indicator 2. Due to the presence of the resistor 50, a portion of the voltage of the battery B is absorbed whereby that available for illumination of the indicator 2 is less than that supplied by the battery B. This reduction in voltage reduces the intensity of illumination of the bulb 2 to something less than the full intensity when the full voltage of the battery B is applied thereto. It will be noted that under high-beam operation of the headlights, the bulb 2 will be illuminated at low intensity, the intensity being just sufficient so that during conditions requiring illumination of the headlights 4 and 6, sufficient light will be given off by the indicator bulb 2 to indicate to the operator of the motor vehicle that the headlights 4 and 6 are operating on the high-beam filament without being brilliant enough to bother in driving. Actuation of the switch 66 to place the head lamps in low-beam operation will de-energize the bulb 2.

The operation of the apparatus 1, with the headlight switch 62 open, for turn signal indicating, is as follows:

Upon closure of the switch 92 for signaling a turn, a circuit will be completed between the terminals 52 and 56 of the battery B as follows: From the terminal 56, through the conductor 58, the terminal 20, the conductor 40, the contact 33, the hot resistor 38, the resistor 36, the conductor 34, the winding 28, the terminal 22, the conductor 88, the switch 92 and one of the conductors and sets of light 98—10 or 100—8 to ground and to the grounded terminal 52. Normally, the length of the hot wire 38 is such that the contacts 32 and 33 are maintained separated. As the current flows through the resistor 38 its temperature increases and it lengthens permitting the arm 102 to bring the contacts 32 and 33 into engagement whereby the resistors 36 and 38 are short-circuited. This short-circuiting permits an increased current flow through the winding 28 causing the armature 104 to move in a position to close the contacts 30 and 31 whereby a circuit will be completed from the terminal 20, the conductor 42, the now closed contacts 30 and 31, conductor 43, the terminal 44, the filament of the bulb 2, the terminal 46, ground 48, and the grounded terminal 52. Upon closure of the contacts 30 and 31, it will therefore be appreciated

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that the full voltage of the battery B is applied to the filament of the bulb 2 whereby it is illuminated brilliantly for the period of time that the contacts 30 and 31 are closed.

As soon as the contacts 32 and 33 close, the short circuit around the resistors 36 and 38 permits the hot wire resistor 38 to again cool, shortening its length and thereby pulling open the contacts 32 and 33. Opening of the contacts 32 and 33 will, of course, again energize the resistors 36 and 38 and reduce the current flow through the winding 28, permitting the contacts 30 and 31 to open and de-energizing the bulb 2. As soon as the wire has again become heated, the contacts 32 and 33 will close and thereby short circuit the resistors and increase current flow through the winding 28 for closing the contacts 30 and 31 to again give a brilliant illumination of the bulb 2. In order to prevent illumination of the bulb 2 in the event of failure of one of either of the turn signal lamps 8 or 10, the winding 28 is so proportioned relative to the current required by the sets of lights 8 or 10 that insufficient current is passed through the winding 28 unless both of the bulbs of one of the sets 8 or 10 is drawing current. Therefore the bulb 2 will not be flashed even though the switch 92 be closed unless both of the bulbs of one of the sets 8 and 10 which is energized are illuminated. It will therefore be apparent that upon operation of the switch 92, the bulb 2 will be given a pulsating energization between off and illumination at high brilliance which will indicate that one of the sets of signal lights 8 and 10 has been energized and both of them are burning.

Now consider the operation of the system when the headlights are illuminated and the switch 66 is set for high beam, and at the same time the turn signal switch 92 is positioned for energizing one of the sets of bulbs 8 or 10. In this case, assume that it is the indication for a left turn and the switch 92 is positioned to contact the terminal 96. As indicated above, closure of the switch 62 and the position of switch 66 into high-beam position for illuminating the high-beam filament of the lamps 4 and 6 will provide a low intensity illumination of the bulb 2. Upon movement of the switch 92 to contact 96 for a left-hand signal, the contacts 30, 31, 32 and 33 will function as set forth above. In this case, however, opening of the contacts 30 and 31 will not cause the bulb 2 to go out but merely to reduce the energization to that which is applied through the resistor 50. Upon closure of the contacts 30 and 31, however, the full voltage of the battery B will be applied across the filament of the bulb 2 and the bulb 2 will be at full brilliance.

It may, therefore, be seen that with the use of a turn signal at the same time that the high-beam head lamps are illuminated will cause the bulb 2 to flash intermittently from high brilliancy to low brilliancy, that with the head lamps on either low beam or completely de-energized, energization of the turn bulbs 8 or 10 will cause the bulb 2 to flash from high brilliancy to out condition, and with the high-beam filament of the bulbs 4 and 6 energized and with the turn bulbs de-energized, the bulb 2 will burn at continual low brilliancy. This arrangement provides an indication which is brilliant enough for the operator to observe the operation of his turn signal lamps in the daytime and at the same time provides night indication for both the turn signal and high headlight beam which does not inter-

fere with the night operation of the motor vehicle.

Generically, the invention contemplates the use of the described elements in any relative physical location. More specifically as is shown in Figs. 2 and 3 the invention contemplates a unitary structure for the apparatus 1 which may be easily mounted on the instrument panel of a motor vehicle as, for example, on the speedometer casing 110. The structure comprises a cup-shaped metallic shell 112 having an end wall 114 adapted to seat against the rear wall of the casing 110 and substantially concentric with an aperture 116 therein. The wall 114 is provided with a central aperture having a drawn peripheral inwardly extending wall 118 forming a bulb retainer for supporting the bulb 2. The wall 118 is provided with diametrically opposite J-shaped slots 120 for retaining the bulb 2. If desired, these slots 120 may be cut out of the wall 118 or may be formed by embossing. Suitable means such as screws extending through tabs on the shell 112 may be used to secure the shell 112 to the casing 110.

In the form shown the casing 110 is provided with a clamping ring 122 suitably secured to the casing 110 as by welding and drawn together by a screw 124 to clamp the shell 112.

The open end of the shell 112 is closed by a disk 126 of insulating material and held in place as by spinning the peripheral edge of the shell 112 to form a shoulder 128. The terminals 20, 22 and 24 are carried by the disk 126 and extend outwardly. These terminals may be provided with screws 130 for connecting the wires 58, 88 and 86 thereto. Or the screws may be omitted as shown in Fig. 3 and the terminals 20, 22 and 24 may be used to project into a female receptacle for connecting the aforesaid wires thereto.

The relay 26 comprises an I-shaped ferrous member 132 secured at one end to one arm of an angle member 134. The other arm of the member 134 is secured to the disk 126 and in electrical connection with the terminal 20. The winding 28 is wound about the narrow section of the member 134 and has one end portion connected to the terminal 22. The other end of the winding 28 is connected to arm 136 and an L-shaped member having its other arm 138 in juxtaposition with but electrically insulated from the free end portion of the member 132 as by a sheet of insulating material. A member 140 is in juxtaposition with the arm 138 but electrically insulated therefrom as by a sheet of insulating material. A first arm 142 of the member 140 extends at an angle thereto and carries the contact 31. This arm 142 is electrically connected to the terminal 24 through the resistor 50.

The armature 104 carries the contact 30 adjacent its free end and the hinged end is hingedly secured to the inner end of the member 132 as by a flexible piece 144. The armature 104 is in bridging arrangement with the wide portions of the I-shaped member 132. The arm 102 is also flexibly secured at one end to the inner end of the member 130 diametrically opposite to the armature 104. The free end of the arm 102 carries the contact 33. Normally the arm 102 is urged by its flexible securement into a position to engage the contacts 32 and 33 but is held in a position to hold contact 33 away from contact 32 by the hot wire resistor 38 connected between the free end of the arm 102 and an insulating support 146 on the angle member 134.

A stop member 143 is arranged in juxtaposition

with the member 140 but is electrically insulated therefrom by a piece of sheet insulating material. The stop member 143 has arms 143a and 143b which limit contact opening movement of the arm 102 and armature 104 respectively. A leaf spring 143c having one end portion secured to the armature 104 and having its other end portion lying against the arm 143b normally maintains the armature against the arm 143b. The juxtaposed elements have aligned apertures and are secured together by a rivet which extends therethrough but is smaller than the diameter of the aligned apertures and may be provided with an insulating sleeve if desired.

The member 140 also has an arm 148 which forms the conductor 43 and which is bent into J formation to provide for resilient engagement with terminal 44 of bulb 2. The resistance 36 is connected between the end of resistance 38 secured to support 146 and the arm 136.

This construction of apparatus 1 is simple and economical of manufacture and provides a compact unit for use either as original or accessory equipment for a vehicle.

What is claimed and is desired to be secured by United States Letters Patent is as follows:

1. In a unitized beam and turn signal indicator for motor vehicles having turn signals and high-beam headlights, a single indicating lamp, a first circuit for energizing said lamp and energizable as a consequence of the energization of said turn signals, said circuit including means rendered operable as a consequence of said first circuit becoming energized to flash said lamp between a highly brilliant condition and a less brilliant condition, a second circuit for said lamp energizable as a consequence of the energization of said high-beam lights, said second circuit upon energization being operable to burn said lamp at an intermediate brilliance.

2. In a unitized beam and turn signal indicator for motor vehicles having turn signals and high-beam headlights, a housing, a bulb retainer carried by said housing and adapted to receive an indicating lamp, a first circuit for energizing said lamp and including said housing, said first circuit being energizable as a consequence of the energization of said turn signals, said circuit further including means rendered operable as a consequence of said first circuit becoming energized to flash said lamp between a highly brilliant condition and a less brilliant condition, a second circuit for said lamp and including said housing, said second circuit being energizable as a consequence of the energization of said high beam lights, and operable to burn said lamp at an intermediate brilliance.

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